

R1004 Rev 2

August 2018

Department of Transport

**Design Event Selection for Erosion Hazard
Assessments**

West & South Coasts of WA

marinas

boat harbours

canals

breakwaters

jetties

seawalls

dredging

reclamation

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Executive Summary

The Western Australian State Coastal Planning Policy (SPP 2.6, WAPC 2013) requires consideration of coastal erosion hazards, including coastal erosion. The policy requires determination of areas susceptible to coastal hazards, using allowances defined by SPP 2.6 Schedule One. Facilities within the coastal hazard area shall be managed using a Coastal Hazard Risk Management and Adaptation Plan (WAPC 2014). Determination of storm erosion allowances is common to both Schedule One and CHRMAP, based on calculation of the maximum cross-shore storm erosion with consideration of the maximum longshore storm erosion. The maximum cross-shore storm erosion response is typically evaluated using a beach profile model, simulating the impact of severe storm events.

SPP2.6 Schedule One identifies that the storm event for erosion should be based on ocean forces and coastal processes, which have a one percent or one-in-one hundred probability of being equalled or exceeded in any given year over the planning timeframe. This is equivalent to a 100 year Average Recurrence Interval (ARI) event. The type of storm to be considered varies according to region, with mid-latitude storms applicable to the southwest and south coasts of Western Australia. Assessments are presently undertaken using a storm sequence comprised of three consecutive simulations of a severe storm based on measurements from July 1996. The suitability of this storm sequence has not been validated across the southwest and south regions, except a preliminary evaluation on part of the Perth metropolitan coast.

The purpose of this study is to provide regionally appropriate recommendations to aid in the assessment of coastal erosion risk for South West WA. This includes recommendations of plausible regional events to be used to calculate erosion with various likelihoods for several different timeframes. Additionally, this includes a recommendation of the regionally appropriate representative mild, stormy and average years for medium term coastal evolution or coastal management structure impact assessment

Given the vast lengths of coastlines contained within South West WA, the assessment has been subdivided into 7 key coastal regions. The regions are as follows.

- Mid-west (Geraldton)
- Wheatbelt (Jurien Bay)
- Metropolitan/Peel
- South West (Cape Naturaliste)
- South Coast (Albany)
- Hopetoun and Bremer Bay
- Great Southern (Esperance)

Regionally-relevant storm events suitable for evaluation of erosion allowances with different likelihoods have been determined using the following steps:

1. Existing wave, water level and wind data was compiled from Wave Buoys, Tide Gauges and Wind Stations throughout the assessment site extent. The wave data record was extended using WAVEWATCH III (WWIII) hindcast for locations and dates when wave data was not

available. The WWIII hindcast output was calibrated through factoring of wave height, following comparison with measured data; however, hindcast estimates of wave period and direction were not calibrated.

2. Severe storms within the oceanographic and meteorological record were identified based on extreme wave height, storm power or water level. The cross-shore profile model SBEACH was used to simulate identified storms; and indicate potential capacity to cause acute erosion.
3. Using these results, the relationship between extreme wave height, storm power, water level and erosion potential was examined. As expected, the relationship between each of these factors and erosion potential is imperfect, though some relationships exhibited a higher degree of correlation than others.
4. Aerial photographs, vegetation line plots and surveys were examined, to determine if they supported the assessment of historic storm severity. Ultimately, the observations provided a limited and qualitative form of validation, as (1) coastal observations were too infrequent to resolve individual storms; and (2) an apparent mismatch occurs between model results and observed coastal behaviour.
5. Following studies from other parts of Australia, the potential for the cumulative effect of multiple storms was considered a potential cause of the mismatch between observed behaviour and the modelling of single storm events. The impact of closely spaced storms, termed storm clusters, was considered capable of causing greater erosion than a single larger storm. A “Net Cluster Power” method was developed to analyse historic storm clusters of elevated wave or water level conditions.
6. A correlation between Net Cluster Power and erosion potential, as modelled in SBEACH, was established, such that there is confidence that the “average” ARI Net Cluster Power event will have a modelled erosion potential of equivalent recurrence on most profiles within the different regions.
7. The top Storm Clusters ranked by Net Cluster Power were identified and simulated in SBEACH to determine the relative erosion potential. An extreme analysis was completed on both Net Cluster Power and erosion potential results in SBEACH. This allowed the calculation of Net Cluster Power and erosion potential for various recurrence interval events.
8. Design storm sequences were developed using a combination of the individual severe storms identified. For each ARI, the design storm sequences were synthesised to have the corresponding ARI Net Cluster Power and simulated to ensure the corresponding ARI erosion potential was reasonably achieved. For example, the 50 year ARI design event is characterised by a 50 year Net Cluster Power and a 50 year erosion potential confirmed by SBEACH. This involved simulation of multiple storm sequences with the target Net Cluster Power until one was identified that achieved the target erosion potential

This study has utilised a large amount of data to identify a range of events, periods and conditions that are relevant when considering the impact of storm events on the coastline of south Western Australia. Whilst a large amount of data was available for this study there are some “substantial” data gaps that should be filled to improve the validity of future assessments. As outlined above, this data collection should ideally include monitoring of beaches to help characterise shoreline erosion and response processes for the local region, together with the ongoing collection of wave and water level data.

Perhaps one of the more significant outcomes from this study is the fact that the observational data currently available suggests that the scale of cross shore storm erosion widely predicted by beach profile erosion models does not match observations. This is a key consideration, as the design events that have been identified within this study are comprised of actual events, or a combination of actual events, which have been observed within each of the regions. The outcomes of modelling using these events should therefore be reasonably consistent with observed outcomes provided the models are reliable, well set up, calibrated and validated. Review of previous modelling completed within the regions suggests that this may not be the case.

This discrepancy is caused partly by the simplification of wave transformation from offshore to inshore in the simulations of this and other studies. Additionally, the basic/coarse methodology used in SBEACH modelling can limit its accuracy, especially when storm-based historical beach survey data is largely unavailable.

This outcome highlights: (1) the need to undertake beach monitoring to assist calibration of a storm erosion model; and (2) the potential requirement for better simulation and calibration techniques and/or the requirement to investigate a new storm erosion model which provides greater calibration flexibility.

The use of a dual assessment of Net Cluster Power and erosion potential is intended to improve robustness of the recommended storm sequences over future decades. Modelling these events with reliable, well set up, calibrated and validated models should therefore provide outcomes reasonably consistent with observations. Ultimately, the accuracy of results obtained by simulating these storm sequences cannot be verified until the calibration and validation of a storm erosion model using real profile monitoring data has been undertaken.

Results of the study displayed a distinction between the west coast and south coast regions, which is consistent with differences in aspect and exposure to key meteorological events. Within each of the sub-regions, there was a reasonably high degree of similarity between events identified for the different locations.

Identification of the regionally appropriate representative mild, stormy and average years was completed using a comparison of statistical metrics established throughout the assessment. These metrics consider wave height, tidal residual and wave power. Using all available information, representative “average,” “mild” and “stormy” years were selected for each region. The criteria for selection of each year are summarised below.

- Mild year: Characterised by wave metric values that are at least one standard deviation below the mean values and are close to, if not, the lowest in the record. The duration of storm surge exceedance should also be much lower than the mean.
- Average year: Characterised by metric values that are generally very close to the mean value. Where more than one event matches this criteria, stronger weighting was given to those years with storm wave related metrics (duration of threshold exceedance and net power during exceedance) that better approximated the mean.
- Stormy year: Characterised by wave metric values that are at least one standard deviation above the mean values and are close to, if not, the highest in the record. The duration of storm surge exceedance should also be meaningfully above the mean value.

Finally, extreme analysis of the peak instantaneous wave and water level conditions was completed for each region, with results presented within the report.

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Glossary

For the purposes of this assessment, the following terms have been defined.

Wave Threshold

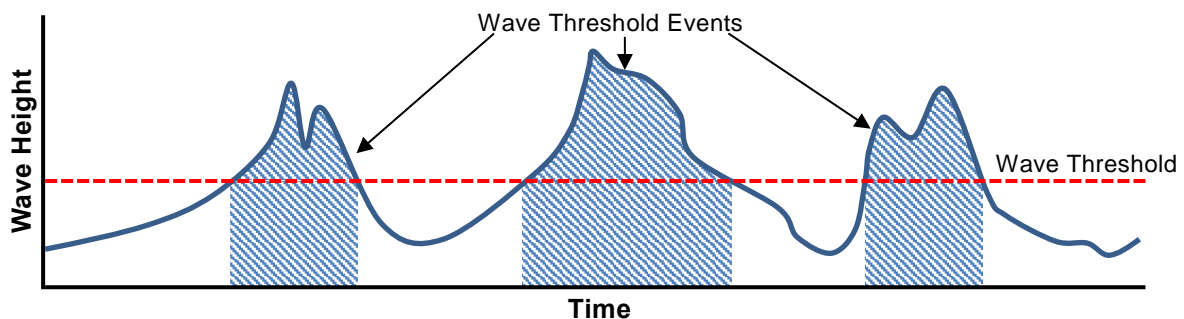
Calculated as the average significant wave height plus two times the standard deviation of the significant wave height over the data record.

Water Level Threshold

Calculated as the average water level plus two times the standard deviation of the water level over the data record.

Wave Threshold Event

An event during which the significant wave height exceeds the wave threshold. A wave threshold event starts when the significant wave height first exceeds the wave threshold and is terminated when it falls back below the wave threshold.

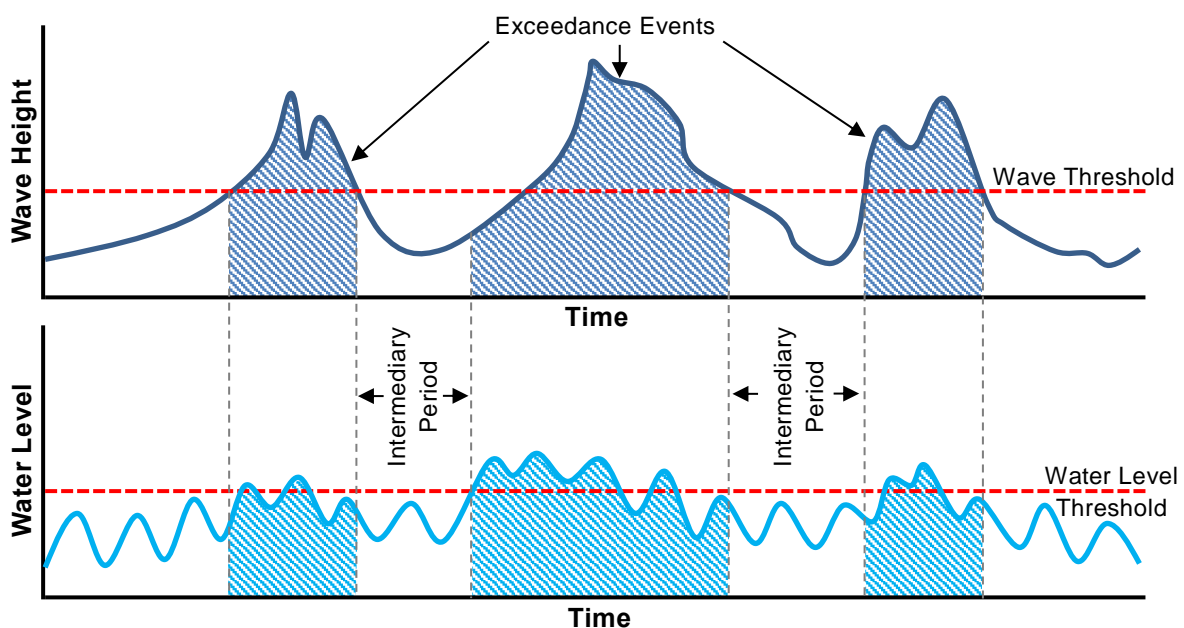


Exceedance Event

An event during which either the wave or the water level thresholds are exceeded. An exceedance event starts when the significant wave height or water level first exceeds the respective threshold and is terminated when both the wave and water level fall back below the respective thresholds.

Intermediary Period

A period in between exceedance events where inherently, the wave and water level are both below the respective thresholds.



Net Wave Power

The integral of instantaneous wave power over a specified period, exceedance event or storm.

Net Exceedance Power

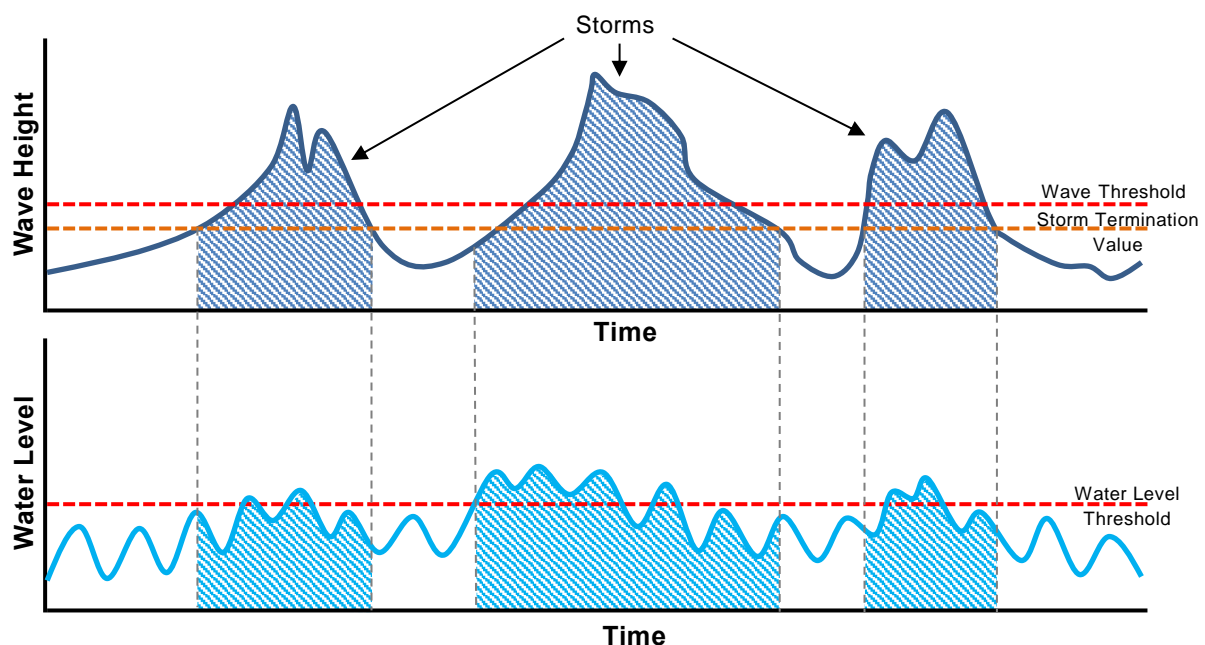
The cumulative sum of net wave power for each exceedance event within a storm.

Storm Termination Value

Calculated as the average significant wave height plus one standard deviation of the significant wave height over the data record.

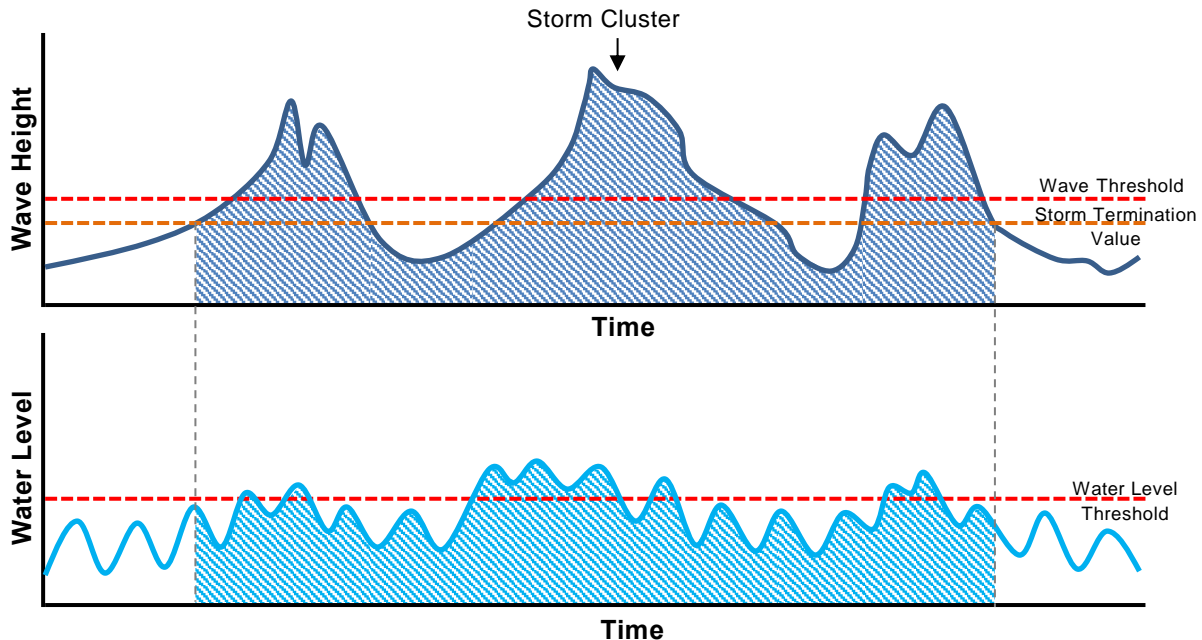
Storm

A storm is a combination of any exceedance events with intermediary periods that (1) are less than 12 hours, and (2) do not include significant wave heights below the storm termination value. A storm also includes a build-up period (preceding) and “tail” after the last exceedance event within a storm. The build-up and tail are terminated at a maximum of 12 hours, or at the first time step that the significant wave height falls below the storm termination value



Storm Cluster

A storm cluster is a combination of successive storms which are grouped by relating the power of the exceedance events with the intermediary period between them. A further description of the clustering process is provided in Section 5.



Net Cluster Power

The cumulative net wave power over all exceedance events within a cluster. *This only includes wave power when either wave or water level exceeds its respective threshold.*

Incident Wave Direction

The direction of incoming waves. The wave direction is specified in degrees and represents the direction that the wave is travelling from, i.e. 270° is a wave travelling from the west.

Sea Direction

The direction of incident waves within the “sea” component of the spectrum. Seas are typically defined within the measurements as have wave periods of less than 8 seconds. The sea direction is specified in degrees and represents the direction that the wave is travelling from, i.e. 270° is a wave travelling from the west.

Wind Direction

The direction of the wind. The wind direction is specified in degrees and represents the direction that the wind is blowing from, i.e. 270° is a wind blowing from the west.

Directional Exceedance Event

An event for which, over its entire duration, either the wave or the water level thresholds are exceeded and the incident wave remains within the specified direction interval. An exceedance event (1) starts when the significant wave height or water level first exceeds the respective threshold and the incident wave direction is within the specified interval, and (2) is terminated when both the wave and water level fall back below the respective thresholds or the incident wave direction moves outside the specified interval.

Storm Sequence

A synthetic sequence of storms used to represent different average recurrence intervals.

Erosion Potential

A metric used to estimate the relative potential of a storm or event to cause erosion of a shoreline profile. Erosion potential is determined by completing simplified modelling of storms or events on a profile using the SBEACH model. An erosion potential value of “1” is assigned to the storm or event with the largest modelled erosion distance, with the erosion potential for other storms or events rescaled to show the potential extent of erosion that could occur for each storm or event as a proportion of the largest erosion distance.

1. Introduction

Within Western Australia coastal development (both new and existing) is guided by State Planning Policy 2.6: State Coastal Planning Policy (SPP2.6; WAPC 2013). This guidance is in the form of coastal hazard risk management and adaptation planning, which can be used to help guide the location of new development on the coastline as well as to assess the risk and develop management strategies for existing development. As part of this process SPP2.6 requires consideration of coastal erosion hazards, in particular acute erosion caused by severe storm events, chronic erosion caused by the ongoing impacts of coastal processes and shoreline recession as a result of sea level rise.

Assessment of the impact of acute storm erosion is typically completed with the aid of a shoreline profile change model, which is used to simulate the impacts of severe storm events on the coastline. Guidance on the appropriate storm is provided within Schedule One of SPP2.6, which relates the type of storm to the region of the assessment (refer Figure 1.1). It is noted that for all regions the risk of erosion should be based on an event with a one-in-one hundred probability of occurrence in any given year. This is equivalent to a 100 year Average Recurrence Interval (ARI) event.

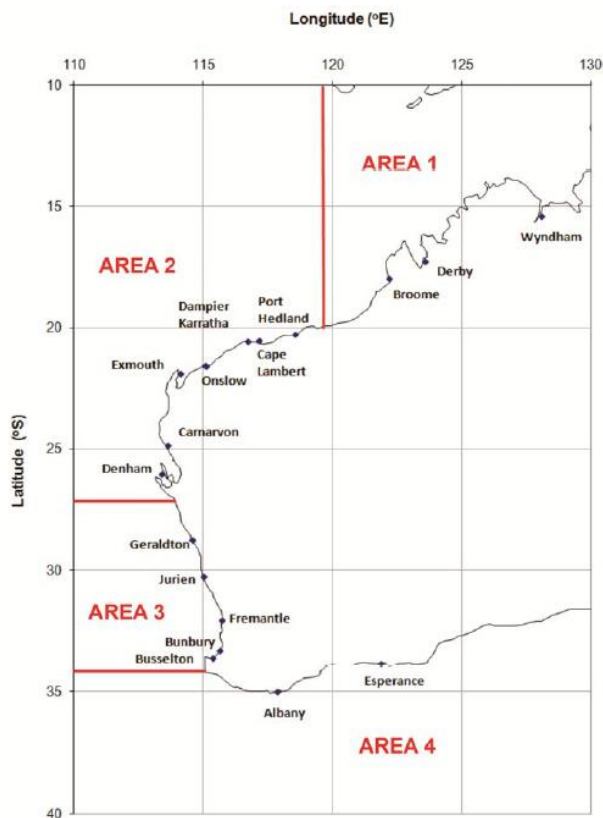


Figure 1.1 Coastal Areas as Defined within SPP2.6

Within SPP2.6 Areas 3 and 4 the risk of erosion should be based on the impacts of a mid-latitude depression or extra-tropical low storm event. Historically, this has been achieved by modelling the impact of a severe storm sequence that affected the south west of Western Australia in July 1996. Three consecutive simulations of this event have been estimated to represent the 100 year ARI event for beach erosion. However, an exact quantification of the severity of this event has not been completed, nor has the suitability of using this event throughout Areas 3 and 4 been validated.

In addition, the requirement to complete Coastal Hazard Risk Management and Adaptation Planning (CHRMAP; WAPC, 2014) also introduces the requirement to better understand the relative likelihood of different events. Understanding of erosion likelihood is part of the risk management framework applicable to CHRMAP decision-making. Furthermore, the relative storminess of different years is one of the factors that may need to be considered when reviewing shoreline response.

To help advance the understanding of storm conditions throughout SPP2.6 Areas 3 and 4 the Department of Transport engaged specialist coastal engineers M P Rogers & Associates (MRA) to complete a design storm event selection study. The key objectives of this study are as follows.

- a) Provide recommendations on regionally appropriate severe events for coastal Areas 3 and 4. This is for consideration when undertaking SPP2.6 Schedule One assessments for a 100 year planning timeframe through the analysis of available metocean data.
- b) Provide a recommendation of plausible regional events for coastal Areas 3 and 4 to be used to calculate erosion with the likelihood of Rare, Unlikely, Possible, Likely, and Almost Certain for a number of different timeframes. Those events are required for developing and selecting management options in a set of variable timeframes where built assets are within the hazard risk zone defined by Schedule One.
- c) Provide a recommendation of the regionally appropriate representative mild, stormy and average years for coastal Areas 3 and 4. An understanding of the variability of prevailing conditions may support investigations of sediment transport and coastal evolution as part of CHRMAP determination. This can include avoiding anomalistic years when choosing a representative year for preliminary analysis, or modelling anomalistic years as a technique to identify upper or lower bounds of behaviour.

Given the vast lengths of coastlines contained within coastal Areas 3 and 4, the assessment has been subdivided into 7 key coastal regions. These regions are as follows (refer also Figure 1.2).

- Mid-west (Geraldton)
- Wheatbelt (Jurien Bay)
- Metropolitan/Peel
- South West (Cape Naturaliste)
- South Coast (Albany)
- Hopetoun and Bremer Bay
- Great Southern (Esperance)



Figure 1.2 Location Plan

The assessment has been broken down into a number of different tasks. These tasks involve the following.

- Wave climatology assessment.
- Identification of key storm events.
- Design storm event selection.
- Assessment of representative years.
- Extreme wave and water level analysis.

This report presents the data, methods and result of these investigations.

2. Available Metocean Data

A range of different metocean measurements are available for this project. The available data and sources of the data are outlined below.

2.1 Wave Recordings

The Department of Transport collect offshore wave records using Waverider Buoys deployed at a number of locations along the coast. Early data records were non-directional, however direction measurements have typically been recorded for over the last decade. Not all regions considered within this assessment have offshore wave recordings.

Details of the locations and duration of available wave recordings available for use in this study are presented in Table 2.1, with the locations shown in Figure 2.1. Directional wave recordings from the Rottnest recording location privately held by MRA were also made available for use on this study. The locations of WWIII model extraction points (discussed in Section 2.4) are also shown on this figure.

Table 2.1 Locations & Durations of Available Wave Recordings

Region	Location	Dates of Available Data
Mid-West (Geraldton)	No deep water data available	
Wheatbelt (Jurien Bay)	42 m water depth (30.291667 °S 114.914444 °E)	Jan 1998 to October 2009 – Non-directional October 2009 to October 2017 – Directional
Metropolitan/Peel	48 m water depth (32.111389 °S 115.401944 °E)	July 1994 to July 1995 – Directional January 1994 to December 2004 – Non-directional September 2004 to October 2017 – Directional
South West (Cape Naturaliste)	50 m water depth (33.362222 °S 114.764444 °E)	May 1999 to February 2010 – Non-directional February 2010 to October 2017 – Directional
South Coast (Albany)	60 m water depth (35.198056 °S 117.721944 °E)	July 2005 to September 2008 – Non-directional September 2008 to October 2017 – Directional
Bremer Bay & Hopetoun	No deep water data available	
Great Southern (Esperance)	52 m water depth (34.000556 °S 121.900000 °E)	June 2006 to December 2011 – Non-directional January 2012 to October 2017 - Directional

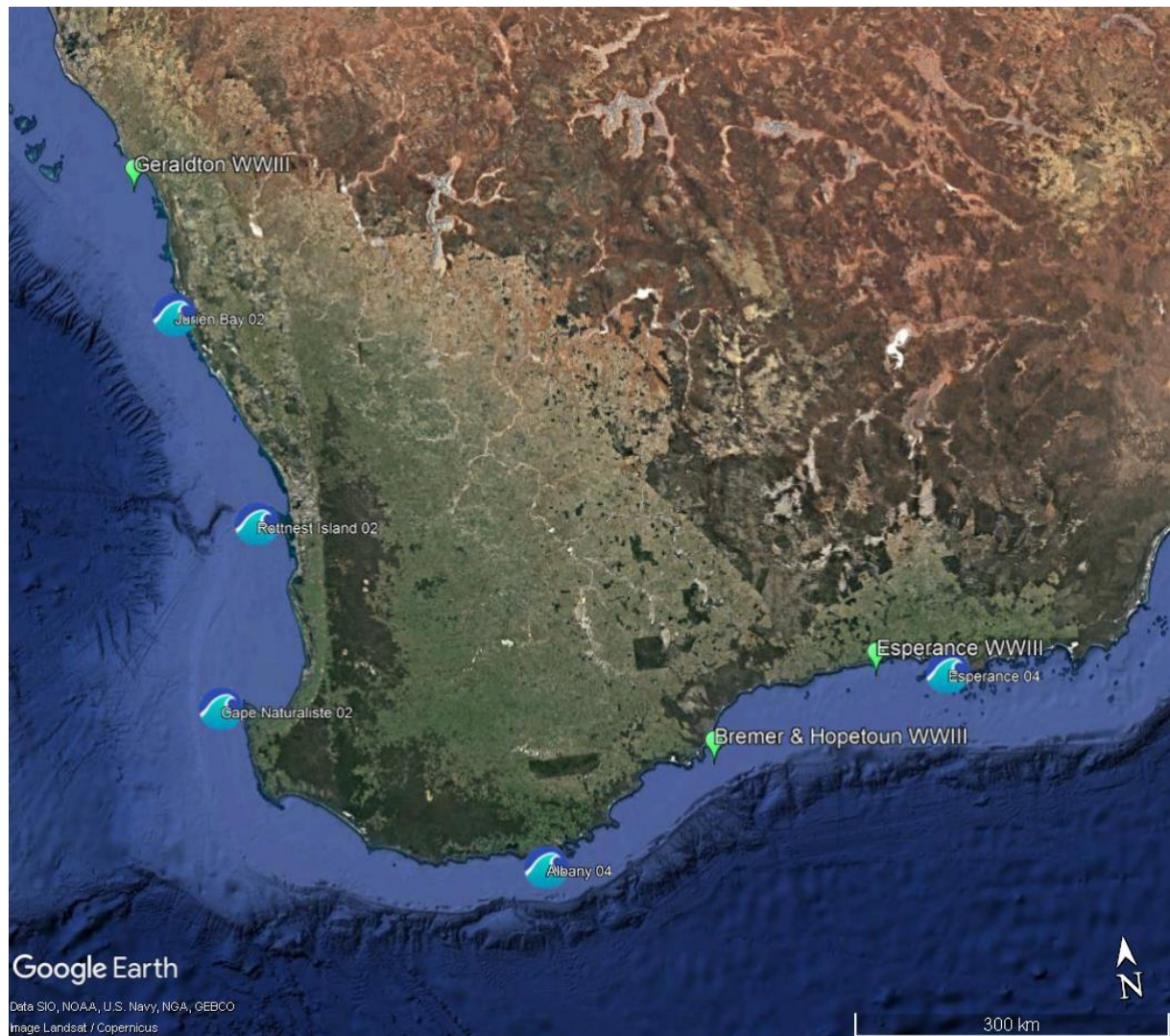


Figure 2.1 Locations of Wave Measurement Devices

2.2 Water Level Recordings

Water level records were provided by the Department of Transport for use in this study. Details of the available water level records are provided in Table 2.2.

Table 2.2 Locations & Durations of Available Water Level Recordings

Region	Location	Dates of Available Data
Mid-West (Geraldton)	Within Geraldton Port	April 1986 to September 2017
Wheatbelt (Jurien Bay)	Jurien Boat Harbour	January 1981 to February 1983 May 1991 to September 2017
Metropolitan/Peel	Fremantle Harbour Fremantle Fishing Boat Harbour Mandurah Fisherman's Jetty/Mandurah Ocean Marina	January 1950 – December 1965 January 1966 to September 2017 December 1990 to September 2017
South West (Cape Naturaliste)	Bunbury Inner Harbour Bunbury Outer Harbour Port Geographe	September 2001 to September 2017 January 1987 to March 2005 January 2002 to October 2017
South Coast (Albany)	Albany Port	January 1979 to September 2017
Bremer Bay & Hopetoun	Bremer Bay	September 1998 to September 2017
Great Southern (Esperance)	Esperance Port	January 1987 to September 2017

2.3 Wind Recordings

Wind data was obtained from the Bureau of Meteorology (BOM) for this project. The best available (highest frequency) wind data was sourced, which provided two different data sets. Aviation Weather Services data provides data measured at a consistent half hour interval across the duration of the recording, however the extent of data coverage is relatively short – limited to the past one to two decades. Observation data spans a much longer period, however the quality of the early data can be quite poor due to low temporal resolution – typically three hourly recordings or less. Details of the wind data used for the purposes of this assessment are provided in Table 2.3.

Table 2.3 Locations & Durations of Used Wind Recordings

Region	Location	Dates of Available Data
Mid-West (Geraldton)	Geraldton Airport	Observations: Aviation Weather Services Data: December 1993 to December 2017
Wheatbelt (Jurien Bay)	Badgingarra Research Station	Observations: January 1965 to December 2017 Aviation Weather Services Data: April 1997 to December 2017
Metropolitan/Peel	Swanbourne	Observations: September 1993 to December 2017 Aviation Weather Services Data: December 1993 to December 2017
	Rottneest Island	Observations: November 1987 to December 2017 Aviation Weather Services Data: December 1993 to December 2017
South West (Cape Naturaliste)	Cape Naturaliste	Observations: January 1957 to December 2017 Aviation Weather Services Data: December 1995 to December 2017
	Busselton Jetty	Observations: September 1997 to December 2017
South Coast (Albany)	Albany Airport	Observations: April 1965 to December 2017 Aviation Weather Services Data: December 1993 to December 2017
Bremer Bay & Hopetoun	Hopetoun	Observations: January 1996 to December 2017 Aviation Weather Services Data: December 1995 to December 2017
Great Southern (Esperance)	Esperance	Observations: June 1969 to December 2017 Aviation Weather Services Data: December 1993 to December 2017

A substantial data gap from 1994-2001 was present in the Badgingarra Research Station data. This gap was filled with wind data from the BOM Hindcast model (lat -30.29, long 114.91). This

data has been validated at other locations on the west coast including Rottneest. Therefore, it is considered appropriate for filling this substantial gap in the recorded data.

2.4 WWIII Wave Hindcast Model Background & Analysis

Given the relatively limited duration of available wave recordings, combined with the fact that offshore wave measurements are not available at all locations, alternate sources of wave information needed to be investigated. This wave data was used to extend the available period of wave records and therefore helped to ensure that the longest possible period of information was considered within the assessments.

The WAVE WATCH III (WWIII) model (Tolman, 2009) is a third generation wind wave model that is utilised by the National Centre of Environmental Prediction (NCEP/NOAA) to simulate wave conditions around the globe. The wave model suite consists of global and regional nested grids and utilises results from a Climate Forecast System Reanalysis Reforecast (CFSRR) as the key model driver. The CFSRR provides a coupled reanalysis of the atmospheric, oceanic, sea-ice and land data from 1979 to 2010 which ultimately provides the wind conditions that are used to drive the model (Chawla et al. 2011). WWIII hindcast data is available from 1979 – 2009 (inclusive).

Of particular interest for this study are the results from the modelling of the Australian model grid. The resolution of this particular model is $1/15^\circ$ or 4 minutes (this equates to a resolution of 7km or less). The bathymetry of the model grid is presented in Figure 2.2.

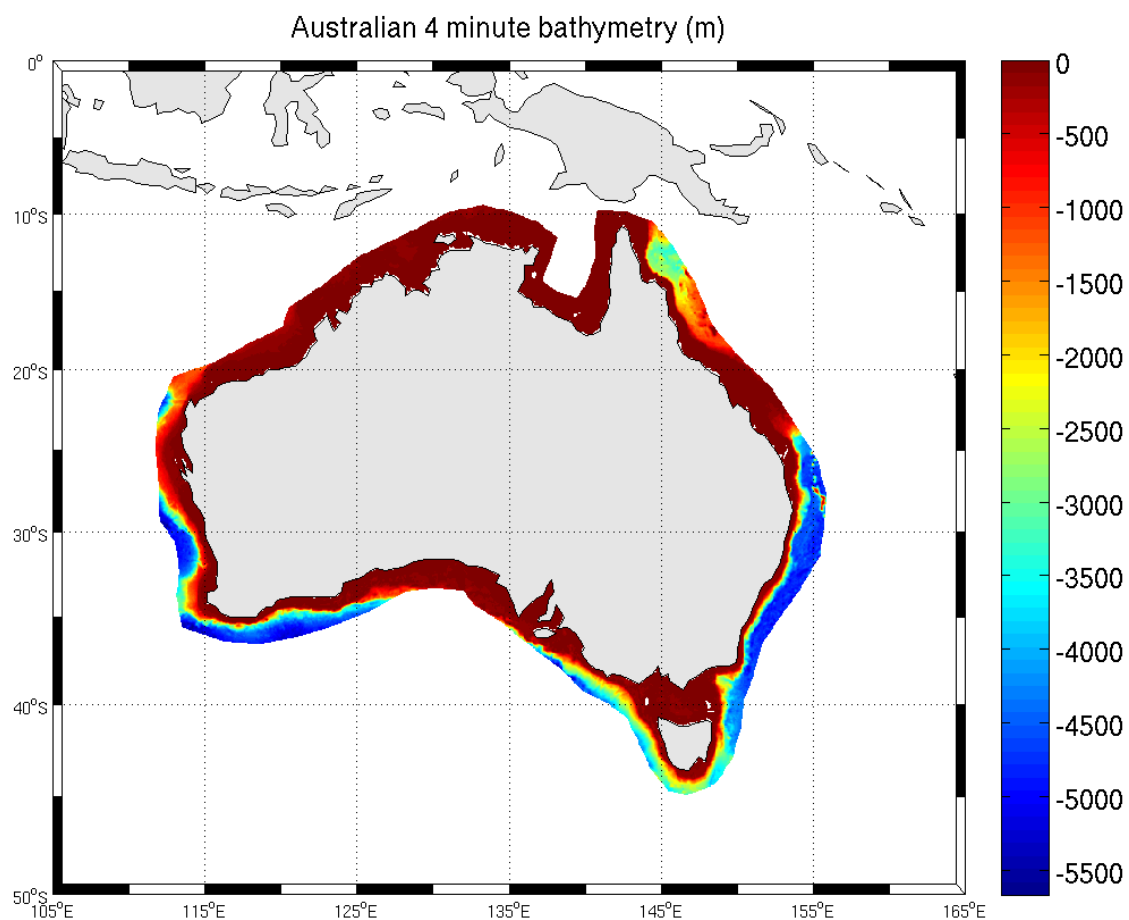


Figure 2.2 Bathymetry of the Australian WWIII Hindcast Model Grid

Outputs from the WWIII model were extracted from the locations of the wave measurement devices highlighted in Figure 2.1 using a bilinear interpolation scheme. This scheme interpolates linearly between the surrounding grid points in an attempt to provide a representation of the wave conditions at the extraction point.

In addition to the locations of the wave measurement devices, data was extracted from the locations outlined in Table 2.4 to provide information for regions where wave measurements were not available (these locations are also shown on Figure 2.1). Data was extracted from an additional location near Esperance to overcome the sheltering effects of the Recherche Archipelago (discussed further in Section 3).

Table 2.4 Locations of Additional WWIII Extraction Points

Region	Location
Mid-West (Geraldton) (50m depth)	29.2167 °S 114.6917 °E
Bremer Bay & Hopetoun (Representative of 50m depth)	34.4875 °S 119.8502 °E
Great Southern (Esperance) (50m depth)	33.9667 °S 121.1833 °E

The additional WWIII data extracted for the regions presented in Table 2.4 is intended to be representative of an offshore location in approximately 50m water depth. For the Mid-West and Great Southern regions this was achieved via extraction of WWIII hindcast data at locations in approximately 50 m water depth.

For Bremer Bay, data was extracted at several locations along the 50 m contour and compared to the nearest wave buoy (Albany) and extracted WWIII data sets for the adjacent regions (Albany & Esperance). Wave height data extracted along the 50 m contour was significantly lower than the compared datasets. It was therefore assessed that due to the relative coarseness of the model grid and the associated generalisation of the bathymetry, it was not justifiable to use the extracted data along the 50 m contour without recorded wave buoy data at Bremer Bay to validate the WWIII data model.

To provide an appropriate level of conservatism, a point along the 60 m contour was chosen for extraction. This extraction location provided more consistent estimates of wave height when compared to the Albany wave buoy and extracted WWIII data sets for the adjacent regions (Albany & Esperance).

Whilst the WWIII model has been calibrated and validated at various locations within the global model domain (Tolman 1998, Tolman 2002a, Tolman 2002b), the accuracy of the model over the study area required validation. Chawla (2010) notes that WWIII has been found to have a persistent small positive wave height bias in the southern hemisphere. Further discussion in this regard is also provided by Durrant & Greenslade (2011), which consolidates other work previously completed within the Australian region.

Upon review of the WWIII output versus the recorded wave measurements it was found that WWIII did generally over-predict the wave heights, particularly for more severe events. As a result, it was necessary to apply a correction to the modelled wave heights to help ensure that the WWIII predictions were comparable to the wave measurements. Wave measurements themselves also have inherent inaccuracies, particularly during the most severe conditions. For instance, measurements that are recorded by Waverider buoys can be influenced by the fact that the buoy can be submerged during portions of the wave, and therefore provide an underestimate of the actual wave conditions during such events (Bettington and Wilkinson 1997).

A comparison of WWIII predictions with wave measurements was completed for each location where measurement information was available. Review of the comparison showed that the level of accuracy varied with wave height and therefore event severity. As a result a piecewise correction factor for each location was applied to the WWIII hindcast data sets.

The piecewise correction factor for each location was determined by comparing the WWIII hindcast data with the wave measurements across three different data ranges. To ensure consistency across all locations, the threshold values for the data ranges were determined based on statistical attributes of the data sets, specifically, the average value and standard deviation.

As the focus of this study is on severe wave conditions that will ultimately contribute to beach erosion, the threshold values for the data ranges were weighted towards higher wave heights. Consistent with Li et al. (2011) a threshold for severe storm waves was set as the average value (μ) of the dataset plus two standard deviations (σ). A further threshold was applied at a value equivalent to the average value plus three standard deviations. This provided the following data ranges.

- Low Range: wave heights less than the average plus two standard deviations.

$$- H_s < \mu + 2\sigma$$

- Medium Range: wave heights between the average value plus two standard deviations and the average value plus three standard deviations.

$$- \mu + 2\sigma < H_s < \mu + 3\sigma$$

- High Range: wave heights greater than the average value plus three standard deviations.

$$- \mu + 3\sigma < H_s$$

Assessment of the WWIII hindcast data versus measurements across each of these ranges was completed for all locations where measurements were available. This assessment involved the review of WWIII predictions versus wave measurement values at the corresponding time. Collation of all values within each of the data ranges yielded difference factors for each location and data range. These difference factors, defined as the combined average value of the WWIII hindcast data versus the combined average value of the measurements, are presented in Table 2.5. As an example, a value of 1.21 indicates that WWIII overestimated the measured wave conditions by 21%.

Table 2.5 Difference Factors between WWIII hindcast data & Wave Measurements

Region	Data Ranges		
	Low Range	Medium Range	High Range
Wheatbelt (Jurien Bay)	1.21	1.22	1.0
Metropolitan/Peel	1.10	1.11	1.12
South West (Cape Naturaliste)	1.14	1.16	1.17
South Coast (Albany)	1.05	1.04	1.05
Great Southern (Esperance)	Unacceptable differences due to sheltering within the Recherche Archipelago.		

The difference factors show that the level of agreement between the WWIII hindcast data and the measurements demonstrate some degree of variation between each of the locations. However, perhaps most significantly, the WWIII hindcast data showed a very poor congruence with measurements at Esperance. Upon closer review it was obvious that this was due to the sheltering effects of the Recherche Archipelago and the fact that the individual islands could not be adequately resolved within the WWIII bathymetry. The WWIII hindcast data that was extracted at the Esperance measurement location was therefore not used within this assessment. Data from an unsheltered location west of the site (at the location outlined in Table 2.4) was considered to provide a better representation of the offshore wave conditions within the region.

For all locations other than Esperance, the difference factors were used to provide a piecewise linear correction to the WWIII hindcast datasets. The correction was applied to each data range by multiplying all the data within that range by the inverse of the difference factor (i.e. Correction factor for Jurien Low Range = $1/1.21 = 0.83$). At transitions between the data ranges the correction factors were linearly transitioned over half a standard deviation above and below the threshold values (i.e. one standard deviation in total).

Resultant datasets were subsequently reviewed to ensure that the results of the correction provided an overall improvement in model accuracy. Results were reviewed qualitatively, based on an assessment of the Index of Agreement after Willmott (1981) (refer Table 2.6) and visually, through review of cross plots (Figure 2.2) and time history plots (Figures 2.3 and 2.4).

Willmott (1981) proposed an assessment methodology to determine the relative accuracy of model predictions against measurements. Like any qualitative assessment of model performance, the Index of Agreement can be a harsh measure of model quality when slight phase differences occur between the measured and modelled data. Visual assessment of model quality is therefore also required.

The Index of Agreement is determined as follows, where X is the variable being compared and \bar{X} the mean of that variable.

$$IOA = 1 - \frac{\sum |X_{model} - X_{obs}|^2}{\sum (|X_{model} - \bar{X}_{obs}| + |X_{obs} - \bar{X}_{obs}|)^2}$$

A perfect agreement between the model and the recordings will yield an index of 1, whilst no relationship would yield an index of 0. Values meaningfully greater than 0.5 are considered to be indicative of good model performance (Willmott et al. 1985).

Table 2.6 Index of Agreement values for Raw and Calibrated WWIII Significant Wave Height Data

Location	Entire Data Set		Hs < Average plus two Standard Deviations		Hs > Average plus two Standard Deviations	
	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated
Jurien Bay	0.95	0.97	0.92	0.95	0.98	0.99
Rottneest	0.87	0.95	0.80	0.92	0.96	0.98
Cape Naturaliste	0.93	0.97	0.90	0.96	0.96	0.98
Albany	0.96	0.97	0.94	0.95	0.98	0.99

As observed from the Index of Agreement values, the corrections applied to the WWIII hindcast dataset have provided an improvement of apparent model skill with regard to the predictions of wave heights. This is also observed visually through review of cross plots of the WWIII hindcast data versus the wave measurement for both the raw and calibrated datasets, as presented in Figure 2.3.

The cross plots show that the corrections that have been applied provide an improved overall agreement between measured and modelled data, particularly in terms of the congruence in wave heights. This is indicated by the slope of the least squares regression line which is much closer to 1 for the calibrated data than it is for the raw data, although across all sites the slope of the least squares regression line is less than 1. This indicates the factored WWIII hindcast datasets still provide an overestimate of recorded data of around 3-4%. Some degree of scatter is visible within the data. This scatter is not unexpected, for two reasons.

- Firstly, scales and impacts of meteorological features that can contribute to local wave conditions may not be adequately resolved (either under or over) within the CFSRR global modelling and may not therefore be well represented by WWIII.
- Secondly, the timing of events within the WWIII model, and therefore the predicted wave events, may not be exactly correct and may therefore contribute to the apparent scatter of the data.

Observations of time history plots for total wave height therefore provide a further visual check of the data suitability. Time history plots are presented for two different periods, being June to July 2006 and August to September 2009, as both of these periods included an event that was observable across all locations. These time history plots are presented in Figures 2.4 and 2.5.

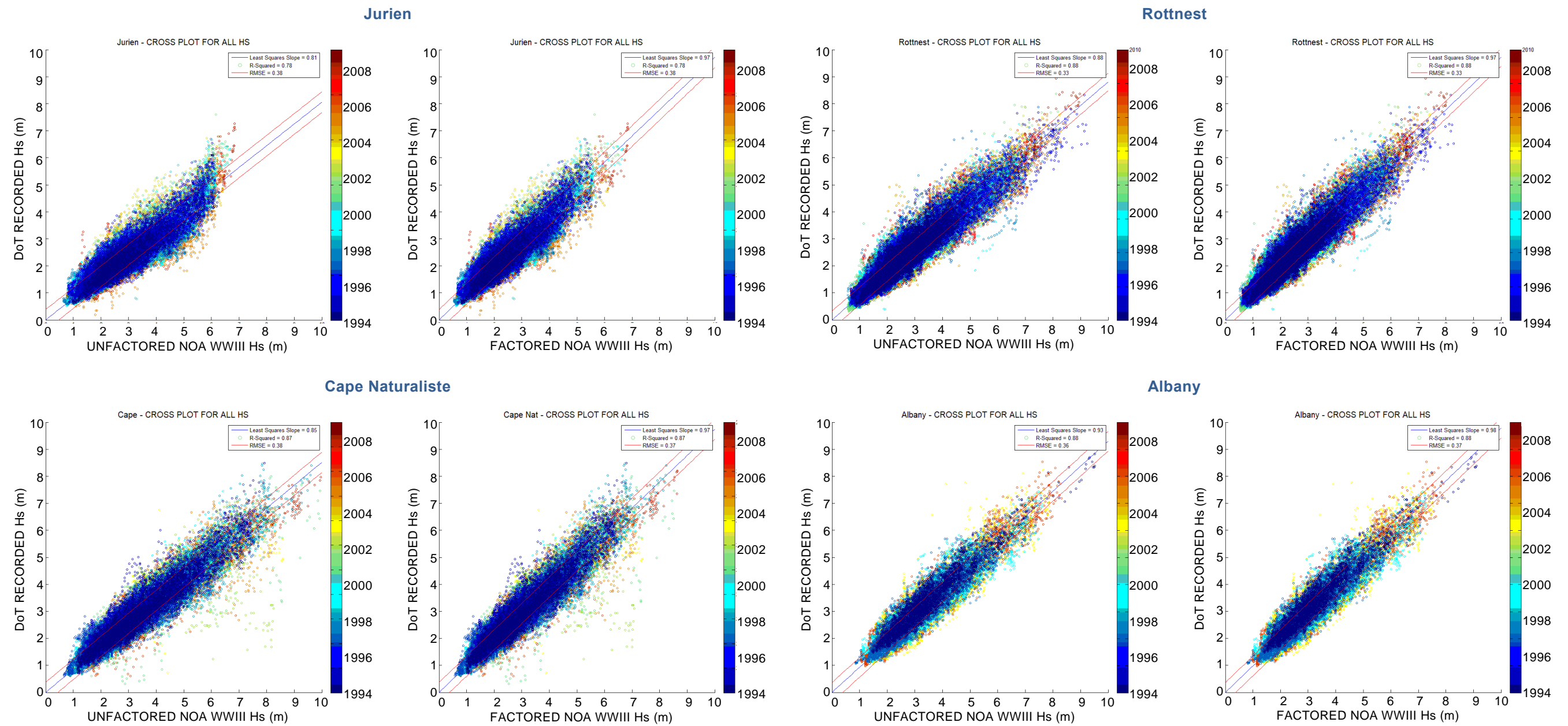


Figure 2.3 Cross Plots of WWIII hindcast data versus Measurements for Raw and Calibrated Data

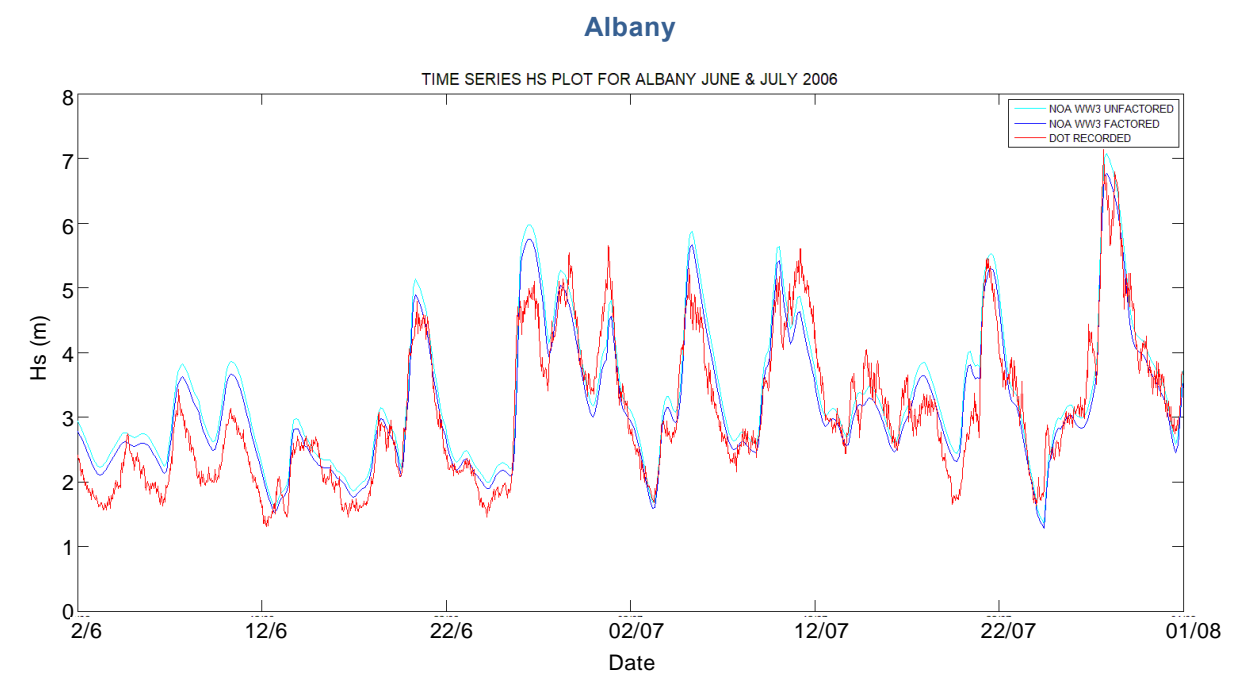
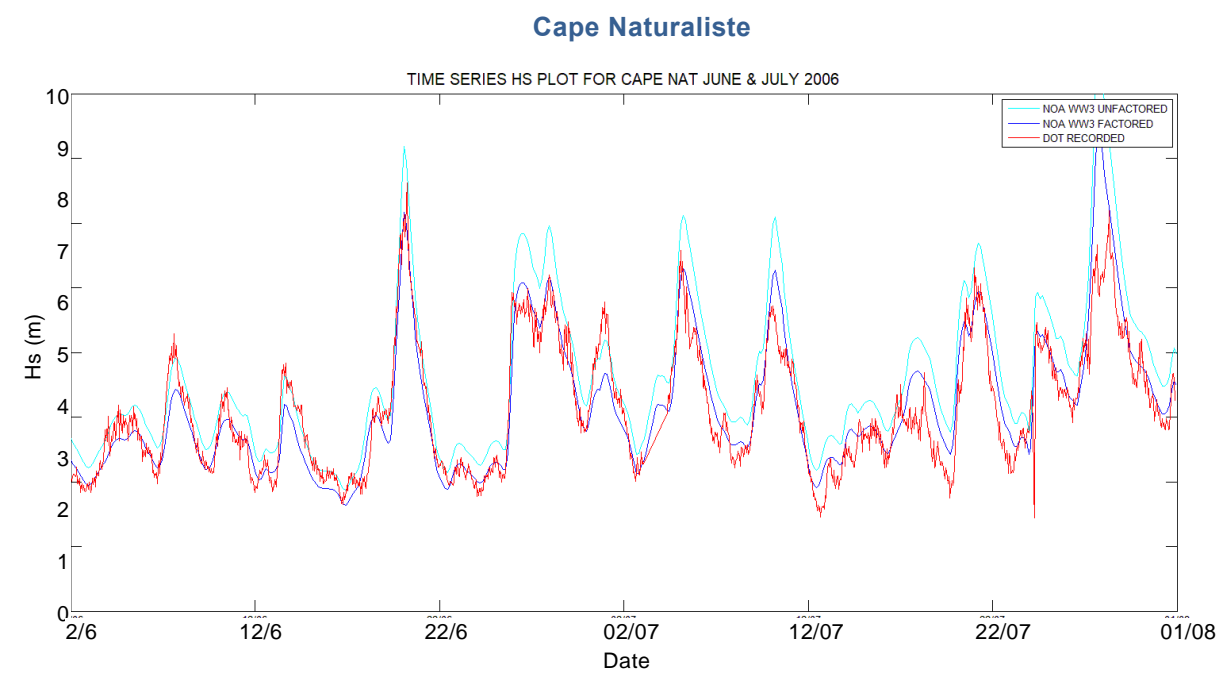
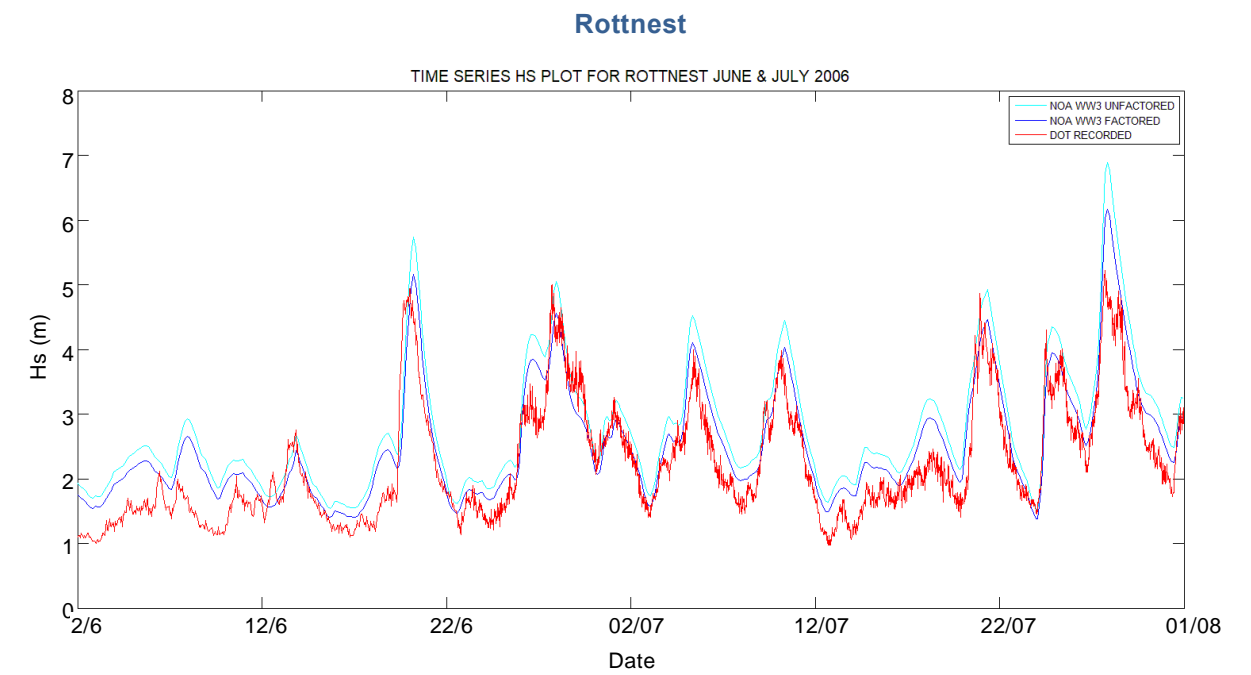
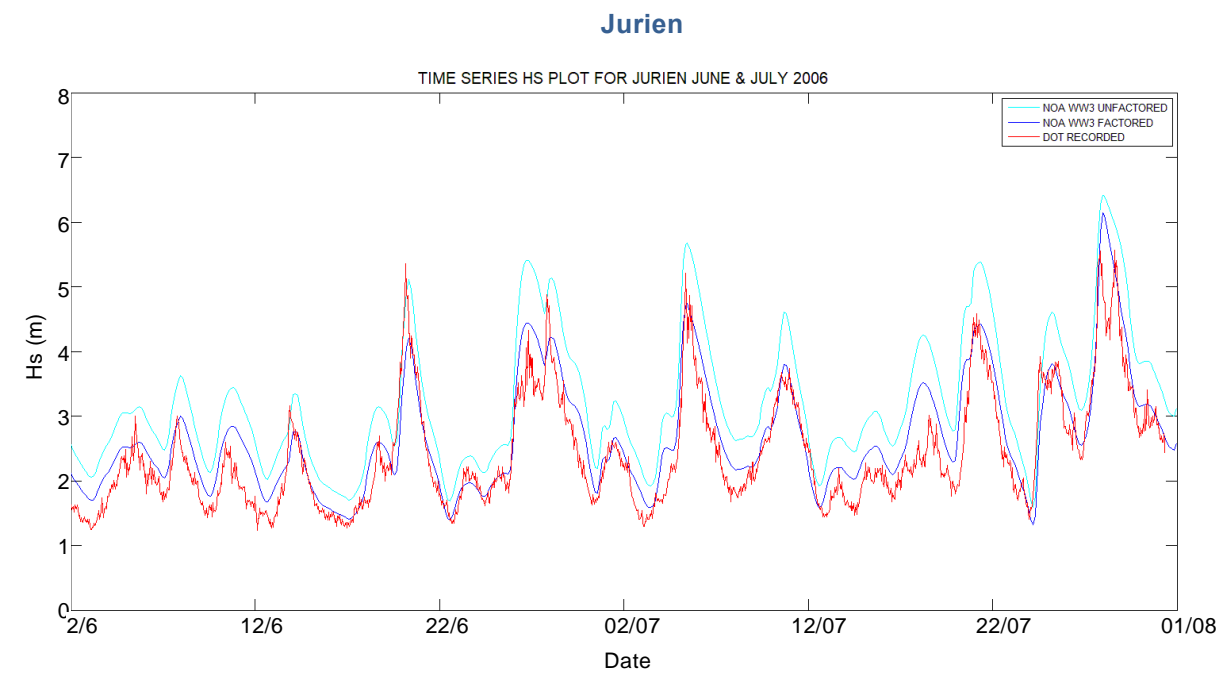


Figure 2.4 Time History Plots of Raw and Calibrated WWIII hindcast data versus Measurements for the Period from June to July 2006

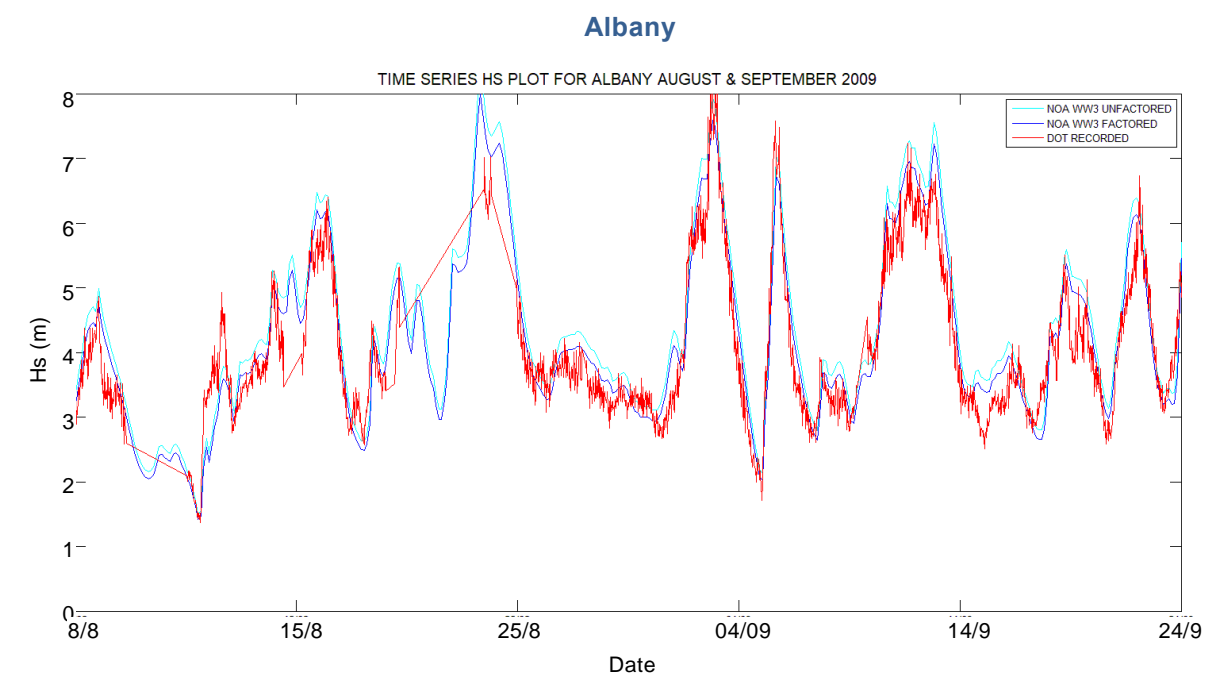
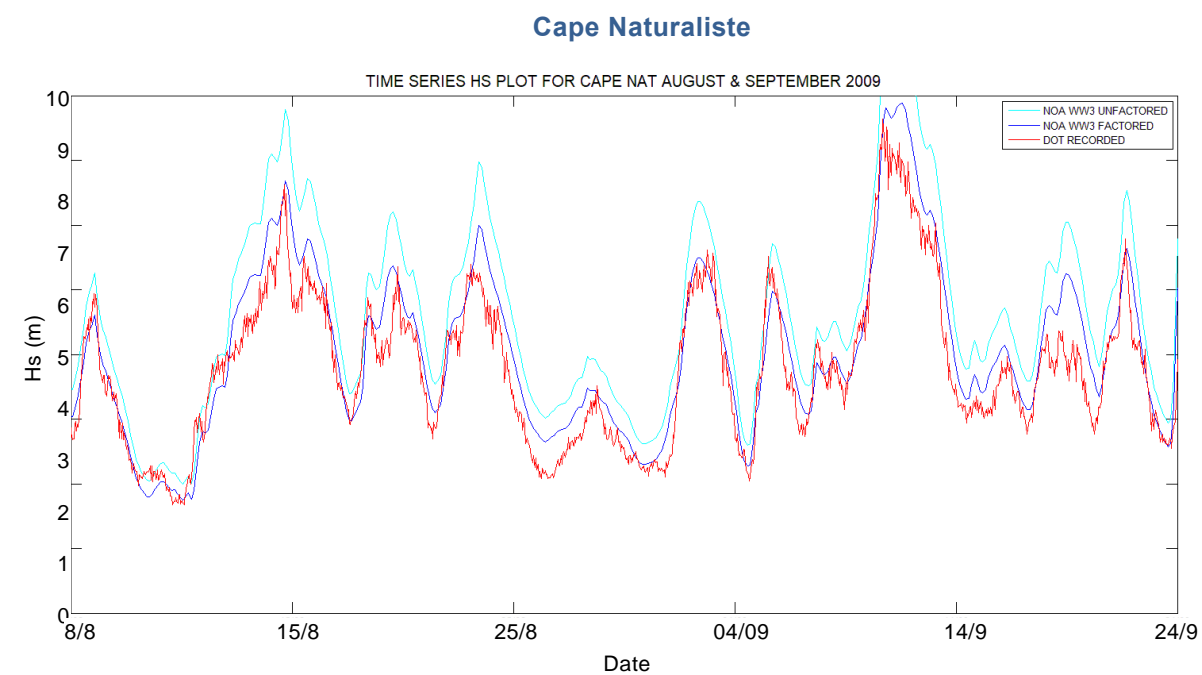
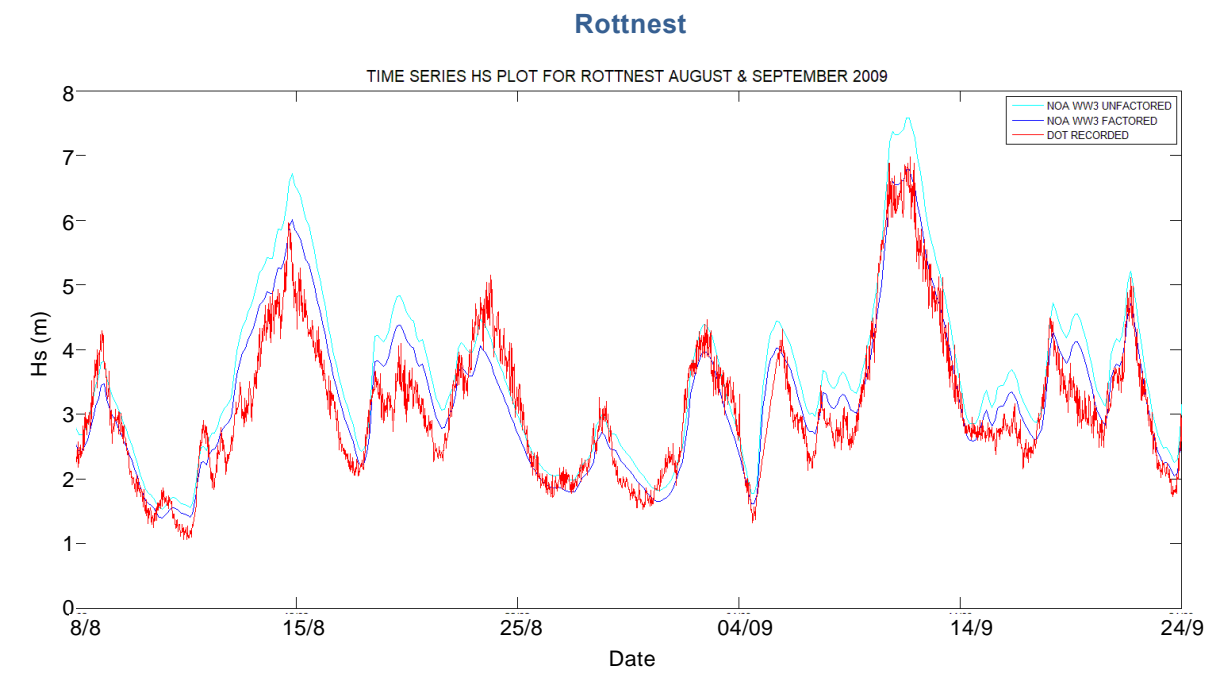
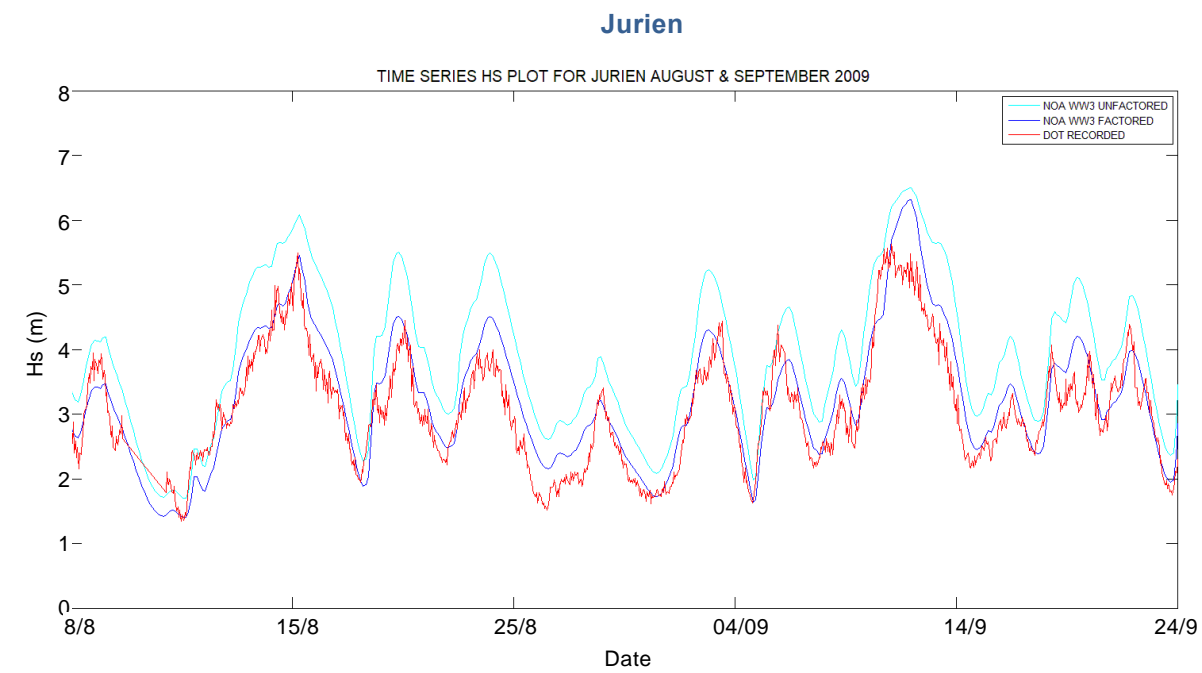


Figure 2.5 Time History Plots of Raw and Calibrated WWIII hindcast data versus Measurements for the Period from August to September 2009

The time history plots show that there is reasonable agreement between the calibrated WWIII hindcast data and the measurements across most of the record. It is notable that there are periods where the raw WWIII hindcast data may have provided a better representation of the measurements, however on the whole the calibrated data provides a consistently better agreement. As a final check on the outcomes of the data correction, the average wave heights of the top events within the WWIII hindcast data were compared to the average wave heights of the top events within the measurement. For consistency, and to ensure that severe events were identified, top events were selected based on a 72 hour moving average for both datasets (further details on the reasoning and relevance of a 72 hour averaging period are provided in Section 4). Results are presented in Figure 2.6 in the form of event rankings versus average wave height.

The results of the moving average events comparison presented in Figure 2.6 show that the calibrated WWIII hindcast dataset provides a much better fit than the raw values, however the calibrated dataset is still slightly conservative. This is evidenced by the average Hs of the calibrated WWIII hindcast dataset events being consistently greater by approximately 3-4% than the corresponding ranked events of the recorded dataset.

On review, this slight conservatism is considered to be beneficial given that there are some uncertainties associated with the WWIII hindcast data. In particular, the accuracy of the data during earlier periods in the record (the 1980's and early 1990's) when the temporal and spatial resolution of the available wind and atmospheric data records would not be as good as present, is unknown.

Details of the events identified and used to prepare these plots are provided in Appendix A. As shown in the appendix, there is generally reasonable agreement between the ranks of the events across the different data sets, although in some instances a discrepancy of 0.1 to 0.2 m between the WWIII hindcast data and the measurements can result in quite different rankings of events. This is a function of the accuracy of the WWIII wave data, as previously discussed.

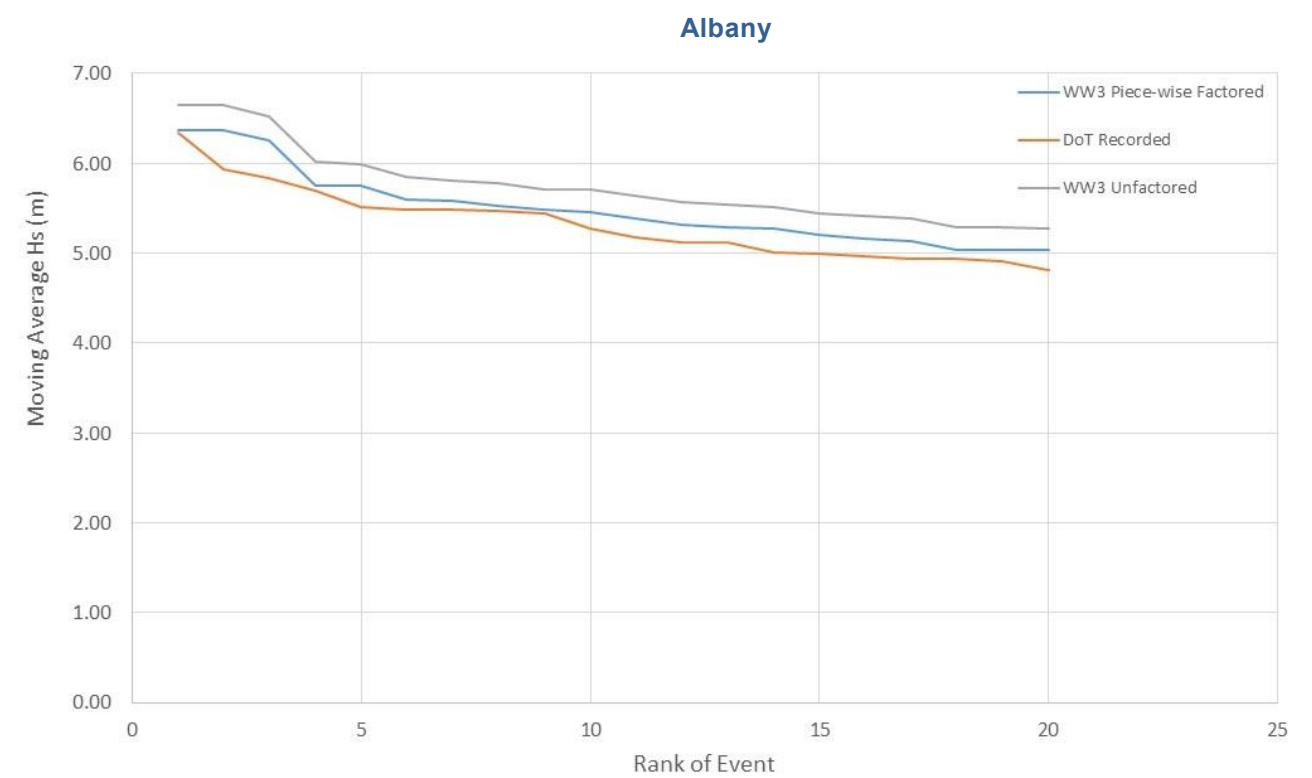
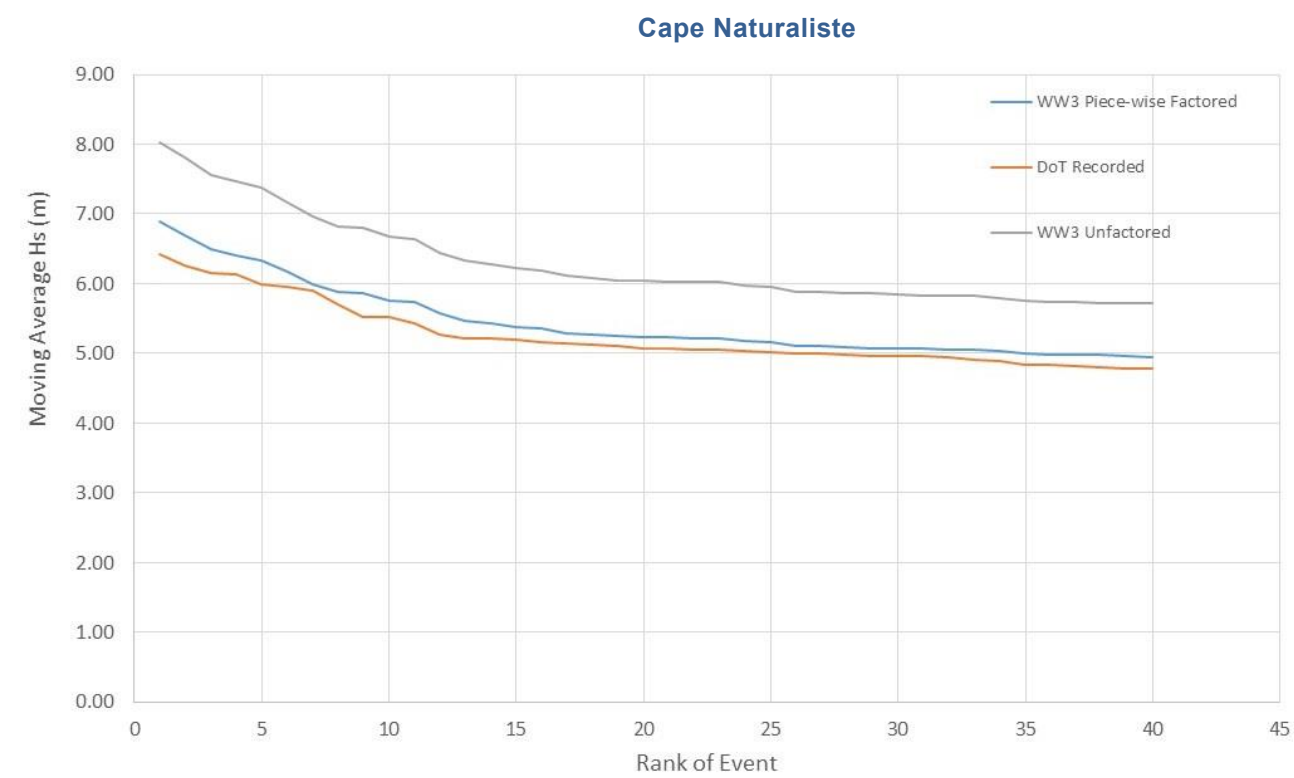
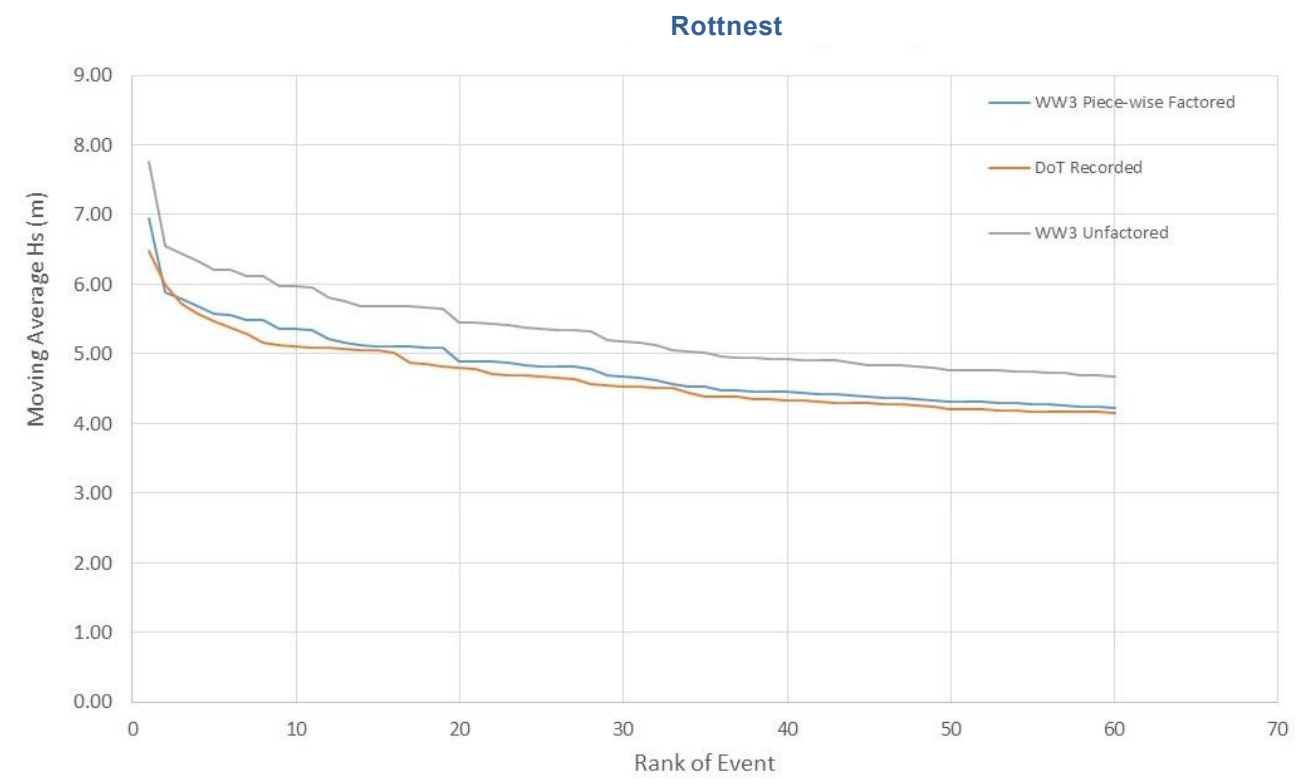
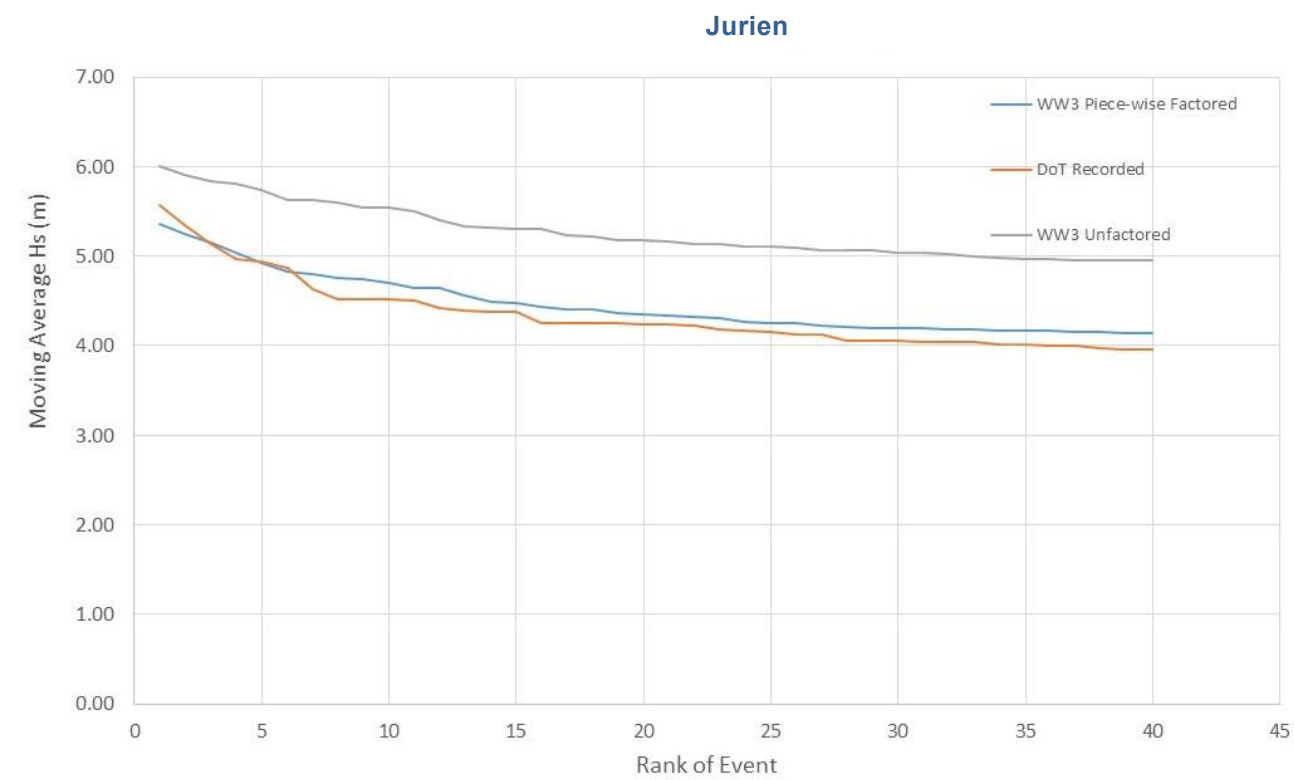


Figure 2.6 Peak 72 Hour Average Wave Heights from WWIII hindcast data versus Wave Measurements

The qualitative and visual reviews of the calibrated WWIII hindcast data versus the measurements suggest that after calibration WWIII provides a good representation of the local wave climate with regard to total wave height. However, other aspects of the wave climate are also important. In particular, wave period is important when assessing potential beach response as well as when quantifying metrics such as wave power.

Peak wave period, which is the most critical for this assessment given it represents the peak wave energy within the spectrum, is particularly disposed to fluctuations as the balance of wave energy switches in bi-modal seas. This feature means that it is not possible to provide a simple correction to peak wave period, as it was with wave height. Therefore the suitability of the WWIII hindcast data for peak wave period was assessed by both a review of the Index of Agreement as well as a review of the average peak wave periods across the top 30 wave height events versus the measured peak periods. The Index of Agreement values are presented in Table 2.7. Comparison of the average values, including standard deviations, are presented in Table 2.8 and are based on averages over 72 hours for each event.

Table 2.7 Index of Agreement values for WWIII Peak Period Data

Location	Entire Data Set	Hs < Average plus two Standard Deviations	Hs > Average plus two Standard Deviations
Jurien Bay	0.70	0.70	0.76
Rottnest	0.75	0.74	0.87
Cape Naturaliste	0.77	0.76	0.87
Albany	0.78	0.77	0.91

Table 2.8 Comparison of Average Peak Period values & Standard Deviations for Top 30 Wave Height Events

Location	Wave Measurements		WWIII	
	Average (s)	Standard Deviation (s)	Average (s)	Standard Deviation (s)
Jurien Bay	14.18	1.18	14.86	1.05
Rottnest	13.70	0.94	13.63	1.10
Cape Naturaliste	14.00	1.09	13.89	1.01
Albany	14.31	0.98	14.46	1.10

Review of both the Index of Agreement and the average values for peak period suggest that WWIII provides a reasonable representation of the peak period. Importantly, even for the most severe events within the records, the average values and standard deviations are reasonably similar, with no apparent bias in WWIII hindcast data.

As a final check on the adequacy of the WWIII hindcast data, a review of wave directions has been completed. The directional review is limited by the fact that directional wave measurements did not commence in some locations until the late 2000's, meaning that the period of overlap with the WWIII hindcast data is small or non-existent. Furthermore, WWIII provides mean wave directions for the entire spectrum while the wave measurements provide directions broken down to sea and swell components. Direction comparisons between the two would therefore be expected to be imperfect (thus an assessment of the Index of Agreement would be of little relevance). Nevertheless, for periods of extreme wave conditions the majority of the wave energy would be contained within the swell component of the spectrum. Consequently, a comparison of the relative directions during these peak events would yield some information regarding the directional accuracy of the WWIII hindcast data. Results of this assessment are presented in Table 2.9. It is noted that the assessment of non-weighted average directions and associated standard deviations of an entire data set do not have any significant meaning in and of themselves however in this instance they are considered to provide a representation of the level of agreement, or otherwise, between the data sets.

Table 2.9 Comparison of Average Wave Direction values & Standard Deviations for Top Wave Height Events

Location	Wave Measurements		WWIII	
	Average (s)	Standard Deviation (s)	Average (s)	Standard Deviation (s)
Jurien Bay	No data available			
Rottneest	258.3	5.5	250.5	5.4
Cape Naturaliste	No data available			
Albany	218.4	4.4	210.0	4.1

The results of the directional analysis show that the directions are similar, though a difference of approximately 8° is apparent for both locations (Rottneest and Albany) where a comparison was possible. This difference in direction could be explained by either the difference in reported directions (mean total direction in WWIII and peak swell direction within the wave measurements) or a directional bias within WWIII, however the relative contributions of each of these is difficult to determine. Irrespective of this fact, a difference in direction of approximately 8° is considered to be reasonable for this project, but does need to be acknowledged as a potential limitation.

On the basis of the above assessment it is considered that the WWIII hindcast data, including the wave height corrections that have been applied, show an appropriate level of congruence with the wave measurements to enable them to be used within this project – provided the limitations discussed below are understood. For regions where wave measurement data is not available, corrections to the WWIII hindcast data will still be required to ensure that the data is not overly conservative. Corrections for these regions will be applied based on the closest available correction (Jurien corrections for Geraldton and Albany corrections for Bremer/Hopetoun and Esperance), however the extent of correction will be reduced by 30% (70% of the total) to provide an allowance for uncertainty against changes that may occur across regions. For instance, at Geraldton the low range reduction factor would be $1+0.21 \times 70\% = 1.15$ compared to the reduction

factor of 1.21 that was applied for Jurien. The final factors for each of these regions is provided in the Table 2.10.

Table 2.10 Factors for 'WWIII Only' Regions

Region	Data Ranges		
	Low Range	Medium Range	High Range
Geraldton	1.15	1.15	1.00
Hopetoun	1.04	1.03	1.03
Esperance	1.04	1.03	1.03

2.4.1 Limitations of WWIII

The use of the WWIII hindcast data provides the benefit that the analysis of storm events can be extended to cover a period back to 1979 and up to 2009. This extension helps to provide a more meaningful and statistically robust analysis compared to the use of wave measurement information only, which would limit the assessment duration to little more than a decade in some instances. However, whilst the use of WWIII hindcast data is beneficial, there are some limitations to its use.

Primarily, the WWIII hindcast data is still the product of a modelling system and whilst that system provides a good level of congruency with the measurements, the fit is not perfect. The wave height corrections that have been made to the data for this study provide an overall improvement in fit across the duration of the record, however anomalous events, particularly those of a small meteorological scale, are not well resolved and can be underestimated. An example of this is provided when reviewing the wave heights associated with an event that occurred in May 2003. This system was a small and intense system that impacted the south west on the 15th and 16th of May 2003. The scale of the system, as shown in the synoptic charts presented in Figure 2.7, means that it would not be well resolved within the CFSRR system and would therefore be expected to be underestimated within WWIII. A time history of the WWIII wave heights and measurements at Rottnest is provided in Figure 2.8.

This time history plot shows that the wave heights for this anomalous event were underestimated by WWIII even in their raw form, however the subsequent correction of the data contributes to a further underestimate. Whilst the underestimate for this type of event is not ideal and is an obvious limitation of the system, this limitation is not overly significant in the context of the identification of the most severe beach erosion events. This is on the basis that, generally speaking, it is likely that longer average recurrence interval beach erosion events will be associated with larger scale synoptic features that correspondingly have a larger duration. These larger scale events should be captured in the WWIII hindcast data which should therefore provide a long period of record for event classification and assessment of severity. Conversely, the smaller scale events are likely to have shorter average recurrence intervals and therefore should be adequately resolved within the recorded wave measurements.

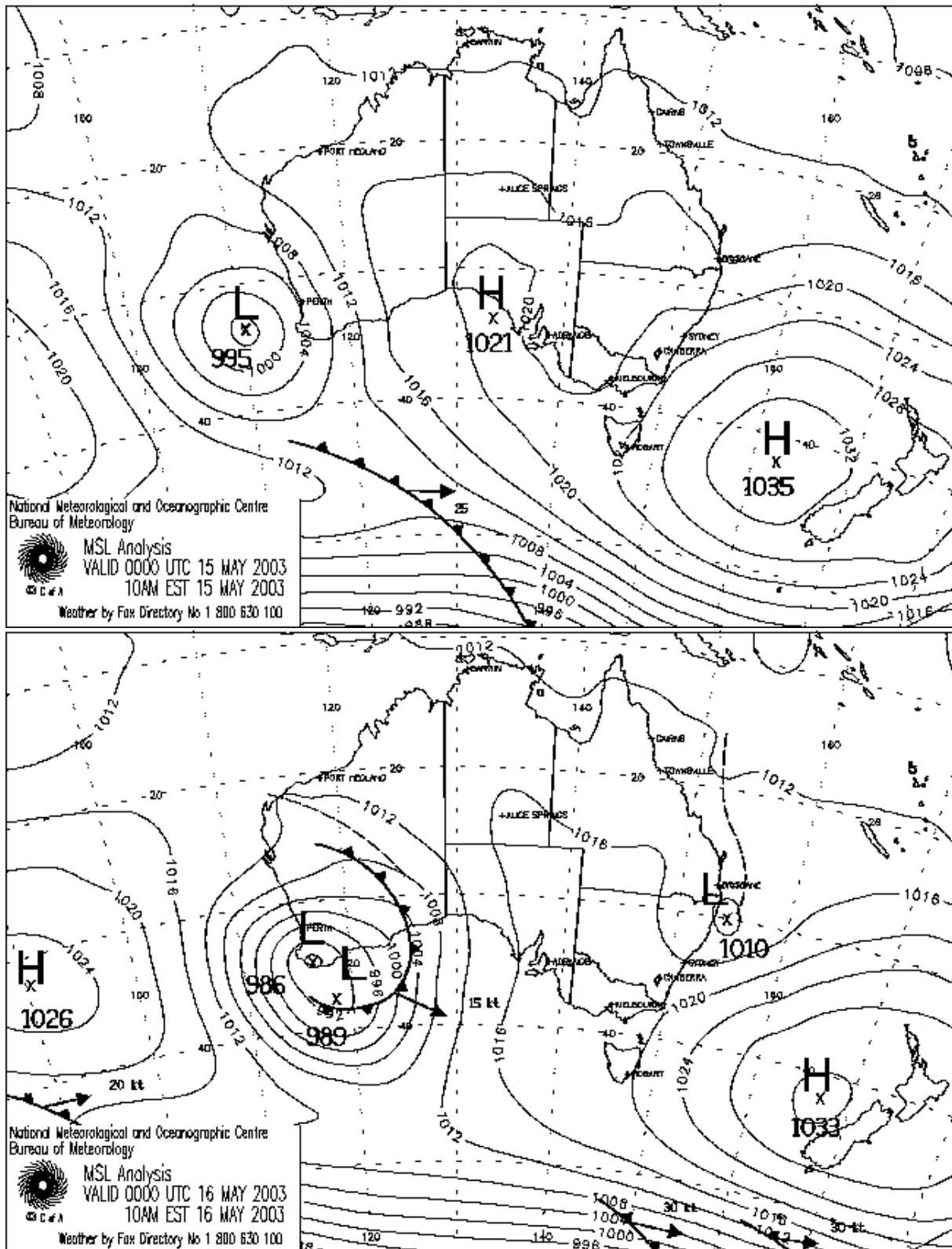


Figure 2.7 Synoptic Charts showing the Passage of the May 2003 Event

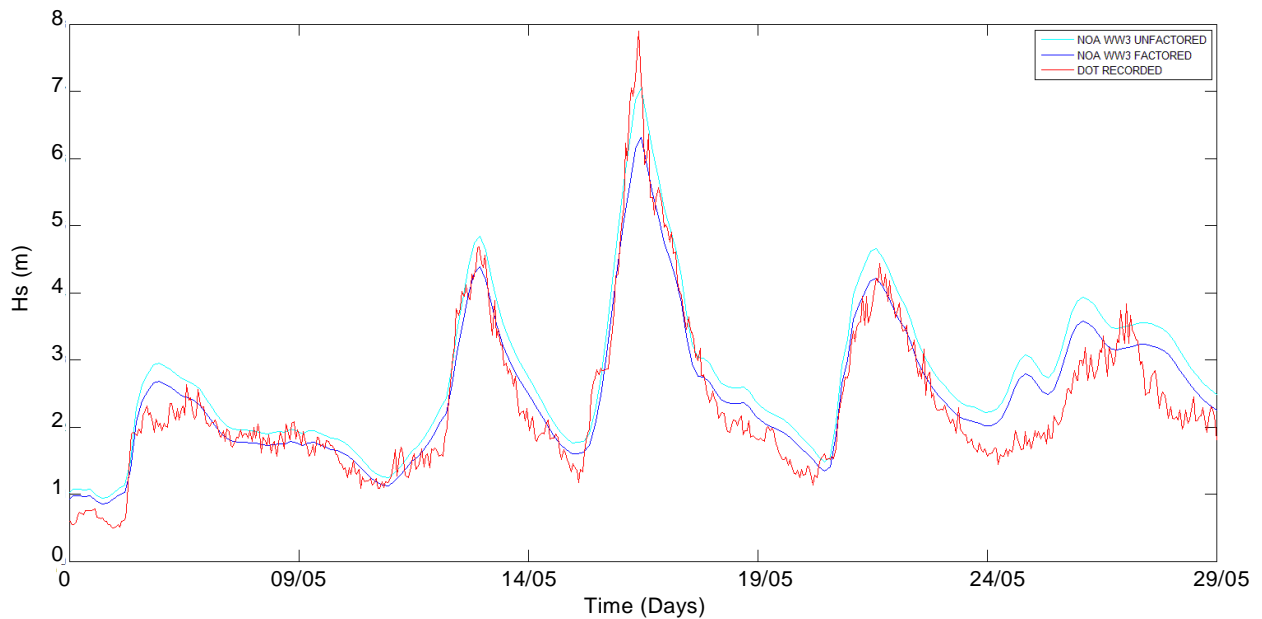


Figure 2.8 Time History Plot of the WWIII Wave Heights versus Measurements for the May 2003 Event at Rottneest

Wave period and wave directions within the WWIII hindcast data have been shown to be slightly less accurate than the wave heights, albeit still reasonable.

2.4.2 Used Metocean Data

A summary of the data used for each section of the assessment is provided in Table 2.11. For Sections 3,4 & 6, both wave and water level data for the same period is required for the analysis constraining the data that can be used to periods of overlap. For Section 7, the entire available data sets for waves and water levels are used.

Table 2.11 Summary of Metocean Data Used

Region	Data Set	Section 3 Wave Climatology	Sections 4 & 5 Identification of Key Storms & Design Storm Sequences	Section 6 Assessment of Representative Years	Section 7 Extreme Wave & Water Level Analysis
Mid West (Geraldton)	Wave	CWWIII ¹ 1979-2009	CWWIII ¹ 1986-2009	CWWIII ¹ 1986-2009	CWWIII ¹ 1979-2009
	Water Level	-	Geraldton Port 1986 - 2009	Geraldton Port 1986 - 2009	Geraldton Port 1986 - 2017
	Wind	-	Geraldton Airport AWS 1986-2009	-	-
Wheatbelt (Jurien Bay)	Wave	WB ² 1998-2017	CWWIII ¹ 1981-1983 & 1991-1998 WB ² 1998-2017	CWWIII ¹ 1981-1983 & 1991-1998 WB ² 1998-2017	CWWIII ¹ 1979 - 1998 WB ² 1998-2017
	Water Level	-	Jurien Boat Harbour 1981 - 1983 & 1991 - 2017	Jurien Boat Harbour 1981 - 1983 & 1991 - 2017	Jurien Boat Harbour 1981 - 1983 & 1991 - 2017
	Wind	-	Badgingarra Obs 1981 - 1983 & 1991 - 1993 BOM 1993-2001 Badgingarra AWS 2001-2017	-	-
Metropolitan/Peel	Wave	WB ² 1994 - 2017	CWWIII ¹ 1979-1994 WB ² 1994-2017	CWWIII ¹ 1987-1994 WB ² 1994-2017	CWWIII ¹ 1979-1994 WB ² 1994-2017
	Water Level	-	Fremantle Fishing Boat Harbour 1979-2017	Fremantle Fishing Boat Harbour 1987-2017	Fremantle Fishing Boat Harbour 1950-2017
	Wind	-	Rottneest Obs 1987 -1993 Rottneest AWS 1993 - 2017	-	-
South West (Cape Naturaliste)	Wave	WB ² 1999-2017	CWWIII ¹ 1985-1999 WB ² 1999-2017	CWWIII ¹ 1985-1999 WB ² 1999-2017	CWWIII ¹ 1979-1999 WB ² 1999-2017
	Water Level	-	Bunbury Outer Harbour 1985 - 2004 Bunbury Inner Harbour 2005-2017	Bunbury Outer Harbour 1985 - 2004 Bunbury Inner Harbour 2005-2017	Bunbury Outer Harbour 1985 - 2004 Bunbury Inner Harbour 2005-2017
	Wind	-	Cape Nat Obs 1985 -1995 Cape Nat AWS 1995 - 2017	-	-

Notes: 1. CWWIII refers to calibrated WIII hindcast data. For more details refer to Section 2.4.

2. WB refers to wave buoy data. For more details refer to Section 2.2.

Table 2.11 Summary of Metocean Data Used (continued)

Region	Data Set	Section 3 Wave Climatology	Sections 4 & 5 Identification of Key Storms & Design Storm Sequences	Section 6 Assessment of Representative Years	Section 7 Extreme Wave & Water Level Analysis
South Coast (Albany)	Wave	WB ² 2005-2017	CWWIII ¹ 1979- 2005 WB ² 2005-2017	CWWIII ¹ 1979- 2005 WB ² 2005-2017	CWWIII ¹ 1979- 2005 WB ² 2005-2017
	Water Level	-	Albany Port 1979- 2017	Albany Port 1979- 2017	Albany Port 1979- 2017
	Wind	-	Albany Airport Obs 1979 - 1993 Albany Airport AWS 1993 - 2017	-	-
Hopetoun & Bremer Bay	Wave	CWWIII ¹ 1979- 2009	CWWIII ¹ 1998- 2009	CWWIII ¹ 1998- 2009	CWWIII ¹ 1979- 2009
	Water Level	-	Bremer Bay 1998 - 2009	Bremer Bay 1998 - 2009	Bremer Bay 1998 - 2017
	Wind	-	Hopetoun AWS 1998 - 2009	-	
Great Southern (Esperance)	Wave	WB ² 2006 – 2017 CWWIII ¹ 1979- 2009	CWWIII ¹ 1987- 2009	CWWIII ¹ 1987- 2009	CWWIII ¹ 1979- 2009
	Water Level	-	Esperance Port 1987-2009	Esperance Port 1987-2009	Esperance Port 1987-2017
	Wind	-	Esperance Obs 1987 - 1993 Esperance AWS 1993 - 2009	-	-

Notes: 1. CWWIII refers to calibrated WWIII hindcast data. For more details refer to Section 2.4.

2. WB refers to wave buoy data. For more details refer to Section 2.2.

3. Wave Climatology

A regional assessment of wave climatology is useful to describe the spatial and temporal variations in wave climate within the study region. This wave climatology assessment was completed for each of the available long-term deep-water measurement locations, as outlined within Section 2. Unfortunately, no wave measurements are available for the Mid-West (Geraldton) or Bremer Bay to Hopetoun regions. As a result, assessments for these regions have been completed using WWIII hindcast data.

The wave climatology assessment provides a general statistical evaluation. If required, more detailed information can be obtained from various other works that have been completed on wave climatology in the south west. Wandres *et al.* (2017) completed an assessment of the response of the southwest wave climate to Indian Ocean climate variability. Bosserelle *et al.* (2012) summarises inter-annual variability and longer-term changes in the WA wave climate between 1970 and 2009. Li *et al.* (2011) completed an assessment of interannual variability and trends of storminess in Perth from 1984 to 2008. Other works relating directly to the WA south west include Reidel & Trajer (1978), Steedman & Associates (1982) and Lemm *et al.* (1999). For a broader view of southern hemisphere wave climatology, works from Young (1999) and Hemer *et al.* (2010) are relevant.

3.1 Assessment Methodology

To provide a more thorough analysis of the seasonal changes in wave conditions the assessment of wave climatology has been completed for calendar months at each location. Tracking the wave changes per month provides a much more meaningful outcome than assessment based on the 4 seasons described by a Mediterranean climate.

The assessment of the wave measurements involved a largely statistical analysis of the wave data to help describe the wave climate. Monthly average values, and corresponding standard deviations, were calculated for all key aspects of the wave conditions (Hs, Tp and Direction). Median, maximum and minimum values were also extracted for Hs as a further descriptor of the severity of the wave climate. Statistics were calculated for sea, swell and total significant wave heights.

All statistics were determined on a time weighted basis given the differences in recording intervals within the datasets. Statistics for directional data were calculated using formulae for circular average and standard deviation given the potential numerical issues associated with directional transitions through the north point (359° to 0°). The following equations were used for these calculations, where θ is the recorded direction and n the index number of the record.

$$\bar{s} = \frac{1}{n} \sum_{n=1}^n \sin \theta_n$$
$$\bar{c} = \frac{1}{n} \sum_{n=1}^n \cos \theta_n$$
$$\text{Average Direction; } \bar{\theta} = \begin{cases} \arctan\left(\frac{\bar{s}}{\bar{c}}\right) & \left| \bar{s} > 0, \bar{c} > 0 \right| \\ \arctan\left(\frac{\bar{s}}{\bar{c}}\right) + 180^\circ & \left| \bar{c} < 0 \right| \\ \arctan\left(\frac{\bar{s}}{\bar{c}}\right) + 360^\circ & \left| \bar{s} < 0, \bar{c} > 0 \right| \end{cases}$$

$$R = \sqrt{\bar{s}^2 + \bar{c}^2}$$

$$\text{Standard Deviation}; S = \sqrt{-2 \ln R}$$

In addition to the above statistical assessment, review of wave occurrence above a threshold was completed to help provide an estimate of the total duration of severe storm waves within each period. Following Li et al. (2011) the threshold value for severe storm waves was defined as two standard deviations above the average value – as calculated for the entire dataset. Given the adopted definition, it follows that the threshold values vary between regions.

3.2 Results

Summary statistics from the assessment of the wave records are presented in Tables 3.1 to 3.5. Key statistics are also plotted in Figures 3.1 to 3.5.

Review of this information shows that:

- peak average and median wave heights are generally experienced in July through September;
- maximum recorded wave heights also generally fall within the July to September period;
- swell and total peak period are elevated in the period between April and September, whereas the peak period of the seas remains relatively constant throughout the year; and
- directional variations in the sea component of the wave record are obvious at all locations, while swell directions are generally relatively consistent throughout the year.

Table 3.1 Monthly Wave Climate Statistics for Geraldton WWill hindcast data (1979-2010)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	1.91	1.82	1.80	1.92	2.15	2.44	2.62	2.62	2.56	2.24	1.95	1.93	2.17
	Standard Deviation(m)	0.45	0.50	0.52	0.61	0.77	0.89	0.94	0.87	0.81	0.65	0.56	0.48	0.76
	Median (m)	1.90	1.82	1.78	1.86	2.05	2.34	2.44	2.48	2.43	2.16	1.90	1.91	2.05
	Maximum (m)	3.70	3.97	4.17	4.93	7.71	6.83	7.22	7.05	6.11	5.44	6.84	4.07	7.71
	Minimum (m)	0.26	0.52	0.55	0.53	0.54	0.72	0.64	0.83	0.74	0.63	0.67	0.68	0.26
	Average Exceedance Duration of Threshold Wave Height (hours)	0.19	1.06	1.26	7.84	28.26	59.71	87.00	78.00	62.42	21.77	4.55	1.35	29.45
Total Tp	Average (s)	12.30	12.73	13.29	13.70	13.99	14.26	14.38	14.43	14.17	13.58	12.90	12.44	13.52
	Standard Deviation (s)	2.17	2.12	1.79	1.71	1.84	1.92	1.85	1.72	1.84	1.88	1.97	2.12	2.05
Total Direction	Average (°)	220.47	220.00	220.17	221.03	223.16	224.93	224.54	223.88	223.76	223.36	223.04	221.10	222.46
	Standard Deviation (°)	5.65	5.10	4.40	4.69	6.37	5.95	5.20	4.80	4.75	4.75	5.45	5.95	5.56

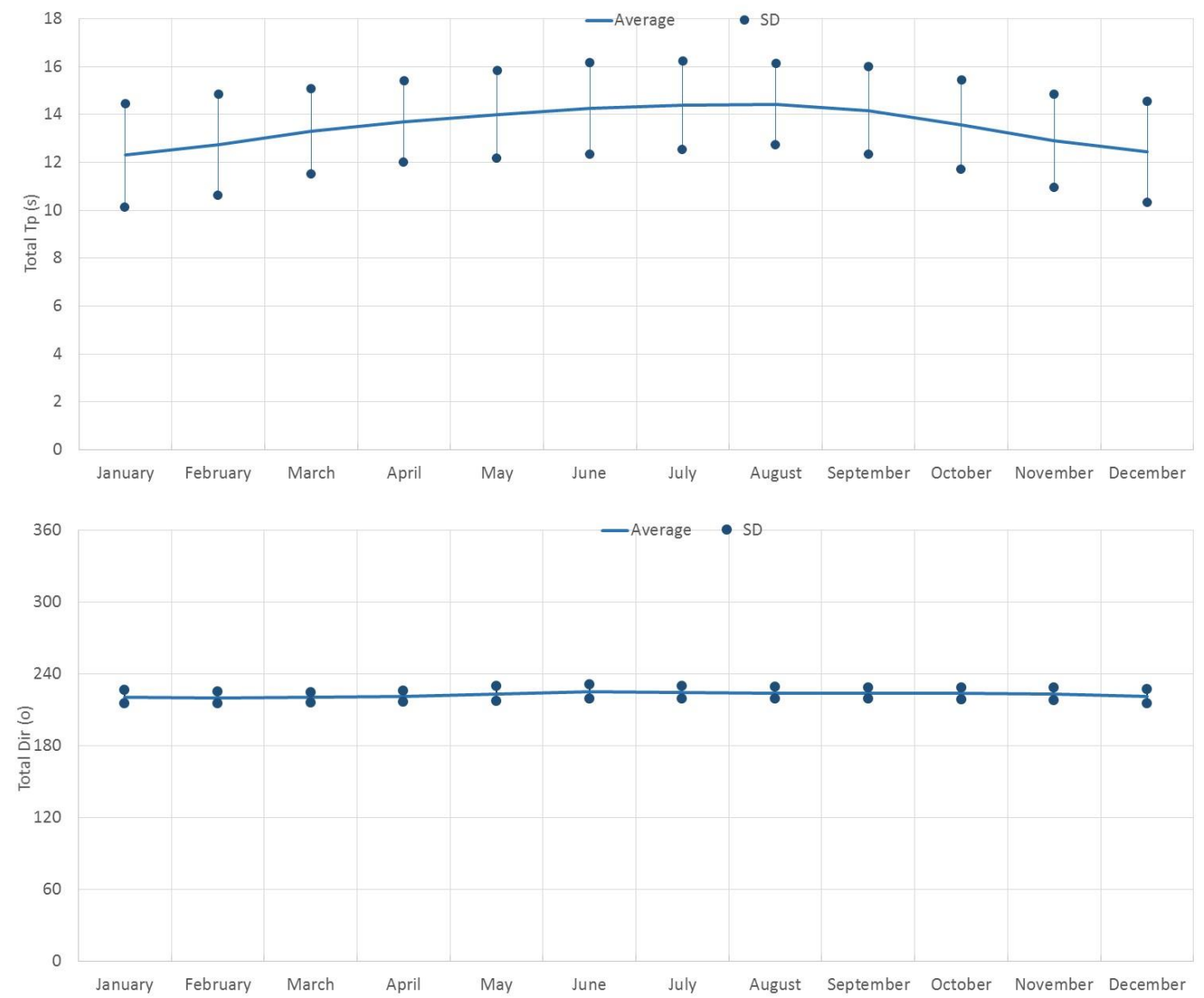
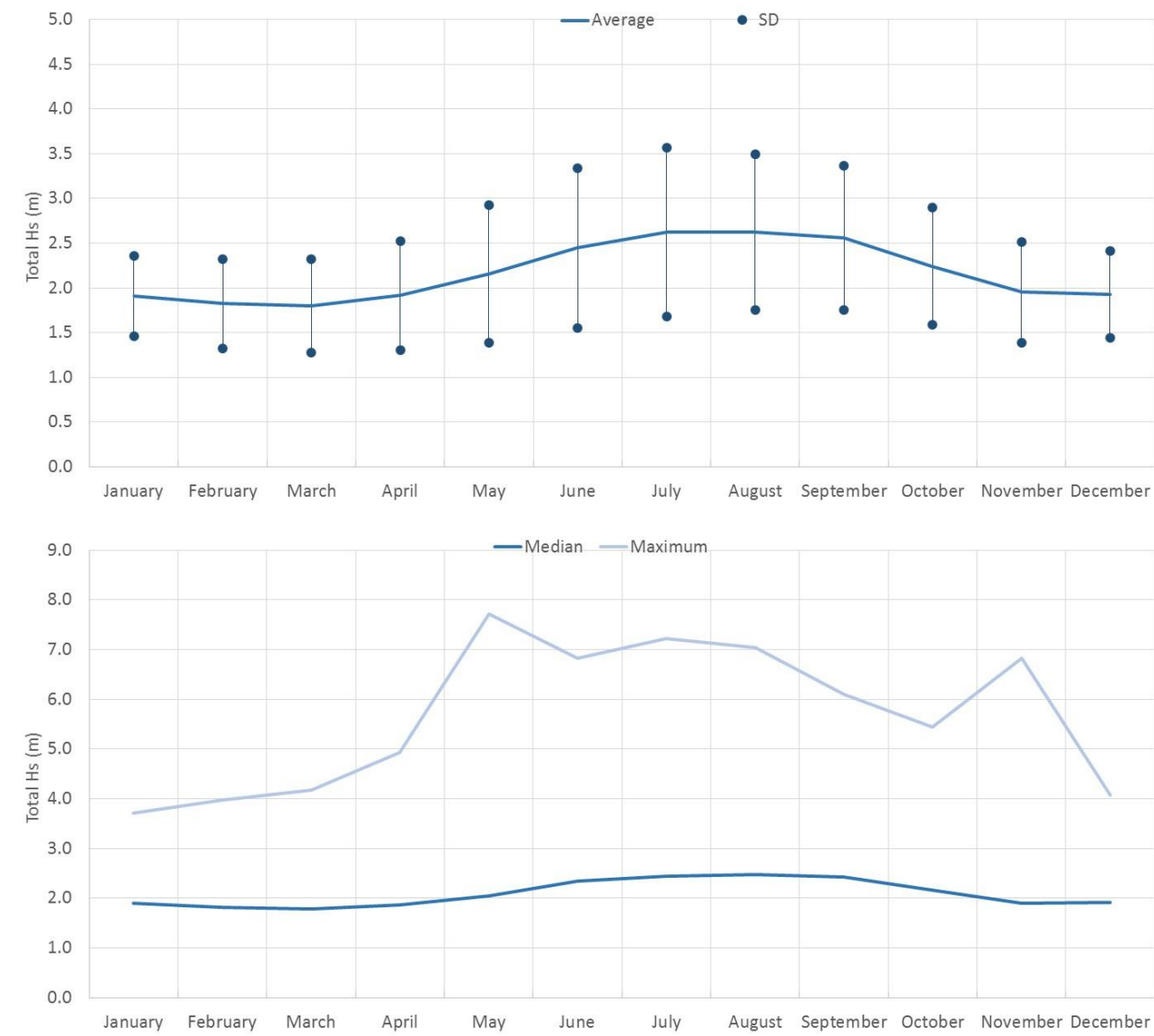


Figure 3.1 Monthly Wave Climate Statistics for Geraldton WWII hindcast data

Table 3.2 Monthly Wave Climate Statistics for Jurien Bay Wave Recordings (02/01/1998 – 31/11/2017)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	2.13	1.96	1.96	1.99	2.18	2.41	2.62	2.60	2.68	2.38	2.11	2.05	2.25
	Standard Deviation (m)	0.58	0.60	0.62	0.72	0.85	0.91	0.95	0.91	0.97	0.72	0.61	0.58	0.81
	Median (m)	2.06	1.93	1.91	1.90	2.04	2.26	2.45	2.47	2.52	2.26	2.08	2.02	2.14
	Maximum (m)	5.41	4.52	4.96	6.36	6.67	6.78	7.26	7.60	6.69	6.60	5.35	5.04	7.60
	Minimum (m)	0.61	0.19	0.45	0.53	0.63	0.74	0.61	0.78	0.61	0.67	0.64	0.37	0.19
	Average Exceedance Duration of Threshold Wave Height (hours)	6.06	2.93	5.42	12.60	33.49	53.24	65.34	62.93	76.75	26.69	3.58	2.29	29.28
Swell Hs	Average (m)	1.55	1.43	1.53	1.69	1.90	2.07	2.28	2.26	2.32	1.97	1.61	1.45	1.84
	Standard Deviation (m)	0.55	0.54	0.57	0.69	0.79	0.85	0.86	0.82	0.90	0.72	0.59	0.55	0.78
	Median (m)	1.47	1.37	1.47	1.58	1.77	1.97	2.15	2.15	2.18	1.84	1.54	1.37	1.71
	Maximum (m)	5.18	4.29	4.65	6.21	6.05	6.10	6.74	6.83	6.07	5.98	4.86	4.63	6.83
	Minimum (m)	0.30	0.15	0.36	0.32	0.24	0.33	0.38	0.60	0.50	0.52	0.49	0.14	0.14
Sea Hs	Average (m)	1.41	1.29	1.17	1.00	1.02	1.14	1.22	1.21	1.26	1.29	1.31	1.39	1.22
	Standard Deviation (m)	0.41	0.44	0.42	0.39	0.49	0.55	0.59	0.57	0.54	0.42	0.42	0.40	0.49
	Median (m)	1.41	1.28	1.14	0.95	0.90	0.98	1.07	1.07	1.16	1.24	1.30	1.38	1.16
	Maximum (m)	2.96	2.77	3.23	2.90	3.42	3.20	3.15	3.36	3.48	3.45	2.87	2.63	3.48
	Minimum (m)	0.29	0.12	0.18	0.16	0.20	0.21	0.27	0.26	0.23	0.30	0.26	0.24	0.12
Total Tp	Average (s)	11.75	11.76	12.69	13.54	13.64	13.88	13.98	14.04	13.93	13.25	12.50	11.63	13.06
	Standard Deviation (s)	2.69	2.66	2.51	2.10	2.25	2.38	2.25	2.24	2.21	2.32	2.51	2.79	2.58
Swell Tp	Average (s)	12.22	12.21	12.96	13.62	13.73	14.03	14.10	14.14	14.02	13.42	12.83	12.15	13.29
	Standard Deviation (s)	2.20	2.21	2.15	1.96	2.08	2.13	2.05	2.07	2.06	2.06	2.07	2.23	2.23
Sea Tp	Average (s)	6.84	6.78	6.74	6.70	6.66	6.57	6.83	6.79	6.85	6.77	6.66	6.74	6.74
	Standard Deviation (s)	0.93	1.02	1.11	1.28	1.42	1.41	1.29	1.28	1.19	1.08	1.06	0.95	1.19
Swell Direction	Average (°)	231.65	230.13	230.44	232.61	236.15	238.88	239.88	239.54	239.55	238.66	235.94	231.35	235.05
	Standard Deviation (°)	10.61	13.05	9.50	9.46	9.90	9.38	8.43	9.98	9.38	8.24	9.81	10.96	10.73
Sea Direction	Average (°)	211.07	207.72	208.63	218.36	231.25	244.77	238.90	237.18	227.88	223.07	219.33	208.54	220.83
	Standard Deviation (°)	17.16	17.85	22.01	36.98	45.86	55.53	47.93	42.59	37.91	27.69	26.15	13.11	36.34

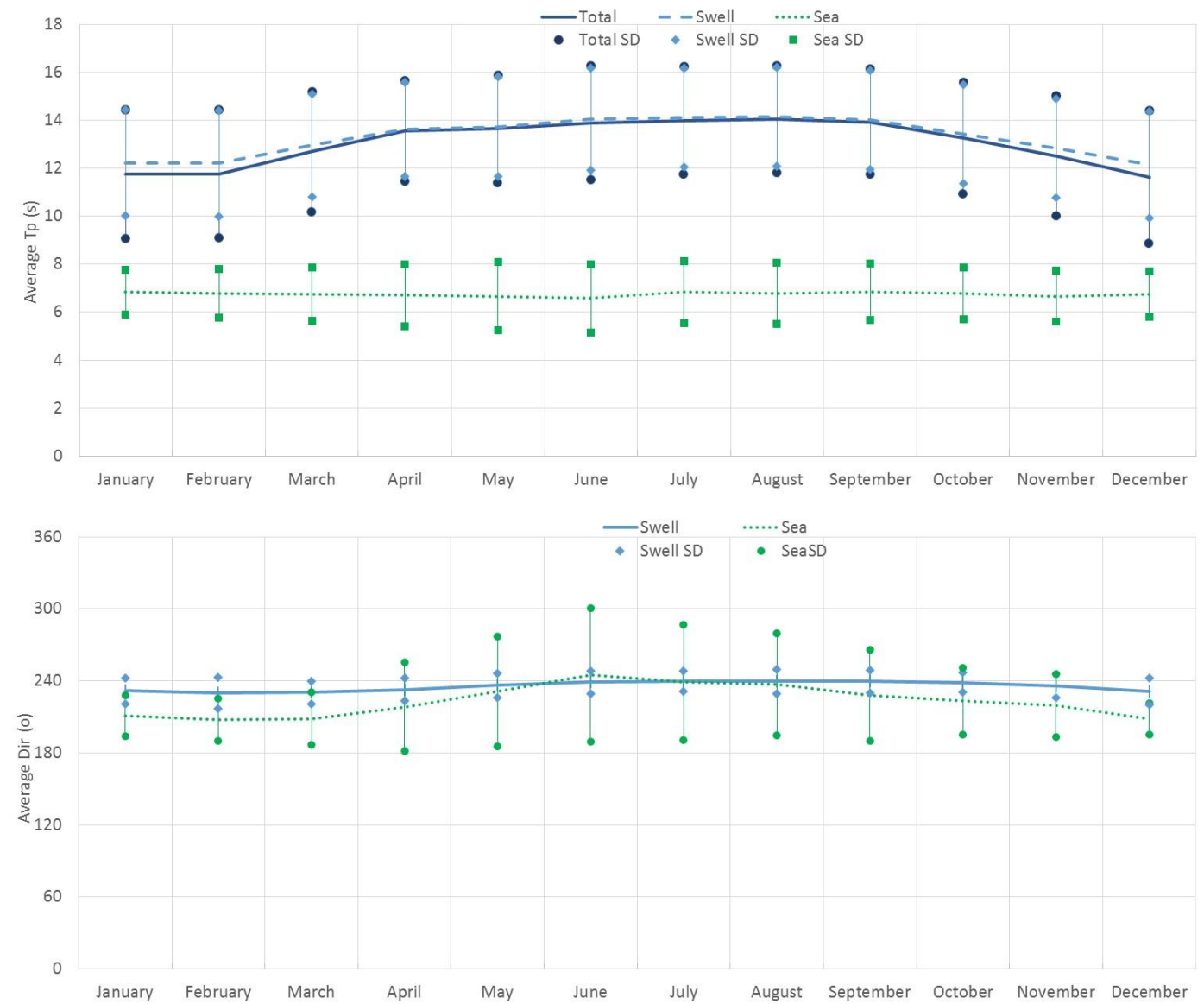
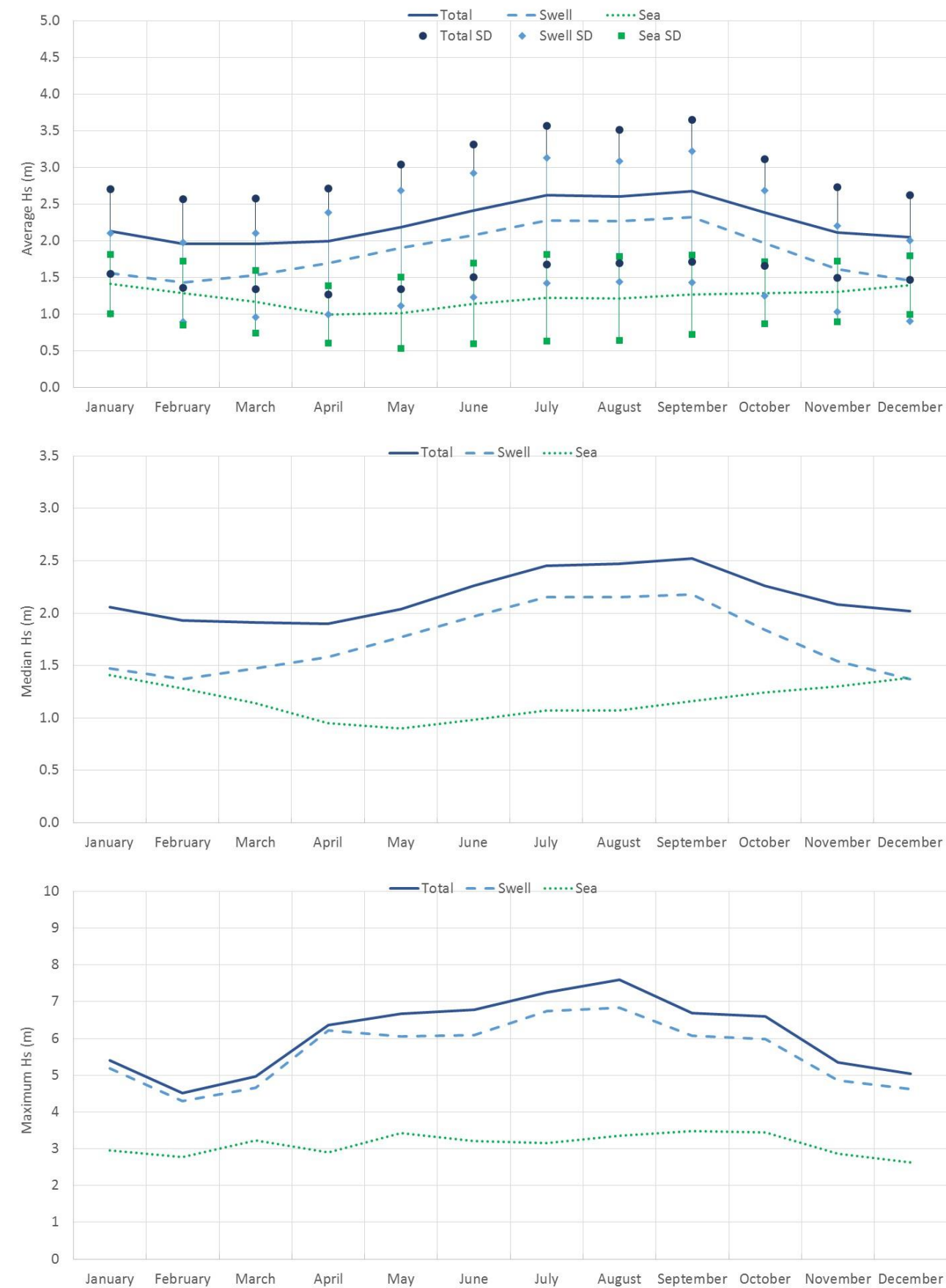


Figure 3.2 Monthly Wave Climate Statistics for Jurien Bay Wave Recordings

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Table 3.3 Monthly Wave Climate Statistics for Rottnest Wave Recordings (11/03/1994 – 31/11/2017)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	1.84	1.72	1.72	1.82	2.15	2.45	2.73	2.64	2.68	2.18	1.91	1.83	2.15
	Standard Deviation (m)	0.58	0.60	0.63	0.72	0.98	1.02	1.14	1.02	1.07	0.83	0.69	0.61	0.93
	Median (m)	1.78	1.67	1.63	1.70	1.93	2.27	2.48	2.45	2.48	2.02	1.82	1.79	1.96
	Maximum (m)	4.53	4.81	5.80	5.96	7.89	7.88	8.94	7.61	7.46	7.95	8.00	5.25	8.94
	Minimum (m)	0.50	0.41	0.41	0.35	0.41	0.19	0.68	0.65	0.69	0.39	0.45	0.32	0.19
	Average Exceedance Duration of Threshold Wave Height (hours)	0.59	1.00	3.21	9.19	39.89	61.81	101.55	77.31	87.70	26.59	6.82	1.96	34.80
Swell Hs	Average (m)	1.32	1.24	1.33	1.51	1.81	2.04	2.31	2.26	2.30	1.80	1.45	1.29	1.73
	Standard Deviation (m)	0.52	0.52	0.56	0.66	0.88	0.94	1.04	0.93	0.98	0.78	0.64	0.54	0.87
	Median (m)	1.23	1.14	1.24	1.39	1.63	1.87	2.10	2.10	2.12	1.63	1.36	1.21	1.54
	Maximum (m)	4.09	4.65	5.17	5.24	7.29	7.22	8.53	7.13	6.83	7.35	7.38	4.68	8.53
	Minimum (m)	0.26	0.28	0.31	0.25	0.28	0.10	0.48	0.47	0.45	0.28	0.24	0.20	0.10
Sea Hs	Average (m)	1.23	1.13	1.03	0.96	1.09	1.28	1.37	1.30	1.32	1.18	1.18	1.24	1.19
	Standard Deviation (m)	0.46	0.48	0.46	0.45	0.58	0.62	0.66	0.61	0.60	0.49	0.47	0.47	0.55
	Median (m)	1.19	1.10	0.97	0.88	0.92	1.11	1.23	1.16	1.19	1.10	1.13	1.19	1.09
	Maximum (m)	2.95	3.10	3.19	3.21	3.72	3.67	3.89	3.61	3.55	3.51	4.69	2.93	4.69
	Minimum (m)	0.20	0.14	0.15	0.11	0.16	0.13	0.23	0.29	0.18	0.15	0.16	0.14	0.11
Total Tp	Average (s)	11.60	11.57	12.36	12.95	13.10	13.23	13.44	13.29	13.13	12.56	12.05	11.38	12.57
	Standard Deviation (s)	2.78	2.78	2.58	2.72	2.48	2.64	2.39	2.61	2.53	2.53	2.65	2.90	2.73
Swell Tp	Average (s)	12.25	12.17	12.78	13.15	13.31	13.56	13.64	13.64	13.46	12.98	12.57	12.14	12.98
	Standard Deviation (s)	2.04	2.07	2.00	2.44	2.16	2.23	2.11	2.08	2.06	1.90	1.99	2.07	2.17
Sea Tp	Average (s)	6.57	6.60	6.60	6.83	6.82	6.83	6.96	6.91	6.95	6.74	6.69	6.67	6.76
	Standard Deviation (s)	1.18	1.30	1.40	1.31	1.35	1.27	1.18	1.20	1.15	1.24	1.22	1.15	1.25
Swell Direction	Average (°)	246.25	245.54	246.90	249.06	252.47	256.43	257.27	257.00	255.57	253.34	251.97	246.93	251.60
	Standard Deviation (°)	8.90	11.12	8.24	9.15	9.08	12.07	10.04	9.14	7.76	7.94	9.03	8.61	10.23
Sea Direction	Average (°)	222.41	221.08	222.75	232.60	247.98	255.41	258.39	252.53	246.30	237.74	232.93	224.89	236.88
	Standard Deviation (°)	24.93	33.62	38.16	38.44	52.15	60.13	44.68	40.29	32.08	30.71	31.46	23.99	40.30

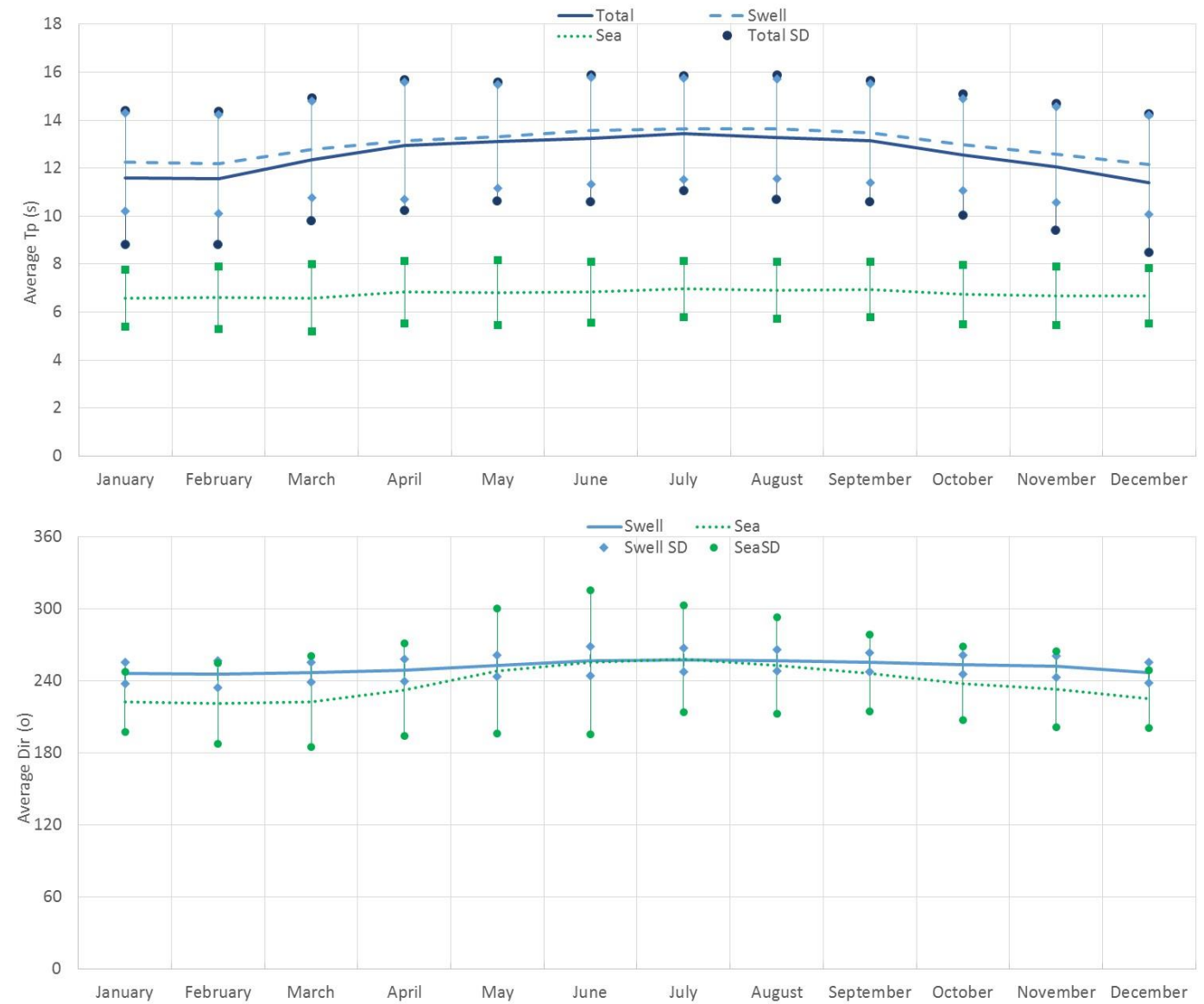
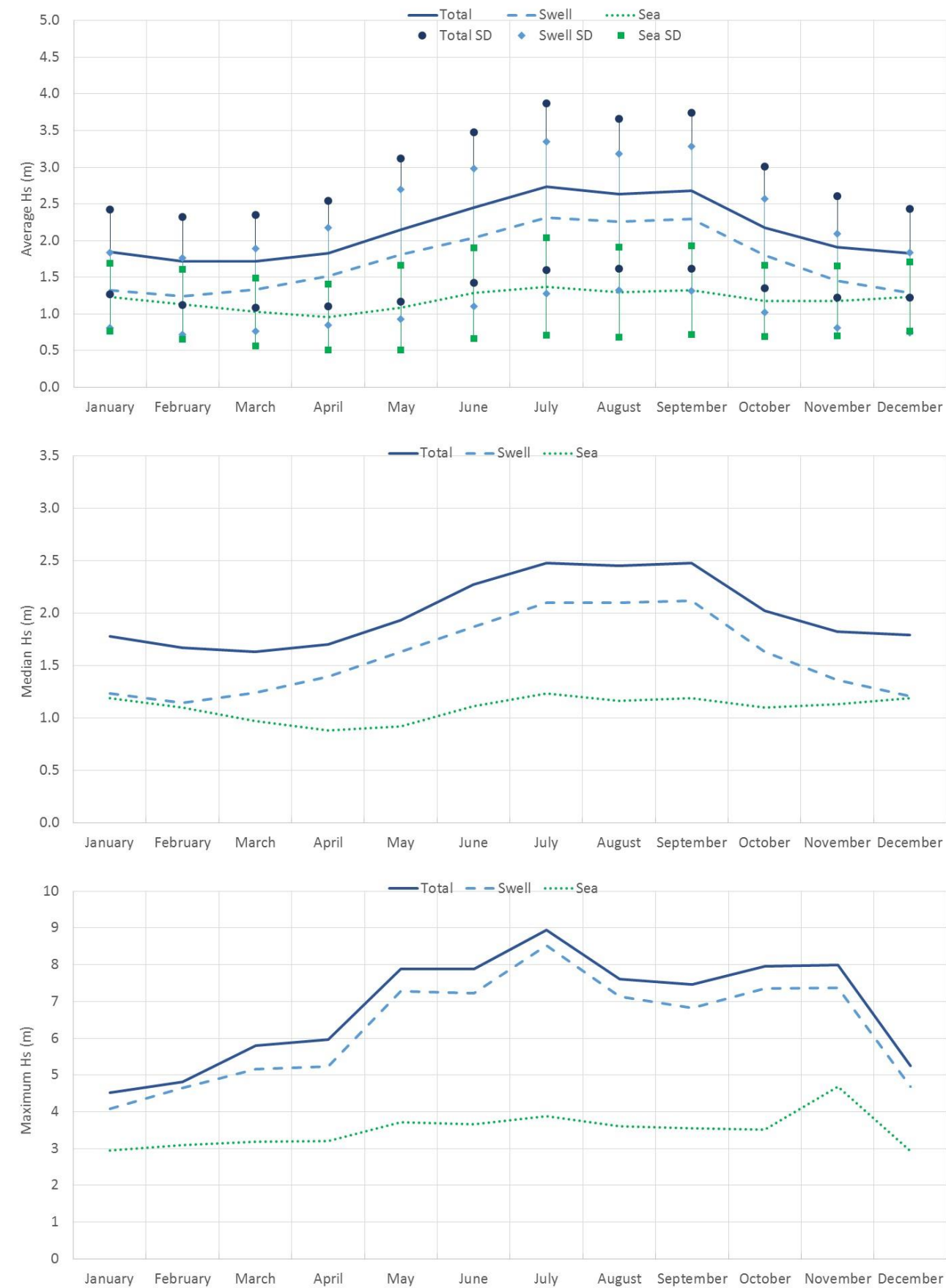


Figure 3.3 Monthly Wave Climate Statistics for Rottneast Wave Recordings

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Table 3.4 Monthly Wave Climate Statistics for Cape Naturaliste Wave Recordings (28/05/1999 – 31/10/2017)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	2.24	2.07	2.26	2.45	2.76	3.11	3.35	3.21	3.27	2.70	2.31	2.16	2.67
	Standard Deviation (m)	0.66	0.68	0.79	0.88	1.04	1.07	1.13	1.07	1.20	0.93	0.80	0.71	1.04
	Median (m)	2.12	1.99	2.16	2.31	2.56	2.92	3.17	3.05	3.08	2.53	2.22	2.06	2.47
	Maximum (m)	6.88	6.66	6.84	7.64	8.12	7.85	8.66	9.13	9.47	8.49	7.67	6.74	9.47
	Minimum (m)	0.61	0.61	0.54	0.32	0.61	1.06	0.75	0.73	0.71	0.71	0.71	0.50	0.32
	Average Exceedance Duration of Threshold Wave Height (hours)	2.06	1.56	5.97	14.44	32.64	55.86	83.69	61.41	84.15	25.44	7.24	1.92	31.36
Swell Hs	Average (m)	1.74	1.60	1.85	2.08	2.35	2.61	2.86	2.76	2.84	2.29	1.87	1.67	2.22
	Standard Deviation (m)	0.68	0.67	0.78	0.87	0.98	1.05	1.08	1.01	1.13	0.89	0.80	0.73	1.01
	Median (m)	1.61	1.47	1.71	1.93	2.17	2.47	2.70	2.63	2.66	2.13	1.75	1.51	2.04
	Maximum (m)	6.67	6.09	6.33	7.35	7.67	7.17	8.13	8.67	9.18	7.85	7.14	6.35	9.18
	Minimum (m)	0.37	0.48	0.44	0.27	0.50	0.43	0.57	0.60	0.55	0.51	0.47	0.26	0.26
Sea Hs	Average (m)	1.34	1.26	1.23	1.23	1.38	1.59	1.66	1.57	1.56	1.37	1.30	1.31	1.41
	Standard Deviation (m)	0.39	0.41	0.44	0.45	0.58	0.60	0.63	0.59	0.59	0.47	0.44	0.40	0.53
	Median (m)	1.31	1.24	1.21	1.16	1.23	1.47	1.56	1.46	1.46	1.30	1.24	1.29	1.31
	Maximum (m)	2.83	2.88	3.30	3.62	4.22	5.01	4.07	4.84	4.42	3.46	3.34	2.79	5.01
	Minimum (m)	0.30	0.21	0.24	0.18	0.33	0.48	0.38	0.37	0.38	0.37	0.33	0.26	0.18
Total Tp	Average (s)	12.10	11.89	12.64	13.13	13.22	13.28	13.48	13.60	13.51	13.00	12.39	11.78	12.85
	Standard Deviation (s)	2.39	2.45	2.32	2.24	2.42	2.63	2.35	2.27	2.20	2.10	2.39	2.53	2.44
Swell Tp	Average (s)	12.40	12.23	12.85	13.27	13.39	13.55	13.64	13.70	13.59	13.09	12.65	12.18	13.06
	Standard Deviation (s)	1.94	2.02	1.95	2.01	2.19	2.26	2.12	2.13	2.05	1.94	1.97	1.95	2.12
Sea Tp	Average (s)	6.58	6.51	6.48	6.62	6.73	6.81	6.92	6.93	7.00	6.89	6.68	6.62	6.73
	Standard Deviation (s)	1.20	1.36	1.37	1.30	1.28	1.15	1.09	1.11	1.09	1.16	1.22	1.21	1.22
Swell Direction	Average (°)	235.59	232.97	233.87	235.19	238.77	243.58	242.50	243.18	243.26	240.52	239.08	233.99	238.63
	Standard Deviation (°)	12.02	14.46	9.83	11.53	13.48	15.61	15.19	12.30	11.58	11.23	13.06	11.89	13.35
Sea Direction	Average (°)	207.20	197.23	202.59	219.97	240.44	253.37	251.92	246.82	238.12	225.66	220.47	207.15	224.84
	Standard Deviation (°)	39.81	44.29	52.28	54.36	62.37	65.27	57.50	50.06	45.32	42.85	45.46	34.80	53.41

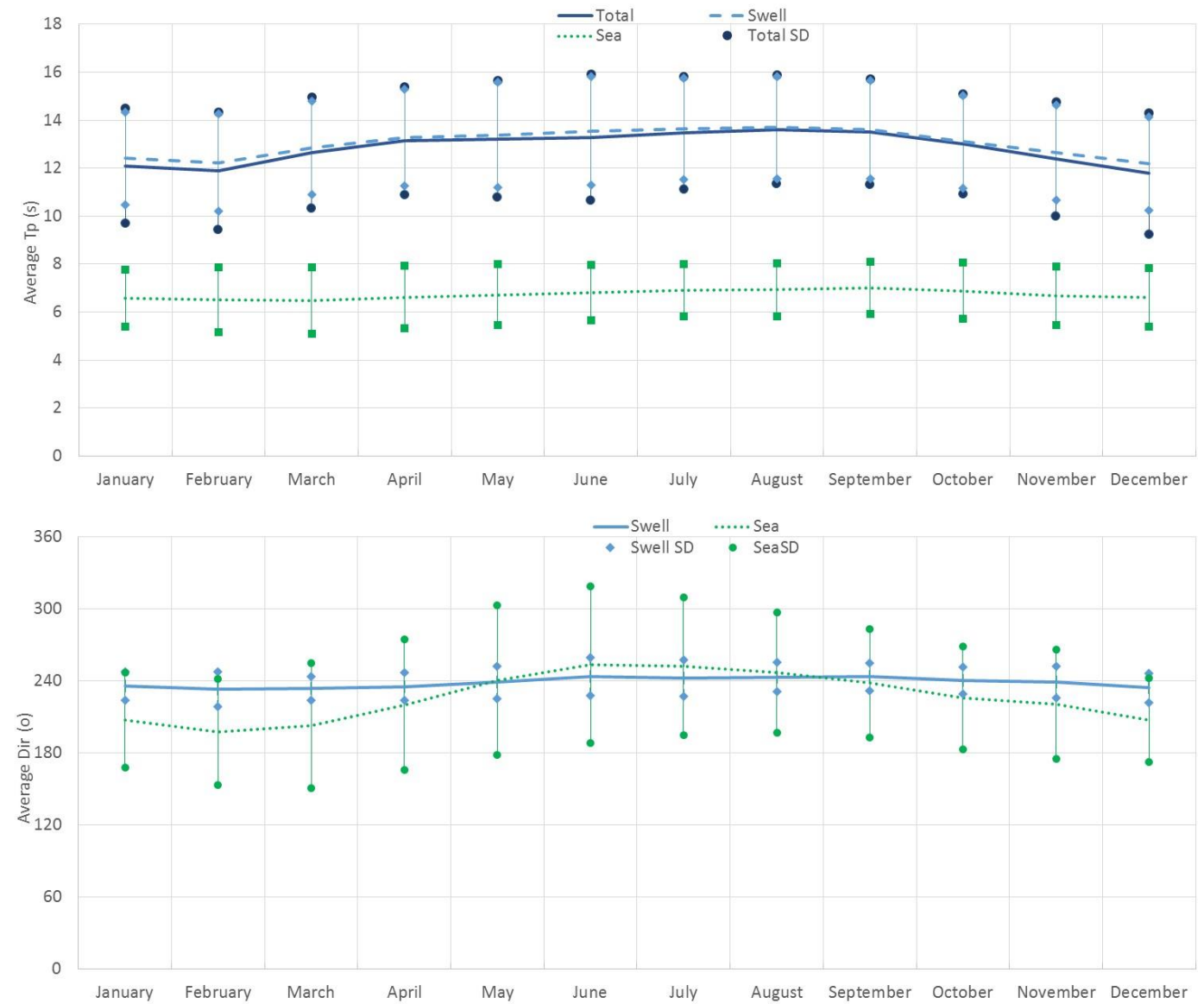
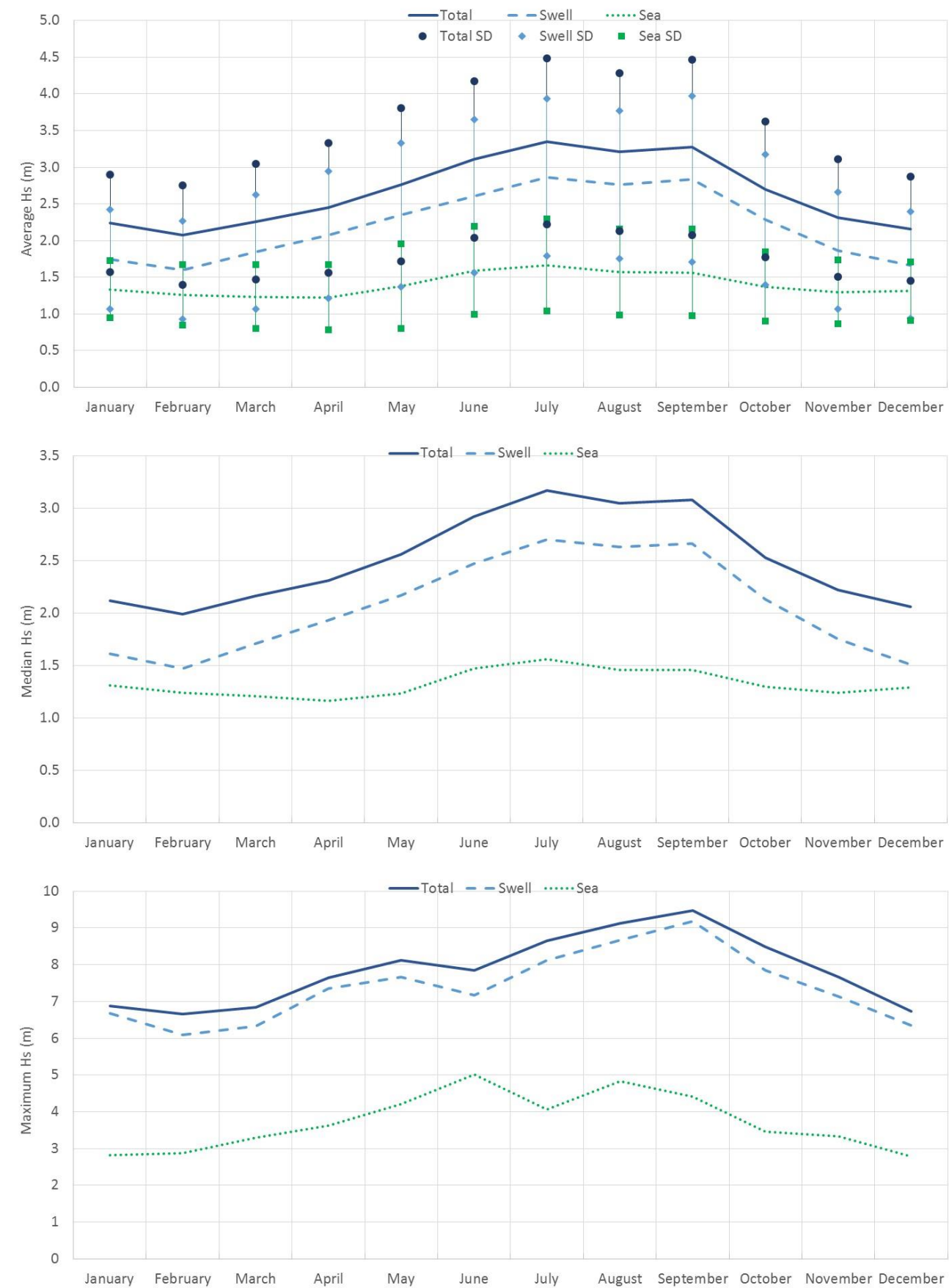


Figure 3.4 Monthly Wave Climate Statistics for Cape Naturaliste Wave Recordings

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Table 3.5 Monthly Wave Climate Statistics for Albany Wave Recordings (26/07/2005 – 31/10/2017)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	2.47	2.37	2.62	2.78	2.93	2.92	3.20	3.14	3.37	2.95	2.49	2.48	2.82
	Standard Deviation (m)	0.68	0.68	0.84	0.95	1.06	1.05	1.04	1.02	1.16	0.96	0.68	0.78	0.98
	Median (m)	2.33	2.25	2.46	2.62	2.73	2.68	3.01	3.02	3.20	2.75	2.40	2.32	2.61
	Maximum (m)	6.06	5.91	7.12	7.28	8.51	7.24	8.18	8.82	9.01	7.74	6.33	6.40	9.01
	Minimum (m)	1.00	0.98	1.12	1.13	1.07	1.12	1.15	1.12	1.08	1.05	0.94	1.02	0.94
	Average Exceedance Duration of Threshold Wave Height (hours)	6.52	4.00	15.58	25.49	36.75	47.79	52.82	42.37	87.86	33.59	6.50	6.50	30.48
Swell Hs	Average (m)	2.00	1.85	2.18	2.38	2.50	2.46	2.74	2.69	2.88	2.47	2.00	1.99	2.35
	Standard Deviation (m)	0.71	0.72	0.84	0.93	1.00	1.01	0.96	0.97	1.09	0.94	0.70	0.78	0.96
	Median (m)	1.87	1.70	2.03	2.22	2.34	2.26	2.60	2.57	2.71	2.29	1.90	1.82	2.18
	Maximum (m)	5.77	5.78	6.56	6.84	8.29	6.58	7.59	8.23	8.57	7.05	5.62	5.86	8.57
	Minimum (m)	0.35	0.55	0.68	0.65	0.55	0.61	0.66	0.84	0.59	0.68	0.44	0.46	0.35
Sea Hs	Average (m)	1.40	1.42	1.40	1.38	1.46	1.49	1.60	1.56	1.70	1.56	1.43	1.43	1.49
	Standard Deviation (m)	0.36	0.36	0.41	0.44	0.54	0.55	0.59	0.54	0.60	0.50	0.40	0.41	0.49
	Median (m)	1.32	1.36	1.31	1.28	1.33	1.39	1.49	1.47	1.57	1.44	1.35	1.36	1.38
	Maximum (m)	3.50	3.07	4.43	3.13	4.81	3.67	3.61	3.92	4.01	3.98	3.23	3.34	4.81
	Minimum (m)	0.65	0.65	0.58	0.58	0.56	0.54	0.58	0.56	0.51	0.57	0.59	0.67	0.51
Total Tp	Average (s)	12.05	11.61	12.55	13.11	13.25	13.39	13.42	13.58	13.48	12.92	12.13	11.61	12.76
	Standard Deviation (s)	2.15	2.49	2.24	2.12	2.16	2.40	2.17	2.18	2.23	2.17	2.38	2.06	2.34
Swell Tp	Average (s)	12.26	12.05	12.72	13.17	13.33	13.51	13.50	13.64	13.54	13.03	12.38	11.80	12.92
	Standard Deviation (s)	1.89	2.13	2.03	2.05	2.04	2.26	2.06	2.08	2.14	2.01	2.09	1.83	2.15
Sea Tp	Average (s)	6.63	6.63	6.61	6.68	6.66	6.62	6.65	6.73	6.72	6.73	6.60	6.61	6.66
	Standard Deviation (s)	1.07	1.07	1.06	1.06	1.08	1.08	1.08	1.05	1.05	1.06	1.07	1.06	1.07
Swell Direction	Average (°)	219.94	213.60	213.64	213.78	214.50	214.47	215.02	215.29	217.40	218.87	215.60	214.14	215.60
	Standard Deviation (°)	18.50	26.83	24.70	16.52	15.62	20.72	17.04	15.13	14.82	19.82	26.08	22.09	20.33
Sea Direction	Average (°)	173.08	158.13	168.37	182.41	196.81	200.78	211.81	207.10	211.46	192.63	180.63	181.99	189.20
	Standard Deviation (°)	53.89	49.36	50.61	52.44	50.23	55.25	44.08	49.67	46.91	54.55	55.67	45.56	53.52

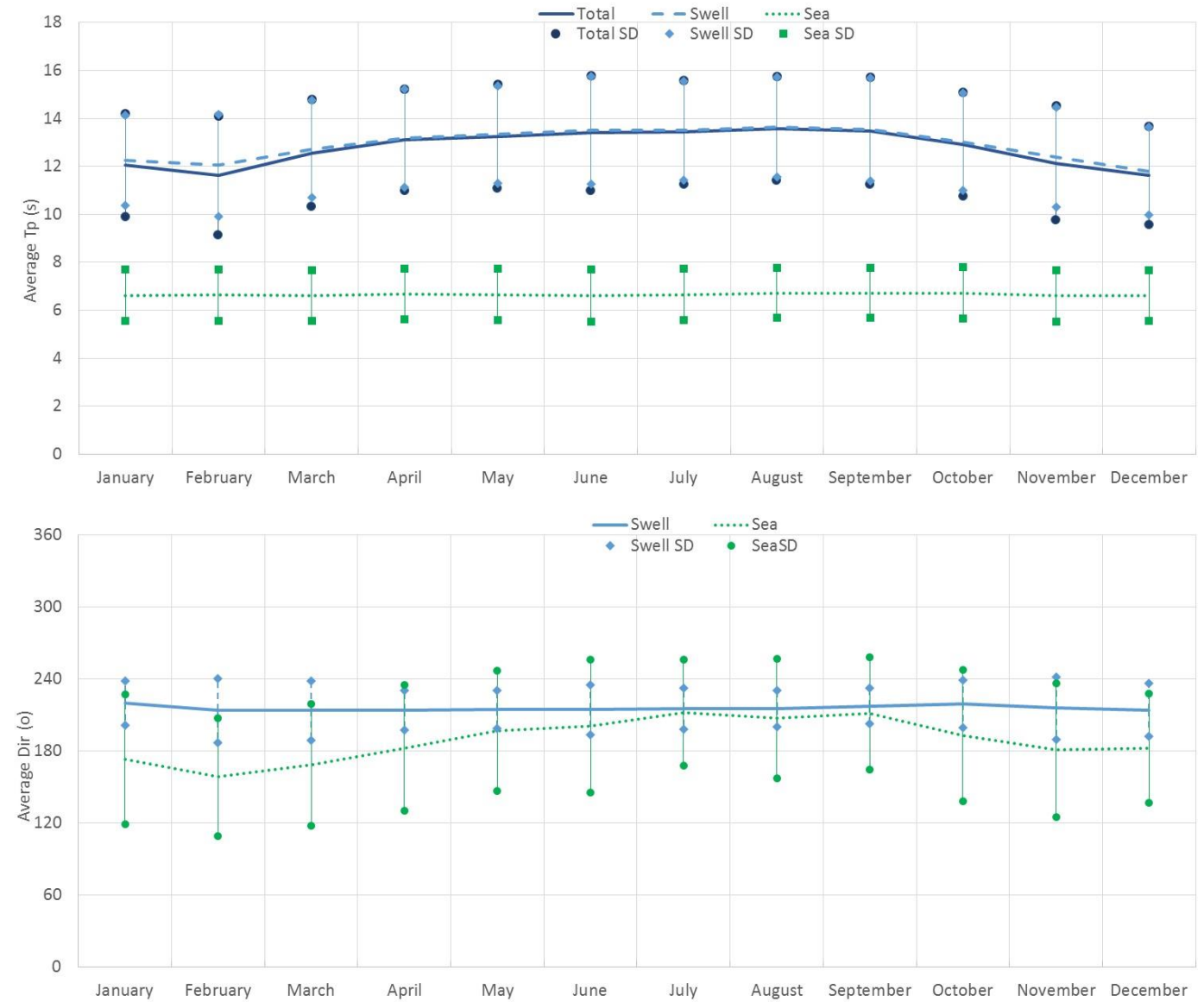
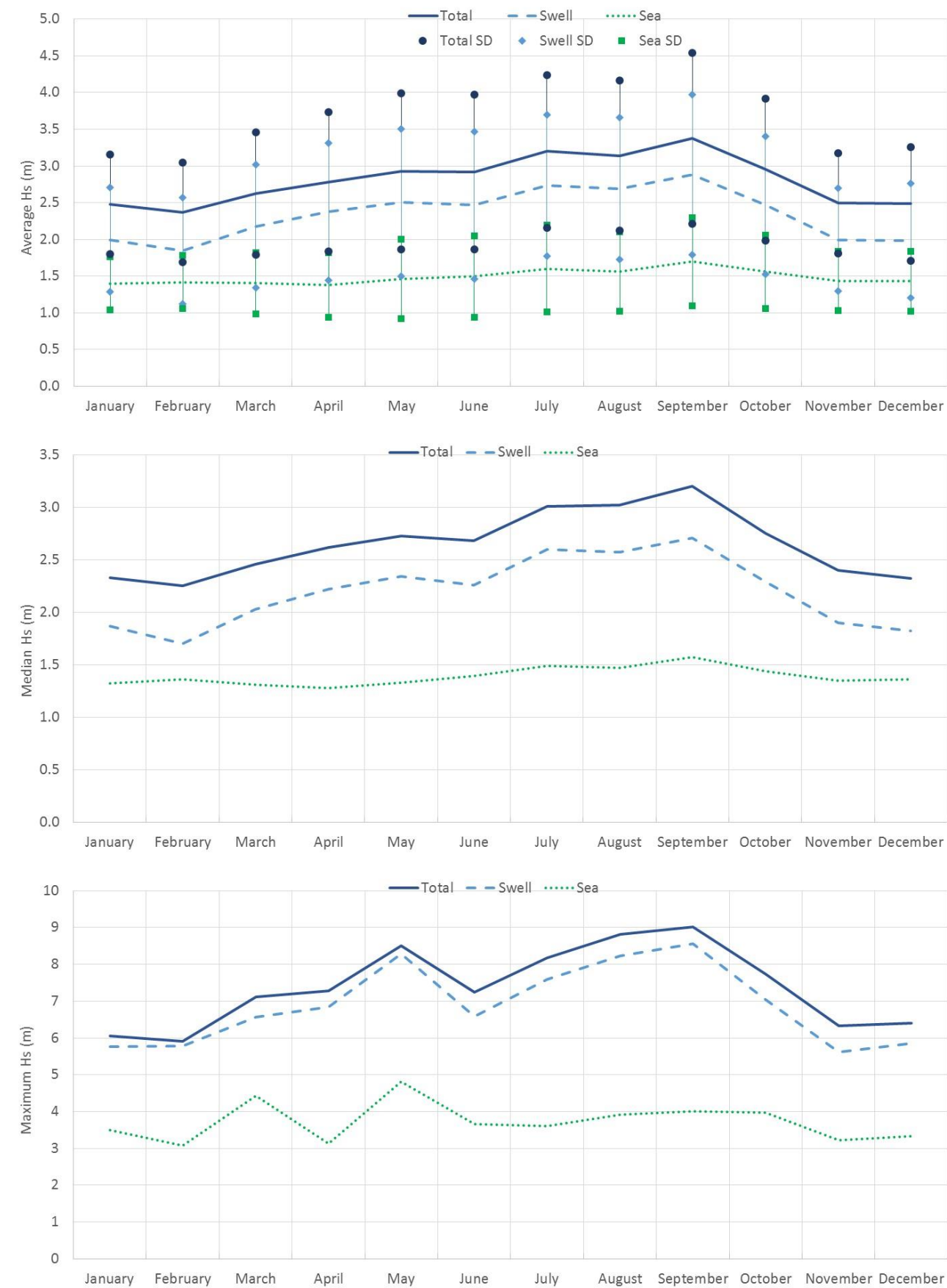


Figure 3.5 Monthly Wave Climate Statistics for Albany Wave Recordings

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Table 3.6 Monthly Wave Climate Statistics for Bremer & Hopetoun WWII hindcast data (1979-2010)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	2.30	2.33	2.40	2.45	2.48	2.58	2.73	2.88	2.79	2.54	2.28	2.28	2.50
	Standard Deviation(m)	0.60	0.58	0.69	0.83	0.92	1.07	0.97	0.97	0.95	0.78	0.68	0.64	0.85
	Median (m)	2.21	2.26	2.30	2.32	2.31	2.35	2.54	2.74	2.62	2.41	2.20	2.18	2.35
	Maximum (m)	6.34	5.73	6.39	6.39	7.72	7.23	6.89	8.18	7.51	6.64	6.07	6.29	8.18
	Minimum (m)	0.55	0.97	0.66	0.94	0.71	0.70	0.67	0.73	1.06	0.78	0.72	0.69	0.55
	Average Exceedance Duration of Threshold Wave Height (hours)	5.13	5.23	13.45	28.84	37.74	62.61	67.06	73.55	64.84	29.42	8.81	10.65	33.94
Total Tp	Average (s)	11.98	12.27	12.93	13.42	13.55	13.73	13.84	13.91	13.75	13.11	12.23	12.08	13.07
	Standard Deviation (s)	2.17	2.20	1.92	1.80	1.91	2.10	2.00	1.86	1.92	2.04	2.32	2.12	2.15
Total Direction	Average (°)	200.34	200.23	202.15	204.19	204.58	205.96	206.04	206.32	206.76	205.90	200.87	201.42	203.82
	Standard Deviation (°)	24.96	23.91	17.50	10.75	12.45	13.29	12.14	9.65	10.65	14.58	25.57	23.62	17.65

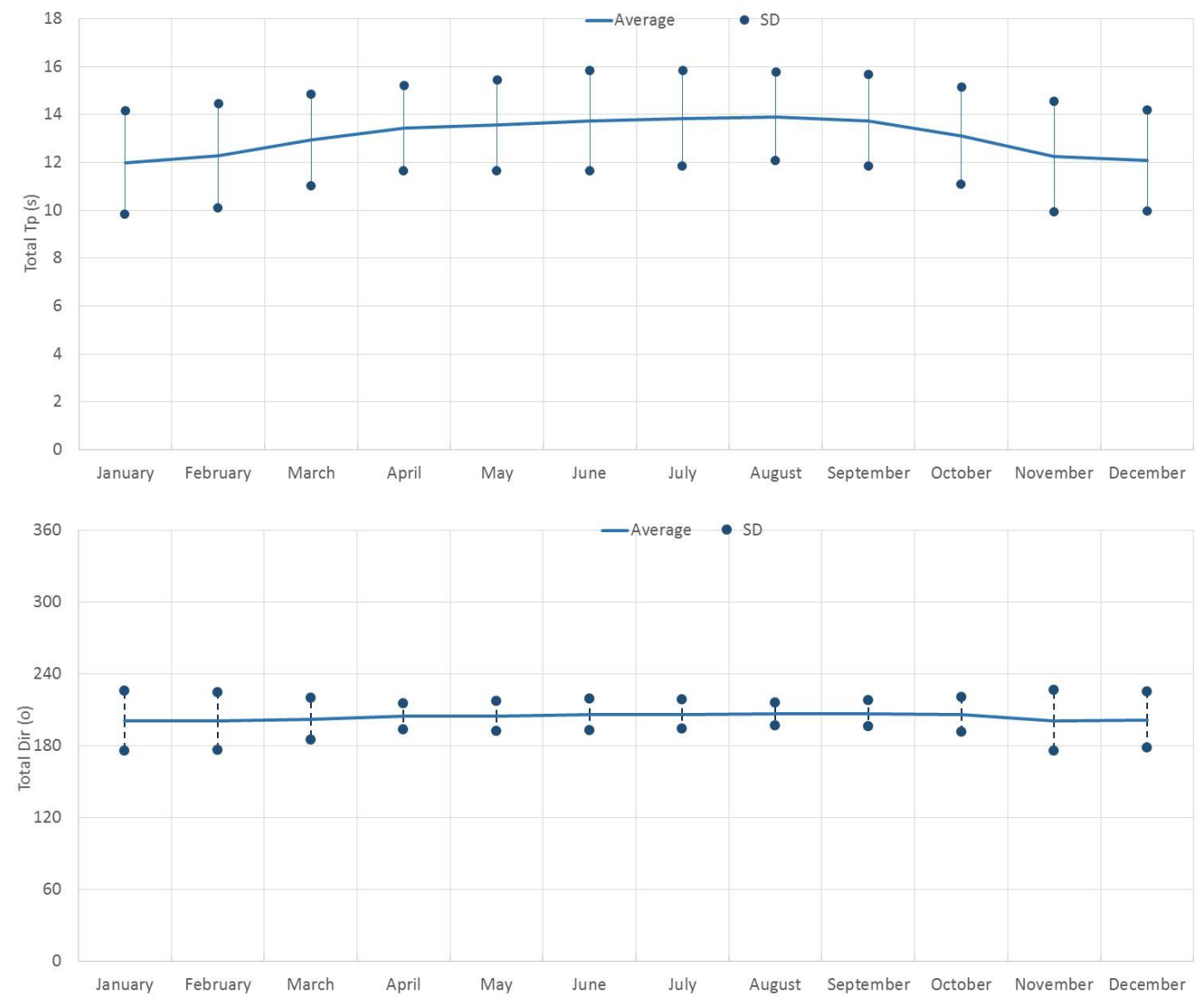
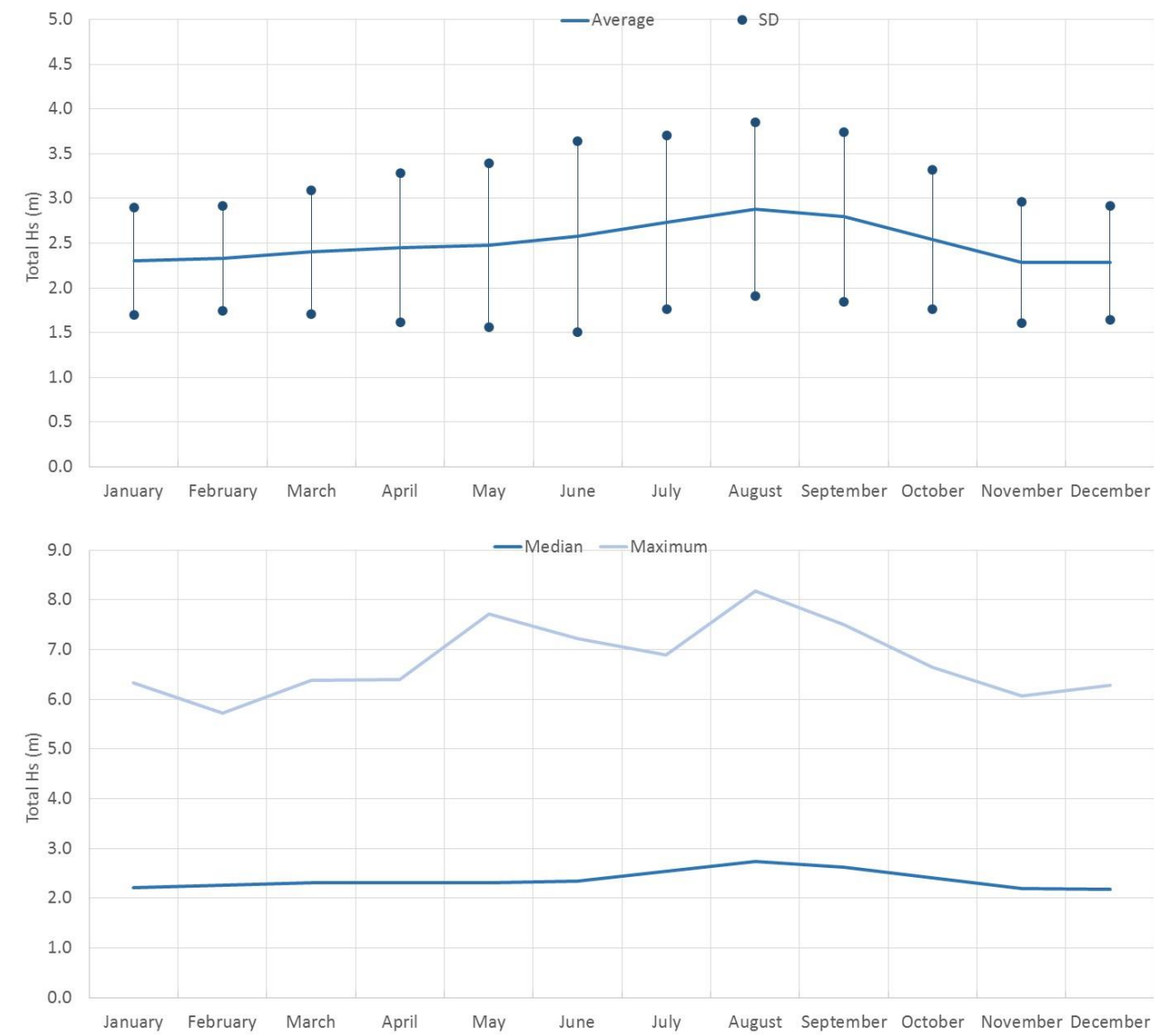


Figure 3.6 Monthly Wave Climate Statistics for Esperance Wave Recordings

Table 3.7 Monthly Wave Climate Statistics for Esperance Wave Recordings (18/06/2006 – 31/10/2017)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	1.66	1.49	1.70	1.75	1.96	1.89	2.13	2.09	2.25	1.92	1.60	1.63	1.84
	Standard Deviation (m)	0.57	0.55	0.66	0.70	0.81	0.83	0.86	0.83	0.92	0.75	0.59	0.62	0.77
	Median (m)	1.58	1.39	1.59	1.63	1.83	1.74	1.99	1.94	2.10	1.77	1.52	1.52	1.70
	Maximum (m)	4.38	3.61	4.53	4.83	6.15	6.10	6.93	6.04	6.18	6.33	5.72	5.18	6.93
	Minimum (m)	0.37	0.47	0.44	0.41	0.57	0.51	0.51	0.67	0.61	0.58	0.42	0.39	0.37
	Average Exceedance Duration of Threshold Wave Height (hours)	9.59	0.80	18.68	21.08	37.11	38.08	62.12	43.27	65.98	31.71	10.36	9.23	29.00
Swell Hs	Average (m)	1.26	1.09	1.33	1.36	1.49	1.44	1.60	1.60	1.73	1.50	1.19	1.20	1.40
	Standard Deviation (m)	0.52	0.52	0.56	0.60	0.63	0.68	0.68	0.65	0.72	0.62	0.52	0.54	0.63
	Median (m)	1.18	1.03	1.25	1.26	1.40	1.35	1.51	1.49	1.61	1.39	1.15	1.11	1.31
	Maximum (m)	3.85	3.17	4.10	4.33	4.70	5.36	5.64	5.34	5.05	5.63	4.04	4.36	5.64
	Minimum (m)	0.21	0.17	0.20	0.25	0.30	0.14	0.27	0.30	0.35	0.40	0.24	0.22	0.14
Sea Hs	Average (m)	1.04	0.97	1.03	1.05	1.22	1.17	1.35	1.29	1.40	1.15	1.02	1.06	1.15
	Standard Deviation (m)	0.37	0.35	0.45	0.48	0.60	0.60	0.66	0.63	0.68	0.53	0.43	0.43	0.55
	Median (m)	0.98	0.92	0.93	0.93	1.06	1.01	1.18	1.15	1.25	1.03	0.93	0.99	1.01
	Maximum (m)	3.12	2.99	3.67	3.50	4.25	4.13	4.76	3.96	4.20	4.18	4.18	3.39	4.76
	Minimum (m)	0.31	0.29	0.28	0.24	0.25	0.24	0.25	0.28	0.28	0.28	0.25	0.22	0.22
Total Tp	Average (s)	11.49	11.24	11.82	12.01	12.00	12.30	12.27	12.29	12.36	12.26	11.48	11.05	11.88
	Standard Deviation (s)	2.29	2.43	2.39	2.54	2.46	2.79	2.76	2.51	2.53	2.35	2.69	2.40	2.56
Swell Tp	Average (s)	11.65	11.56	11.99	12.22	12.19	12.59	12.59	12.45	12.57	12.41	11.88	11.32	12.12
	Standard Deviation (s)	2.06	1.97	2.21	2.27	2.20	2.34	2.31	2.29	2.23	2.12	2.15	2.11	2.23
Sea Tp	Average (s)	6.72	6.59	6.88	6.86	6.89	6.68	6.85	6.97	6.91	6.83	6.68	6.88	6.81
	Standard Deviation (s)	1.48	1.54	1.56	1.36	1.32	1.48	1.27	1.15	1.23	1.33	1.47	1.41	1.39
Swell Direction	Average (°)	224.95	222.82	221.96	218.70	218.92	219.19	218.54	219.79	221.37	223.60	223.99	223.65	221.47
	Standard Deviation (°)	10.30	10.55	11.71	11.30	11.90	12.04	11.62	11.53	11.31	10.45	12.43	11.21	11.59
Sea Direction	Average (°)	200.08	203.61	204.77	208.19	214.05	212.19	217.89	218.39	216.68	210.23	205.62	209.28	209.90
	Standard Deviation (°)	47.91	44.52	38.35	41.41	43.48	46.40	34.97	33.59	36.97	40.48	46.69	37.96	41.78

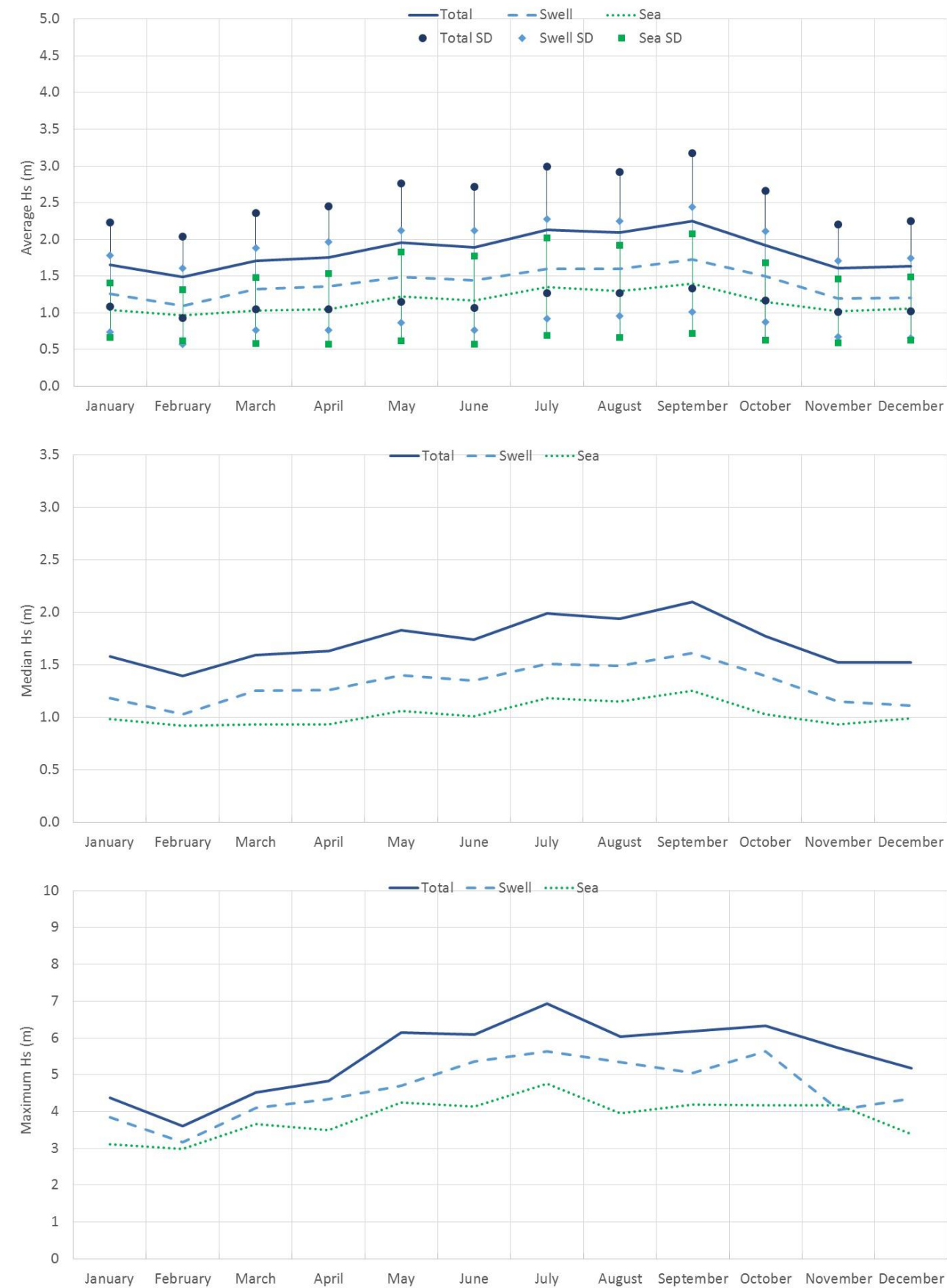


Figure 3.7 Monthly Wave Climate Statistics for Esperance Wave Recordings

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3.2.1 Locational Comparison

To help understand the variation in wave climate within the study area, it is useful to directly compare the key wave statistics for all locations. This information is presented in Figure 3.8.

Comparison of the key wave statistics shows the following.

- Cape Naturaliste and Albany have the highest average and median total wave heights.
- Average and median total wave heights at Rottnest, Jurien and Geraldton are similar over the winter period, however wave heights are higher at Jurien over the summer months, with Geraldton also being slightly higher than Rottnest. This is expected to be a result of the stronger summer sea breeze regime at Jurien. The fact that the wave heights in Geraldton are not as high as Jurien over summer is expected to be due to limitations with WWIII resolving the summer sea breeze.
- Maximum total wave heights are similar for Cape Naturaliste and Albany, while maximum wave heights at Rottnest are slightly lower, with maximum wave heights at Jurien lower still. Maximum wave heights at Bremer are lower than at Albany, which may be due to a slight sheltering due to the alignment of the coastline in this region (the coastline has a south easterly aspect), or could be due to differences between WWIII hindcast data and measurements.
- Average, median and maximum wave heights at Esperance are significantly lower than all other measurement locations (this is discussed further below).
- Peak periods are generally similar at all locations, again with the exception of Esperance.
- Average swell directions are generally from the south-west quadrant, however measurements at Albany are more southerly than the directions at the west coast locations. This difference in direction is likely to be caused by wave refraction effects as longer period swell waves cross the continental shelf. This trend is not observed for other south coast locations Esperance and Bremer & Hopetoun. This is not observed at Esperance due to sheltering of waves from the south through east by the Recherche Archipelago (discussed further in the following section. Whilst in Bremer & Hopetoun, WWIII hindcast data is used which only provides mean wave directions. Hence, this data may not identify seasonal variability in wave directionality.
- Average sea directions show consistent trends across the year, with approximately 40° to 60° changes in direction between the summer and winter periods. For west coast locations these directions are more southerly in summer, associated with the summer sea breeze cycle, and more westerly in winter. At Albany the sea directions are more from a south-south-easterly direction in summer and shift to south-south-westerly in winter. As discussed above, this is not observed at Esperance due to sheltering of waves from the south through east by the Recherche Archipelago (discussed further in the following section. Whilst in Bremer & Hopetoun, WWIII hindcast data is used which only provides mean wave directions. Hence, this data may not identify seasonal variability in wave directionality.

A common theme in the comparison of the wave data is the fact that the Esperance data appears to be an outlier in the majority of statistics. The reason for this and the subsequent suitability of the Esperance data to adequately describe the offshore wave climate for the region is a critical consideration for this project.

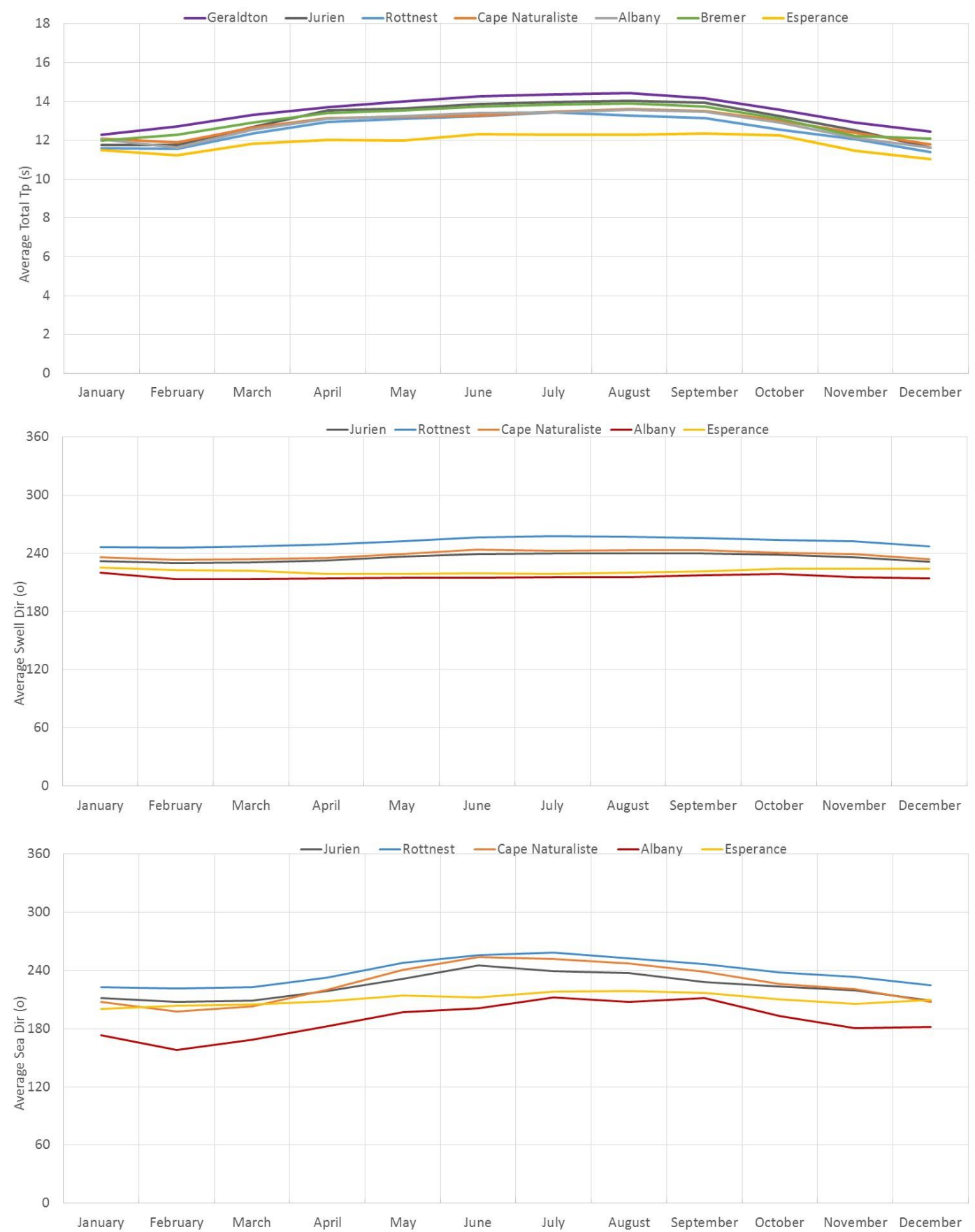
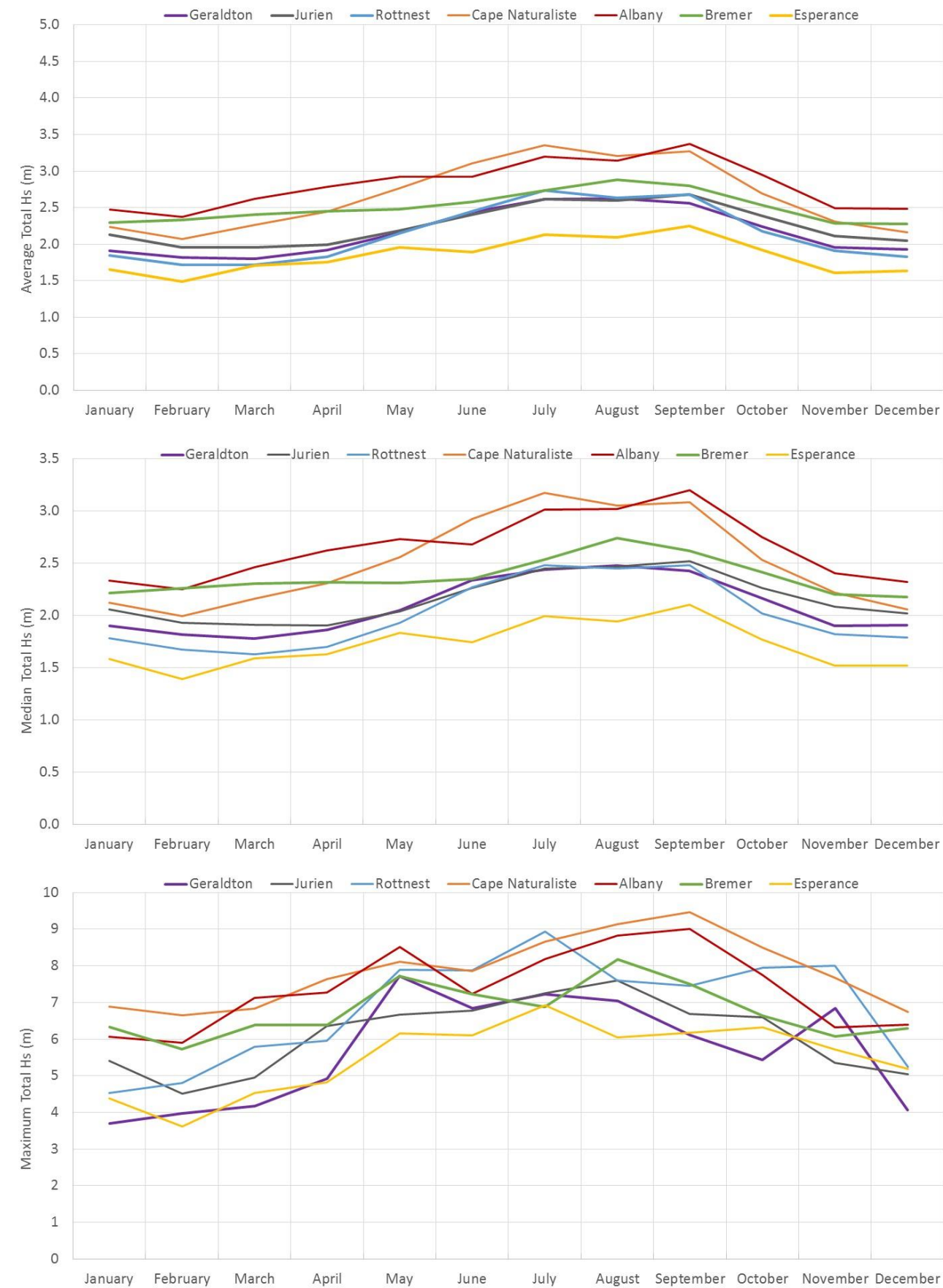


Figure 3.8 Monthly Wave Climate Statistics Comparison for All Locations

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Suitability of Esperance Wave Data

Offshore wave measurements at Esperance are recorded by a Waverider Buoy located in a water depth of approximately 52 m. Whilst this depth is similar to the water depths for other measurement devices, the Esperance measurement location is within the Recherche Archipelago and is therefore sheltered from offshore waves by a number of different islands and reef systems. The location of the device is shown in Figure 3.9.



Figure 3.9 Location of the Esperance Waverider Buoy

Esperance wave conditions could reasonably be expected to be slightly less than those at Albany, however, they are substantially lower (on average ~35%). Therefore, given the anomalous wave statistics from the Esperance measurements caused by the sheltering of the measurement location, the Esperance data is not considered suitable to describe the Great Southern region. Future stages of this project will therefore utilise data from WWIII, as described previously.

Revised statistics for Esperance, utilising the WWIII hindcast data, are provided in Table 3.8 and Figure 3.10. Revised comparison plot with wave conditions from the other locations are presented in Figure 3.11. Review of the revised comparison plots shows the WWIII hindcast data for Esperance compares much better with measurements and data from surrounding locations.

Table 3.8 Monthly Wave Climate Statistics for Esperance WWIII hindcast data (1979 to 2010)

		January	February	March	April	May	June	July	August	September	October	November	December	All Months
Total Hs	Average (m)	2.27	2.28	2.39	2.53	2.63	2.80	2.99	3.15	3.05	2.70	2.31	2.29	2.62
	Standard Deviation(m)	0.67	0.66	0.77	0.91	1.00	1.17	1.07	1.07	1.06	0.89	0.76	0.72	0.96
	Median (m)	2.15	2.19	2.27	2.40	2.46	2.55	2.80	3.01	2.87	2.55	2.19	2.16	2.44
	Maximum (m)	7.33	5.78	6.72	6.70	7.88	7.74	7.51	8.73	8.22	7.14	7.02	6.79	8.73
	Minimum (m)	0.57	0.82	0.65	0.81	0.60	0.69	0.63	0.95	0.92	0.81	0.54	0.69	0.54
	Average Exceedance Duration of Threshold Wave Height (hours)	3.87	3.19	9.97	24.39	36.39	66.19	71.23	78.00	69.58	31.16	8.23	9.00	34.27
Total Tp	Average (s)	12.47	12.78	13.29	13.71	13.96	14.14	14.24	14.30	14.14	13.52	12.82	12.53	13.50
	Standard Deviation (s)	2.00	2.03	1.82	1.81	1.95	2.10	2.06	1.91	1.97	2.03	2.08	1.99	2.09
Total Direction	Average (°)	212.46	211.35	211.27	211.73	212.87	213.69	213.77	213.81	214.45	214.64	213.33	212.61	213.01
	Standard Deviation (°)	13.15	13.48	10.20	7.42	8.39	10.27	10.37	8.30	8.01	8.59	13.92	14.42	10.85

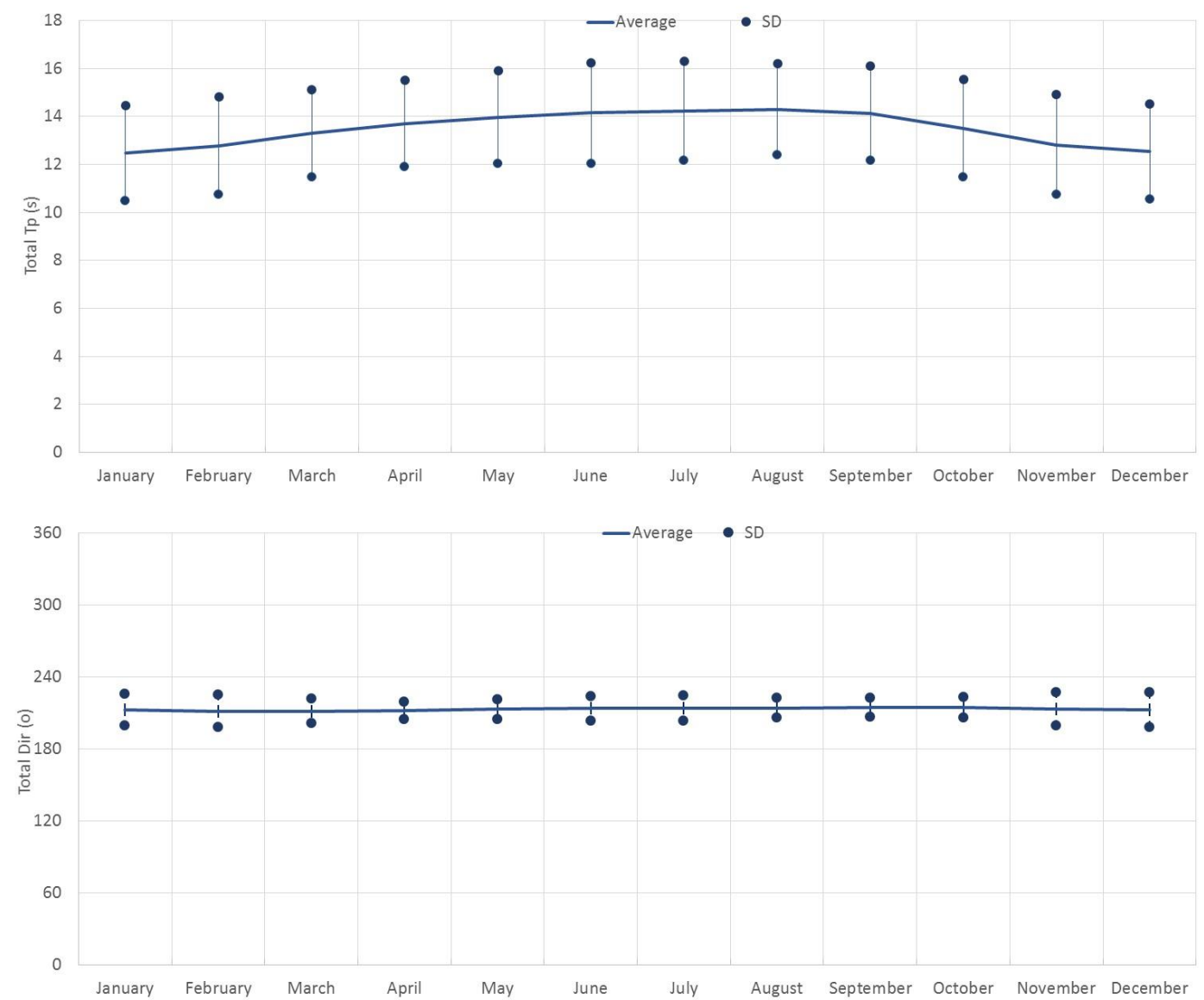
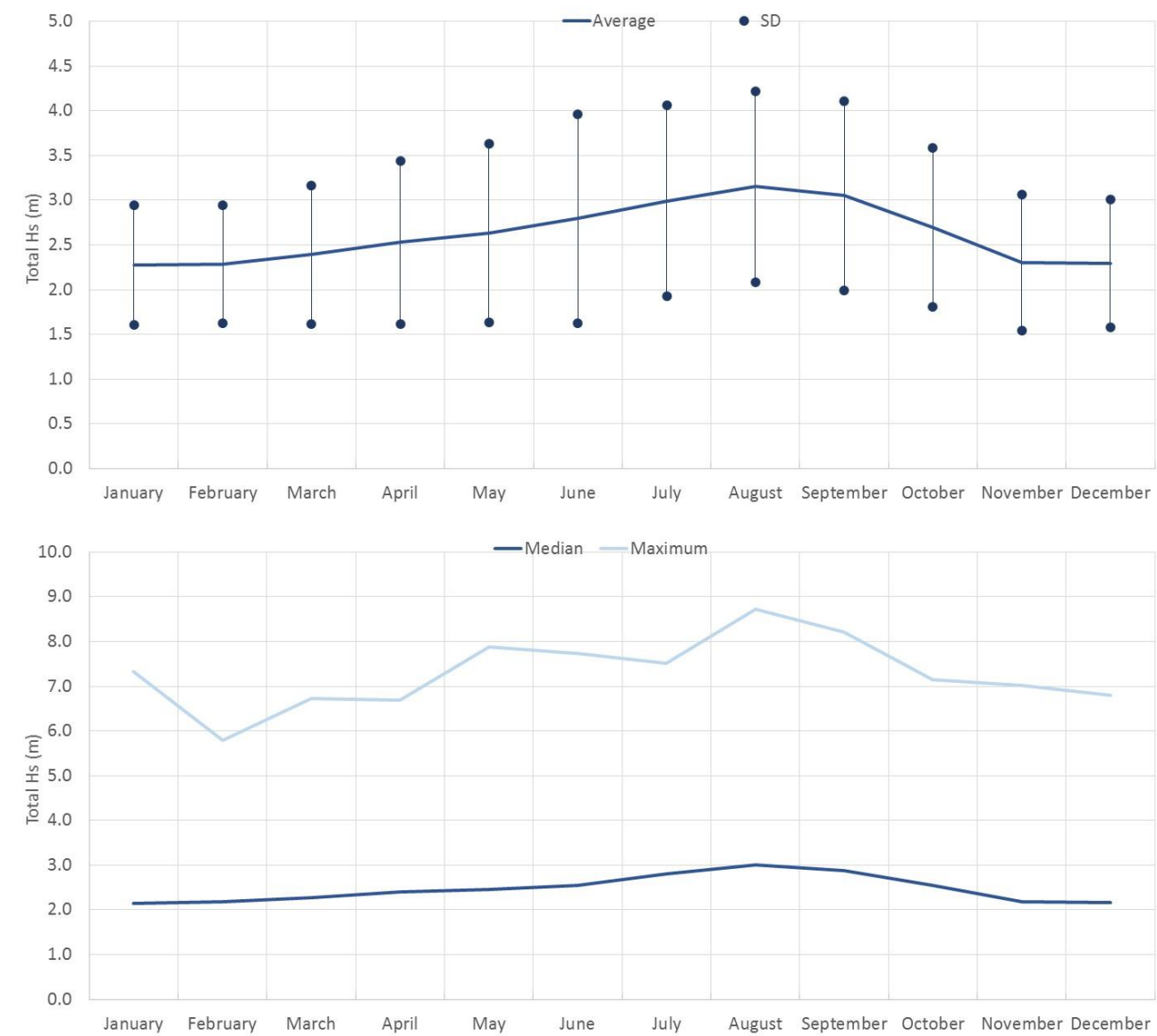


Figure 3.10 Monthly Wave Climate Statistics for Esperance WWIII hindcast data

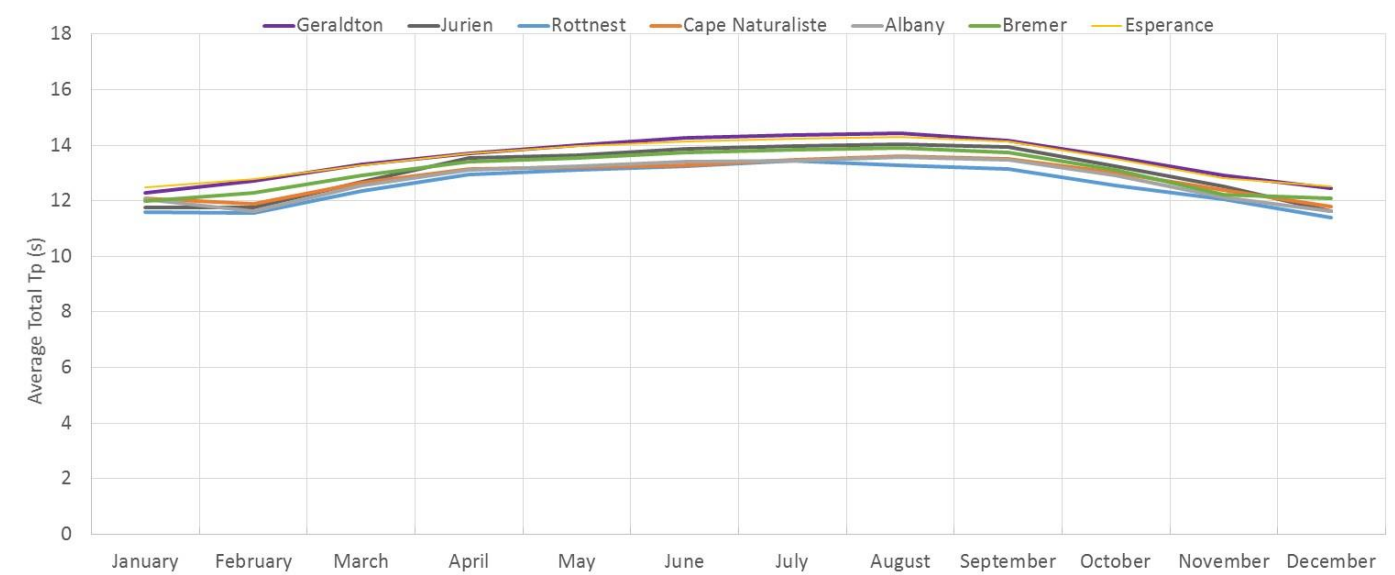
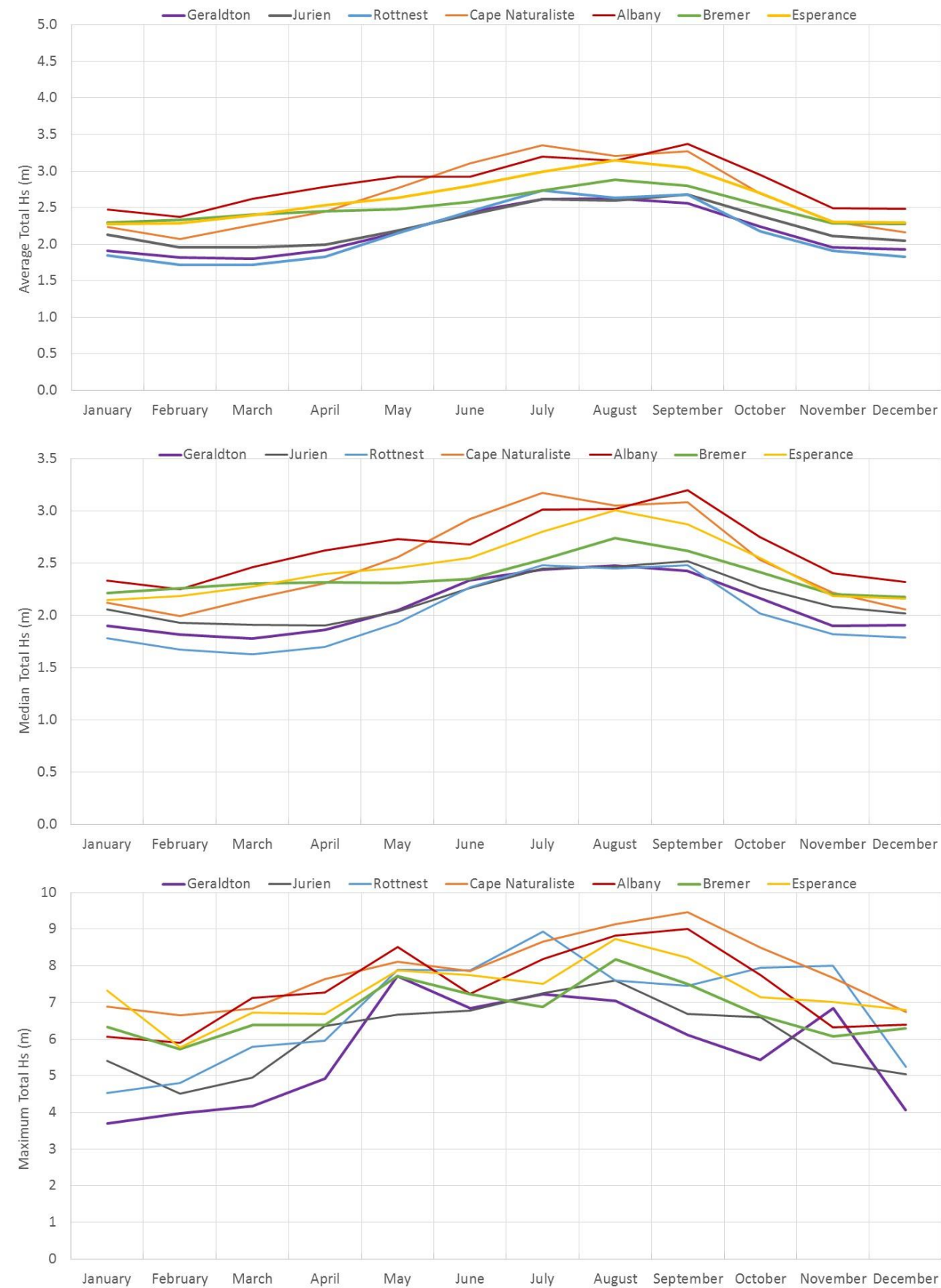


Figure 3.11 Monthly Wave Climate Statistics Comparison for All Locations using Esperance WWII hindcast data

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4. Identification of Key Storms

The primary task for this component of the project was to identify the largest, most potentially erosive storms within the record for each of the regions. The methodology, results and discussion relating to this task are presented within this section.

4.1 Assessment Methodology

The response of the shoreline to severe wave and water levels is complex. Whilst severe wave conditions can provide the energy required to cause beach erosion, much of this energy can be spent eroding the beach berm if water levels are not also elevated. This erosion process can therefore become limiting as offshore bars are formed and wave energy is dissipated over a wider surf zone.

If elevated water levels occur coincident with severe wave conditions, the shoreline response can be quite different. Elevated water levels nearshore allow larger waves to impact the beach and, if the water level is sufficient, the dune. Wave impact on the dune can cause significant erosion, as the steeper slope of the dune compared to the beach leaves it vulnerable to rapid transformational changes.

Given the potential coastal response to different conditions, it is clear that no single metric is sufficient to assess the potential erosive effects of different storms. Callaghan et al. (2008) proposed a methodology to quantify the overall probability of events including erosion variates such as wave height, period, direction, duration and tidal anomaly in recognition of the interdependency of these variates to contribute to shoreline erosion. However, the methodology proposed considered only the maximum tidal anomaly and not the sustained elevated water level (including the impact of tide) which is critical for assessing whether the water level was sufficient to cause erosion of the dune over a sustained period. While assessment of peak instantaneous water levels or wave heights may provide an indication of the potential for shoreline erosion, that potential can only be realised if the conditions linger for an extended period. Average water levels may therefore provide a better metric for the assessment of beach erosion potential, though the impact of averaging over different event durations needs to be contemplated.

To provide an indication of the relative sustained severity of events within the records, moving averages have been used as a tool to help identify abnormally high and sustained periods of severe conditions. Whilst different periods for the moving averages were reviewed, a 72 hour moving average was chosen for this assessment. This averaging period was chosen as it roughly corresponds to the duration of wave threshold exceedance (average wave height plus 2 standard deviations as discussed in Section 3) with a recurrence of once every two years on average. The choice of this recurrence period was made to ensure that a sufficient number of events would be captured within the record to enable identification and quantification of the severity of key storms.

Application of the moving average to the data sets provides a smoothing of the instantaneous data and identifies the events with sustained elevated conditions. As an example, the wave heights and water levels associated with a severe storm sequence that occurred in July 1996 have been plotted for Rottnest wave data and Fremantle water level data respectively. The 72 hour moving average has been included on the plot to highlight its effectiveness at identifying these severe, long duration events. This plot is provided in Figure 4.1.

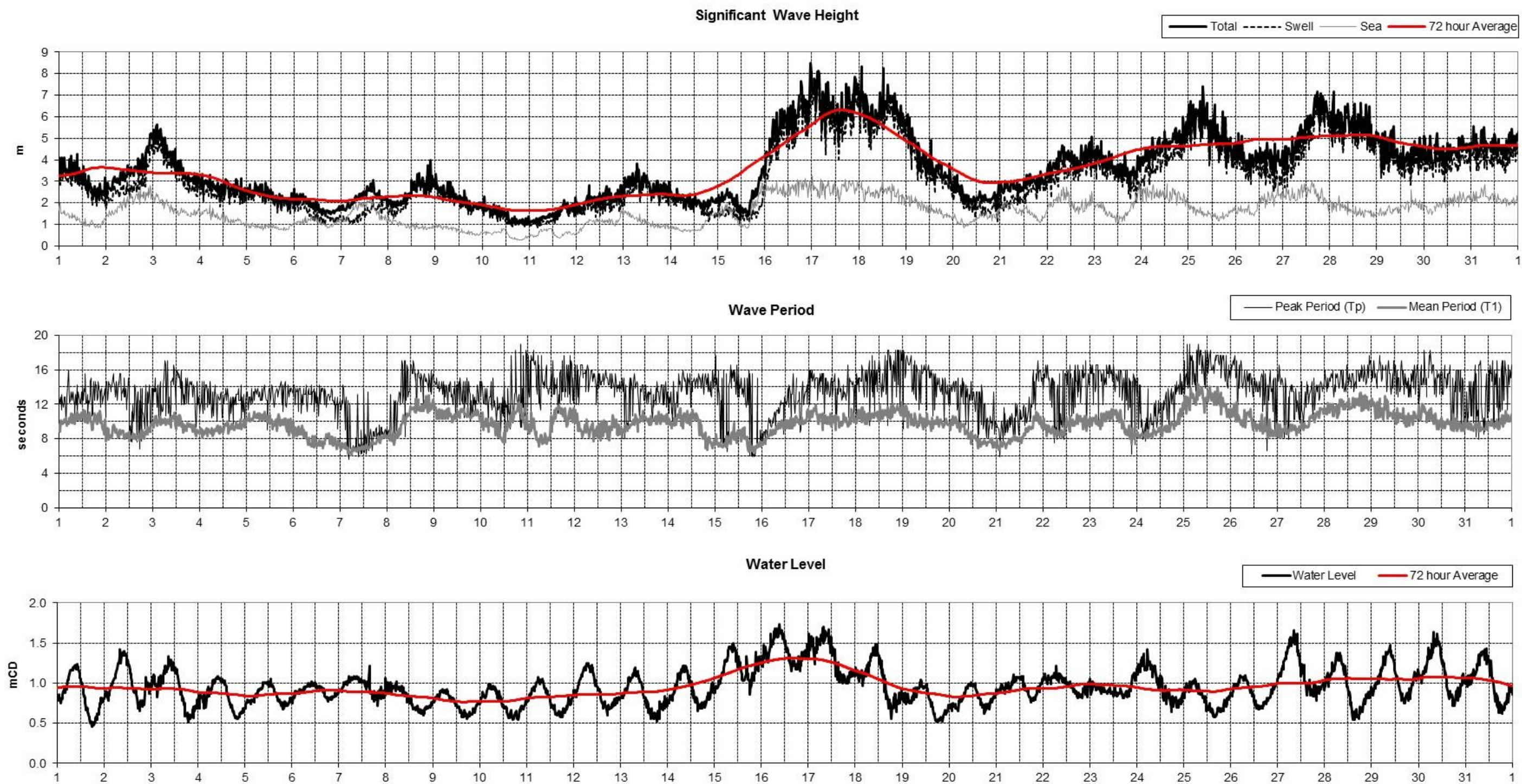


Figure 4.1 Example of the Effectiveness of the 72 Hour Moving Average in Identifying Key Events

Calculation of the 72 hour moving average was completed for each of the wave and water level datasets within each region. Additionally, in recognition of the importance of wave period as a key variate for beach erosion, wave power was also calculated for the entire dataset based on the method outlined in Sorensen (1978, 1993). The calculation of net wave power was completed using the following equation based on the raw observational values from the wave data, noting that the wavelength (L) was calculated based on the peak wave period.

$$\int_{t_{start}}^{t_{end}} P = \frac{\rho g H^2 L}{16T} \left(1 + \frac{2kd}{\sinh 2kd} \right) dt$$

The top 100 events, based on total net wave power over 72 hour durations, were then extracted based on the calculated wave power. The corresponding values of the other variates were also extracted for each event so that the joint occurrence could be assessed. For instance, for a 72 hour average wave height the corresponding 72 hour water level and net 72 hour wave power were also extracted.

Rounding out the description of storms, the influence of storm duration has been considered through determination of wave threshold events. For the purposes of this initial identification, wave events were deemed to have commenced when the wave height exceeded the wave threshold value and concluded when the wave height next reduced below the wave threshold value. The duration of the wave threshold event was the total time that the wave height exceeded the threshold, as demonstrated in Figure 4.2. Net wave power was then calculated for each of the identified wave threshold events.

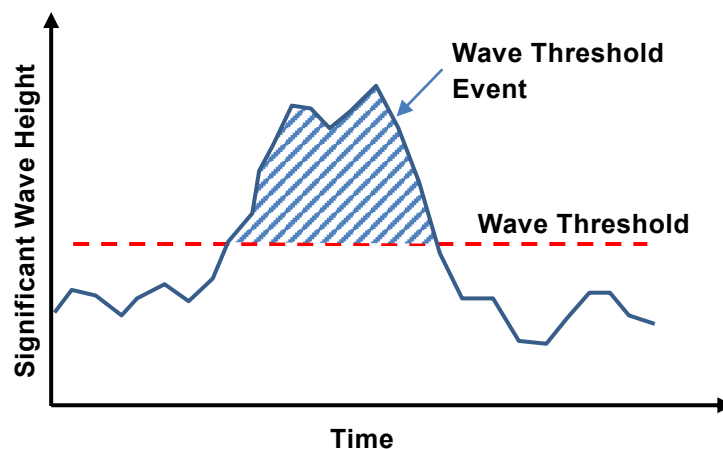


Figure 4.2 Schematic Showing Identification of a Wave Threshold Event

Completion of the above analysis for each location results in the extraction of a range of primary and secondary variates for each assessment methodology. A summary of these variates is provided in Table 4.1. It is important to note that the identified events included everything within the measurement and WWII record. This includes tropical cyclone events, even though they are not part of this investigation. The inclusion of tropical cyclone events within the records was completed to help provide context (if required in the future) regarding the relative severities of tropical cyclone and non-cyclonic events. Nevertheless, for all analysis presented hereafter tropical cyclone events were removed from the records.

Table 4.1 Summary of Primary & Secondary Variates for each Assessment Methodology

Assessment Methodology	Primary Variate	Secondary Variates
72 hour duration	Average wave height Average water level Net wave power	Corresponding average wave height, water level or net wave power
Wave threshold method	Net wave power	Average water level

To assist in the selection of events for further analysis, cross plots were completed of the average wave height versus the average water level and net wave power versus the average water level for the 72 hour averaging duration. The primary and secondary variates were used to plot each event, with the assessment adopting a nomenclature based on the rank and type of the primary variate to identify each event on the plot (given date stamps were too cumbersome to be included). The rank of the event was based on its rank from 1 to 100 for each primary variate, with 1 being the most severe. The type of event was attributed a numeral subscript as outlined below.

- “a” for a 72 hour event with average wave height as its primary variate.
- “c” for a 72 hour event with average water level as its primary variate.
- “e” for a 72 hour event with net wave power as its primary variate.
- “f” for wave threshold events identified by the wave threshold analysis.

An example of the cross plots is provided in Figure 4.3 for the Metropolitan/Peel region. The cross plots allow visual identification of the events that are relative outliers. It should be noted however, that each individual event can occur up to three time on the plots, once for each primary variate. Therefore, whilst it is expected that the average wave heights and net wave power should plot reasonably closely (depending on the distribution of wave periods within the event) the proximity of the average water level point to the wave related points provides an indication of how well the peak wave and water level attributes align.

As an example of the output from the cross plot, the points corresponding to the July 1996 event have been highlighted on Figure 4.2. The numbering of the events show that, within the Metropolitan/Peel region the July 1996 event had the highest ranked average water level, second highest ranked wave power and third highest ranked average water level.

A similar methodology to that used to identify the July 1996 event in the above example was used to identify events associated with other outliers in the dataset. The list of outliers was then checked against the ranked list of wave threshold events (sorted by total wave power) to ensure that the top threshold events had also been captured. In total this resulted in the identification of the top 15 to 20 events for each region. Within this selection, a number of events that were not overly severe in any one metric, but were relatively consistent across all metrics, were included to provide a sensitivity analysis on the selection methodology.

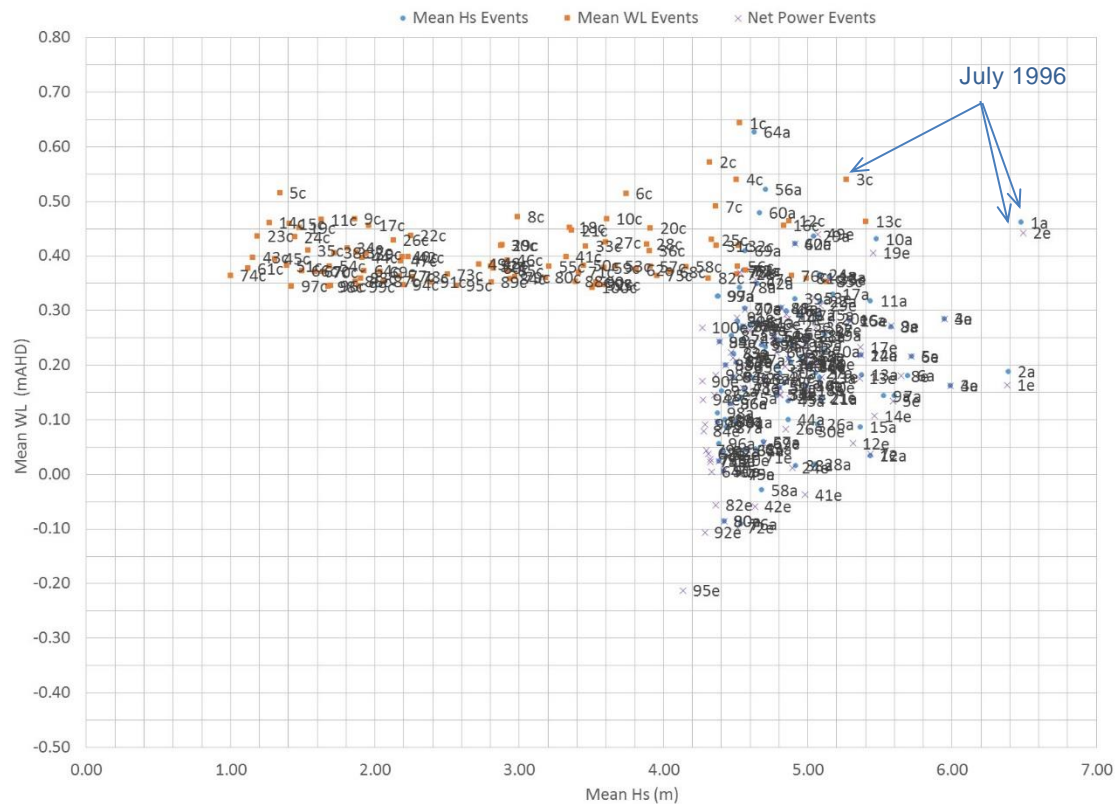


Figure 4.3 Example Variate Cross Plots for the Metropolitan/Peel Region

Assessment of the potential severity of these identified events requires a methodology that considers the potential for resultant coastal change. Given that the purpose of this project is to identify storms that will be used to guide assessments to the requirements of SPP2.6, it follows that the severity of events should be reflected in the outputs of shoreline response modelling.

Shoreline response modelling for SPP2.6 is typically completed using profile change models such as SBEACH (Larson & Kraus 1989, Wise et al. 1996, Larson & Kraus 1998, Larson & Kraus 2004). As a result, the top 15 to 20 identified events were simulated within SBEACH for two locations within each region. As outlined in Callaghan et al. (2008) antecedent beach conditions have a significant bearing on beach profile response, therefore each location was modelled based on the observed/surveyed profile as well as an eroded shoreline profile. This would represent the beach condition that could be possible after impact of one or a number of smaller events.

The eroded shoreline profile was prepared by simulating a mid-range event from each region on the observed/surveyed profile, with the output from that simulation then used as the input for analysis of the top events. Using this methodology the top events were simulated over 4 different profiles for each region.

Whilst the averaging durations were used to help identify the events and provide a basis for direct comparison, the full extent of the associated storms (as defined for this study) were modelled. For this study a storm is defined as a combination of any exceedance events with intermediary periods that (1) are less than 12 hours, and (2) do not include significant wave heights below the storm termination value. A storm also includes a build-up period (preceding) and “tail” after the last exceedance event within a storm. The build-up and tail are terminated at a maximum of 12 hours, or at the time step closest to the exceedance event where the significant wave height falls below the storm termination value. This definition helps to ensure that the four stages of a storm, as defined by Li (2018) and presented in Figure 4.4, are captured.

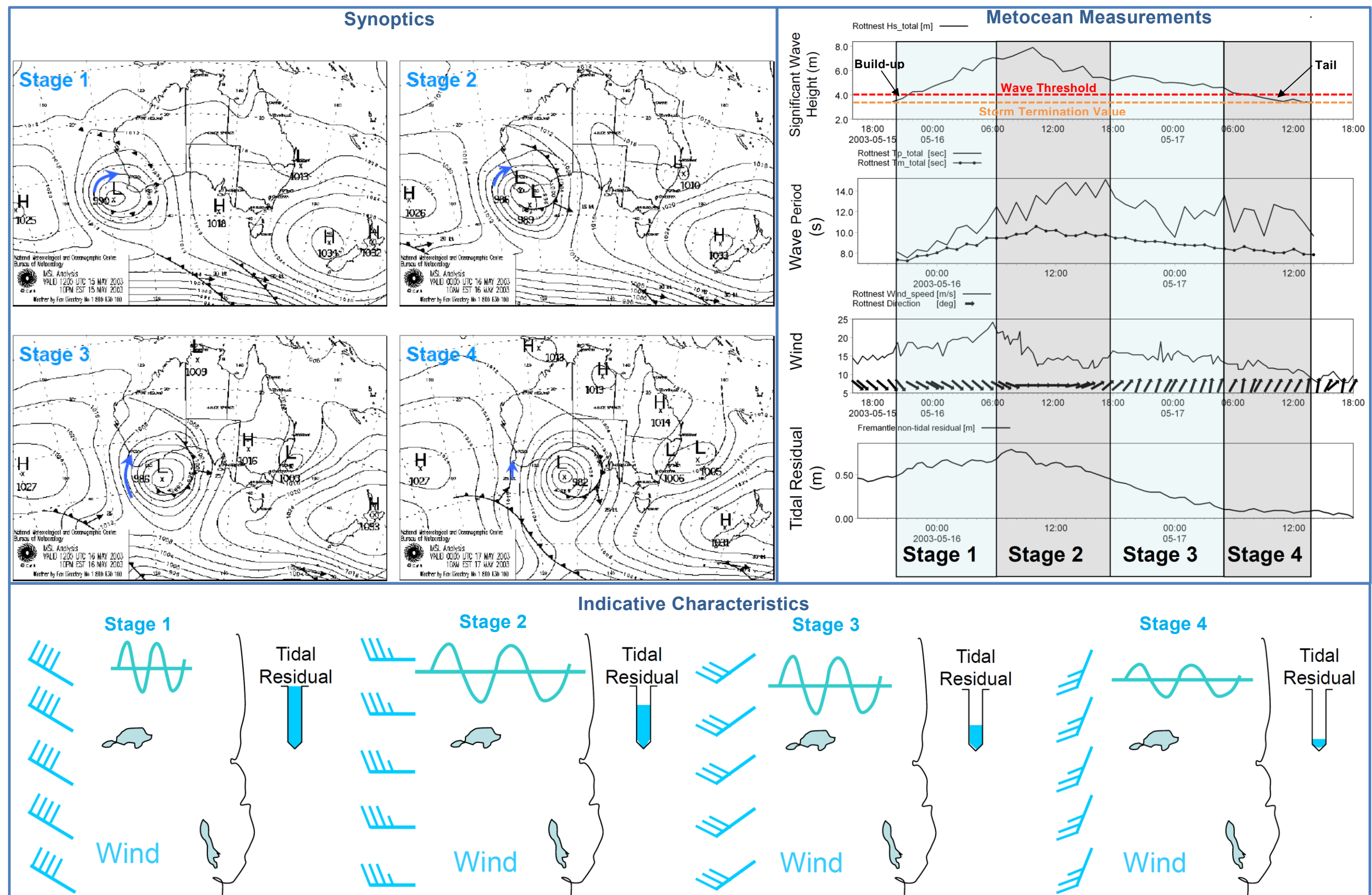


Figure 4.4 Typical Characteristics (Four Stages) of a Storm Impacting the South West of Western Australia (Li 2018)

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Following simulations, erosion distances were extracted from SBEACH by measuring the distance between the landward-most extent of erosion and a nominated contour elevation on the profile (typically around the elevation of the toe of the dune). To assist with the review of these SBEACH results, the simulated erosion distances were normalised for each location. Normalisation was completed by rescaling the SBEACH predicted erosion distances to ensure that the results from each profile were equally weighted. Without rescaling, any review or quantification of the combined erosion distances, which are used in this study as a prediction of erosion potential of the storms, would be skewed towards the outcomes from the profile with the greater erosion distances.

It must be noted that the purpose of the SBEACH simulation was only to identify the relative erosion potential of the various storms – recognising that the following simplifications have been undertaken in this regional study: a) SBEACH has been used as a tool to translate offshore wave conditions into nearshore wave energy, including the influence of water level variation; b) application of SBEACH modelling from a comparatively long distance offshore provides greater capacity for profile disequilibrium, and therefore a more sustained (monotonic) profile evolution over time. Although SBEACH is known to ignore many active processes it should provide a reasonable indication of the potential for shoreline change caused by the different wave and water level conditions. As such, the simulations were not necessarily set up to provide results that could be interpreted to meet the requirements of SPP2.6. Rescaling the data eliminated the potential for misrepresentation of modelled outcomes within this study.

The rescaling process was completed by combining the total erosion distances modelled for the observed/surveyed and eroded beach profiles for each event at each location. The combined erosion distances were then reviewed to determine the largest combined erosion distance for each location. The event with the largest erosion distance was assigned a value of 1 for that location, with the other events assigned a value based on the relative proportion of the simulated erosion compared to the maximum event. For instance, where the maximum combined erosion of a profile was 40 m and an event had a simulated combined erosion of 30 m, then the normalised erosion value for that event at that location would be $30/40 = 0.75$. Once determined, a cross plot of normalised values for the two different locations was prepared to assess the overall results.

Results from the SBEACH modelling yielded some variable results, with some storms demonstrating different relative extents of erosion potential on different profiles. This introduces complexity when trying to identify a single storm for a given recurrence interval (as required in future stages of this project) as the results suggest that different storms within the same region could yield quite different results. Intuitively this makes sense, as different beach typologies and morphologies have evolved in response to certain unique conditions, so one set of storm conditions could incite a proportionately different result on different beaches. Anecdotally this also appears to match observations, as even during severe storms such as the July 1996 storm, the extent of erosion was variable across a region.

Given this apparent complexity, the identification of severe events has been expanded to include the top 5 to 8 events for each region. These events have been chosen based on the modelled erosion potential at both locations individually as well as the combined result. That is to say that an event need not demonstrate a significant erosion potential at both locations to be included within the list, but must demonstrate a high level of erosion potential for at least one location.

A review of the average wave directions has been completed for the identified severe events to ensure that events from the full range of directions have been included. However, it is noted that the events selected in this phase are the large scale events, as a result there is generally a small

range of average wave directions for each event. Identification of extreme events from different directions is discussed further in Section 5 of this report.

Finally, as a check on the outcomes of this assessment, readily available information has been reviewed in an attempt to validate the events identified within this section. Available information has included:

- shoreline movement plans and coastal vegetation line mapping;
- aerial photography;
- survey information;
- anecdotal information, such as news reports, or reports on damage to infrastructure, etc;
and
- shoreline photographs or monitoring.

Details of this review, as well as the results of the assessment completed in accordance with the above methodology are provided hereafter for each region.

4.2 Results

4.2.1 Mid-west (Geraldton)

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and wave threshold analysis are presented in Table 4.2. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at Glenfield Beach and Greenough Beach, at the locations shown in Figure 4.5. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.6, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.2 Storms Identified for Modelling in SBEACH – Mid-west (Geraldton)

Primary Variate Number	Secondary Variate Number	Dates
1a	3c, 1e, 3f	15/07/1996 - 20/07/1996
1c	-	27/05/1999 - 28/05/1999
2a	3e, 4f	14/07/1990 - 18/07/1990
3a	2e, 1f	26/07/1993 - 31/07/1993
4a	46c, 7e, 6f	05/06/1995 – 10/06/1995
5a	5e, 2f	31/07/1991 - 06/08/1991
5c	72a	25/06/2003 - 28/06/2003
6a	4e, 5f	09/09/2009 - 14/09/2009
7a	8e, 8f	23/08/2004 - 27/08/2004
8a	6e, 7f	03/06/1997 - 06/06/1997
9a	9e, 10f	10/07/2002 - 13/07/2002
10c	-	27/06/1986 - 29/06/1986
13a	10e, 9f	29/07/2007 - 02/08/2007
14a	72c, 21e, 15f	27/06/2009 - 01/06/2009
19a	59e, 16f	19/07/1989 - 22/07/1989
26a	6c, 48e, 33f	21/05/2009 - 24/05/2009
40a	54c, 36e, 53f	21/07/2007 - 23/07/2007
41a	63c, 69e, 45f	17/06/1996 - 22/06/1996
51c	57a, 60e, 47f	12/05/1988 - 15/05/1988

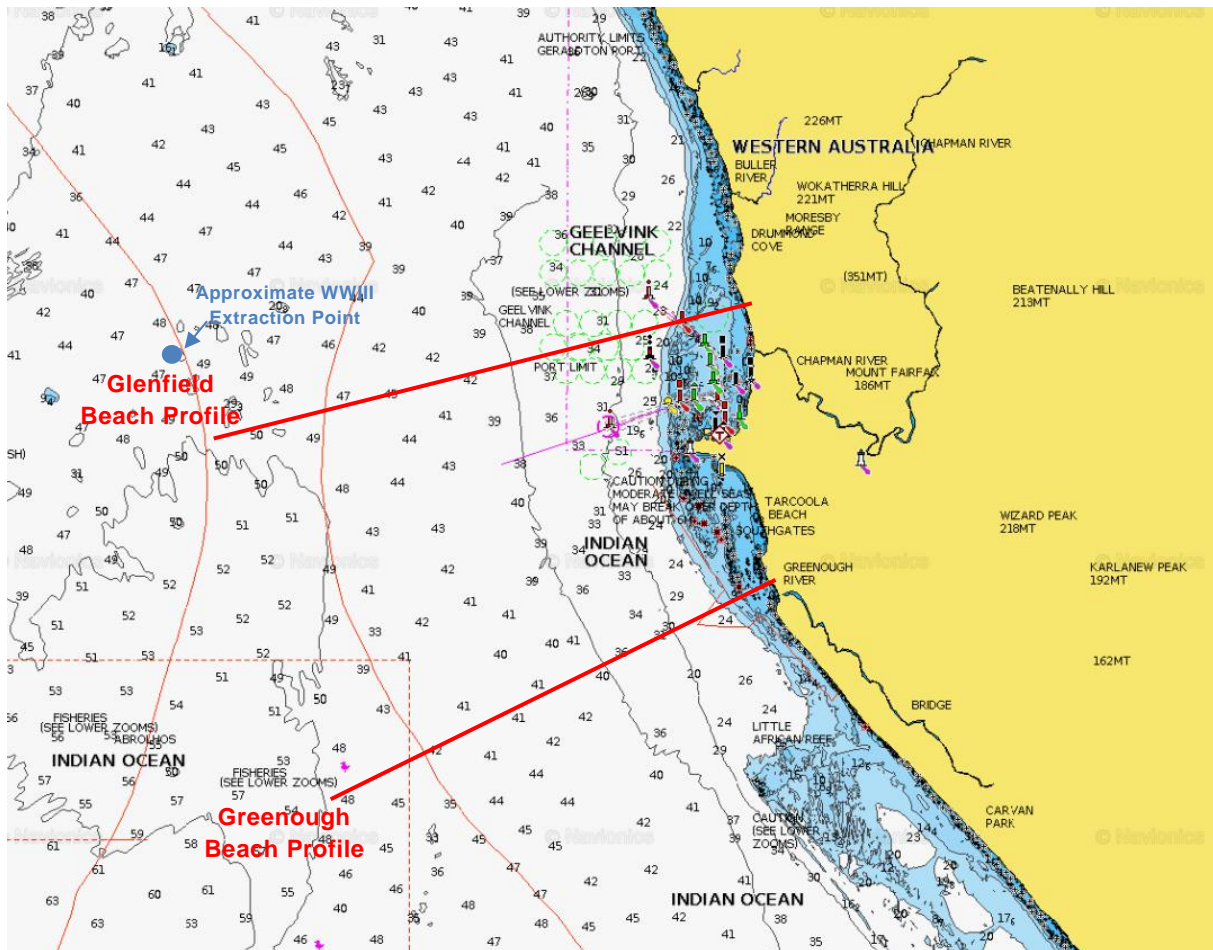


Figure 4.5 Locations of SBEACH Profiles – Mid-west (Geraldton)

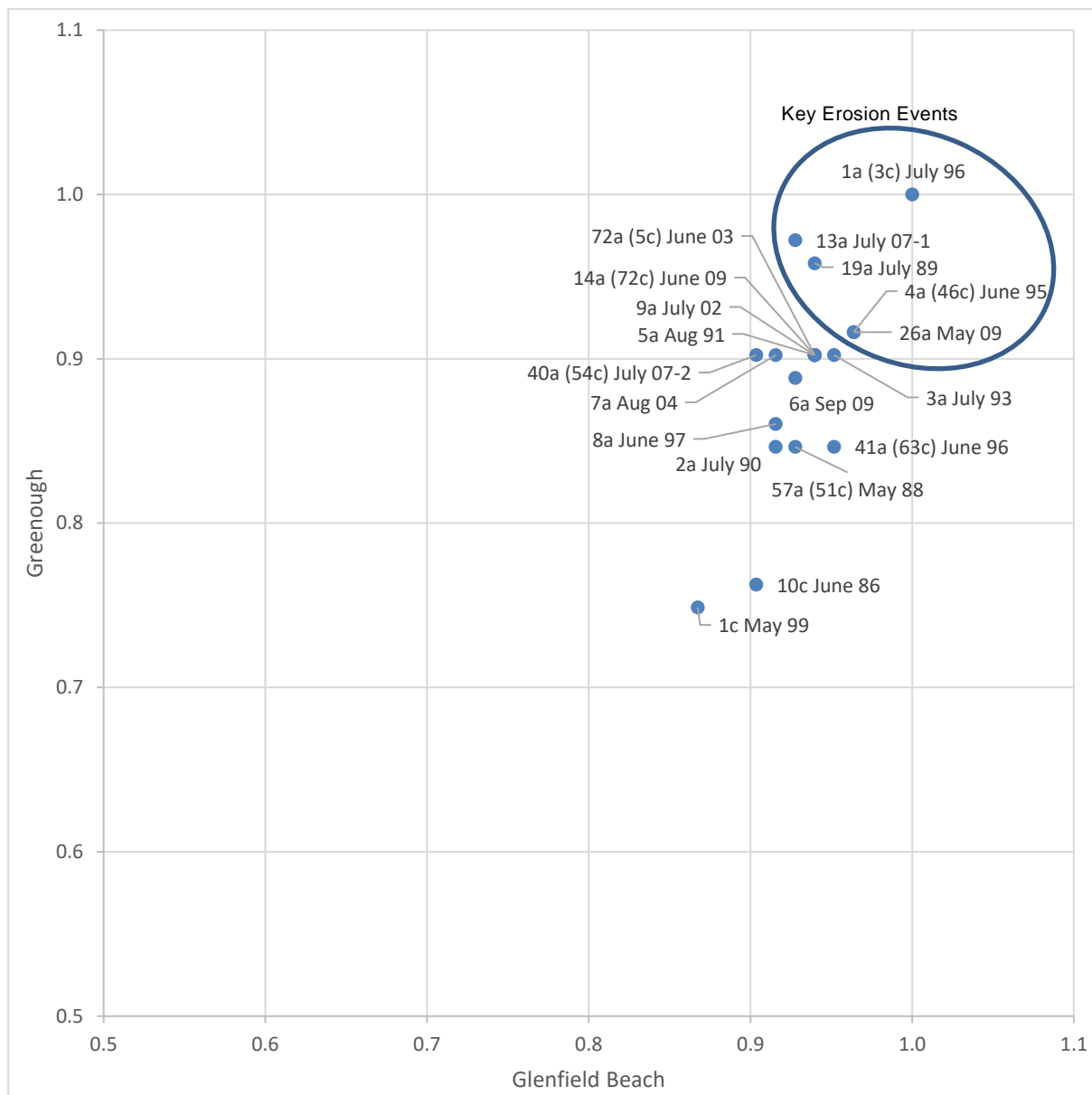


Figure 4.6 Normalised Results of SBEACH Modelling – Mid-west (Geraldton)

The results show a reasonably consistent outcome from the SBEACH modelling, with a relatively linear relationship between the extents of erosion modelled for both locations. A very clear delineation is also apparent between the top 5 storms and the remainder of the modelled events.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the Mid-west (Geraldton) region are summarised in Table 4.3. Time history information for these storms is provided in Appendix C.

Table 4.3 Key Storms for the Mid-west (Geraldton)

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
15-Jul-96 20:00	20-Jul-96 8:00	108	2.0	5.7	1.8	231	-	-	0.41	55	275
05-Jun-95 23:00	10-Jun-95 11:00	108	1.7	5.2	1.4	228	-	-	0.37	58	283
29-Jul-07 23:00	02-Aug-07 14:00	87	1.4	4.7	1.3	225	-	-	0.17	44	255
19-Jul-89 23:00	22-Jul-89 17:00	66	1.2	4.5	1.2	225	-	-	0.20	51.8	281
21-May-09 2:00	24-May-09 14:00	84	0.9	4.3	0.9	223	-	-	0.40	55	234

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.4.

Table 4.4 Outcomes from Observational Review – Mid-west (Geraldton)

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement plots and time history plots completed for the Cape Burney to Greys Beach Inundation and Coastal Processes Study (MRA 2017a)	Some relevant information presented below.
Vegetation line movement time history plots completed for the Town Beach to Drummond Cove Inundation and Coastal Processes Study (MRA 2016)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.

Of the information that was reviewed the most pertinent information is presented in Figures 4.7 and 4.8. This information includes time history plots of vegetation line change for the sections of coastline from Cape Burney to Greys Beach and from Town Beach to Drummond Cove.

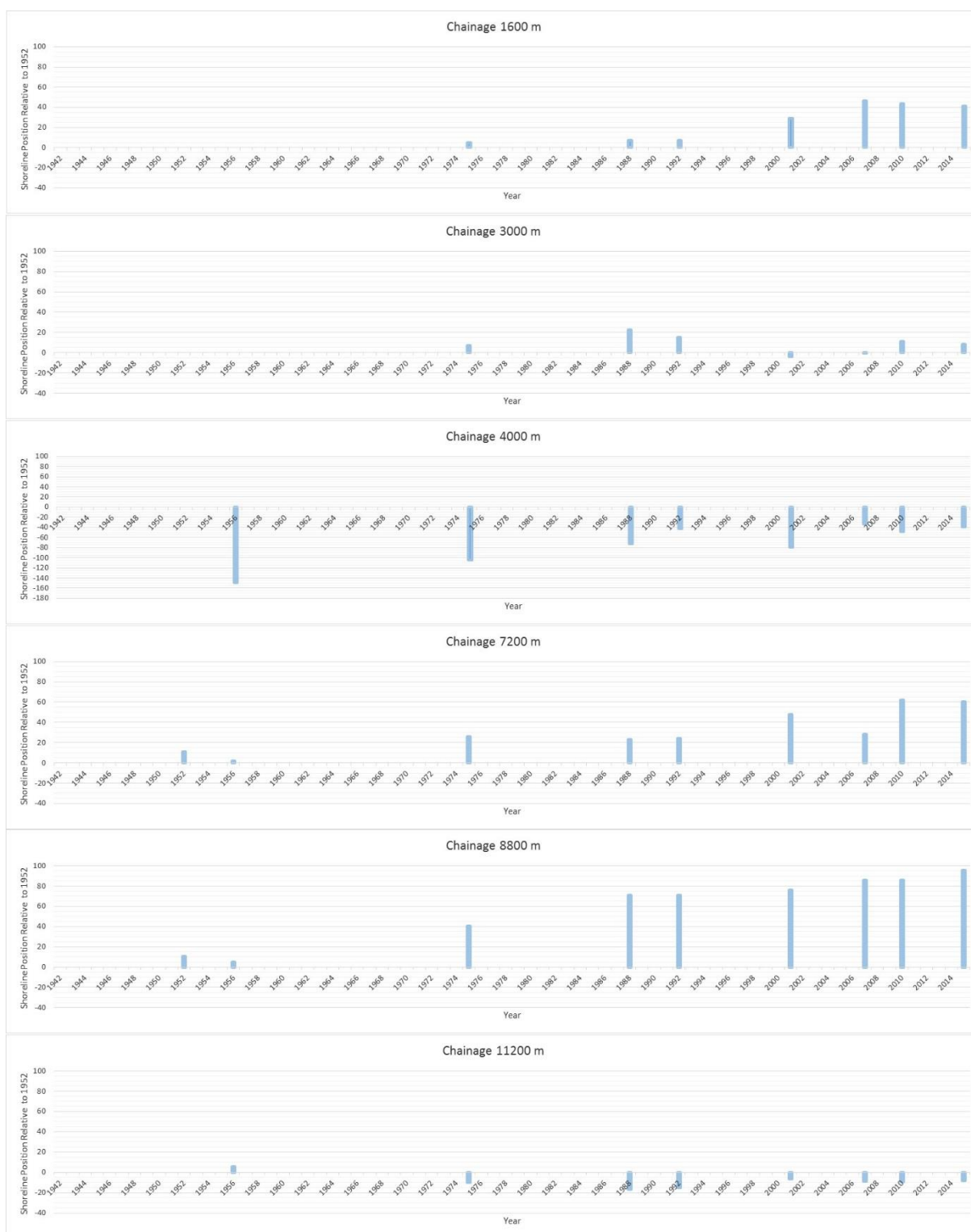


Figure 4.7 Time History of Vegetation line Position for Different Shoreline Sections between Cape Burney & Greys Beach

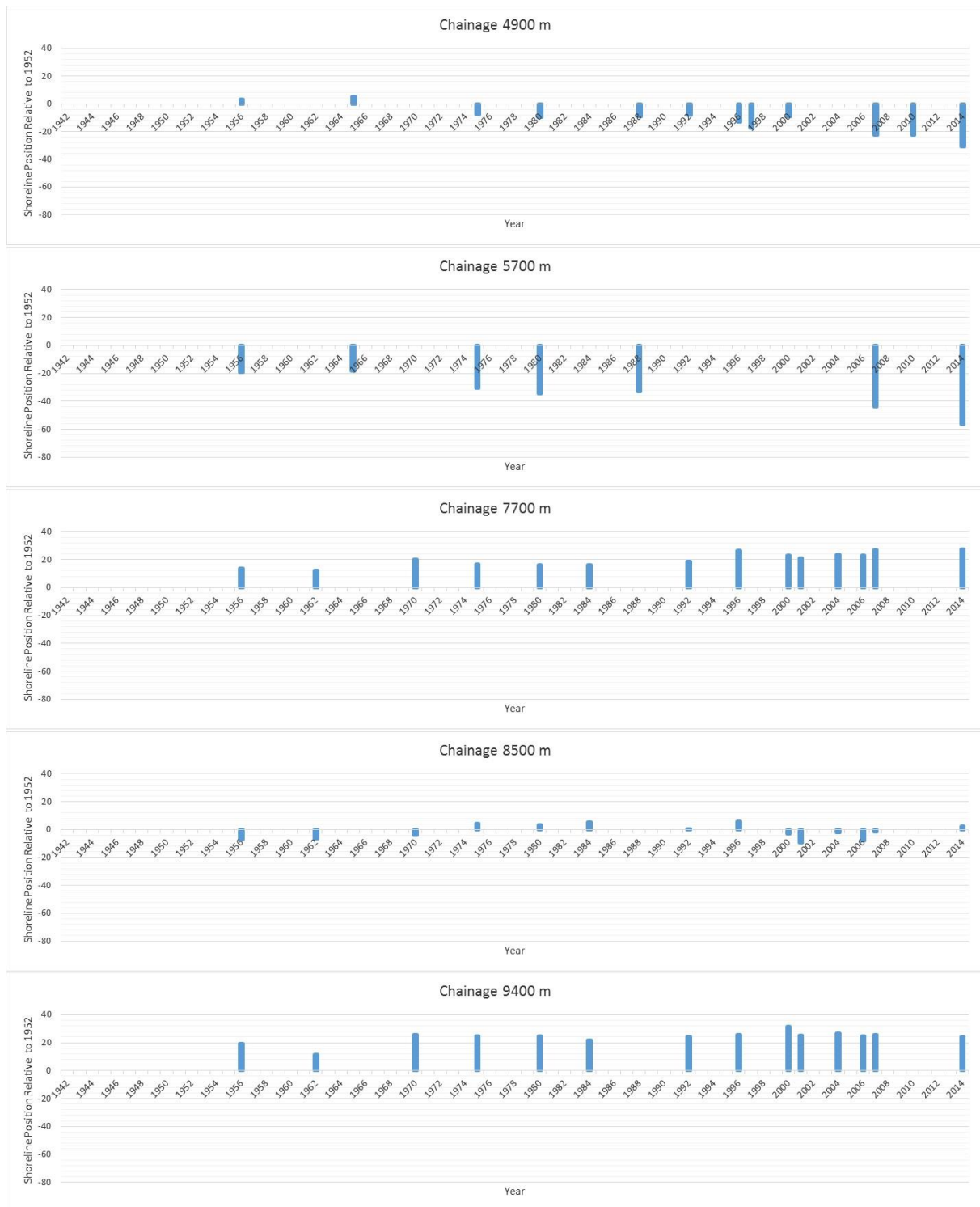


Figure 4.8 Time History of Vegetation line Position for Different Shoreline Sections between Town Beach & Drummond Cove

From review of this information it is difficult to determine any consistent trends across the region that would be indicative of a severe erosion event. One of the key challenges in this regard is that the temporal resolution of much of the data is too coarse to provide an opportunity for a meaningful review of beach erosion. It is therefore not possible, based on this information, to validate or refute the outcomes of the key storm selection for this region.

4.2.2 Wheatbelt (Jurien Bay)

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and wave threshold analysis are presented in Table 4.5. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located to the South of Jurien Bay and Cervantes, at the locations shown in Figure 4.9. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.10, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.5 Storms Identified for Modelling in SBEACH – Wheatbelt (Jurien Bay)

Primary Variate Number	Secondary Variate Number	Dates
1a	1c, 2e, 4f	15/07/1996 - 20/07/1996
2a		23/08/2004 – 27/08/2004
2c	43a	10/06/2012 – 14/06/2012
3a	3e, 2f	26/07/1993 - 01/08/1993
4a	5e, 3f	30/07/1991 – 06/08/1991
5a	7e, 5f	04/09/2005 – 10/09/2005
6a	22c, 8e, 7f	05/06/1995 – 10/06/1995
7a	6e, 8f	03/06/1997 – 07/06/1997
8a	57c, 16e, 11f	27/06/2009 – 01/07/2009
9c	26a, 54e, 27f	21/05/2009 – 24/05/2009
10c	48a	25/06/2003 – 28/06/2003
11c	30a, 29e, 23f	26/04/2000 – 29/04/2000
12a	100c, 13e, 17f	22/05/1994 - 26/05/1994
15c	24a, 35e, 34f	17/06/1996 – 22/06/1996
25a		27/07/1996 -03/08/1996
32a	38e, 31f	30/07/2011 – 03/08/2011
34a	97c, 25e, 60f	03/04/2012 – 06/04/2012

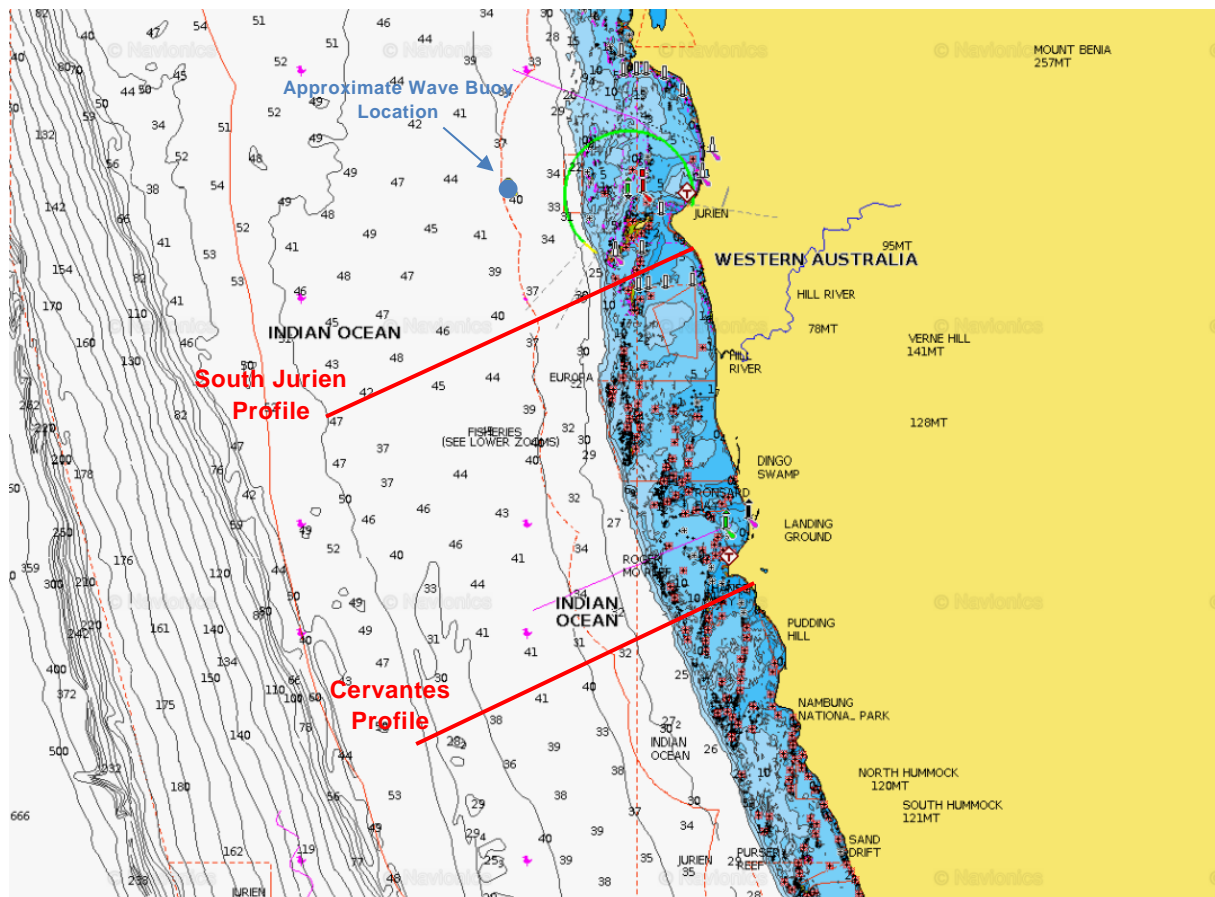


Figure 4.9 Locations of SBEACH Profiles – Wheatbelt (Jurien Bay)

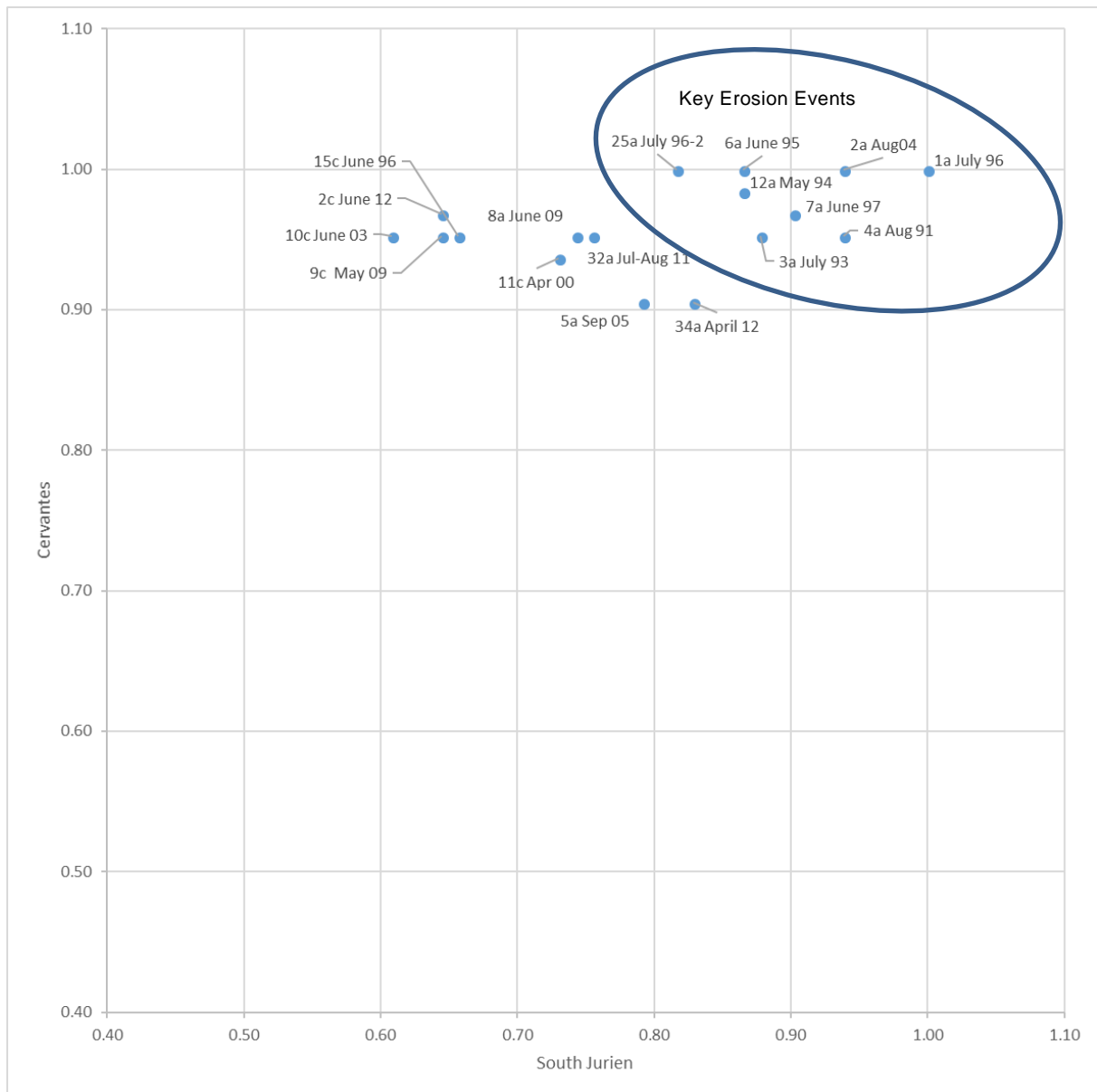


Figure 4.10 Normalised Results of SBEACH Modelling – Wheatbelt (Jurien Bay)

The results show that there is some variability in the modelled response of storms on different profiles, however a trend, albeit with some scatter, is evident. The distinction between the most severe events is less obvious in this region, however the top events can still be readily identified.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the Wheatbelt (Jurien) region are summarised in Table 4.6. Time history information for these storms is provided in Appendix C.

Table 4.6 Key Storms for the Wheatbelt (Jurien) Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
15 Jul 96 20:00	20 Jul 96 11:00	111	2.3	6.0	1.9	251	-	-	0.43	-	-
05 Jun 95 17:00	10 Jun 95 14:00	117	1.8	5.3	1.4	248	-	-	0.34	-	-
03 Jun 97 5:00	07 Jun 97 2:00	93	1.7	5.2	1.6	242	-	-	0.10	33	265
26 Jul 93 8:00	01 Aug 93 8:00	144	2.7	5.6	1.8	245	-	-	0.09	28	299
30 Jul 91 20:00	06 Aug 91 5:00	153	2.8	5.4	1.7	246	-	-	0.16	37.1	315
23 Aug 04 11:45	27 Aug 04 16:15	101	2.0	5.6	1.7	-	-	-	0.07	50	296
27 Jul 96 2:00	03 Aug 96 2:00	168	2.2	4.5	1.1	247	-	-	0.24	-	-
22 May 94 17:00	26 May 94 2:00	81	1.3	4.9	1.3	244	-	-	0.16	27.7	255

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.7.

Table 4.7 Outcomes from Observational Review – Wheatbelt (Jurien Bay)

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement time history plots for the south Jurien shoreline (MRA 2010)	Some relevant information presented below.
Vegetation line movement plots and time history plots completed for Cervantes (MRA 2016b)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Analysis of Beach Monitoring Surveys (Brown 1989) within Jurien Bay	Profile fluctuations appear to be predominately associated with seasonal variations caused by longshore transport processes.
Department of Transport information on September 2013 Storm Events (pers comm. Department of Transport)	Identified a number of locations that were impacted by storm erosion, however the period comprised 3 separate events and is therefore different to the individual events that have been identified in this phase of the project. It is also noted that areas of erosion impact were typically adjacent to a shoreline interruption (groyne, etc) or were where infrastructure had been constructed seaward of the alignment of the dune.

Of the information that was reviewed the most pertinent information is presented in Figures 4.11 and 4.12. This information includes time history plots of vegetation line change at South Jurien as well as vegetation line movement plots for Cervantes.

It is difficult to determine any significant step changes in vegetation line position across the region that could be indicative of severe storm erosion, though small changes are evident. Nevertheless, given the temporal resolution of the data it is difficult to be definitive regarding when any severe storms may have occurred. Given the impacts of storm erosion are not obvious in the records it may mean that either the recovery of the beach profile after severe erosion is relatively rapid, or that the extent of severe erosion is relatively minor. Either way, there is nothing within the observations to either validate or refute the key storms that have been selected for this region.

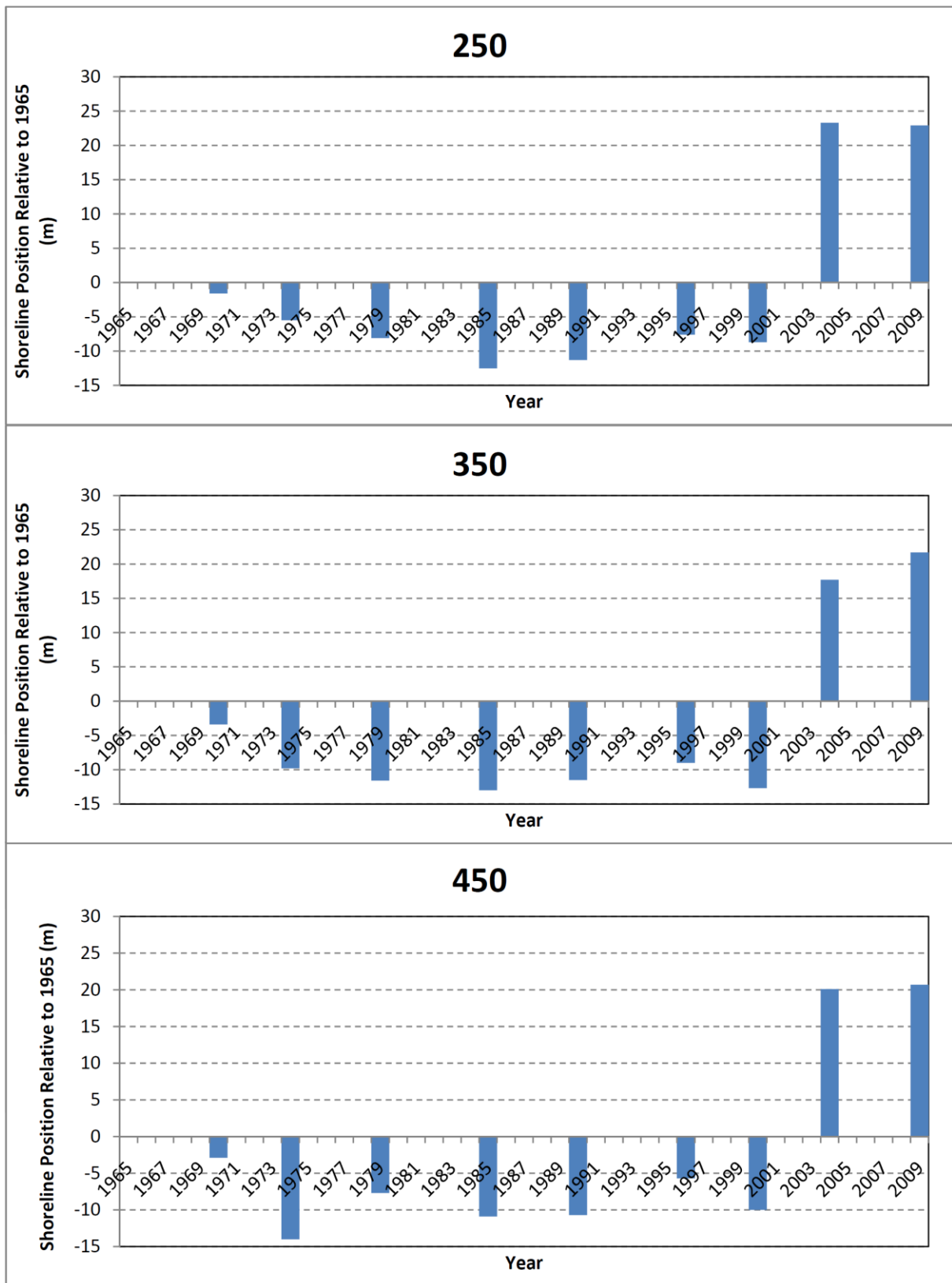


Figure 4.11 Time History of Vegetation line Position Change at South Jurien

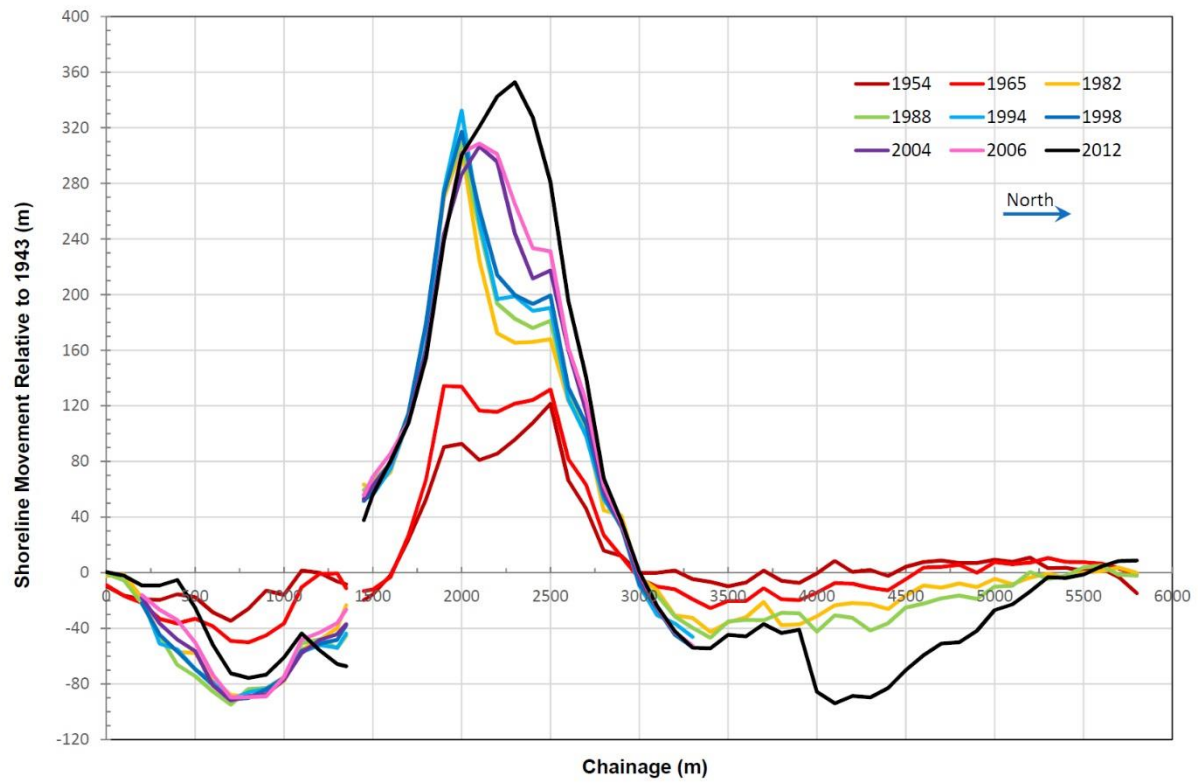


Figure 4.12 Vegetation line Movement Plot for Cervantes

4.2.3 Metropolitan/Peel

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and wave threshold analysis are presented in Table 4.8. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at Scarborough Beach and Madora Bay, at the locations shown in Figure 4.13. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.14, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.8 Storms Identified for Modelling in SBEACH – Metropolitan/Peel

Primary Variate Number	Secondary Variate Numbers	Dates
1a	3c, 2e, 4f	15/07/1996 - 19/07/1996
1c	64a, 178f	10/06/2012 - 13/06/2012
2a	1e, 15f	11/07/1990 - 18/07/1990
2c	56a, 168f	24/06/2003 - 28/06/2003
3a	4e, 5f	23/08/2004 - 27/08/2004
4a	3e, 2f	29/07/1991 - 05/08/1991
4c	22a, 81f	20/05/2009 - 23/05/2009
5a	6e, 6f	09/09/2009 - 13/09/2009
6a	7e, 7f	22/08/1983 - 25/08/1983
7a	5e, 3f	25/07/1993 - 01/08/1993
7c	18a, 33e	01/07/2007 - 04/07/2007
8a	9e, 10f	27/07/2007 - 02/08/2007
10a	13c, 19e, 15f	26/06/2009 - 01/07/2009
12f	34a, 16e	29/06/1985 - 03/07/1985
12c	29a, 49e, 21f	17/06/1996 - 22/06/1996
17a	85c, 20e, 8f	27/07/2011 - 04/08/2011
22a	81c, 29e, 198f	11/08/2017 - 16/08/2017
15e	16a, 24f	23/07/1996 – 03/08/1996

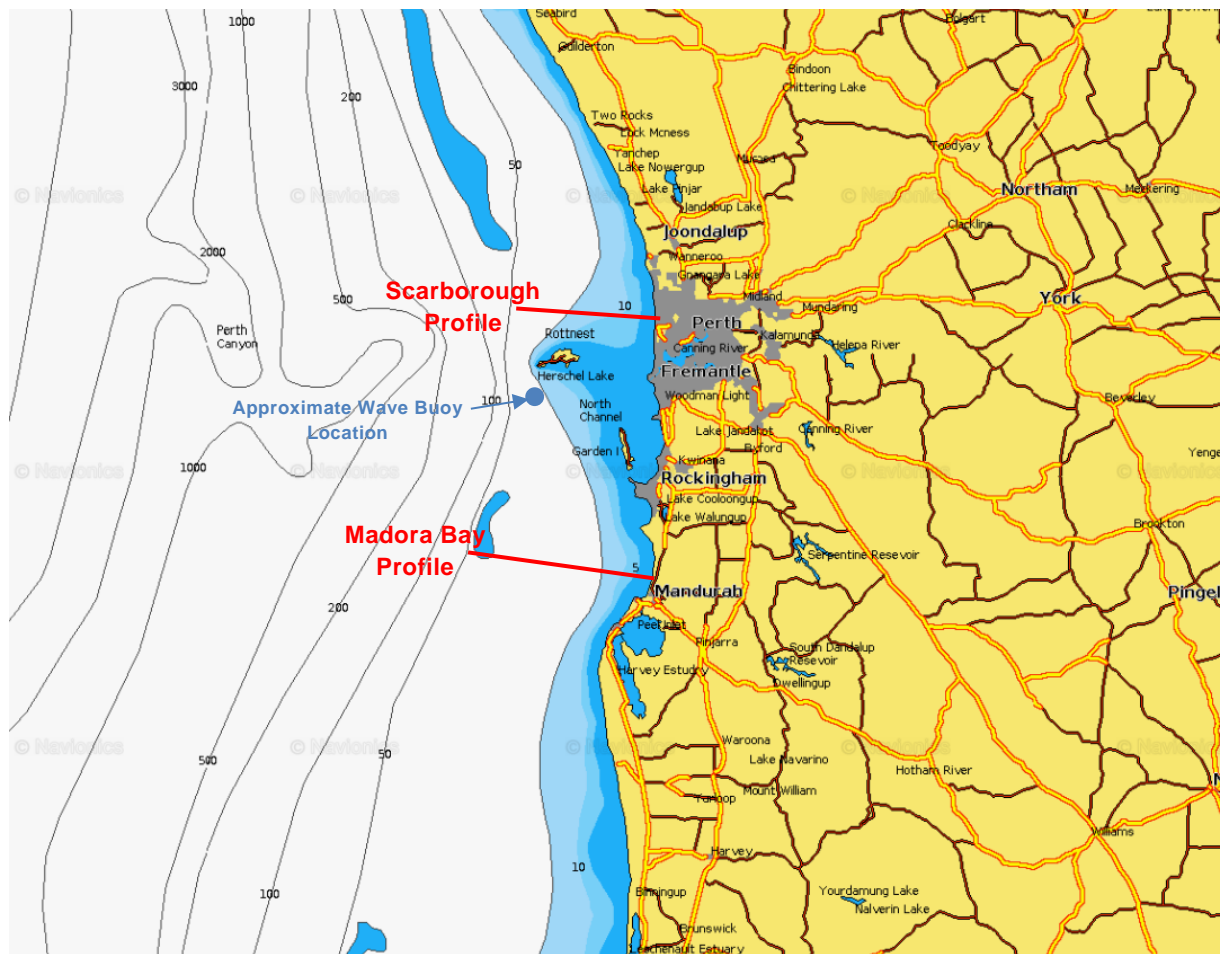


Figure 4.13 Locations of SBEACH Profiles – Metropolitan/Peel

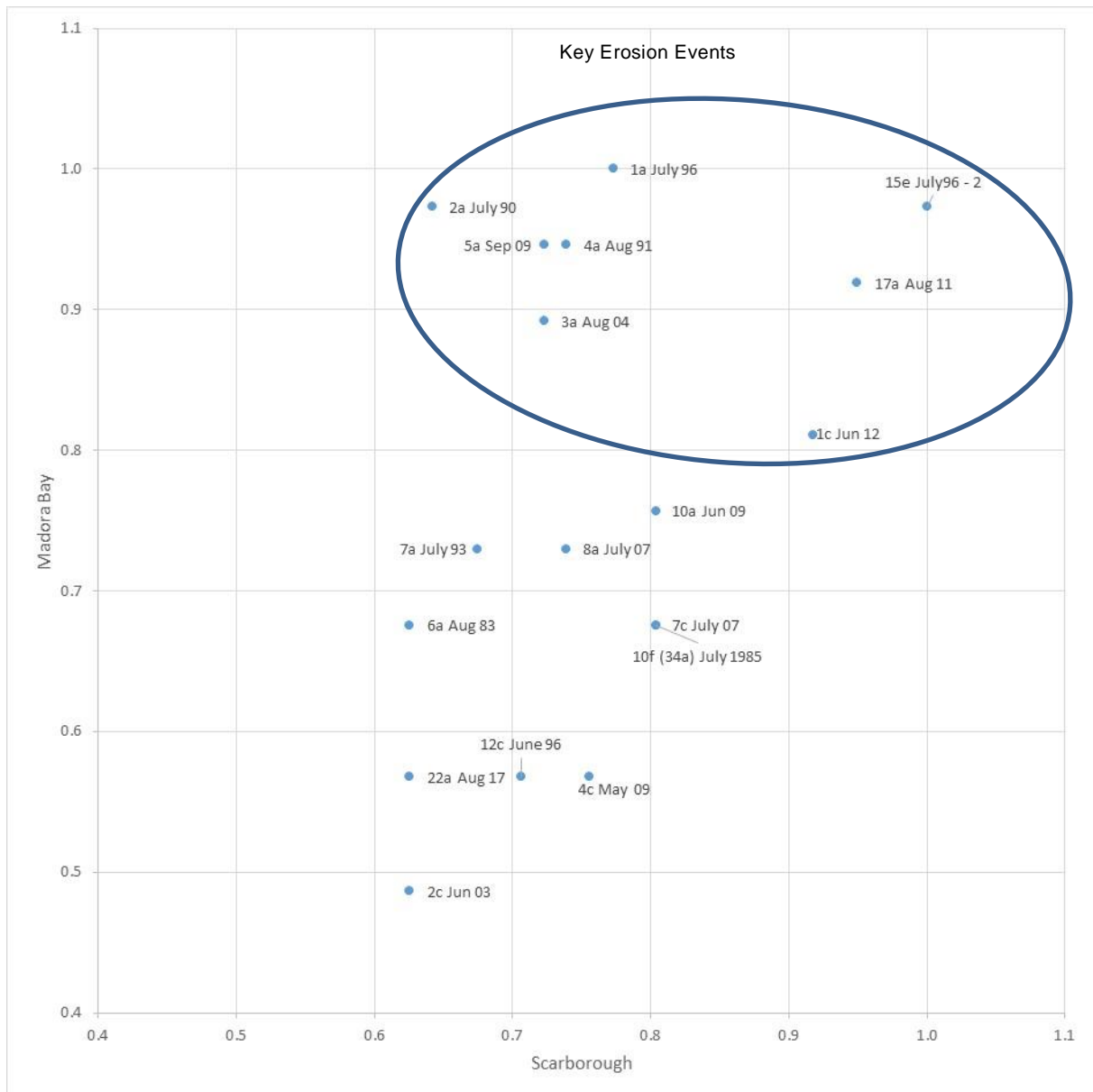


Figure 4.14 Normalised Results of SBEACH Modelling – Metropolitan/Peel

The results show that there is some variability in the modelled response of storms on different profiles. However, there appears to be a reasonably clear distinction between the most severe events and those that are less severe, as shown on Figure 4.14.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the Metropolitan/Peel region are summarised in Table 4.9. Time history information for these storms are provided in Appendix C.

Table 4.9 Key Storms for the Metropolitan/Peel Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MW/Days)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MW/Days)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
15-Jul-1996 20:00:00	19-Jul-1996 21:00:00	97	2.3	6.5	2.1	-	-	-	0.52	85	282
11-Jul-1990 23:00:00	18-Jul-1990 17:00:00	162	3.4	6.4	2.2	251	-	-	0.22	68.4	276
09-Sep-2009 11:10:00	13-Sep-2009 21:10:00	106	2.1	5.7	1.8	-	256	268	0.25	74	285
29-Jul-1991 08:00:00	05-Aug-1991 20:00:00	180	3.4	5.9	1.9	248	-	-	0.30	72.4	309
23-Aug-2004 05:30:00	27-Aug-2004 11:30:00	102	2.2	6.0	1.9	-	-	-	0.20	70	281
27-Jul-2011 23:37:00	04-Aug-2011 09:37:00	178	2.6	5.2	1.4	-	264	269	0.42	70	277
10-Jun-2012 04:24:00	13-Jun-2012 11:24:00	79	0.9	4.6	0.9	-	270	275	0.64	87	285
23-Jul-1996 12:00:00	03-Aug-1996 01:00:00	253	4.2	5.3	1.5	-	-	-	0.31	78	307

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.10.

Table 4.10 Outcomes from Observational Review – Metropolitan/Peel

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Beach survey information from Port Coogee and Owen Anchorage.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement time history plots and beach width measurements completed for Scarborough Beach (MRA 2017b)	Some relevant information presented below.
Vegetation line movement time history plots completed for Madora Bay (MRA 2014)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Dynamics of Scarborough Beach, City of Stirling, Western Australia (Eliot & Travers 2011)	Provides a review of historical changes to Scarborough Beach, noting that increased seasonal recession of the vegetation line corresponded with stormy periods, however complete recovery was generally noted by the following summer. The majority of the noted erosion signals predate the metocean information available for this study.
Beach profile studies for Mindarie Keys (LeProvost, Semeniuk & Chalmer 1988)	Profile fluctuations appear to be predominately associated with seasonal variations caused by longshore transport processes.
Town of Cottesloe beach monitoring information (Cardno 2017)	Profile fluctuations appear to be predominately associated with seasonal variations caused by longshore transport processes.
Department of Transport information on September 2013 Storm Events (pers comm. Department of Transport)	Identified a number of locations that were impacted by storm erosion, however the period comprised 3 separate events and is therefore different to the individual events that have been identified in this phase of the project. It is also noted that areas of erosion impact were typically adjacent to a shoreline interruption (groyne, etc) or were where infrastructure had been constructed seaward of the alignment of the dune.

Of the information that was reviewed the most pertinent information is presented in Figures 4.15 to 4.17. This information includes time history plots of vegetation line change at Scarborough and Madora Bay, as well as beach width measurements completed at Scarborough.

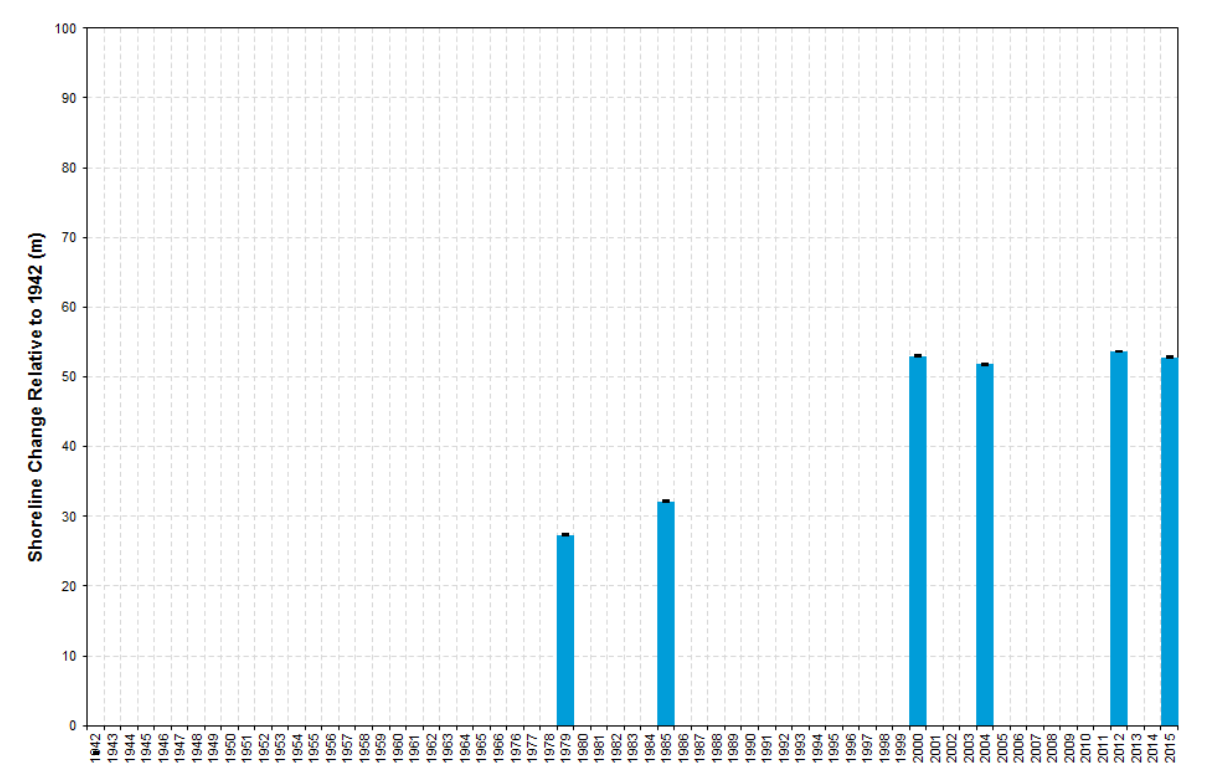


Figure 4.15 Time History of Vegetation line Position at Scarborough Beach

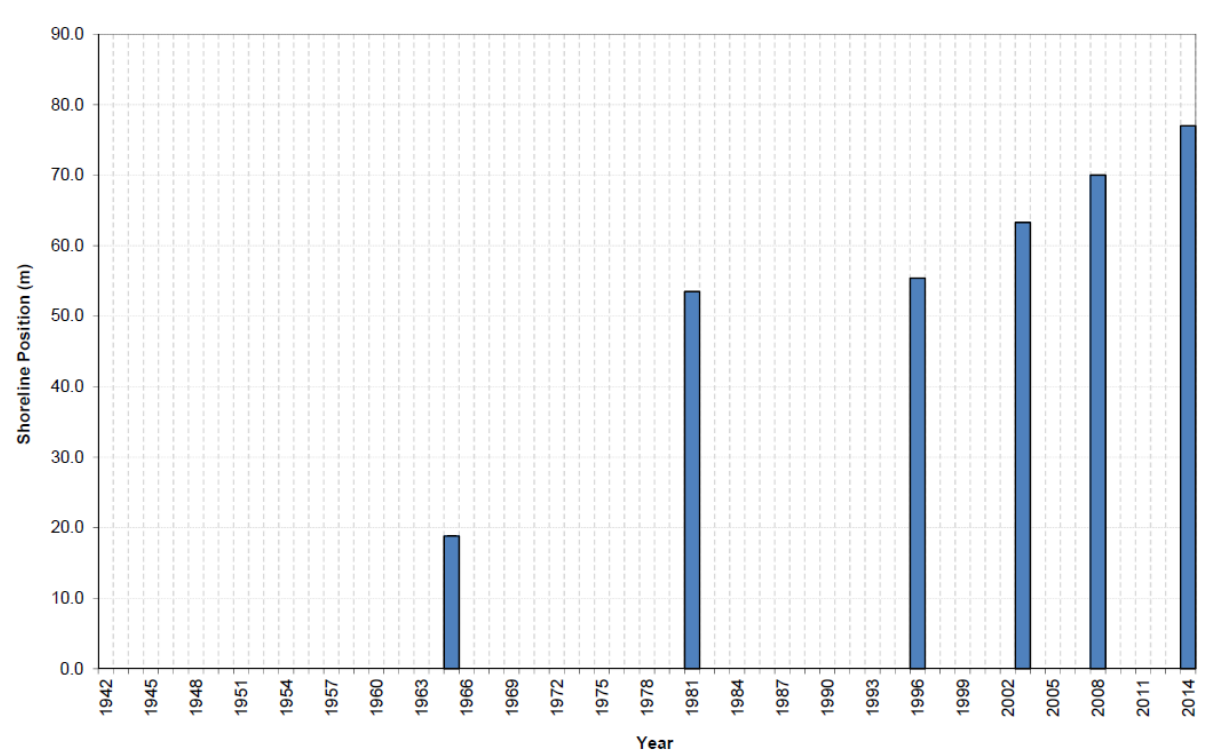


Figure 4.16 Time History of Vegetation line Position at Madora Bay

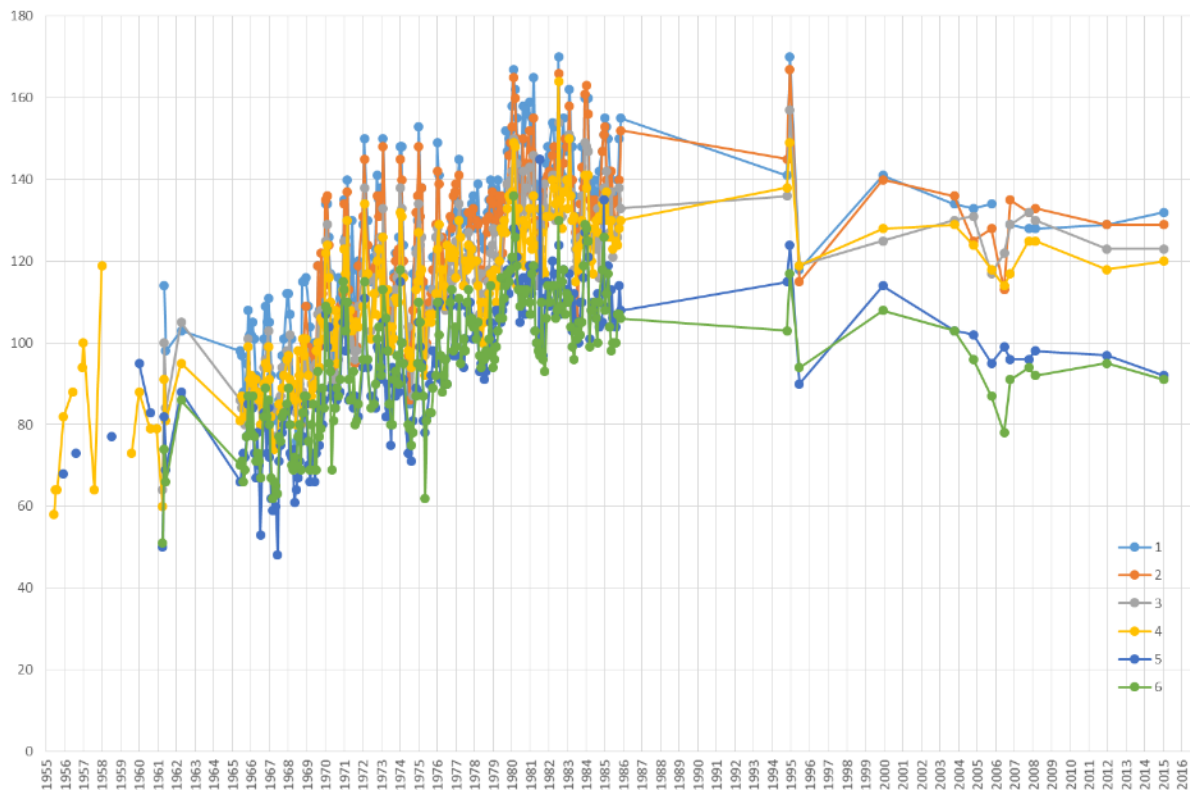


Figure 4.17 Beach Width Measurements at Scarborough Beach

From review of this information it was difficult to determine any consistent trends across the region that would be indicative of a severe erosion event. One of the key challenges in this regard was that the temporal resolution of much of the data was too coarse to provide an opportunity for a meaningful review of beach erosion. The time history plots of vegetation line movement at Scarborough Beach and Madras Bay, for example, do not show any consistent trends that could be considered to be indicative of storm erosion. The 1996 vegetation line position that was presented for Madras Bay was extracted from January 1996 imagery and therefore does not provide any information regarding the potential impacts of the severe storms in the winter of 1996. The fact that the trend in vegetation line movement post 1996 appears to be quite consistent suggests that any impact due to the 1996 storms would have been minimal.

Furthermore, review of the beach width measurements at Scarborough appears to show that seasonal fluctuations are relatively dominant. The response of Scarborough Beach to storm events has been displayed in the work by Eliot & Clarke (1983) and Eliot & Travers (2011). Eliot and Travers (2011) discussed how beach width variability was a combination of factors, including strong seasonality. Increased beach recession in winter during stormy periods was also noted, however full beach recovery was generally observed by summer. Nevertheless, the periods when storm erosion impact are most obvious predate the period of metocean measurement data available for this study. A wider picture of seasonality within the Perth Metropolitan region was described by Masselink & Pattiaratchi (2001), which indicated the importance of alongshore transfer, rather than simply a seasonal cross-shore response to wave energy.'

This review of vegetation line movement information fails to show any step changes in vegetation line position that are consistent across the region and therefore potentially indicative of severe storm erosion during the period considered. This observation leads to the possible conclusion that beach profile recovery after severe storm erosion events is relatively rapid and therefore not

picked up within the data. Alternatively, it is possible that the cross shore beach profile response to severe erosion events is actually less critical than simulations with models such as SBEACH would suggest. Longshore transport gradients may therefore be significantly more important than cross shore transport given that severe beach erosion is typically associated with areas adjacent to shoreline interruptions, such as Trigg Beach after the 1996 event. This could be significant with regard to the assessment methodology for storm related erosion as required by SPP2.6.

4.2.4 South West (Cape Naturaliste)

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and threshold analysis are presented in Table 4.11. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at Caves Road, near Siesta Park and Binningup, at the locations shown in Figure 4.18. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available. The directionality of severe events is such that direct incidence onto the Caves Road profile, as modelled, would be impossible, however as this beach type is extremely well represented in the region it was considered important to capture in the assessment. As the outcomes from the modelling are only being considered relative to each other in this phase of the project, this approach is considered reasonable.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.19, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.11 Storms Identified for Modelling in SBEACH – South West (Cape Naturaliste)

Primary Variate Number	Secondary Variate Number	Dates
1a	3c, 1e, 5f	15/07/1996 - 20/07/1996
1c	31a, 52e	10/06/2012 - 14/06/2012
2a	3e, 1f	12/07/1990 - 18/07/1990
3a	47c, 4e, 3f	29/07/1991 - 05/08/1991
4a	35c, 7e, 19f	21/09/2013 - 26/09/2013
4c	46a, 61e	07/05/2013 - 12/05/2013
5a	2e, 2f	25/07/1993 – 01/08/1993
6a	6e	30/08/2013 - 02/09/2013
6c	70a, 88e	26/04/2000 - 29/04/2000
7a	5e, 7f	02/06/1997 - 06/06/1997
7c	-	21/05/2009 - 23/05/2009
8a	9e, 9f	29/06/1992 - 03/07/1992
9a	8e, 8f	09/09/2009 - 13/09/2009
10a	10e	31/08/2002 - 04/09/2002
11a	11e, 12f	13/09/1996 - 19/09/1996
12a	16c, 28e, 13f	26/06/2009 – 01/07/2009
6f	18a, 67c, 19e	12/07/2000 - 19/07/2000
10f	21a, 13e	28/06/1985 - 03/07/1985
24a	71c, 33e, 4f	26/07/1996 - 02/08/1996

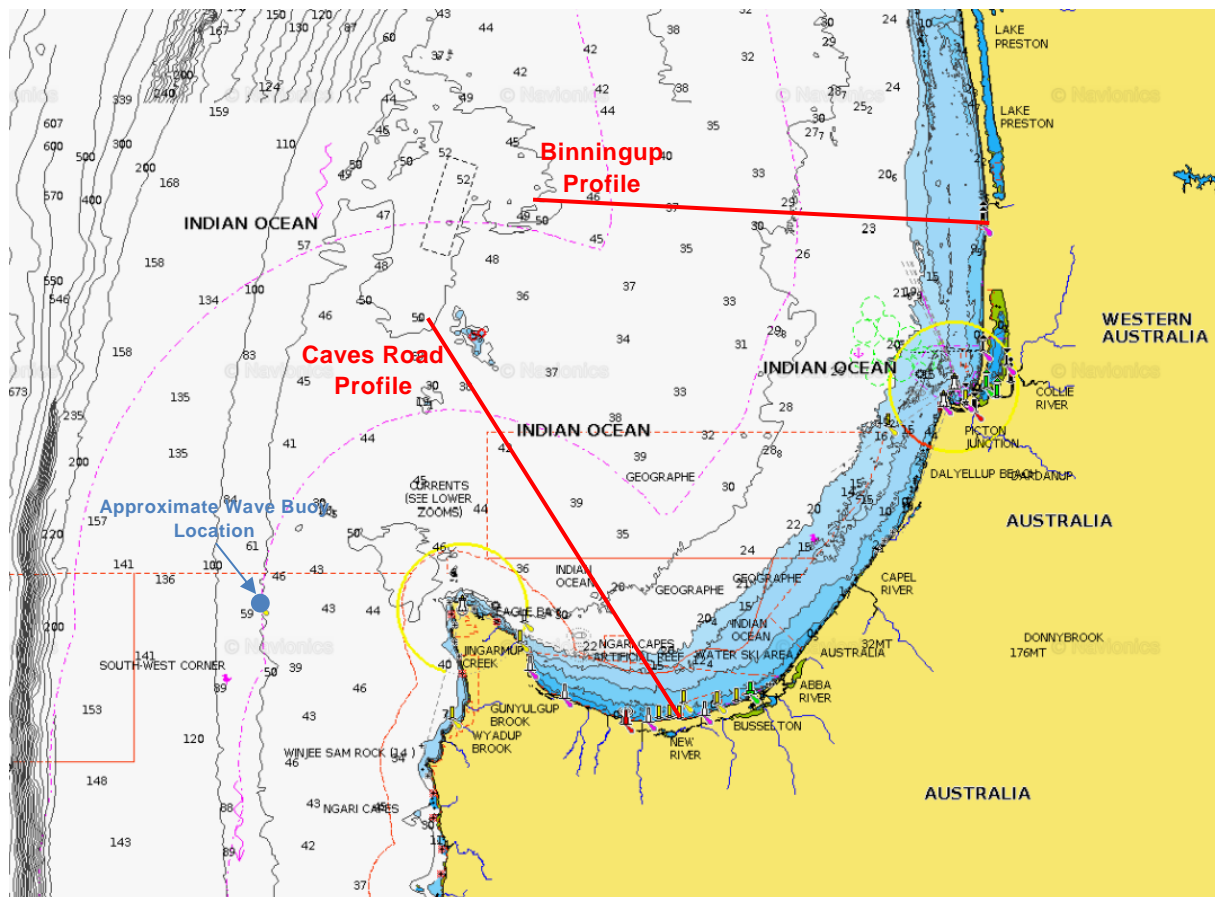


Figure 4.18 Locations of SBEACH Profiles – South West (Cape Naturaliste)

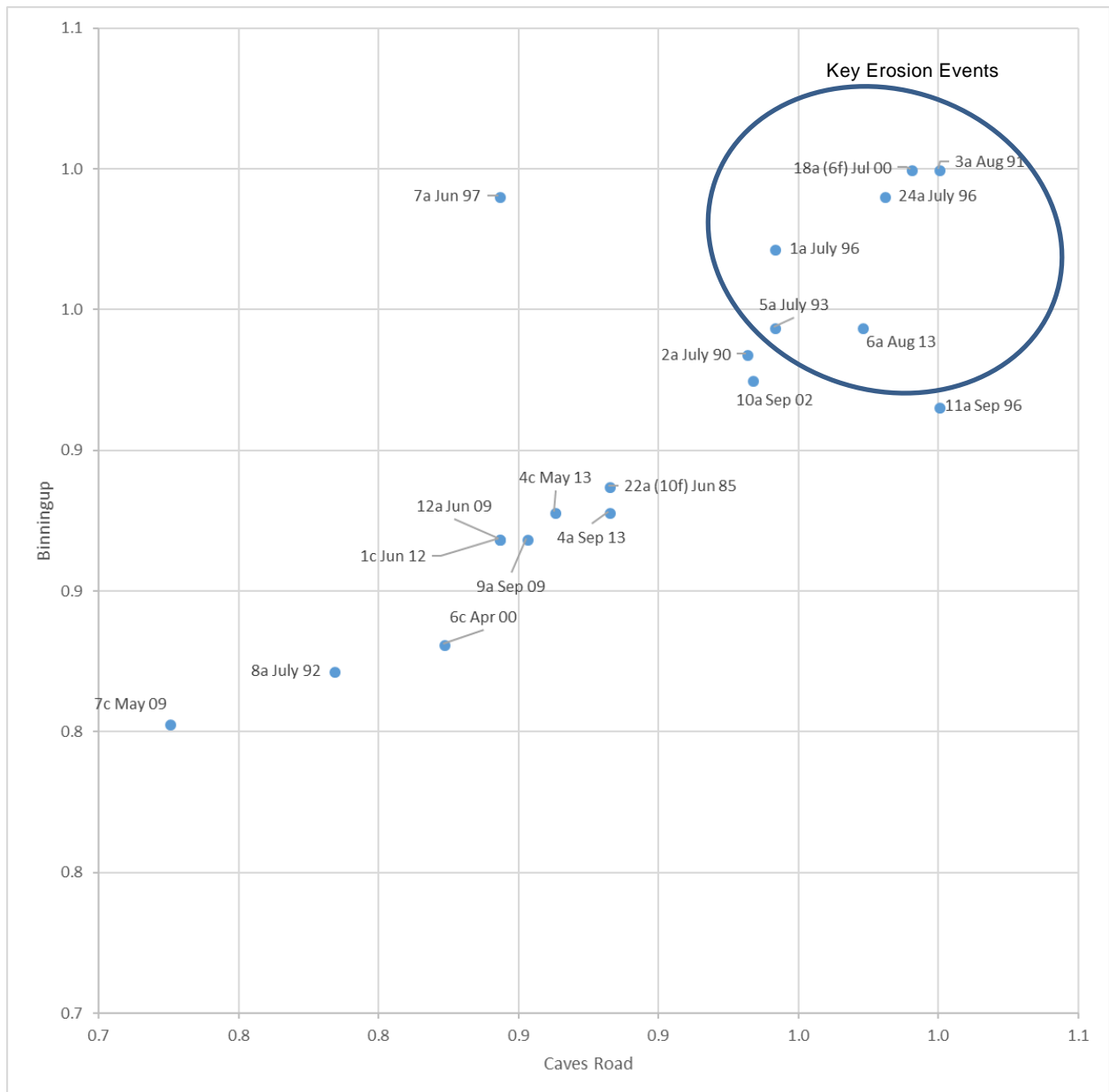


Figure 4.19 Normalised Results of SBEACH Modelling – South West (Cape Naturaliste)

The results show a relatively large degree of scatter within this region, with different events causing very different simulated erosion distances at the two locations. The distinction between the severe events and less severe events in this region is less clear, however a distinction is possible based on the combination of the normalised erosion values. The events assessed as being most severe are identified on the Figure.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the South West (Cape Naturaliste) region are summarised in Table 4.12. Time history information for these storms are provided in Appendix C.

Table 4.12 Key Storms for the South West (Cape Naturaliste) Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
15 Jul 96 20:00	20 Jul 96 2:00	102	3.4	7.6	3.1	253	-	-	0.59	85	301
29 Jul 91 5:00	05 Aug 91 23:00	186	4.7	6.7	2.5	241	-	-	0.45	70.6	260
25 Jul 93 17:00	01 Aug 93 2:00	153	4.1	6.7	2.6	239	-	-	0.25	59.4	258
12 Jul 00 12:15	19 Jul 00 2:30	158	3.3	5.9	1.8	-	-	-	0.42	65	273
30 Aug 13 4:17	02 Sep 13 15:17	83	2.5	6.5	2.4	-	243	277	0.35	61	303
26 Jul 96 11:00	02 Aug 96 23:00	180	3.6	5.7	1.7	244	-	-	0.41	71	293

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.13.

Table 4.13 Outcomes from Observational Review – South West (Cape Naturaliste)

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement time history plots completed for Binningup (MRA 2009)	Some relevant information presented below.
Vegetation line movement plots completed for Broadwater Beach Coastal Erosion Investigation (MRA 2015)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Report on outcomes of Port Geographe beach monitoring for the period between 1998 & 2007 (MRA, 2008)	No severe storm erosion of the shoreline is obvious within the record, as the monitoring profiles are heavily influenced by the works surrounding the Port Geographe structures.
Shore Coastal review of City of Busselton beach monitoring results from 2013 to 2016 (Shore Coastal 2017)	The review discussed severe storms that caused erosion within Geographe Bay during 2012 (prior to the commencement of monitoring). This timing corresponds to one of the identified Key events for the region. Other information predominately shows shoreline changes due to alongshore transport processes.
Department of Transport information on September 2013 Storm Events (pers comm. Department of Transport)	Identified a number of locations that were impacted by storm erosion, however the period comprised 3 separate events. The last, and most severe of these events was identified in the Key events for the region.

Of the information that was reviewed the information from Shore Coastal and Department of Transport appears to support the selection of two of the storms. For further review, particularly in the context of the locations modelled with SBEACH, specific shoreline movement information is presented in Figures 4.20 and 4.21.

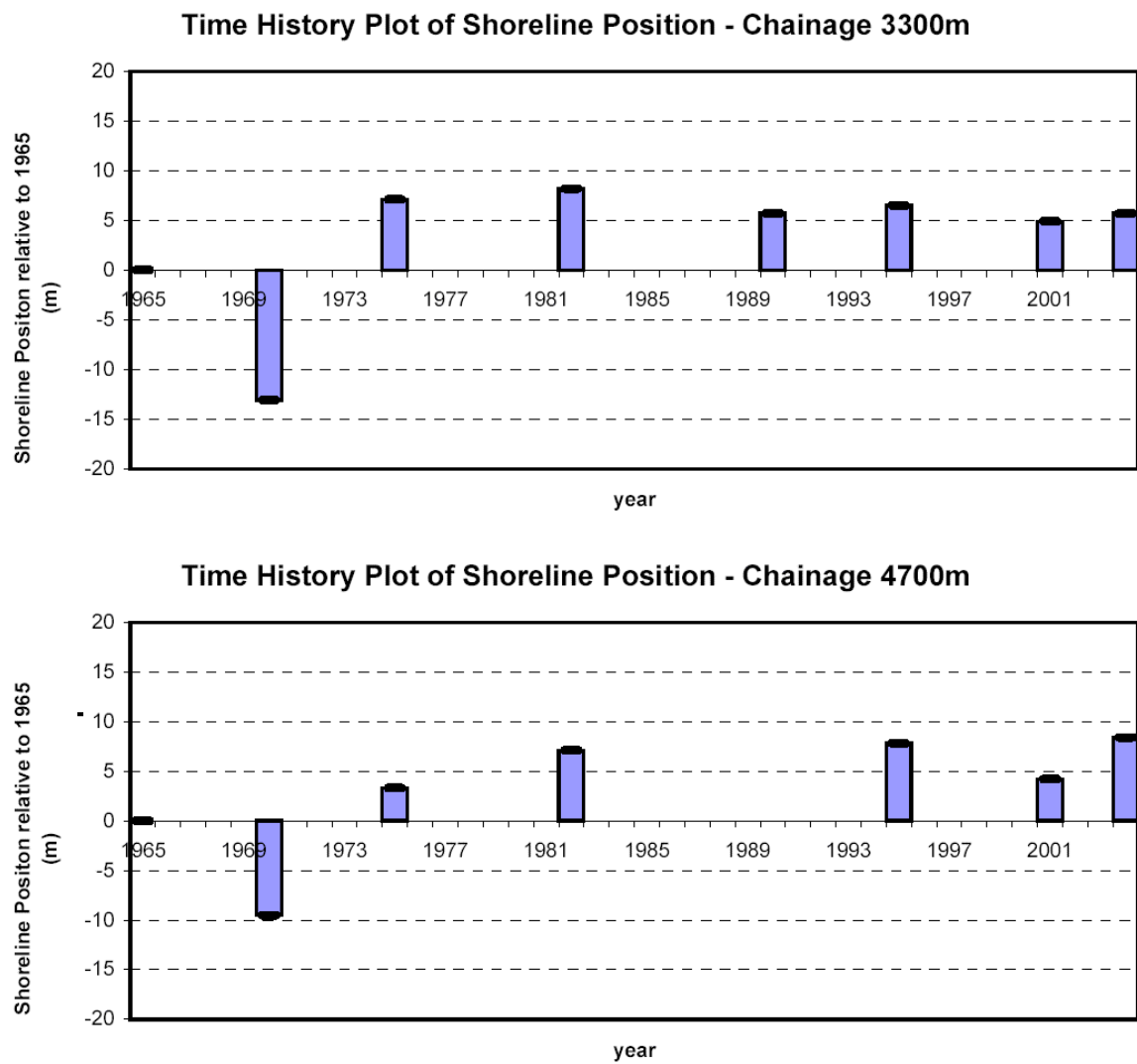


Figure 4.20 Time History of Vegetation line Position at Binningup

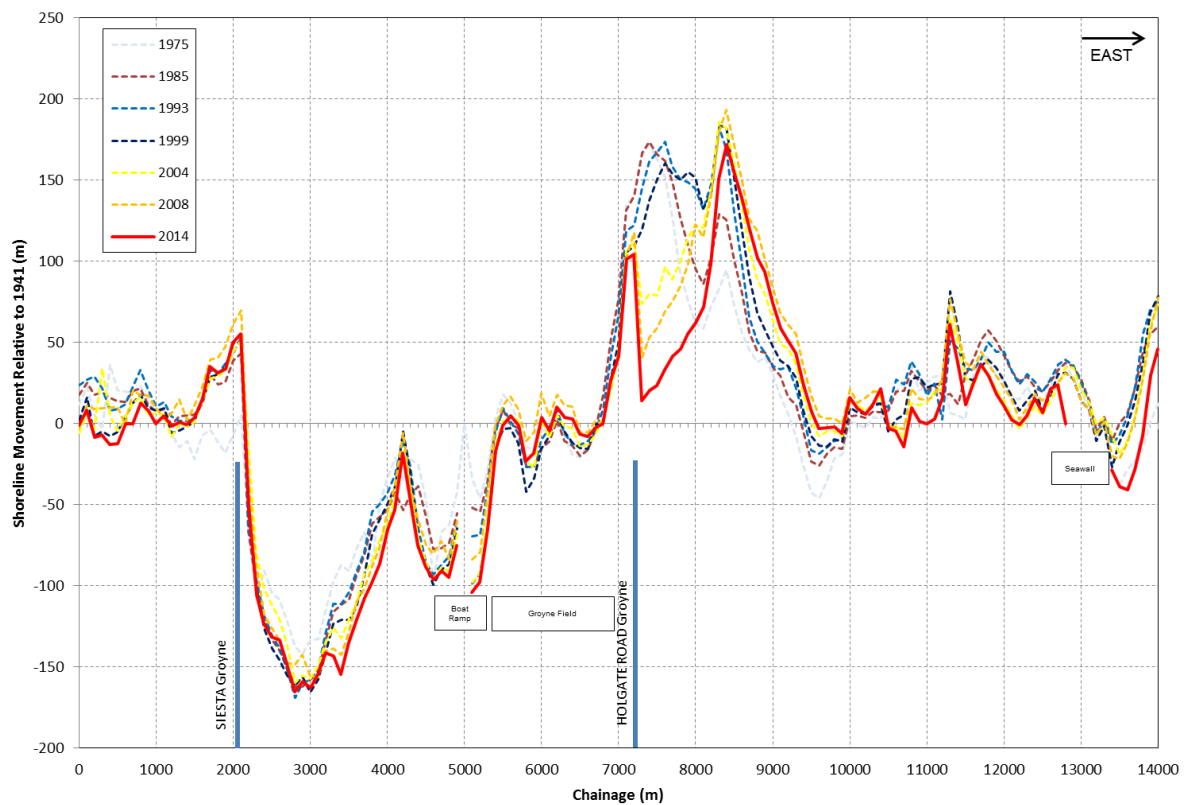


Figure 4.21 Time History of Vegetation line Position along Broadwater Beach Shoreline

From review of the vegetation line movement information, specifically that for Broadwater Beach, it is possible that there has been a consistent erosion over this shoreline section between 2008 and 2014. This period corresponds to two events within the Key events list. Both of these events were also identified by other sources (Shore Coastal and Department of Transport), so it is possible that this information provides some degree of confirmation of the Key events selected for this region.

4.2.5 South Coast (Albany)

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and threshold analysis are presented in Table 4.14. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at Peaceful Bay and Middleton Beach, at the locations shown in Figure 4.22. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.23, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.14 Storms Identified for Modelling in SBEACH – South Coast (Albany)

Primary Variate Number	Secondary Variate Number	Dates
1a	1e, 2f	12/07/1987 - 16/07/1987
1c		22/05/2009 - 24/05/2009
2a	87c, 2e, 4f	03/06/1997 - 06/06/1997
3a	4e, 3f	27/06/1981 – 01/07/1981
4a	8e, 42f	10/09/2008 - 16/09/2008
7a	7e, 16f	09/08/1990 - 14/08/1990
4c	29a, 72e	27/06/2009 – 29/06/2009
6a	11e, 6f	06/09/1984 – 10/09/1984
8a	10e, 5f	02/08/1991 - 06/08/1991
10a	17e, 10f	30/06/1992 - 03/07/1992
11a	6e, 1f	26/07/1993 - 31/07/1993
13a	15e, 7f	01/09/2002 - 06/09/2002
5c	14a, 12e, 12f	16/07/1996 - 20/07/1996
16a	16e, 8f	10/09/2009 - 13/09/2009
70c	22a, 20e, 62f	22/09/2013 – 28/09/2013
5e	18a, 9f	15/06/1979 – 18/06/1979
32e	15a, 37c, 22f	26/05/1981 – 29/05/1981
16c	75a	09/05/2013 – 12/05/2013

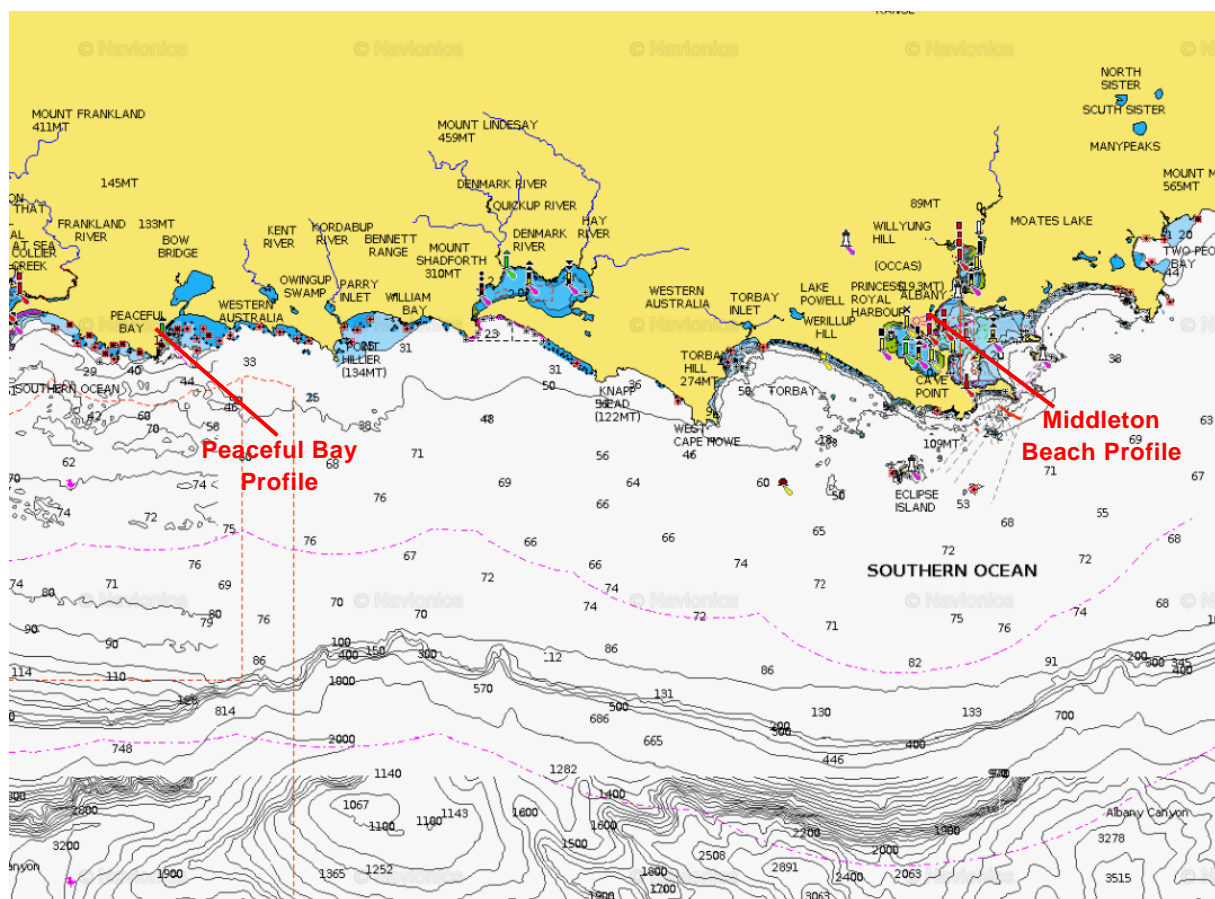


Figure 4.22 Locations of SBEACH Profiles – South Coast (Albany)

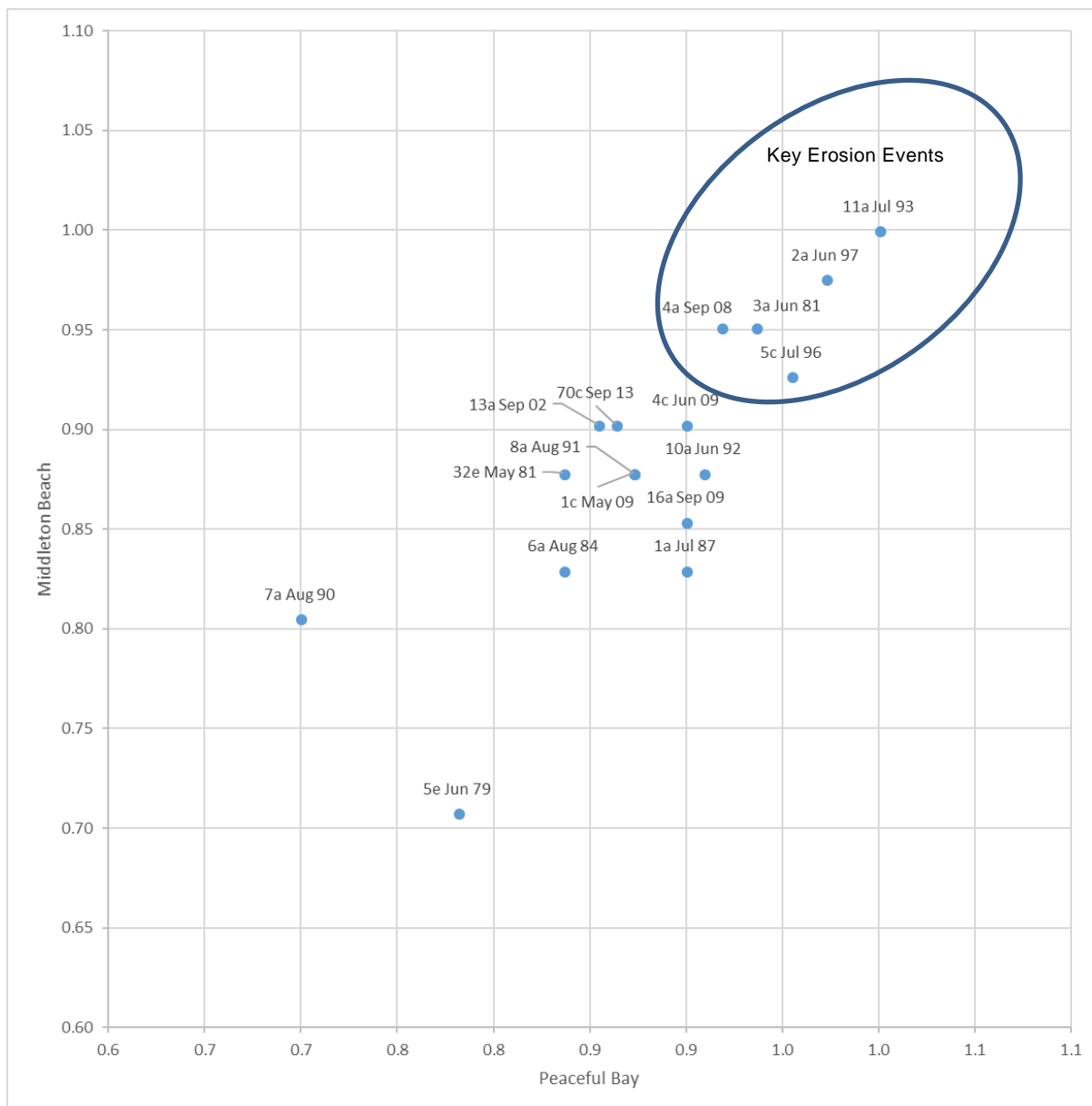


Figure 4.23 Normalised Results of SBEACH Modelling – South Coast (Albany)

The results show a relatively consistent trend with respect to the simulated erosion distances across both profiles. A grouping of events that lead to high erosion values at both locations is obvious within the plot. This group of events represent the most severe beach erosion events within the record.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the South Coast (Albany) region are summarised in Table 4.15. Time history information for these storms is provided in Appendix C.

Table 4.15 Key Storms for the South Coast (Albany) Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
03 Jun 97 5:00	06 Jun 97 20:00	87	2.7	6.5	2.6	212	-	-	0.29	41	294
10 Sep 08 23:50	16 Sep 08 1:20	122	2.9	6.3	2.1	-	216	239	0.28	52	282
27 Jun 81 2:00	01 Jul 81 17:00	111	2.9	6.5	2.3	211	-	-	0.27	52	298
26 Jul 93 2:00	31 Jul 93 2:00	120	3.1	6.0	2.2	216	-	-	0.30	46	296
16 Jul 96 20:00	20 Jul 96 8:00	84	2.1	6.0	2.0	219	-	-	0.39	41	289

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.16.

Table 4.16 Outcomes from Observational Review – South Coast (Albany)

Information Source & Description	Outcome of Review
Shoreline movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Shoreline movement time history plots completed for Middleton Beach (MRA 2015b)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Review of beach profile monitoring from 2013 to 2015 for Middleton Beach in Albany (PRDW, 2015)	Review of such a short period of record provides little information about shoreline change. It was noted that beach erosion occurred in 2014, potentially due to a storm, however over such a short period there is no context to be able to quantify the severity of this event.

Of the information that was reviewed, the most pertinent information is presented in Figure 4.24.

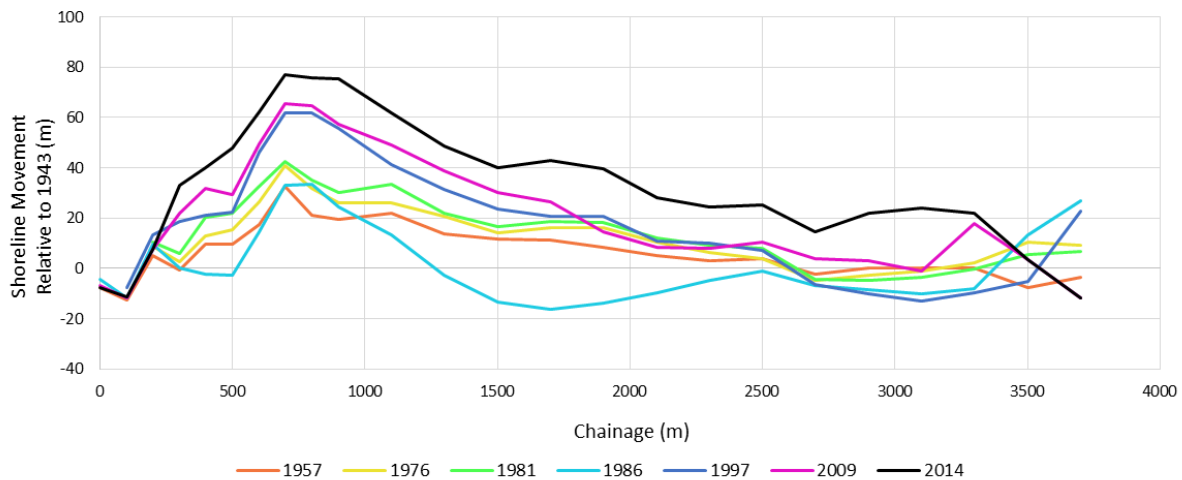


Figure 4.24 Shoreline Movement Plot for Middleton Beach

The shoreline movement plot very clearly shows a major change in shoreline position between 1981 and 1986. This change was in the order of 20 to 30 m in some locations. This is thought to be as a result of the August 1984 storm which caused widespread erosion at a number of locations.

Aside from the erosion associated with the 1984 storm, there is no other evidence of particularly severe storm erosion within the region. As a result, it is not possible to validate or refute the Key events that have been identified for this region.

August 1984 Storm

The August 1984 storm is widely renowned as one of the most severe storms, with respect to observed beach erosion, experienced on for the south coast region in living memory. The storms of August 1984 entirely eroded the primary dunes of Middleton Beach and subsided several residences at Emu Point into the sea (Albany Port 2008).

Figure 4.25 shows the impact of this storm event on Middleton Beach. The shoreline positions (depicted by the coastal vegetation lines) from 1981 (pre-storm) and 1986 (post-storm) are shown on the figure. A time history plot showing the change in vegetation line position since 1943 is also provided. This information highlights the following two points.

1. The 1984 storm caused a significant amount of erosion along Middleton Beach, with the extent of erosion still obvious along some stretches of the beach due to the alignment of more prominent vegetation types, which indicate the extent of erosion.
2. The extent of erosion caused by the 1984 storm event is much greater than recorded during any other event between 1943 and the present.

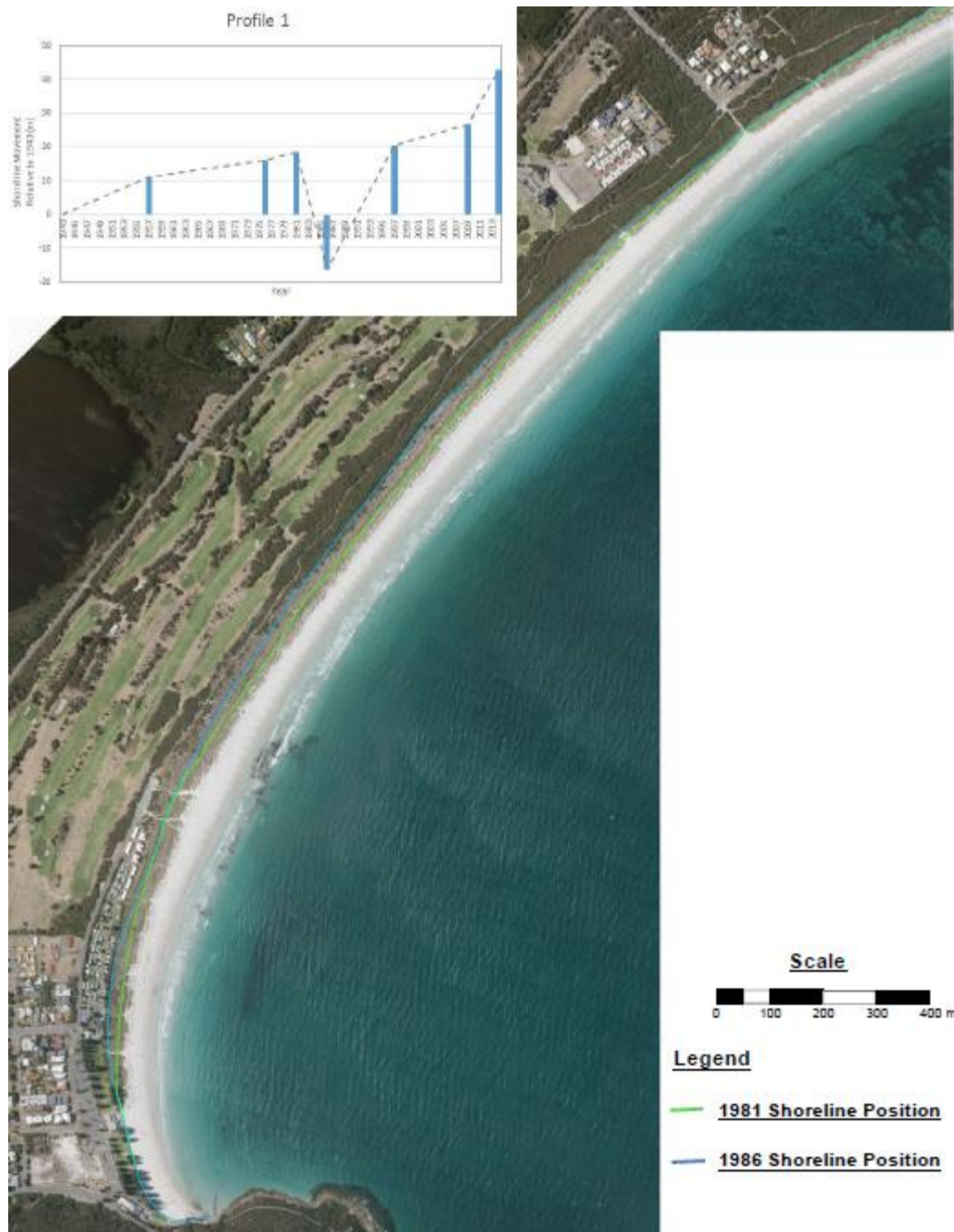


Figure 4.25 Extent of Erosion along Middleton Beach Caused by 1984 Storm

Photographs of Emu Point after the storm are shown in Figure 4.26 (CoA 2008).



Figure 4.26 Emu Point Following August 1984 Storm

The 1984 storm was identified in this section for SBEACH modelling, however results did not confirm it as a top 5 storm. Whilst this may seem counter-intuitive, wave and water level analysis and SBEACH modelling suggest the storm was not as erosive as several others that occurred within the data record based on these metrics.

This analysis does not consider directionality of the identified storms which is thought to be critical for particular anomalous storms such as this. A directional assessment of storm clustering is completed as part of Section 5. The results of that analysis identify the August 1984 storm cluster as the most severe within the data record from the south east quadrant. Hence, the directionality of this storm is theorised to have been the driver for the widespread erosion it caused at certain sites with south easterly aspects. These sites are otherwise largely sheltered from storm conditions which predominantly occur from the south through west, leaving them potentially vulnerable to severe events from anomalous directions.

The outcomes of this highlight the requirement for consideration of storm directionality for sites with sheltering and exposures which are atypical for the relevant region as part of SPP 2.6 assessments.

4.2.6 Hopetoun & Bremer Bay Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and threshold analysis are presented in Table 4.17. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at Bremer Beach and Back Beach, at the locations shown in Figure 4.27. These locations were selected as a reasonable amount of observational data available was available for these locations.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.32, with the results presented as normalised values where total erosion on the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.17 Storms Identified for Modelling in SBEACH – Hopetoun & Bremer Bay

Primary Variate Number	Secondary Variate Number	Dates
1a	93c, 1e, 1f	22/08/2009 - 25/08/2009
1c	53a, 62e, 39f	22/05/2009 - 24/05/2009
2a	43c, 3e, 10f	02/06/2003 - 07/06/2003
2c	89a	28/04/2000 - 30/04/2000
3a	42c, 4e, 13f	11/09/2008 - 16/09/2008
3c	33a, 44e	28/06/2009 – 01/07/2009
4a	22c, 9e, 5f	10/06/2005 - 14/06/2005
5a	2e, 2f	29/08/2005 – 01/09/2005
5c	89e	21/05/1999 - 23/05/1999
6a	34c, 5e, 5f	05/06/2002 - 08/06/2002
7a	75c, 6e, 3f	01/09/2002 - 08/09/2002
7c	72a	20/06/2000 - 22/06/2000
8a	32c, 7e, 6f	22/07/2000 - 25/07/2000
8c	12a, 18e,	20/06/2009 - 23/06/2009
13c	24a, 20e, 24f	28/06/2008 - 30/06/2008

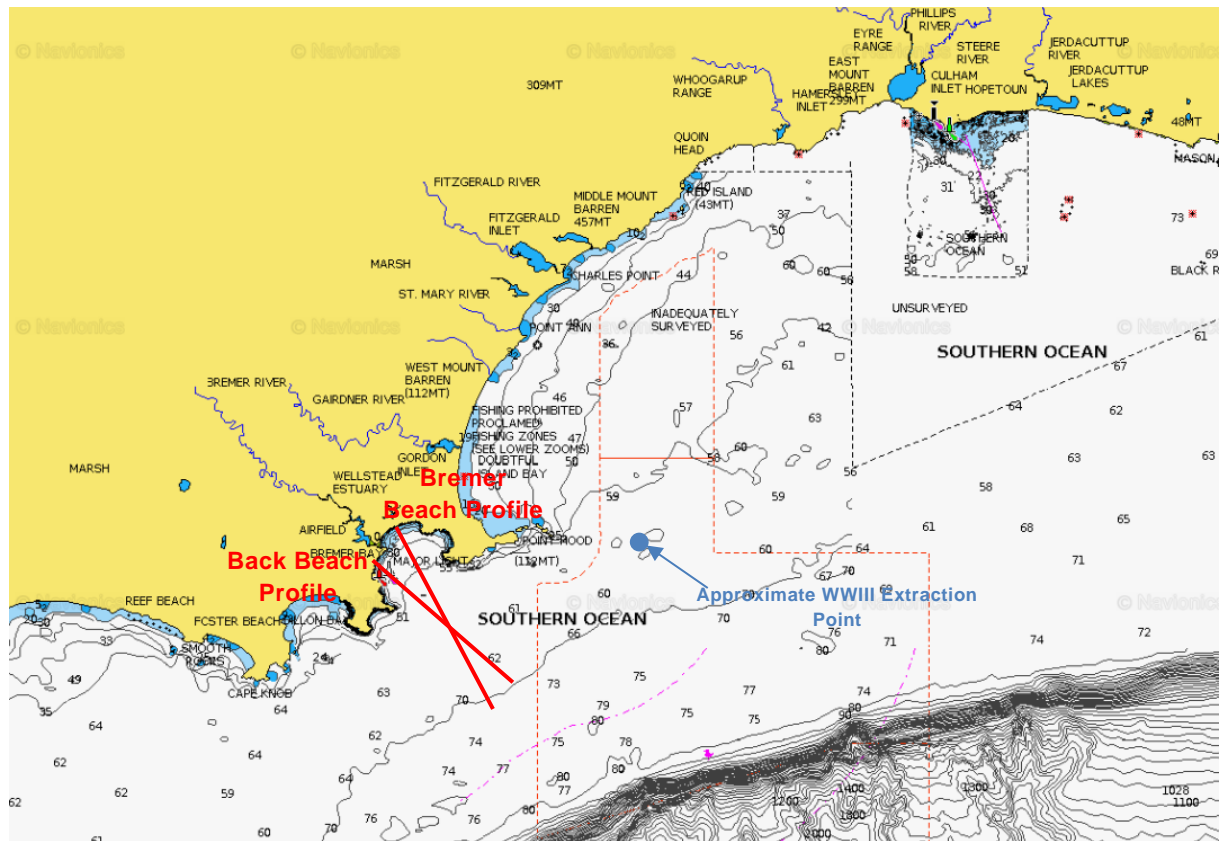


Figure 4.27 Locations of SBEACH Profiles – Hopetoun & Bremer Bay

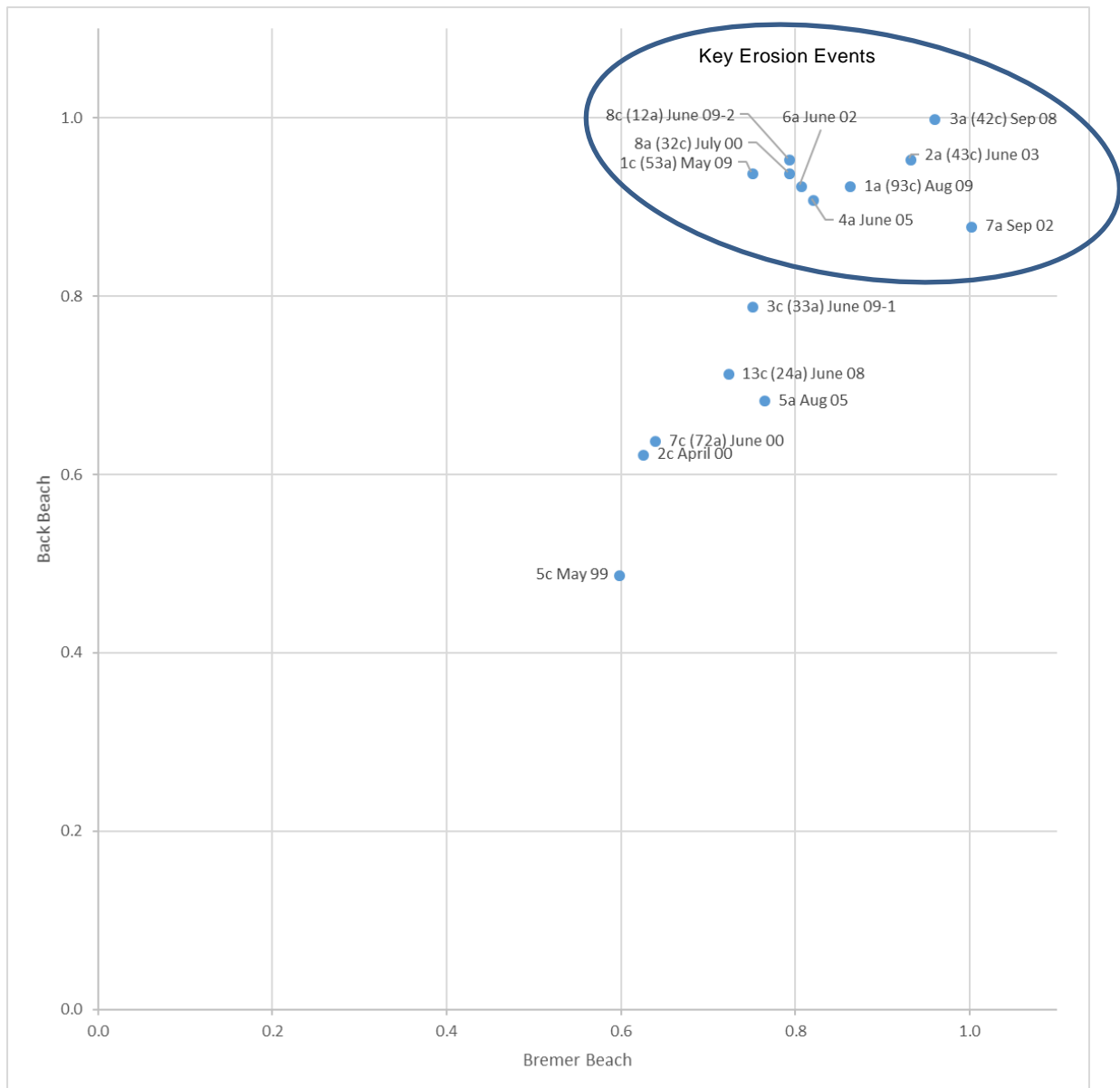


Figure 4.28 Normalised Results of SBEACH Modelling – Hopetoun & Bremer Bay

The results show that there is some variability in the modelled response of storms on different profiles. However, there appears to be a reasonably clear distinction between the most severe events and those that are less severe, as shown on Figure 4.28.

Key Storms

Based on the outcomes of the entire assessment process, the Key storms that have impacted the Hopetoun and Bremer Bay region are summarised in Table 4.18. Time history information for these storms is provided in Appendix C.

Table 4.18 Key Storms for the Hopetoun & Bremer Bay Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
22 May 09 17:00	24 May 09 20:00	51	0.7	4.4	0.7	205	-	-	0.24	44	264
02 Jun 03 23:00	07 Jun 03 17:00	114	2.0	5.5	1.5	200	-	-	0.10	46	279
22 Aug 09 2:00	25 Aug 09 23:00	93	2.0	5.6	1.8	200	-	-	0.02	44	264
11 Sep 08 14:00	16 Sep 08 5:00	111	1.9	5.2	1.5	206	-	-	0.13	54	279
01 Sep 02 17:00	08 Sep 02 5:00	156	2.4	5.0	1.4	203	-	-	0.02	46	274
20 Jun 09 14:00	23 Jun 09 5:00	63	0.9	4.6	0.9	198	-	-	0.03	50	282
10 Jun 05 23:00	14 Jun 05 23:00	96	1.4	5.2	1.3	200	-	-	0.04	48	274
05 Jun 02 20:00	08 Jun 02 20:00	72	1.4	5.1	1.4	204	-	-	0.02	48	274
22 Jul 00 8:00	25 Jul 00 11:00	75	1.4	5.0	1.4	204	-	-	0.11	48	253

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.19.

Table 4.19 Outcomes from Observational Review – Hopetoun & Bremer Bay

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement time history plots completed for Bremer Beach and Back Beach (MRA 2017c)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.

Of the information that was reviewed, the most pertinent information is presented in Figure 4.29. This figure presents a vegetation line movement plot for Bremer Beach and Back Beach. The plot shows how the position of the vegetation line has changed over the period of record. From review of the plot it is apparent that there have been some variations in vegetation line position, however once again the temporal resolution of the data is insufficient to provide meaningful information regarding the occurrence of severe erosion events. On this basis it is not possible to validate the Key storms that have been selected.

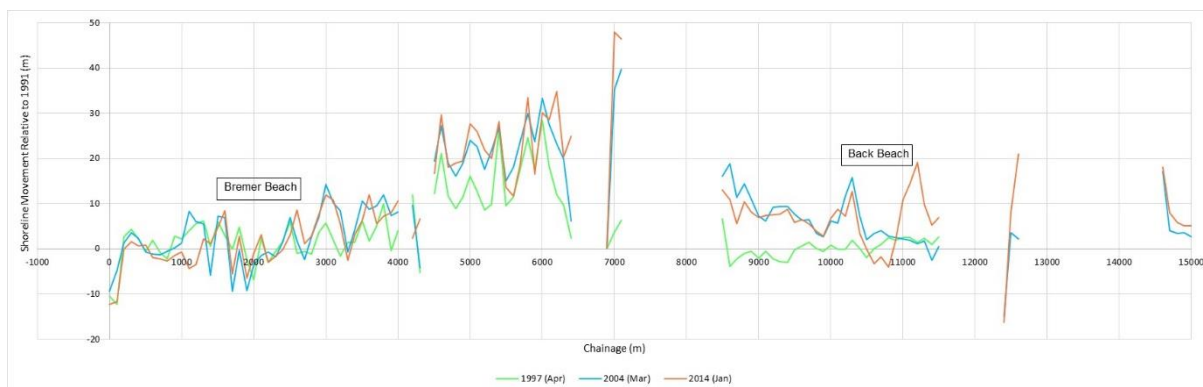


Figure 4.29 Time History of Vegetation line Position at Bremer Beach & Back Beach

4.2.7 Great Southern (Esperance)

Moving Average & Wave Threshold Analysis

The moving average and wave threshold analysis was completed in accordance with the methodology outlined previously. The top 100 events for each variate are presented in Appendix B, together with associated cross plots.

SBEACH Modelling

The severe events that were identified for further assessment based on the moving average and threshold analysis are presented in Table 4.20. These storms were simulated within SBEACH to help determine their relative severities with respect to beach erosion potential.

Simulations were completed for profiles located at the Esplanade and Duke of Orleans Bay, at the locations shown in Figure 4.30. These locations were selected as they were considered to provide a reasonable representation of the beach conditions within the region and also have a reasonable amount of observational data available. It is noted that both locations would receive some sheltering from the islands of the Recherche Archipelago, so the wave input conditions would not necessarily be accurate, however for the purposes of comparison of the relative severity of beach erosion events this was not considered to be a significant issue.

Simulations were completed for both the observed/surveyed profiles as well as for the eroded profiles as previously outlined. The results of the SBEACH modelling are presented in Figure 4.30, with the results presented as normalised values, where total erosion estimates from the observed/surveyed and eroded profiles have been combined to provide a single normalised erosion rank for each location.

Table 4.20 Storms Identified for Modelling in SBEACH – Great Southern (Esperance)

Primary Variate Number	Secondary Variate Number	Dates
1a	95c, 3e, 3f	10/05/1987 - 13/05/1987
1c	64a, 90e	28/06/2009 - 01/07/2009
2a	1e, 1f	13/07/1987 - 16/07/1987
3a	81c, 2e, 2f	22/08/2009 - 25/08/2009
4a	29c, 7e, 22f	02/06/2003 - 07/06/2003
4c	33a, 19e, 12f	18/07/1996 - 20/07/1996
5a	17c, 4e, 32f	11/09/2008 - 16/09/2008
5c	69a, 72e	02/07/2007 - 05/07/2007
6a	10e, 4f	27/07/1994 - 31/07/1994
8a	36c, 13e, 9f	05/06/2002 - 08/06/2002
9a	5e, 5f	29/08/2005 – 01/09/2005
9c	25a, 48e, 52f	20/06/2009 - 23/06/2009
10a	71c, 9e, 28f	01/09/2002 - 06/09/2002
11a	18c, 6e, 6f	03/06/1997 - 07/06/1997
11c	24a, 42e, 86f	01/08/1996 - 04/08/1996
13a	28c, 12e, 8f	22/07/2000 - 25/07/2000
15a	11e, 15f	11/08/1992 - 13/08/1992

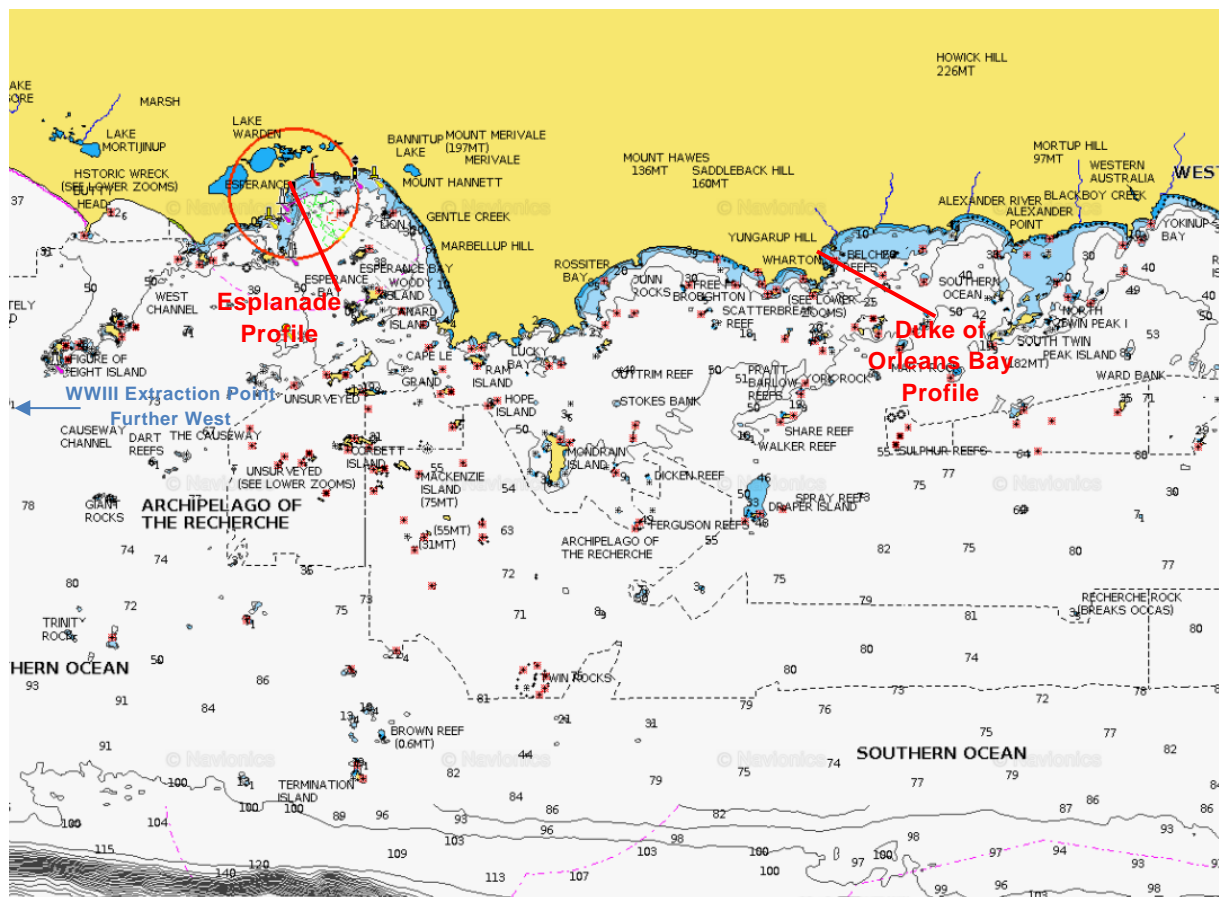


Figure 4.30 Locations of SBEACH Profiles – Great Southern (Esperance)

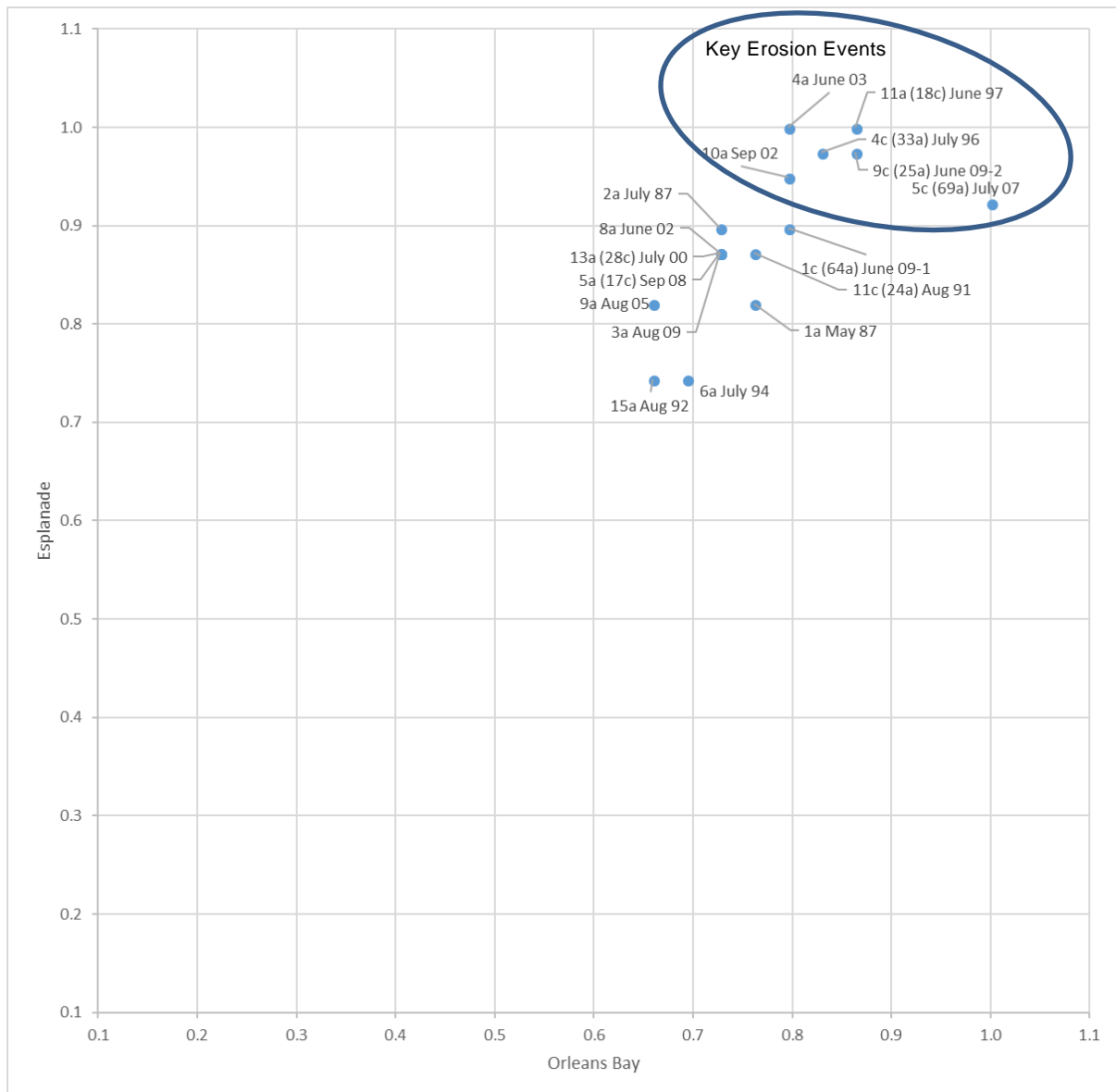


Figure 4.31 Normalised Results of SBEACH Modelling – Great Southern (Esperance)

The results show that there is some scatter in the results, indicating that the simulated erosion response at both locations was different for some events. Nonetheless, a trend is observed and the top events are able to be identified.

Key Storms

Based on the outcomes of the entire assessment process, the key storms that have impacted the Great Southern (Esperance) region are summarised in Table 4.21. Time history information for these storms is provided in Appendix C. In addition to the WWIIII hindcast data used for this assessment, for periods where data was available from the Esperance wave buoy, the corresponding time history is plotted for informational purposes. Information pertaining to exclusion of the Esperance wave buoy data from this assessment is provided in Section 3.2.1.

Table 4.21 Key Storms for the Great Southern (Esperance) Region

Start Date	End Date	Duration (hours)	Storm Net Wave Power (MWDays)	Peak 72 Hour Moving Average Hs (m)	Peak 72 Hour Net Wave Power (MWDays)	Average Wave Direction (°)			Peak 72 Hour Moving Average Water Level (mAHD)	Wind	
						Total	Swell	Sea		Peak Speed (Km/h)	Avg Direction (°)
02 Jun 03 23:00	07 Jun 03 17:00	114	2.3	5.8	1.8	206	-	-	0.31	50	277
03 Jun 97 20:00	07 Jun 97 2:00	78	1.8	5.4	1.8	214	-	-	0.30	61	291
02 Jul 07 23:00	05 Jul 07 5:00	54	0.9	4.7	0.9	217	-	-	0.40	48	286
20 Jun 09 17:00	23 Jun 09 5:00	60	1.0	5.0	1.0	207	-	-	0.23	44	262
01 Sep 02 17:00	06 Sep 02 11:00	114	2.3	5.4	1.7	210	-	-	0.22	48	279
18 Jul 96 2:00	20 Jul 96 14:00	60	1.4	5.2	1.4	216	-	-	0.35	58	289

Review of Observational Information

A range of information was reviewed to assess the potential impacts of severe storms on the coastline. Summary of the outcomes of the review of the most relevant information is provided in Table 4.22.

Table 4.22 Outcomes from Observational Review – Great Southern (Esperance)

Information Source & Description	Outcome of Review
Vegetation line movement plans and coastal movement information for the entire metropolitan area, available online at https://maps.slip.wa.gov.au/Marine/app/ as well as within MRA's database.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.
Vegetation line movement plans and assessment completed by BMT JFA (2015) for the Esperance coastline	No obvious recession that is potentially storm related within the record.
Vegetation line movement and time history plots for Duke of Orleans Bay presented (MRA 2011)	Some relevant information presented below.
Aerial imagery available to view online via the Landgate Map Viewer resource.	No clear evidence of widespread coastal erosion at any specific time that could be indicative of a severe event.

Figure 4.32 presents vegetation line movement and time history plots of shoreline change at Duke of Orleans Bay. Similar to the vegetation line movement information within BMT JFA (2015) it is not possible to detect any consistent trend of shoreline erosion within any period across the entire region. The outcomes of the Key event identification process for this region therefore cannot be validated.

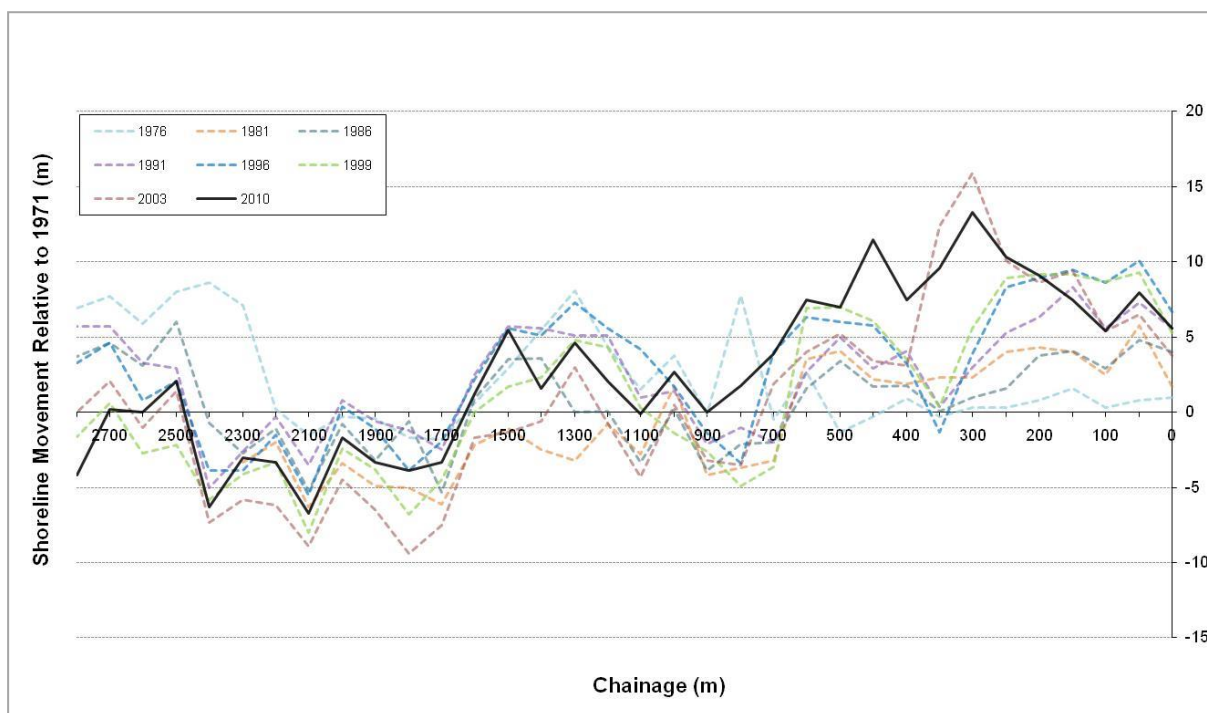


Figure 4.32 Time History of Vegetation line Position at Duke of Orleans Bay

4.3 Discussion of Results

A consistent theme throughout the regions is the inability to identify any widespread shoreline change that could be attributed to a severe erosion event. There are obvious limitations with regard to the temporal and spatial resolution of the data that is available for review, however it could reasonably be expected that some degree of shoreline change could be observed after the most severe events. As an example, the July 1996 storm is one of the most severe events across a number of regions, yet large scale impact on the shoreline could not be identified. The only areas where identification of change was possible were isolated locations where it appeared that longshore transport losses or antecedent beach conditions, were more critical.

Potentially, this result suggests that:

- the recovery of shoreline profiles from cross shore erosion is much quicker than can be detected within the current monitoring records, or
- the extent of erosion that occurs during these events is not always as severe as the modelling would suggest.

On reflection, it would seem that the latter is the most likely explanation. If severe erosion of the dune was to have occurred then it would be expected that changes in the types of vegetation would be evident as the profile recovered, which they generally are not. This outcome may warrant further review or assessment of the appropriateness of models and/or modelling

techniques when completing assessments to the requirements of SPP2.6. Further commentary regarding some of the challenges associated with beach profile response modelling are discussed in Seashore Engineering (2018).

In this regard, another important outcome from this assessment has been the fact that the modelled shoreline response to different storms is not always consistent. Certain events can cause comparatively different erosion distances on different shoreline profiles. In some respects this is an intuitive outcome, as it should be expected that different shorelines with different aspects, morphology and characteristics respond differently to different events. However, what this means is that identifying a single event to define a certain severity within a certain region is unlikely to always provide the same level of conservatism. Consideration should therefore be given to sensitivity testing with more than 1 event when modelling shoreline response.

Furthermore, storms identified within this study have been based on offshore wave measurements. Review of the transformational changes to these waves as they travel onshore will need to be completed by end-users to ensure that the onshore wave conditions are reasonable, particularly surrounding complex bathymetry.

Directionality was not considered as part of the key storm identification process. This has led to the exclusion of some storms which were observed to cause significant shoreline erosion. An example of this is the storm that occurred in August 1984 along the south coast and caused significant erosion of Middleton Beach in Albany. It is arguable that, based on event severity alone, this storm caused significantly greater erosion than should have been expected, however upon review, it was the directionality of this storm (originating from the south east quadrant rather than the much more common south west quadrant) which was largely responsible for the substantial shoreline erosion. An assessment of directionality has been completed as part of Section 5 to identify such events.

5. Design Storm Cluster Selection

5.1 Assessment Methodology

Work completed within the previous section identified the key discrete storms that have impacted each of the regions. Many of these storms were actually just one component of a sequence of meteorological events that contributed to sustained elevated conditions. Whilst it is important to consider the potential impacts of these discrete storms in isolation, the potential erosive effects of clustering of these events is particularly significant.

Clustering of beach erosion events can increase the potential for shoreline erosion. Splinter et al (2013) note that whilst coastal managers typically design for the impact of extreme individual beach erosion events, the cumulative impact of smaller closely spaced storms (clusters) can far outweigh the erosion potential of a single much larger storm. Karunaratna et al. (2013) presented similar findings based on a detailed long term assessment at Narrabeen Beach in New South Wales.

Three consecutive repeats of a storm experienced in July 1996 are currently used to simulate the 100 year ARI beach erosion event, as required by SPP2.6. This storm was identified in Section 4 of this assessment as being one of the most severe events along the western coastline. Consecutive simulations of this storm represent a storm cluster, rather than a discrete storm, as defined for the purposes of this assessment. From review of the wave record it is apparent that, in real time, the occurrence of a series of storms with a cumulative period of elevated wave and water level conditions similar to three repeats of the July 1996 storm would require consideration of a total period in excess of a month. Hence, for consistency with the currently used design storm sequence, the selection of design ARI events for this study has considered the impact of storm clusters.

As part of this assessment, consideration needs to be given to the temporal separation between storms. Such consideration is important as the timescales of intermediate beach recovery will heavily influence whether subsequent events within the storm cluster contribute to additional shoreline erosion.

Timescales of beach recovery are poorly defined, most likely due to the high variability in potential responses based on shoreline morphology and incident conditions during the recovery period. Coco et al. (2013) provide a summation of work by Wang et al. (2006), Birkemeier (1979) and Thom and Hall (1991), noting that whilst initial beach recovery can occur over periods of 1 to 90 days, full recovery can take years, particularly if the erosion contributed to the loss of dunes backing the beach.

Whilst not necessarily directly applicable to the coastline within the study area, work by Angnuureng et al. (2017), Karunaratna et al. (2013) and Ranasinge et al (2012) suggest that timescales for post storm beach profile and berm recovery can be in the order of 10 days. However, the initiation of dune recovery will almost always occur after the storm impacted nearshore morphology resets.

Assessments to the requirements of SPP2.6 consider recession of the dune and therefore consideration of storm clusters for this investigation should ideally be limited to durations over which the potential for intermediate dune recovery would be limited. It is therefore desirable that the duration between events within the defined cluster would not be meaningfully greater than around 10 days. It is noted, however, that the intermediary timeframes between events should be related to the event severity itself.

To determine the method of combining storms into clusters, the following model of erosion during clusters was assumed.

1. An initial storm with sufficient severity to induce erosion of the berm and dune occurs.
2. Some recovery of the berm but negligible erosion of the dune occurs between the initial storm and any succeeding storms.
3. A succeeding storm occurs which either:
 - a. Re-erodes some of the recovered berm but is of insufficient severity to further erode the dune.
 - b. Is of sufficient severity to re-erode all of the recovered berm and further erode the dune.
4. Steps 2 and 3 are repeated until there is a significant recovery period such that initiation of dune recovery can occur.

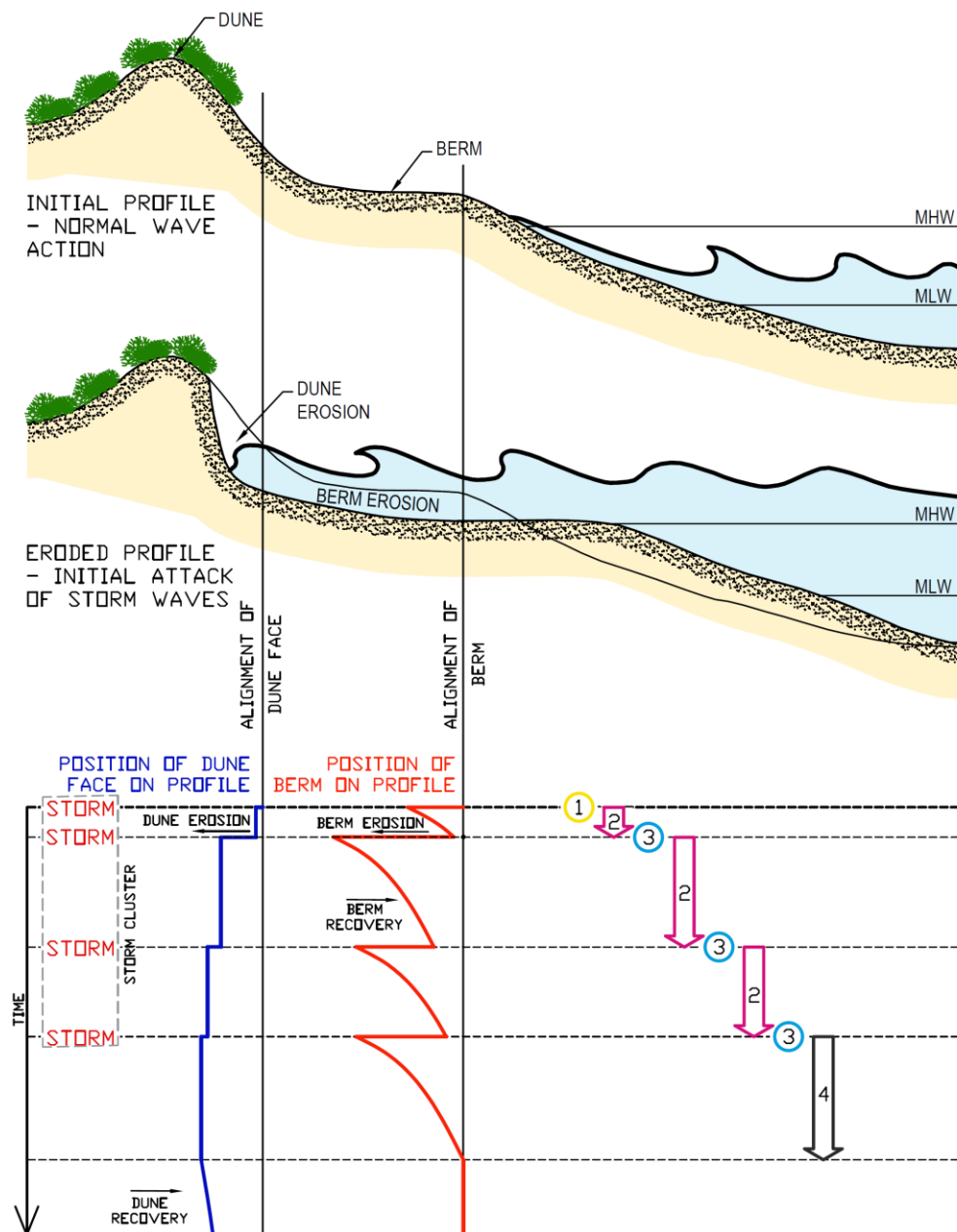
The significance of this is that for a sequence of storms to be grouped as a single cluster, the storm severity required for a succeeding storm to have a cumulative impact on dune erosion is proportional to the period between storms when there is the potential for berm recovery. Hence, the greater the period of berm recovery between the initial storm and the succeeding storm, the more severe the succeeding storm will need to be before it can re-erode the recovered berm and attack the dune.

For the purposes of this assessment the beach recovery period is equal to the intermediary period (the period between exceedance events). An exceedance event is defined as a period over which either wave or water level exceeds a given threshold. Exceedance events encompass the periods of a storm over which significant erosion would occur. Hence, the period between these events (the intermediary period) defines the beach recovery period.

The wave threshold value was defined in previous sections, being the sum of the mean plus two standard deviations of the total wave record. The water level threshold adopted an identical approach, with the threshold taken as the sum of the mean plus two standard deviations of the total water level record.

The inclusion of the water level threshold was considered important in this component of the project to ensure that periods of elevated water levels would be captured within the assessment, especially since the results of the previous section identified that both elevated wave heights and water levels had the potential to result in significant beach erosion.

Given no quantified information is available on beach response and recovery for southwest WA, an assumed relationship between the intermediary duration and the severity of events was used to develop storm clustering. Storm cluster cut-off values were selected based on the intermediary duration and the severity of events. These cut-off values related the net wave power of the exceedance events to the intermediary duration, in days. If, for a given intermediary duration, the net wave power of the subsequent exceedance event was above the defined value it was included as part of the storm cluster. If the net wave power was less than the defined value it was not included in the cluster.



	Simplified Description of Beach Process	Description of Selection Methodology
1	Initial storm causes erosion of beach berm	An exceedance event occurs with a net wave power of greater than 0.15 MWDays
2	Some recovery of the berm, but negligible recovery of the dune, occurs in period between storms.	The net wave power of the succeeding exceedance event is greater than the cut-off value for the given intermediary period between exceedance events (as presented in Table 5.1).
3	Succeeding storm occurs before berm recovery is complete, noting that the greater the period between storms, the more severe the subsequent storm will need to be to cause erosion of the dune.	
4	Berm recovery occurs completely and substantial dune recovery commences prior to subsequent storms occurring. No further storms included within the storm cluster.	The net wave power of the succeeding exceedance event is less than the cut-off value for the given intermediary period between exceedance events. No further exceedance events are included in the storm cluster.

Figure 5.1 Illustration of Storm Cluster Selection Process

The cut-off values that were used for this assessment are presented in Table 5.1. An example of how these cut-off values were applied is presented in Figure 5.2, which shows the storm cluster experienced within the Metropolitan Region in June to August 1996. To give context to the cut-off values that have been adopted, a plot of the annual average occurrence of net wave power per exceedance event has been included in Figure 5.3. This plot presents the results for the Metropolitan region given that this is the area within which the most data is available.

Table 5.1 Storm Cluster Cut-off Values

Intermediary Period (Days)	Cut-off Value for Net Wave Power during Exceedance Event (MWDays)
5	0.15
6	0.25
7	0.35
8	0.45
9	0.55
10	0.65
11	0.75
12	0.85
13	0.95
14	1.05
15	1.15

The occurrence plot shows that an individual exceedance event with a net wave power greater than 1.15 MWDays occurs on average around once per year. It could therefore be expected that the effects of an event such as this would be reasonably apparent on the coastline. An event with a net wave power of around 0.15 MWDays occurs around 11 times per year on average, so its impact would be less noticeable individually, however as part of a cluster of events its impact could still be significant, particularly in the context that the metropolitan area experiences around 44 storms per year, placing these events in the top quartile of annual event severity.

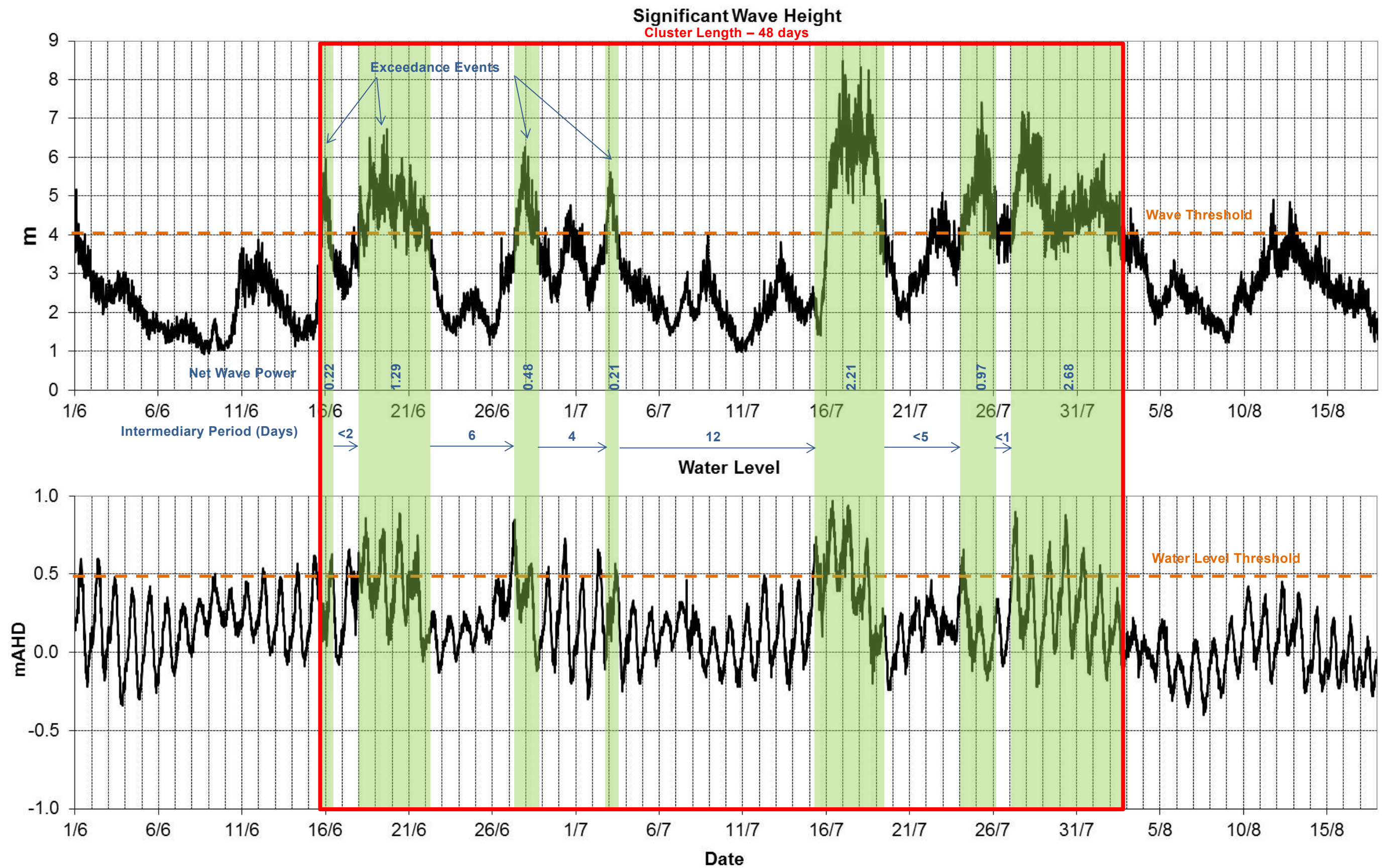


Figure 5.2 Example of Storm Cluster Selection within the Metropolitan/Peel Region in June to August 1996

m p rogers & associates pl

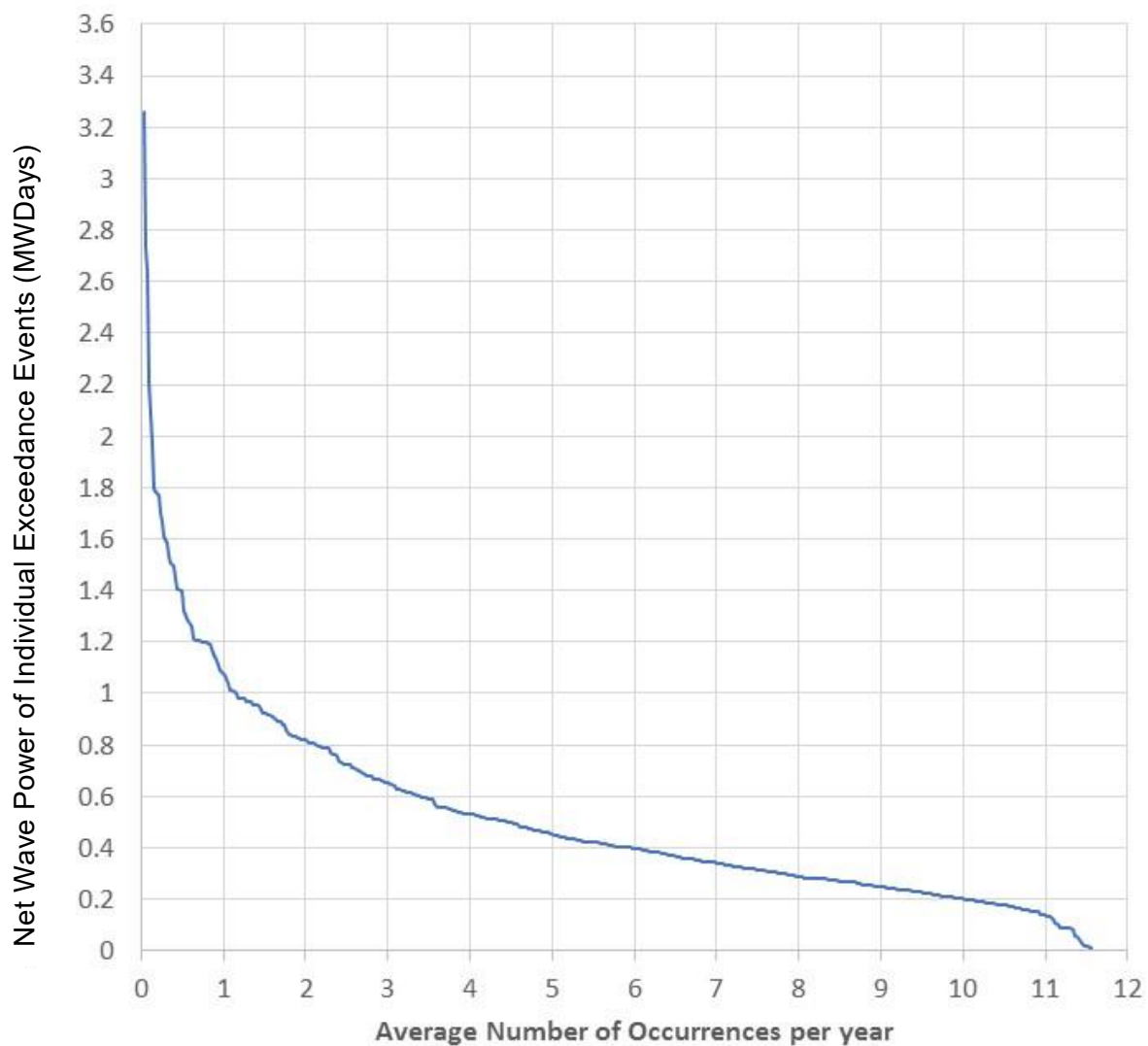


Figure 5.3 Plot of Average Number of Occurrences of Individual Exceedance Event Net Wave Power per Year

Following identification of the storm clusters using the described methodology, the cumulative sum of net wave power for each exceedance event over the entire cluster was determined for event ranking. This summation is defined as “net cluster power.” As this includes the summation of net wave power when one or both of the wave and water level thresholds were exceeded, it provides a single metric that can be used to rank event severity. As presented in the results of the analysis, this net cluster power metric appears to provide a reasonable predictor of simulated beach erosion potential within the SBEACH model, particularly when more severe, longer duration storm clusters are assessed. This is similar to the findings of Splinter et al. (2013) who found that cumulative wave power explained more than 94% of the modelled beach erosion within their study.

Presumably, the reasonable ability of the net cluster power to explain and predict the extent of modelled beach erosion for longer duration events, is due to the fact that over long durations the joint occurrence or joint non-occurrence of elevated water levels and waves appears to balance out. This provides a smoother, less variable outcome than when considering shorter durations.

The top net cluster power events that were identified within each region were simulated with the SBEACH model, consistent with the methodology outlined in Section 4. To improve model simulation time only the exceedance events within the clusters were simulated.

The purpose of this assessment was to identify events with ARI's of 1, 10, 25, 50 and 100 years. To ensure sufficient resolution of the data to enable the identification of the 1 year ARI event, at least one event per year must be identified. Whilst the relationship between the net cluster power and predicted beach erosion is reasonable, there is still scatter in the relationship. Therefore the total number of events extracted and simulated was increased to be greater than one per year. As a general rule the total number of events considered for each region was around 50% greater than the number of years of available data (i.e. 60 events were assessed for a 39 year period of available data).

Extreme analysis of the net cluster power and storm cluster erosion potential predicted for each profile was completed to quantify the relative ARI's of different events.

Design storm clusters were then synthesised for each ARI. The process for storm cluster synthesis was to combine storms identified in Section 4, to create a storm sequence with a net cluster power equal to or slightly greater than would be required to achieve the given ARI based on the extreme analysis of net cluster power for that region. Simulation of the event within SBEACH was then used to confirm that the modelled response at each of the profiles closely approximated that required for the given ARI. Simulation of multiple storm sequences was undertaken until one was identified that achieved both the Net Cluster Power and erosion potential for the given ARI.

Consideration was given to the order of the sequencing, however similar to the findings of Splinter et al. (2013) the sequencing did not significantly affect the erosion response. The outcomes of the synthesis process would be reflective of storm clusters (albeit without the intermediary ambient periods), similar to the currently used three repeats of the July 1996 storm, for each ARI.

Application of the above methodology identifies the design storm clusters that are appropriate for the general coastline within each region. Typically, these conditions are based on the prevailing storm conditions and directions, though application of these storm clusters may not be realistic for shorelines with different aspects.

To highlight this issue, a further assessment - following a similar methodology as that outlined hereto - was completed for less common incident directions. For each region an alternative directional band was identified using the directional plots shown in Figures 5.3 to 5.5. For example, in the Metropolitan region this band was 270 to 360 degrees. The aim of the assessment was to identify a different type of storm cluster with significant energy within this alternative direction band. In reality, these clusters may elicit far greater erosion of a shoreline which is more exposed to this direction than the clusters identified without consideration of directionality. Therefore, directional exceedance events were identified and grouped into storm clusters. The method and thresholds for grouping these directional exceedance events is identical to that for typical exceedance events.

The alternative directions that were considered for each of the different regions are summarised in Table 5.2. An example of a directional exceedance event is provided in Figure 5.4.

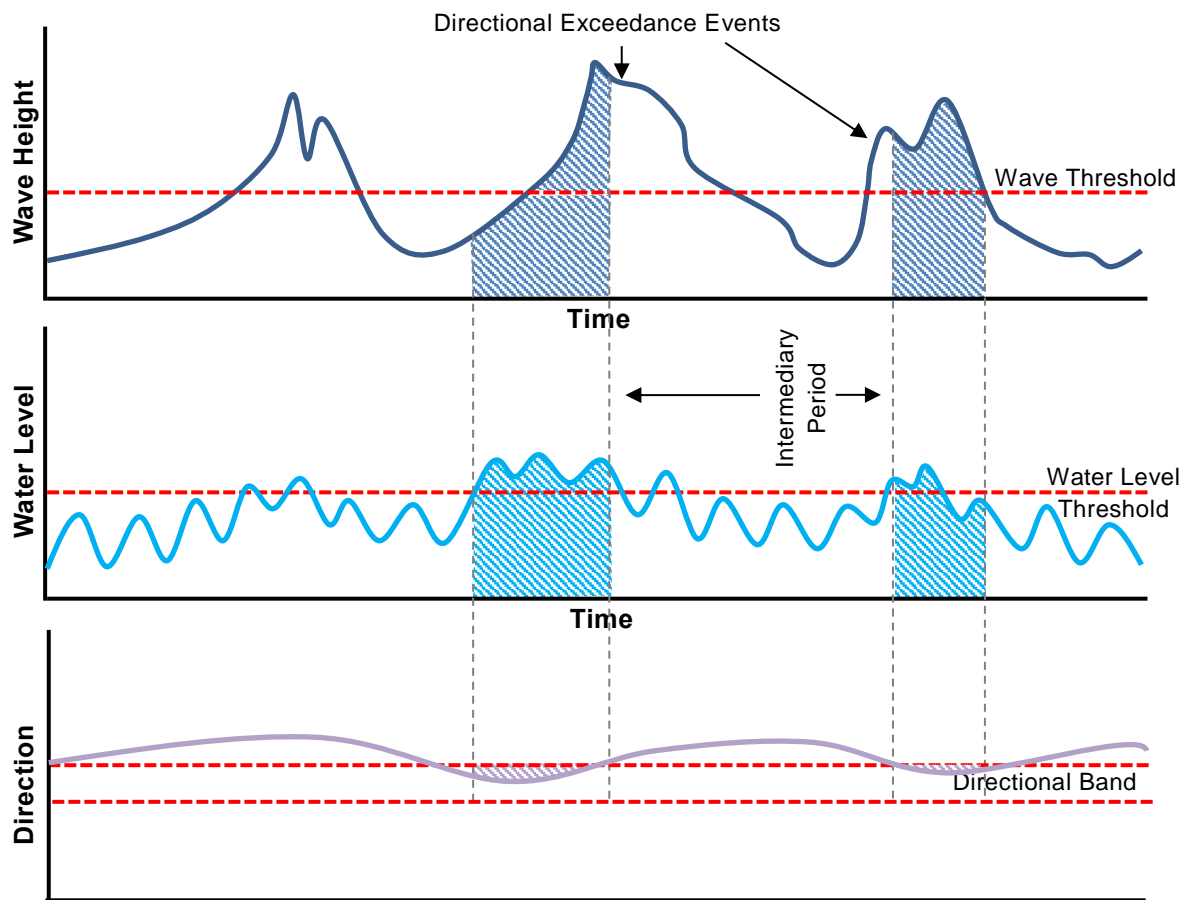


Figure 5.4 Schematic Showing Identification of Directional Exceedance Events

Table 5.2 Alternative Directions Considered for each Region

Region	Alternative Direction Considered
Mid-West (Geraldton)	Nil (Given lack of directional spread shown in data)
Wheatbelt (Jurien)	270° to 360°
Metropolitan/Peel	270° to 360°
South West (Cape Naturaliste)	270° to 360°
South Coastal (Albany)	90° to 180°
Bremer Bay and Hopetoun	Nil (Given short period of data available for assessment)
Great Southern (Esperance)	90° to 180°

There are a number of limitations inherent in this methodology when applied to abnormal directions, not least of which is the fact that wave diffraction and refraction processes can result in wave energy arrival directions at the shoreline that are very different to the offshore wave direction. For example, whilst offshore wave energy may be incident from a south west direction, wave transformational processes may mean that this wave arrives at the shoreline from the north west. The potential for such transformational change, amongst other reasons, means that it would be an over simplification to use the identified directional storm clusters to develop an ARI design storm cluster. However, the top 5 storm clusters from the less common incident directions ranked by net cluster power have been identified for each region.

Assessment of wave directionality is obviously critical for this process. However, the durational limitations of available directional wave measurements reduce the robustness and therefore relevance of this assessment. This is on the basis that directional wave measurements are only available for between 8 and 14 years across all regions. WWIII hindcast data can be used to expand the period of data availability, but is not necessarily appropriate in all instances. This can be observed in Figures 5.5 to 5.8, which provide wave direction plots for sea and swell from the measurement data and total mean wave direction from WWIII.

As previously discussed, the WWIII hindcast data provides parameters for the total wave climate and by virtue of this fact should be more comparable to the swell measurement data than the seas. With this in mind, the wave direction plots show that the direction of the WWIII hindcast data is more focused than the measurements at all locations where comparison is possible. However, the apparent directional distribution is much better along the south coast than it is up the west coast. This is a direct outcome of the scale of events that contribute to directional spread within these two broad regions.

On the west coast, the key directional variation in wave climate occurs when wave energy arrives from the north western quadrant. Except for the impact of cyclone events, which are not being considered within this study, these conditions typically only occur during the early stages of an approaching front, or can be associated with cut-off low pressure systems. The spatial extent of these phenomena are comparatively small and are therefore not well resolved within the WWIII model framework (as discussed in Section 2.4). In contrast, the weather systems that contribute most to directional variation on the south coast are comparatively larger and are therefore far better resolved within WWIII.

The outcome of this finding is that the WWIII hindcast data is not considered appropriate to assess variations in wave event direction along the west coast, however should provide acceptable results along the south coast. It is noted that the incidence of severe waves from the north westerly quadrant decreases with distance north along the coast. This decrease is due to the reduced incidence of the aforementioned weather systems at these northern latitudes. The incidence of storms from the north westerly quadrant in Geraldton is far less than it is at Rottnest, for example.

Consideration of directionality on the west coast therefore requires an alternate methodology that can maximise the use of measurement data given that WWIII hindcast data is not suitable to detect abnormal incident directions.

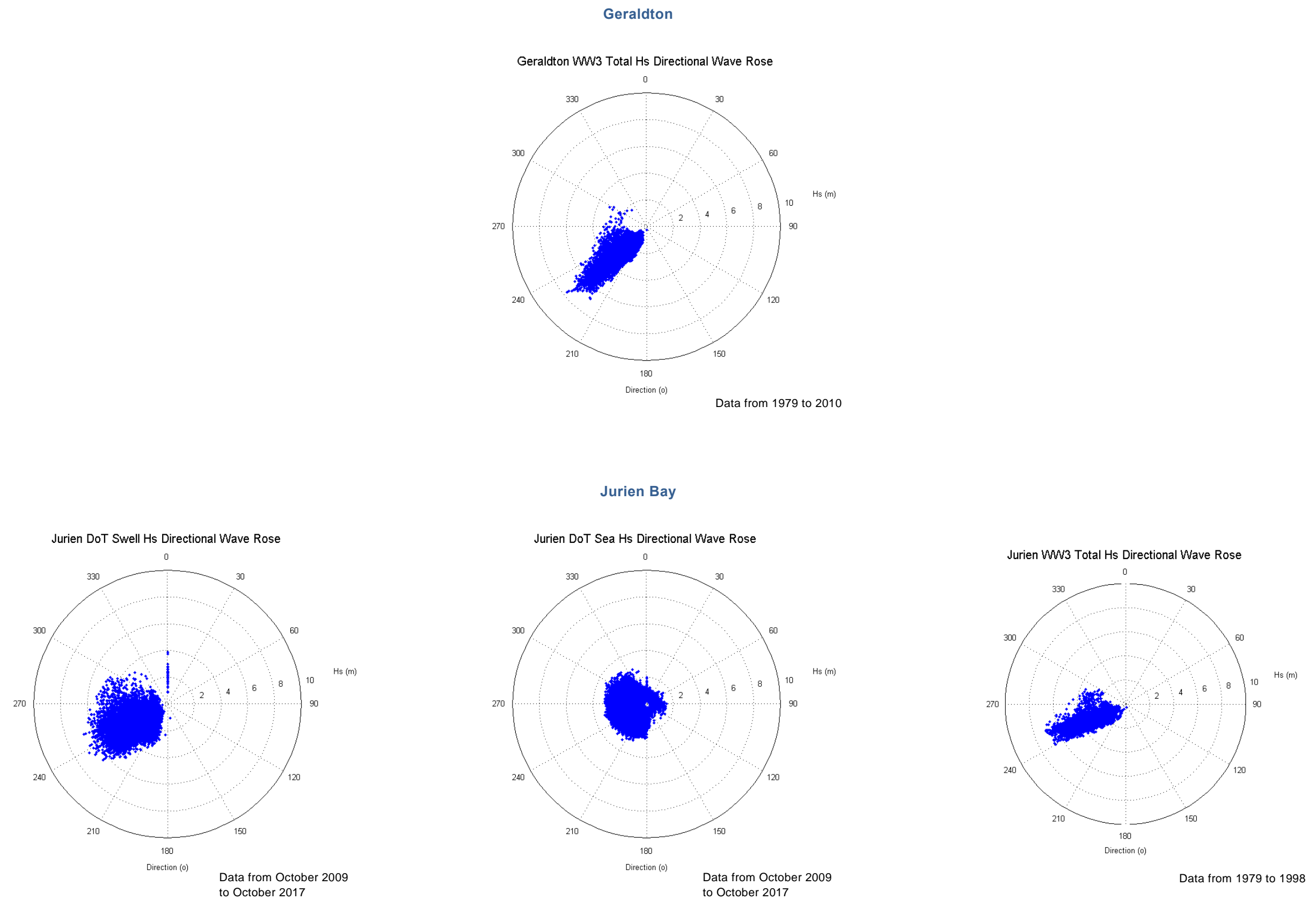


Figure 5.5 Wave Direction Plots for Geraldton & Jurien Bay

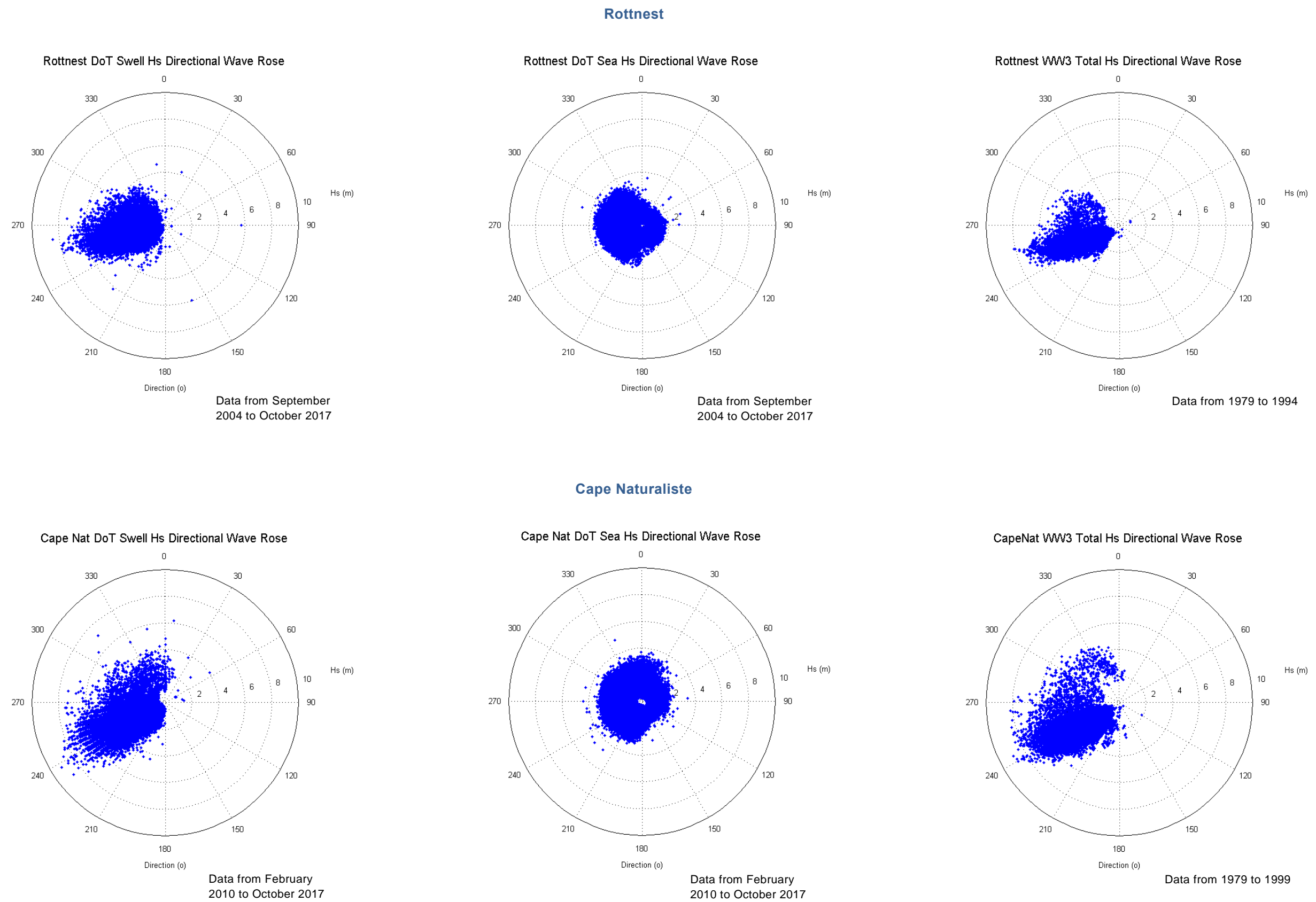


Figure 5.6 Wave Direction Plots for Rottnest & Cape Naturaliste

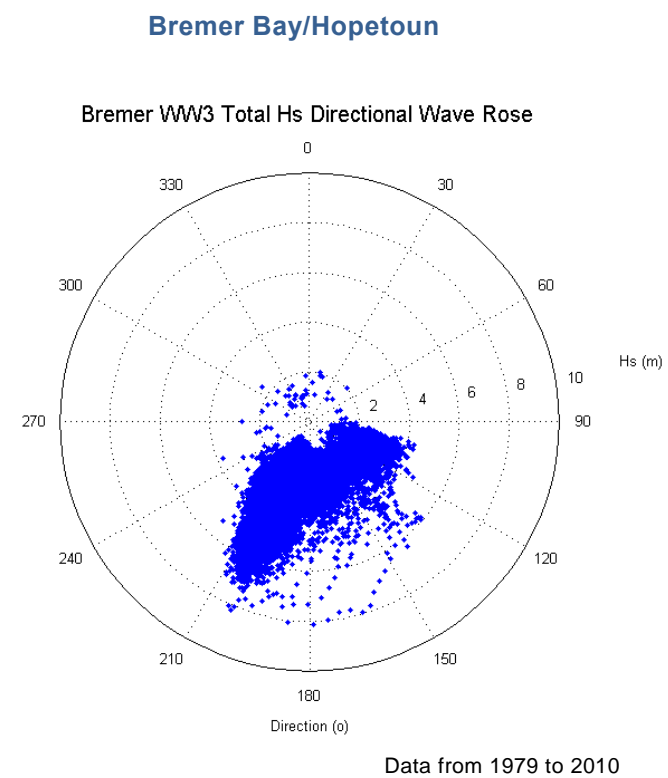
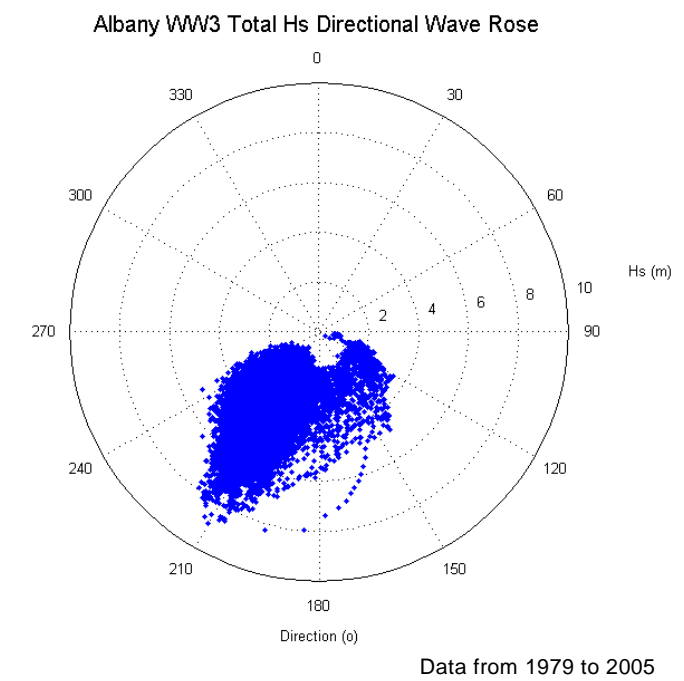
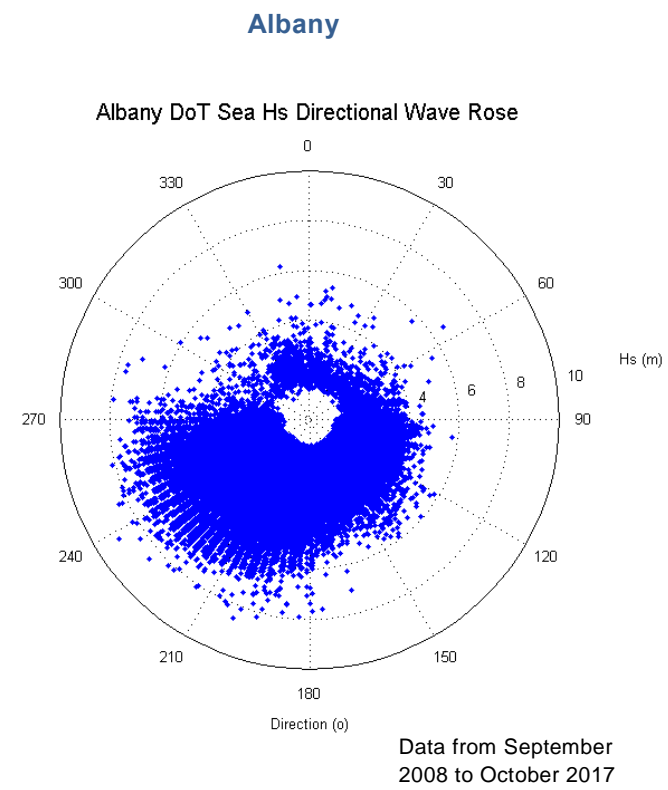
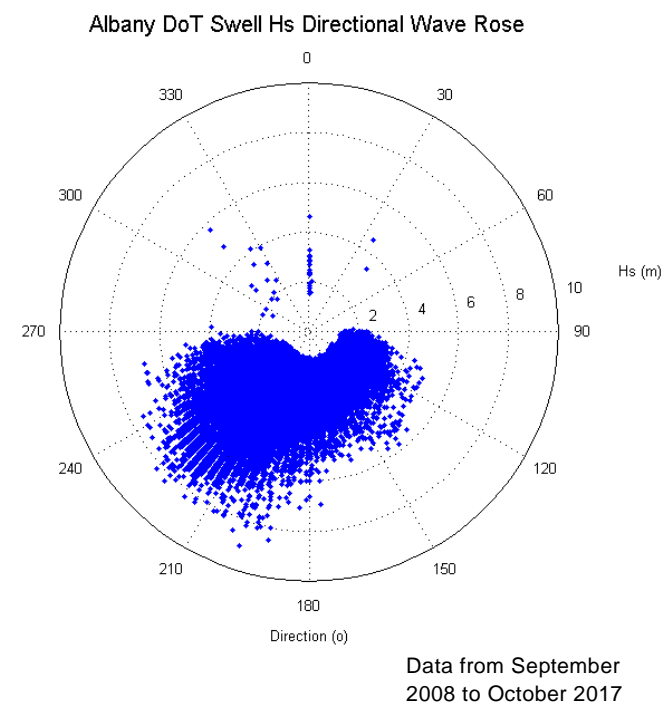


Figure 5.7 Wave Direction Plots for Albany & Bremer Bay/Hopetoun

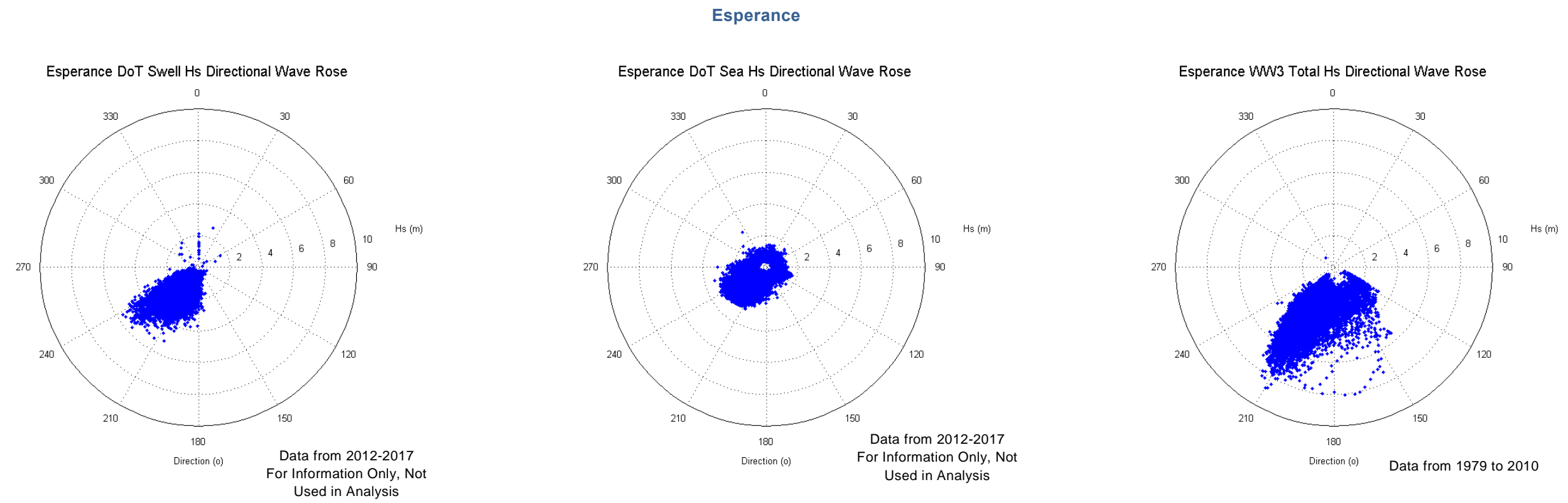


Figure 5.8 Wave Direction Plots for Esperance

5.1.1 Directional Assessment Methodology for West Coast Regions

Where directional wave measurements are available, the assessment of wave directionality can be completed using the measured direction of the swell and sea components. The classification of either sea or swell within the measurements is based simply on the period of the wave, with periods greater than 8 seconds classified as swell and anything less than 8 seconds classified as seas. This can mean that during severe events wave energy can be classed as swell despite it being locally generated within the weather system and therefore not meeting the true definition of swell. This is important, as along the west coast, true swell typically originates from the south west quadrant, with a relatively high degree of focusing, however during severe events with incident wave energy from the north west quadrant the apparent swell can also arrive from the north west.

Review of wave direction information for Rottnest, which is the longest directional and non-directional wave record on the west coast, helps provide an insight into the directional distribution within the measurements. Assessment of the most severe events from the north west quadrant at Rottnest was completed for both the sea and swell directions. The top events, ranked by net cluster power, were determined using the methodology previously outlined, with wave threshold values calculated individually for sea and swell using only the waves with directions from the north west quadrant.

Results from this assessment highlighted that there was a reasonable level of congruence between events identified using either the swell or sea directions. This result highlights that for the assessment of wave incidence from the north west quadrant the selection of the key events is reasonably insensitive to the use of either sea or swell directions. Hence, where directional data was available, swell direction was used to identify events. Where no directional data is available, sea direction calculated from wind/sea correlation was used to identify events.

The above result is important, as it means that the relationship between the incident wind and wave direction during severe events can be used to provide an estimate of wave directionality when no directional measurements are available. The relationship between wind direction and sea and swell direction has been plotted in Figure 5.9 for all periods when the sea wave heights is above its threshold. The use of the threshold cut-off based on the sea wave height was applied as it ensures that only severe events were considered (as the use of a swell based metric may not necessarily mean that local conditions are severe).

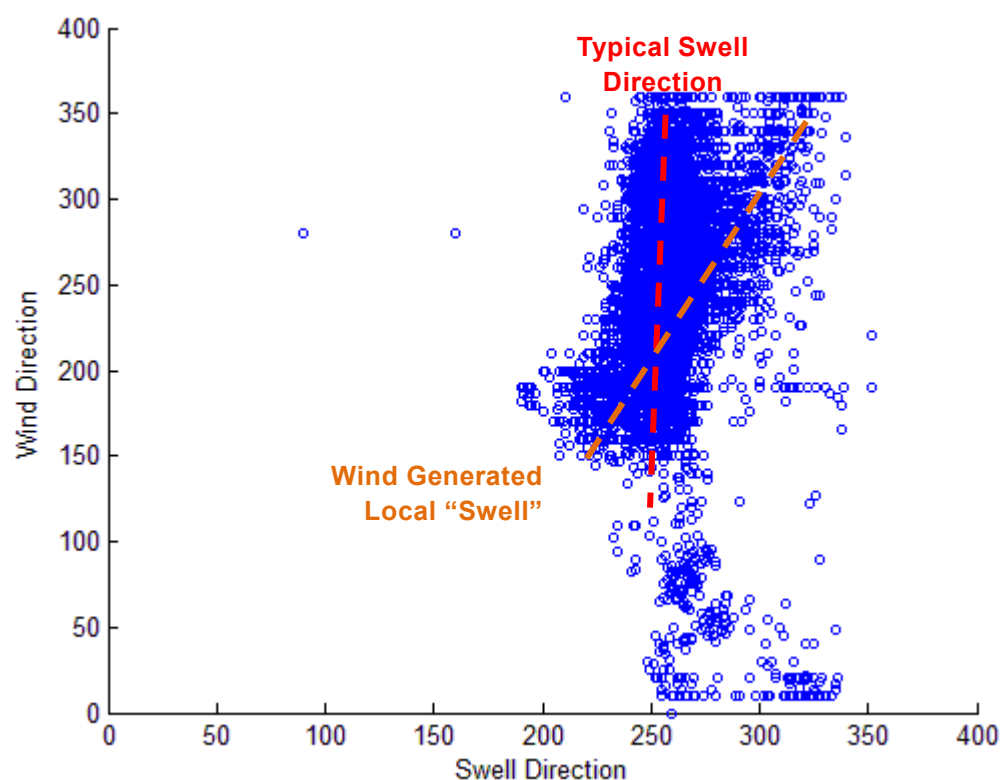
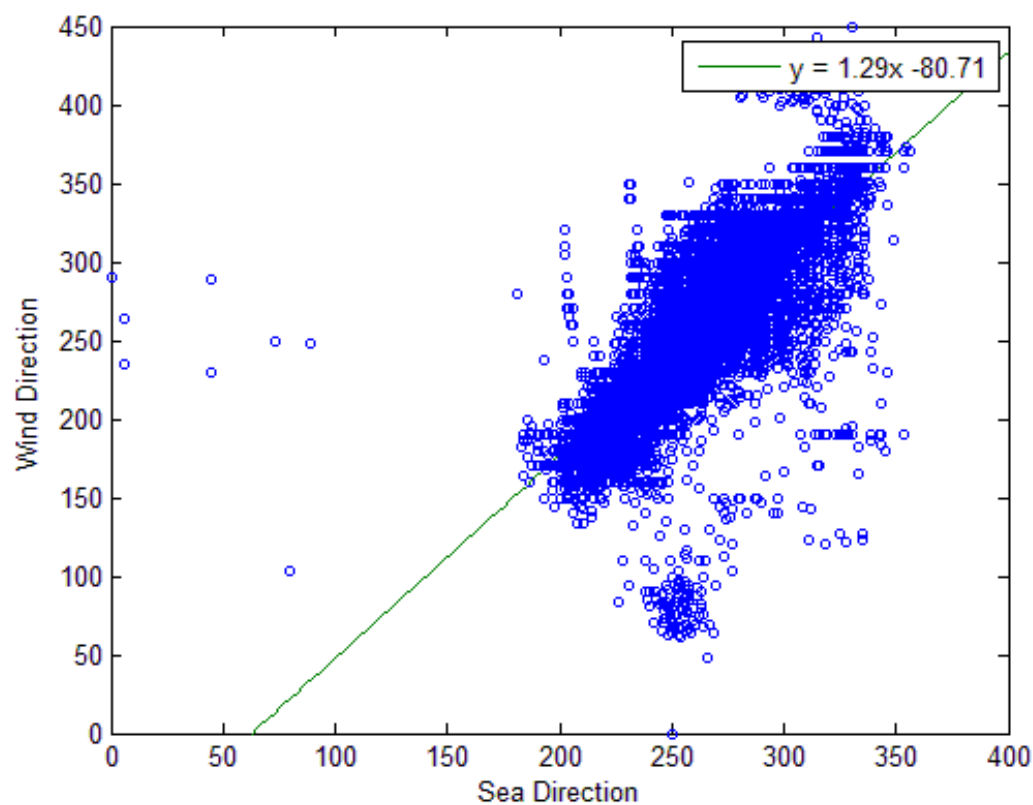


Figure 5.9 Wind Direction versus Sea & Swell Direction for Seas above Threshold at Rottnest

Review of the wind direction versus sea direction plot shows a strong correlation, as expected. The wind direction versus swell direction plot also shows a correlation, however this correlation is overshadowed by the persistence of the background swell from the south west, which is largely independent of wind direction. This result confirms that the local wind direction can be used with linear regression analysis to provide a reasonable estimate of the sea direction for severe events. Given the previous finding that identification of the key wave events from the north west quadrant could reasonably be completed using either sea or swell directions, it follows that using wind direction as a proxy for sea direction will enable the non-directional data to be included within the assessment. This will substantially increase the duration of the available data, therefore providing a better level of statistical significance when completing the extreme analysis.

The use of wind/sea direction alone is likely to result in the identification of some events with a north westerly wind/sea and a prevailing south westerly swell. This will result in an overestimation of the total wave energy within the north west quadrant, providing a conservative result. This conservative outcome may be desirable given uncertainties introduced through the use of wind direction as a proxy for sea direction, combined with the limited duration of wave measurements along the west coast locations (limited to between 18 to 24 years). The latter meaning that extrapolation of extreme analysis results to determine the 50 year ARI event and beyond could be tenuous.

The corollary of the above review is that for west coast locations the wind direction will be used as a proxy for sea direction when the measurements are non-directional. This will allow the key direction events to be identified. This approach is different to the approach used on the south coast, where the WWIII hindcast data is believed to provide an acceptable representation of direction.

5.2 Results

5.2.1 Mid West (Geraldton)

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from June to July 1996 was identified as being the top event for the Mid-West (Geraldton) Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.10.

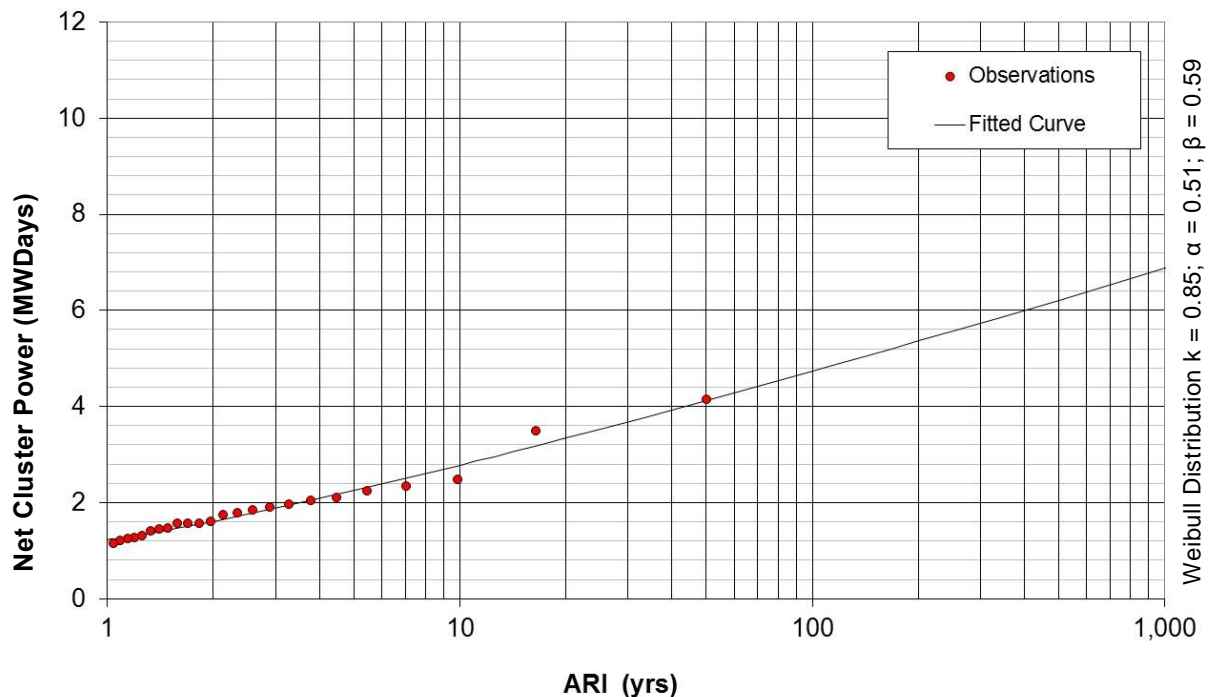


Figure 5.10 Extreme Analysis of Net Cluster Power – Mid-West (Geraldton)

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.11 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storms are largely consistent with expectations.

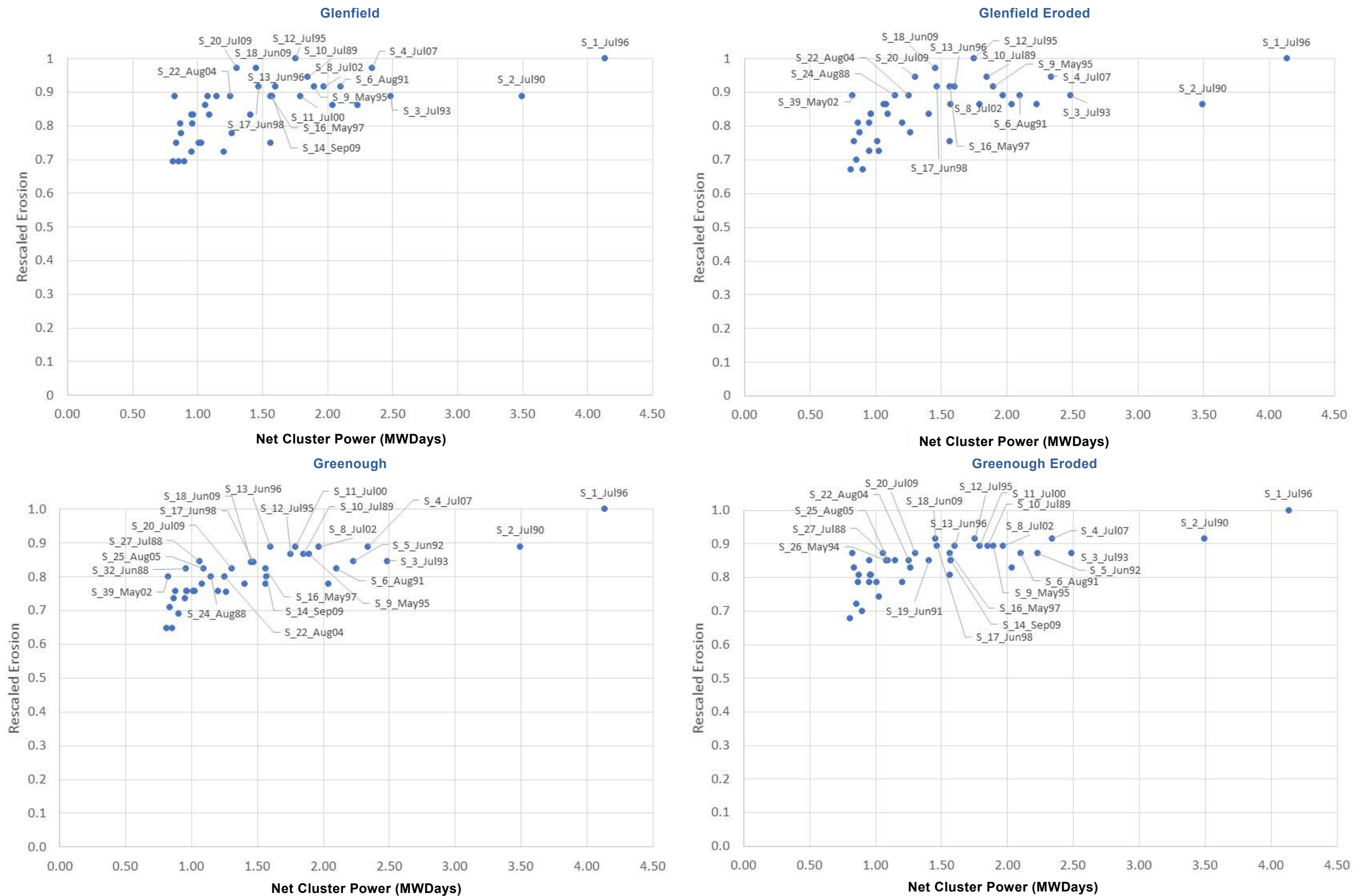


Figure 5.11 Cross Plots of Modelled Profile Erosion versus the Net Cluster Power Events – Mid-West (Geraldton)

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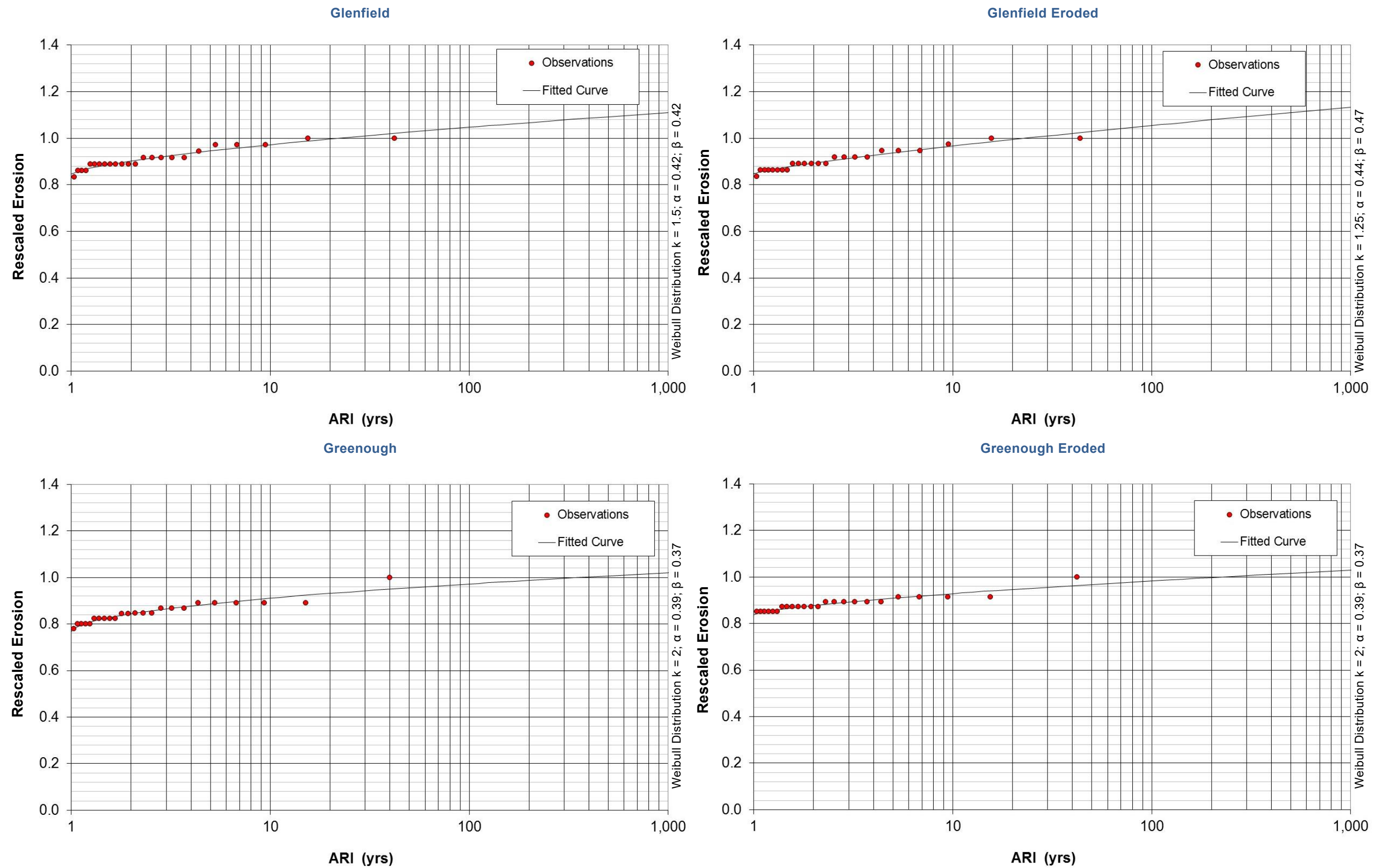


Figure 5.12 Extreme Analysis of Modelled Profile Erosion Potential during the top Net Cluster Power Events – Mid-West (Geraldton)

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.3 for each of the required ARI's.

Table 5.3 Target Net Cluster Power & Estimated Rescaled Erosion Potential for Design Event ARI's – Mid-West (Geraldton)

Average Recurrence Interval (years)	Target Net Cluster Power (MW Days)	Estimated Total Rescaled Erosion			
		Glenfield	Glenfield Eroded	Greenough	Greenough Eroded
1	1.23	0.85	0.84	0.77	0.82
10	2.78	0.97	0.97	0.91	0.93
25	3.53	1.00	1.00	0.94	0.95
50	4.12	1.03	1.03	0.96	0.96
100 ²	4.73	1.05	1.05	0.97	0.97

Notes: 1. Data period 1986-2009, data length 24 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.4. The synthesised design storm sequences are presented in Table 5.5. Time histories of these storm sequences are provided in Appendix E.

Table 5.4 Discrete Storms Used in Synthesis

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
G1	09-08-97 11:00	11-08-97 11:00	2.00	0.46	3.97	-0.04
G2	21-05-09 2:00	24-05-09 14:00	3.50	0.82	4.01	0.39
G3	19-09-89 17:00	22-09-89 20:00	3.13	0.87	4.09	-0.01
G4	27-06-09 14:00	01-07-09 8:00	3.75	1.00	4.31	0.26
G5	10-07-02 14:00	13-07-02 23:00	3.38	1.20	4.63	0.07
G6	23-08-04 14:00	27-08-04 2:00	3.50	1.25	4.70	0.06
G7	03-06-97 11:00	06-06-97 20:00	3.38	1.31	4.67	0.05
G8	15-07-96 20:00	20-07-96 8:00	4.50	1.92	4.97	0.28

Table 5.5 Design Storm Sequences for the Mid-West (Geraldton) Region

Storm Sequence	Net Cluster Power (MW Days)	Modelled Rescaled Erosion				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Glenfield	Glenfield Eroded	Greenough	Greenough Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
G6	1.3	0.92	0.89	0.75	0.83	0.14	0.11
G5	1.2	0.92	0.89	0.80	0.87	0.20	0.20
10 Year ARI Event							
2xG2 + G6	2.9	0.97	0.95	0.89	0.91	0.06	-0.06
G8 + G3	2.8	1.00	0.97	0.89	0.91	0.06	-0.01
25 Year ARI Event							
3xG2 + G7	3.8	0.97	0.97	0.93	0.96	0.08	-0.06
3xG2 + G6	3.7	0.97	0.97	0.93	0.96	0.08	-0.06
50 Year ARI Event							
2xG8 + G1	4.3	1.00	1.00	0.93	0.96	0.08	-0.08
3xG2 + G8	4.4	1.00	1.00	0.98	1.00	0.12	0.01
100 Year ARI Event							
2xG8 + G4	4.8	1.03	1.03	0.98	0.96	0.06	-0.06
3xG3 + G8	4.5	1.03	1.03	0.98	0.96	0.06	-0.06

Two different design storm sequences have been identified for each ARI within this region. The purpose of identifying two storm sequences was to test the sensitivity of the profile response to different types of events. Previous stages of this investigation highlighted that the potential modelled profile response was variable based on broader profile characteristics and antecedent beach condition. As a result it is recommended that both storm sequences be simulated by end-users to determine which is most critical for their profile.

Directional Assessment

There is a clear reduction in the occurrence of incident wave energy from the north west with increasing latitude up the west coast of the study area. This is illustrated within Figures 5.5 and

5.6. This observation, combined with the fact that there are no directional wave measurements available offshore from Geraldton, means that assessment of wave directionality is not reliable or required for the Mid-West (Geraldton) Region.

5.2.2 Wheatbelt (Jurien Bay)

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from June to July 1996 was identified as being the top event for the Wheatbelt (Jurien Bay) Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.13.

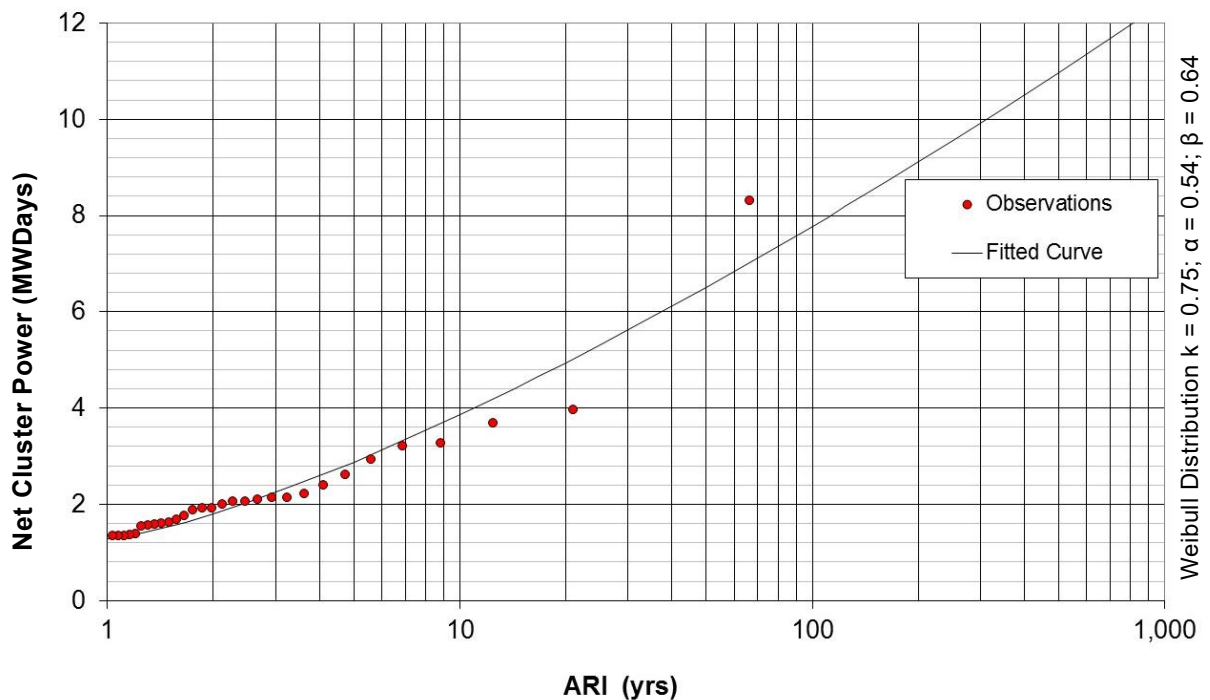


Figure 5.13 Extreme Analysis of Cluster Net Cluster Power – Wheatbelt (Jurien Bay)

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.14 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storm events are largely consistent with expectations.

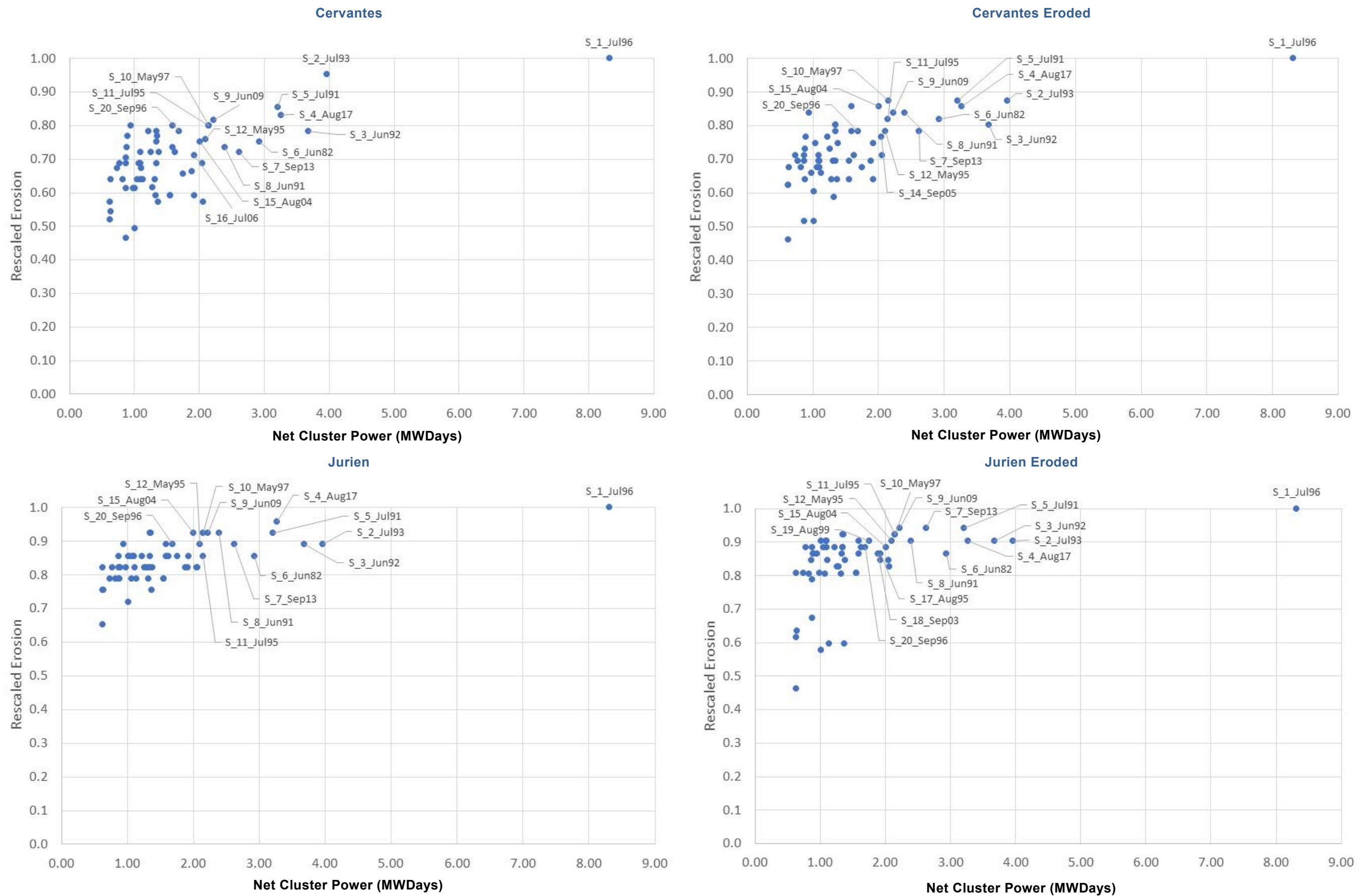


Figure 5.14 Cross Plots of Modelled Profile Erosion versus the Net Cluster Power Events – Wheatbelt (Jurien Bay)

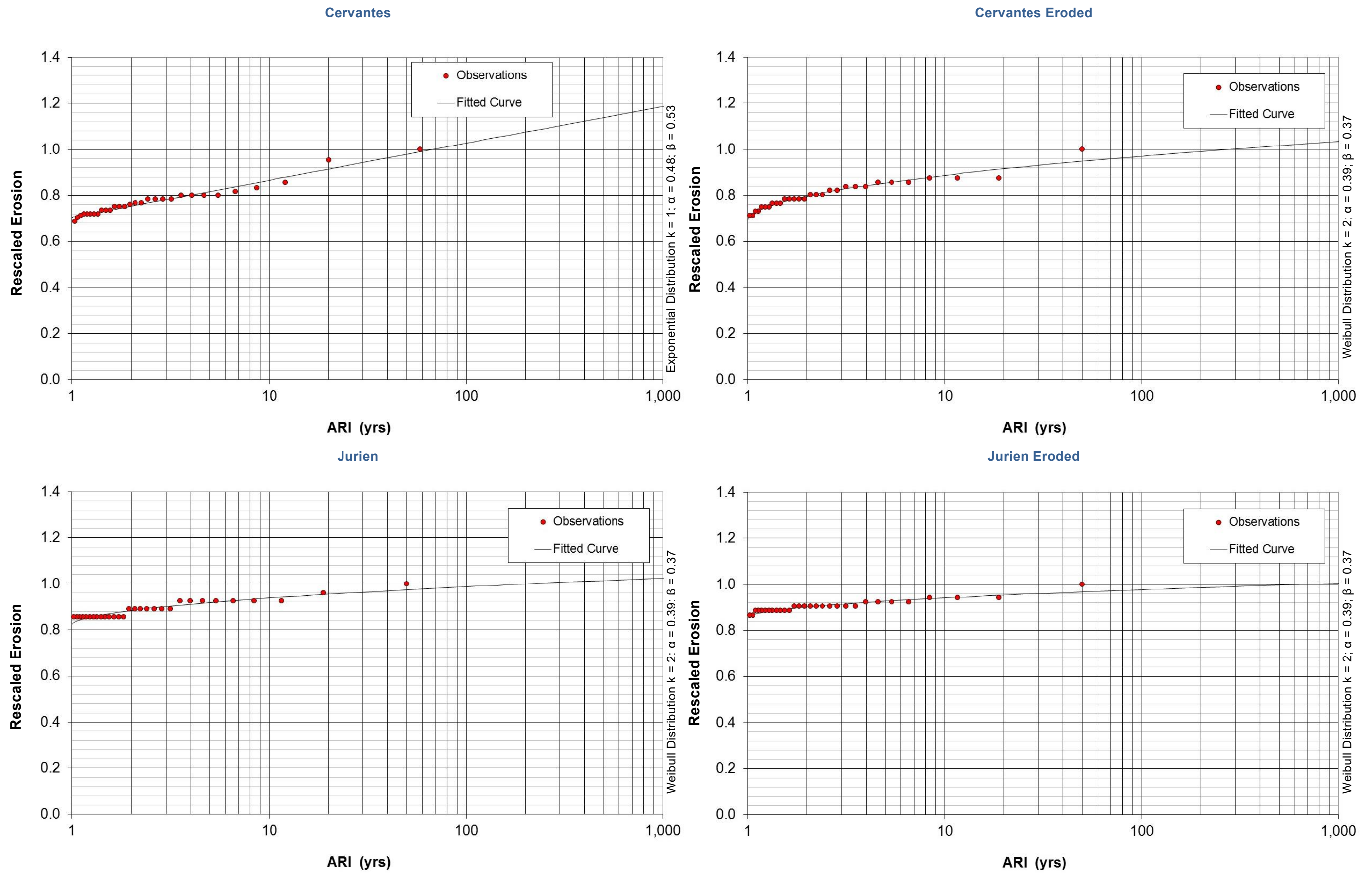


Figure 5.15 Extreme Analysis of Modelled Profile Erosion Potential during the Top Storm Cluster Net Cluster Power Events – Wheatbelt (Jurien Bay)

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.6 for each of the required ARI's.

Table 5.6 Target Net Cluster Power & Estimated Rescaled Erosion Potential for Design Event ARI's – Wheatbelt (Jurien Bay)

Average Recurrence Interval (years)	Target Net Cluster Power (MW Days)	Estimated Total Rescaled Erosion			
		Cervantes	Cervantes Eroded	Jurien	Jurien Eroded
1	1.34	0.65	0.71	0.82	0.87
10	3.86	0.87	0.89	0.94	0.94
25	5.31	0.90	0.92	0.96	0.96
50	6.51	0.93	0.95	0.97	0.97
100 ²	7.78	0.95	0.97	0.99	0.98

Notes: 1. Data period 1981-1983 & 1991-2017, data length 30 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.7. The synthesised design storm sequences are presented in Table 5.8. Time histories of these storm sequences are provided in Appendix E.

Table 5.7 Discrete Storms Used in Synthesis – Wheatbelt (Jurien Bay)

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
J1	06-06-16 19:51	08-06-16 13:21	1.73	0.53	4.30	-0.01
J2	30-09-05 4:45	02-10-05 10:45	2.25	0.64	4.33	-0.12
J3	02-07-91 14:00	05-07-91 14:00	3.00	1.13	4.79	0.01
J4	22-05-94 17:00	26-05-94 2:00	3.38	1.16	4.70	0.09
J5	27-06-09 0:15	01-07-09 9:15	4.38	1.34	4.67	0.20
J6	22-09-13 1:12	26-09-13 12:42	4.48	1.46	4.65	0.09
J7	03-06-97 5:00	07-06-97 2:00	3.88	1.56	4.79	0.06
J8	05-06-95 17:00	10-06-95 14:00	4.88	1.69	4.72	0.19
J9	23-08-04 11:45	27-08-04 16:15	4.19	1.77	5.05	0.03
J10	15-07-96 20:00	20-07-96 11:00	4.63	2.14	5.24	0.26
J11	30-07-91 20:00	06-08-91 5:00	6.38	2.53	4.84	0.02
J12	26-07-93 8:00	01-08-93 8:00	6.00	2.60	4.91	-0.04

Table 5.8 Design Storm Sequences for Wheatbelt (Jurien Bay)

Storm Sequence	Net Cluster Power (MW Days)	Modelled Rescaled Erosion				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Cervantes	Cervantes Eroded	Jurien	Jurien Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
J6	1.5	0.71	0.69	0.79	0.79	0.20	-0.08
J5	1.3	0.76	0.77	0.86	1.02	0.35	0.35
10 Year ARI Event							
2x J8 + J1	3.9	0.86	0.85	0.92	1.09	0.21	0.09
3x J4 + J1	4.0	0.90	0.85	0.92	1.09	0.24	0.14
25 Year ARI Event							
2x J10 + J3	5.4	0.88	0.85	0.99	1.13	0.31	0.11
3x J7 + J2	5.3	0.98	0.93	0.92	1.09	0.25	0.18
50 Year ARI Event							
2x J11 + J7	6.6	1.00	1.01	0.99	1.13	0.31	0.31
3x J7 + J10	6.8	1.00	0.93	0.99	1.13	0.27	0.23
100 Year ARI Event							
3x J12 + J1	8.3	1.02	1.01	0.92	1.09	0.29	0.16
3x J10 + J7	8.0	1.00	0.96	0.99	1.21	0.30	0.27

Two different design storm sequences have been identified for each ARI within this region. The purpose of identifying two storm sequences was to test the sensitivity of the profile response to different types of events. Previous stages of this investigation highlighted that the potential modelled profile response was variable based on broader profile characteristics and antecedent beach condition. As a result it is recommended that both storm sequences be simulated by end-users to determine which is most critical for their profile.

Directional Analysis

The most energetic conditions within the Wheatbelt (Jurien Bay) region are generally incident from the west south west and are therefore within the south west quadrant. However, shorelines

with a northerly aspect may be sheltered from the worst of these conditions. Therefore, an assessment was completed to identify storm clusters with directions from the north west quadrant.

Completion of this directional analysis required review of directional wave data. Where directional wave data was not available, a relationship between wind direction and sea wave direction was applied, as discussed in Section 5.1.1. Details of the data periods used in this assessment are provided in Table 5.9.

Table 5.9 Data Period and Type used for the Directional Analysis – Wheatbelt (Jurien Bay)

Data Type	Period of Available Data
Directional Wave Measurements	October 2009 to October 2017
Non-Directional Wave Measurements using Relationship between Wind and Sea Directions	January 2002 to October 2009

The periods that have been identified with the highest net cluster power from the north west quadrant are summarised within Appendix F. The top events are summarised in Table 5.10. This table includes events from both the period of directional wave measurement data as well as the period when wave directions were calculated based on the relationship with wind direction. It is noted that the periods identified using the wind / sea directional relationship are apparently more severe than those within the directional wave record. This may be reflective of a greater level of directional severity during this period, or could also be due to the noted conservative nature of the wind / sea directional relationship assumption. Notwithstanding, a period from June 2009 was identified as being the top event for the Wheatbelt (Jurien Bay) Region.

Table 5.10 Key Storm Clusters from the North West Quadrant – Wheatbelt (Jurien Bay)

Start Date	End Date	Duration (Days)	Net Cluster Power Within Directional Band (MWDays)	Data Source
02-07-07 1:30	02-07-07 19:30	0.75	0.24	Wave Buoy (Direction from Wind)
23-08-04 19:45	25-08-04 3:45	1.33	0.23	Wave Buoy (Direction from Wind)
02-02-12 9:58	03-02-12 0:28	0.60	0.10	Wave Buoy (Directional Data)
17-06-14 14:04	17-06-14 23:04	0.38	0.09	Wave Buoy (Directional Data)
30-05-11 3:03	30-05-11 11:03	0.33	0.02	Wave Buoy (Directional Data)

5.2.3 Metropolitan/Peel

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from June to July 1996 was identified as being the top event for the Metropolitan Peel Region.

To provide context to the severity of the events, as well as to assist in the synthesis of the design events, an extreme analysis was completed on net cluster power. The results of this analysis are presented in Figure 5.16.

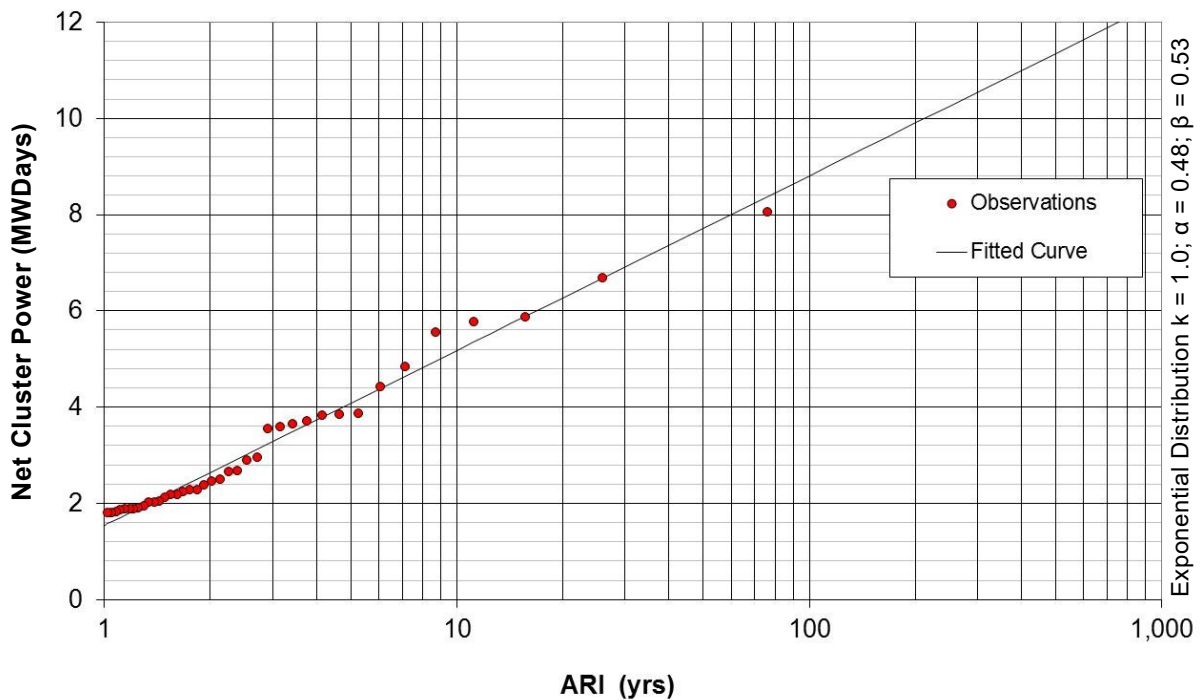


Figure 5.16 Extreme Analysis of Net Cluster Power – Metropolitan/Peel

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net cluster power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.17 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the synthesised storm cluster events are largely consistent with expectations.

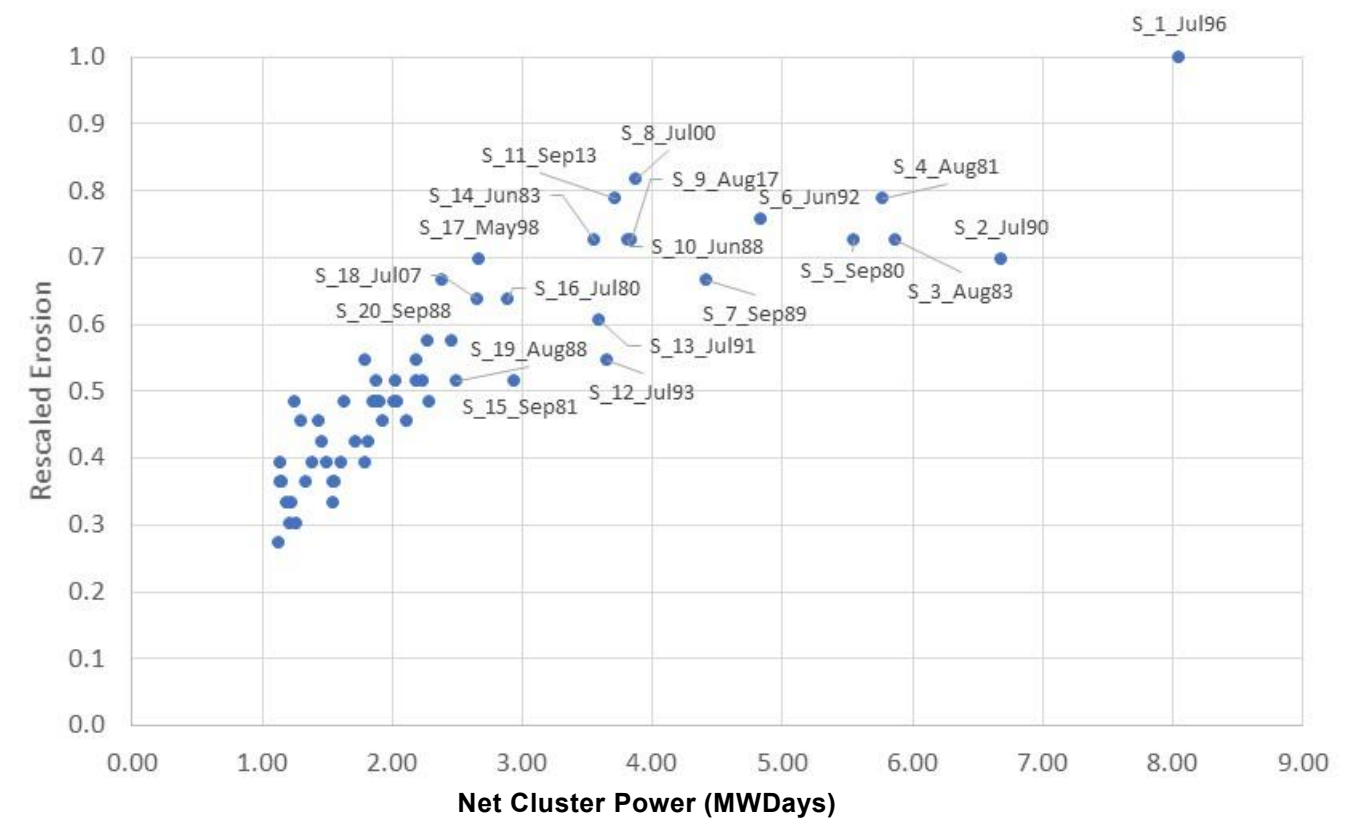
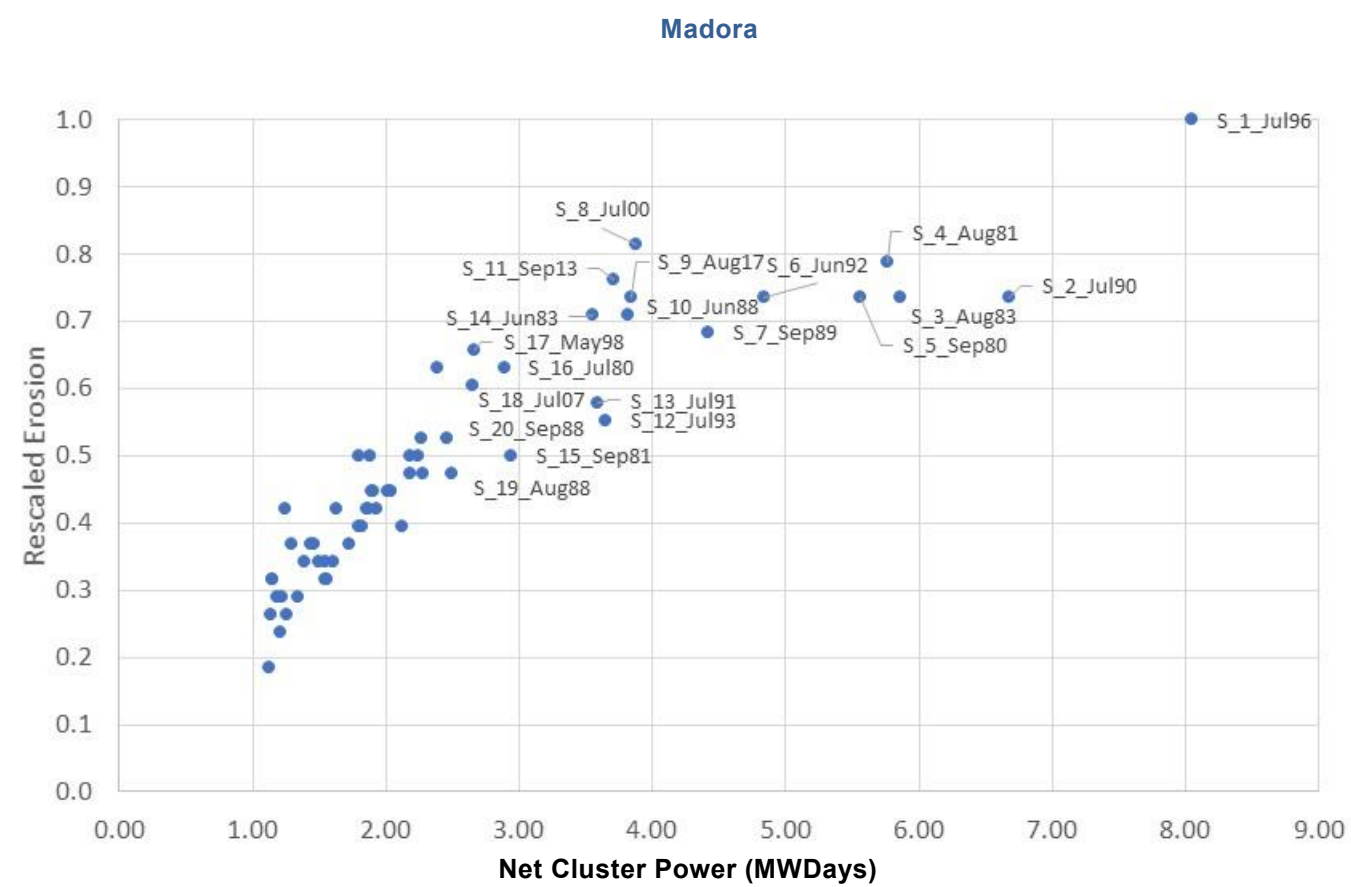
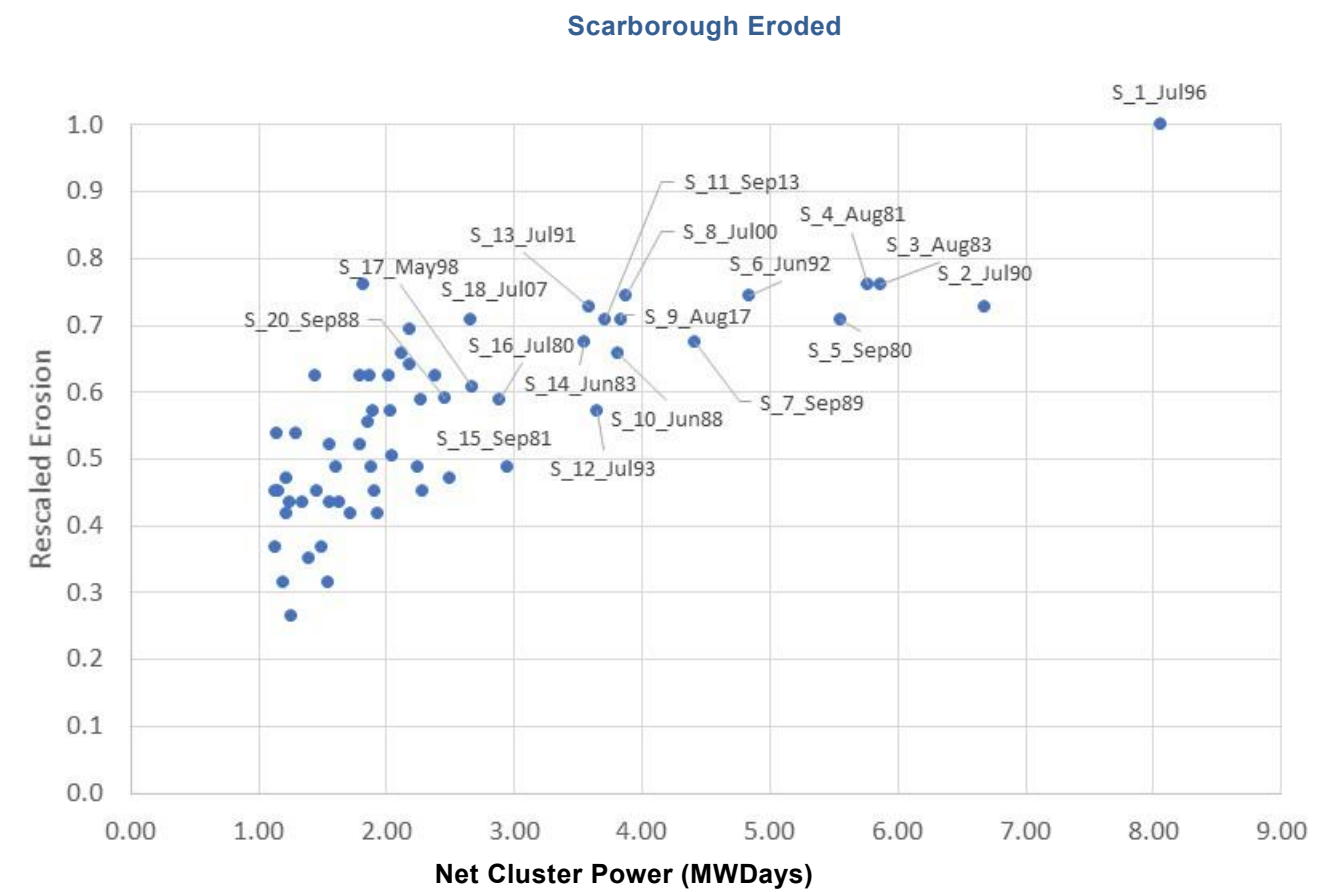
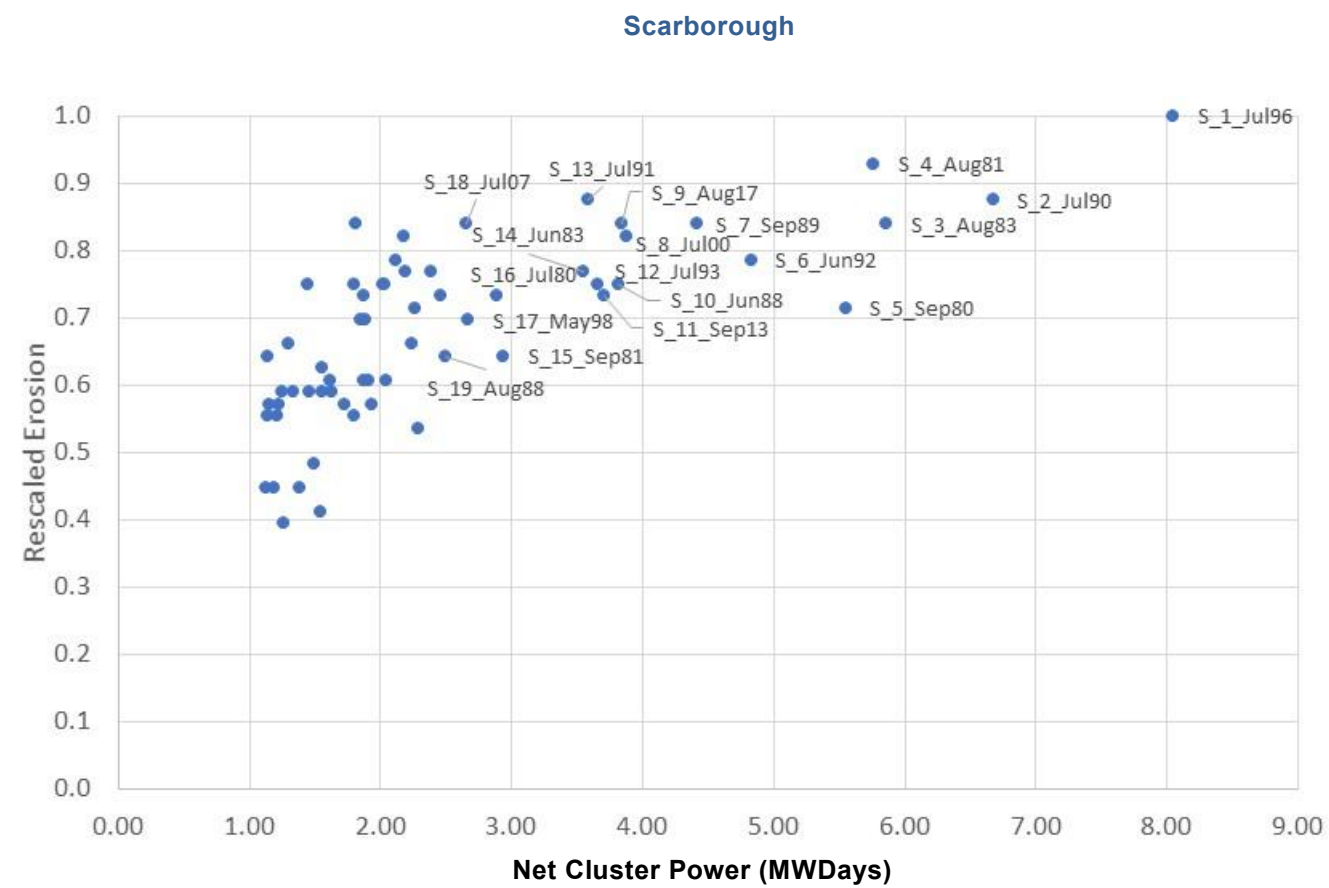


Figure 5.17 Cross Plots of Modelled Profile Erosion versus the Net Cluster Power within the Metropolitan/Peel Region

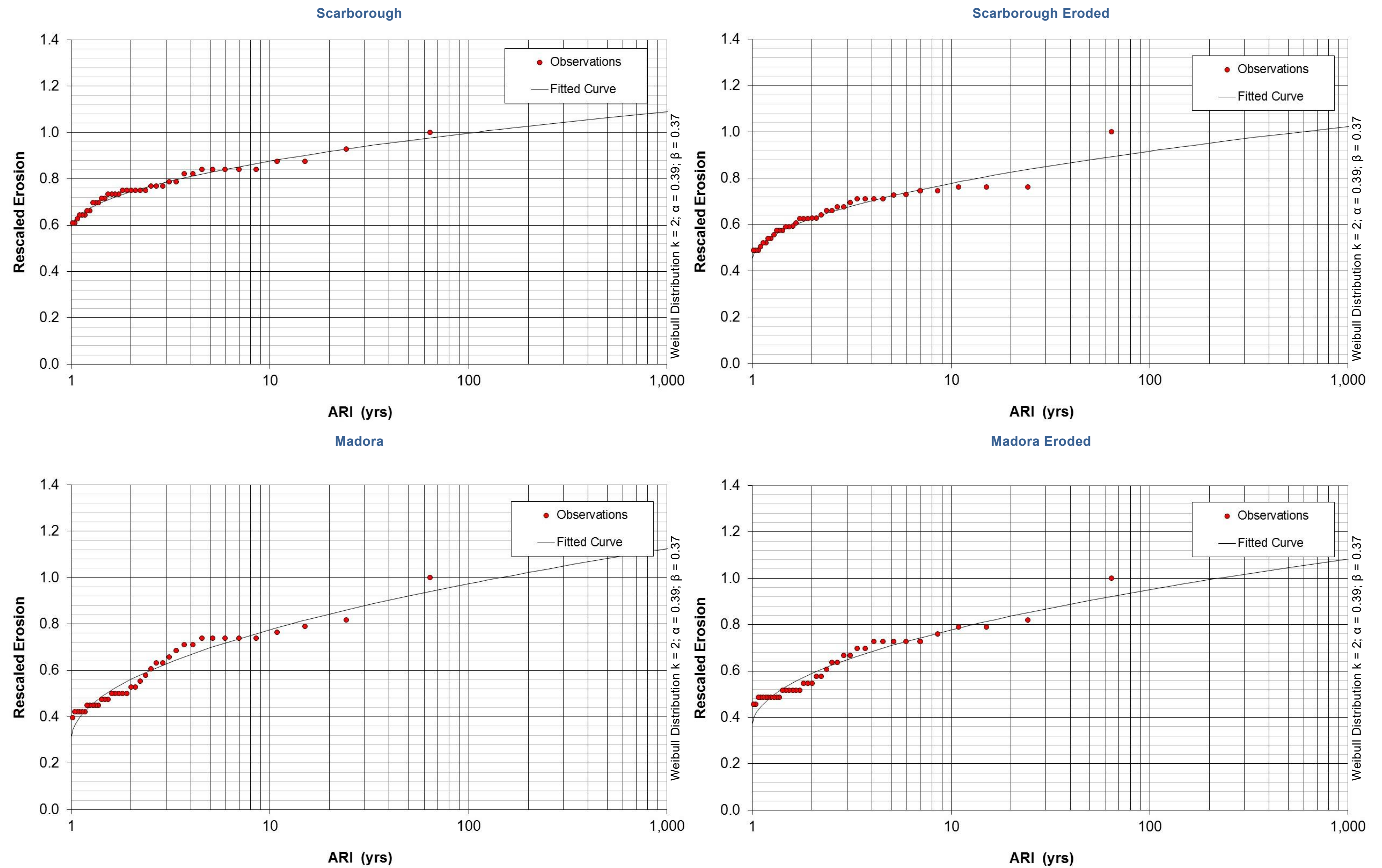


Figure 5.18 Extreme Analysis of Modelled Profile Erosion Potential during the Top Net Cluster Power Events – Metropolitan/Peel

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.11 for each of the required ARI's.

Table 5.11 Target Net Cluster Power & Estimated Rescaled Erosion Potential for Design ARI's – Metropolitan/Peel

Average Recurrence Interval (years)	Target Net Cluster Power (MW Days)	Estimated Total Rescaled Erosion			
		Scarborough	Scarborough Eroded	Madora	Madora Eroded
1	1.55	0.61	0.46	0.33	0.37
10	5.18	0.88	0.78	0.78	0.78
25	6.62	0.93	0.84	0.86	0.85
50	7.72	0.97	0.88	0.92	0.9
100	8.81	1.00	0.92	0.97	0.95

Notes: 1. Data period 1979-2017, data length 39 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.12. The synthesised design storm sequences are presented in Table 5.13. Time histories of these storm sequences are provided in Appendix E.

Table 5.12 Discrete Storms Used in Synthesis – Metropolitan/Peel

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
M1	17-07-08 22:37	20-07-08 3:37	2.21	0.79	4.99	0.24
M2	02-07-91 11:00	05-07-91 8:00	2.88	1.15	5.08	0.14
M3	09-07-02 19:30	13-07-02 14:30	3.79	1.48	4.96	0.18
M4	21-09-13 21:28	26-09-13 10:28	4.54	1.56	4.96	0.25
M5	04-09-05 11:00	09-09-05 22:00	5.46	1.58	4.64	0.16
M6	20-07-90 14:00	25-07-90 8:00	4.75	1.70	4.96	0.02
M7	09-09-09 11:10	13-09-09 21:10	4.42	1.88	5.09	0.15
M8	23-08-04 5:30	27-08-04 11:30	4.25	1.97	5.34	0.15
M9	15-07-96 21:00	19-07-96 21:00	4.00	2.21	5.85	0.39
M10	25-07-93 23:00	01-08-93 2:00	6.13	2.63	4.99	0.05
M11	11-07-90 23:00	18-07-90 17:00	6.75	3.28	5.34	0.13

Table 5.13 Design Storm Sequences for Metropolitan/Peel Region

Storm Sequence	Net Cluster Power (MW Days)	Modelled Erosion Distances				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Scarborough	Scarborough Eroded	Madora	Madora Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
M5	1.6	0.59	0.42	0.39	0.42	0.18	0.06
M4	1.6	0.61	0.49	0.34	0.39	0.07	0.06
10 Year ARI Event							
M11 + M8	5.2	0.96	0.79	0.71	0.73	0.22	-0.02
2x M7 + M3	5.2	0.96	0.81	0.79	0.79	0.13	0.13
25 Year ARI Event							
2x M9 + 2x M2	6.7	0.98	0.86	0.84	0.85	0.09	0.06
3x M8 + M1	6.7	1.00	0.86	0.87	0.88	0.13	0.13
50 Year ARI Event							
2x M11+ 2x M1	8.1	1.00	0.93	0.92	0.94	0.12	0.12
2x M9 + 2x M6	7.8	0.98	0.91	0.92	0.91	0.06	0.06
100 Year ARI Event							
2x M11 + 2x M2	8.9	1.00	0.97	0.95	0.94	0.08	0.01
2x M11 + M10	9.2	1.02	0.93	0.92	0.91	0.12	-0.06

Two different design storm sequences have been identified for each ARI within this region. The purpose of identifying two storm sequences was to test the sensitivity of the profile response to different types of events. Previous stages of this investigation highlighted that the potential modelled profile response was variable based on broader profile characteristics and antecedent beach condition. As a result it is recommended that both storm sequences be simulated by end-users to determine which is most critical for their profile.

Directional Analysis

The most energetic conditions within the Metropolitan/Peel region are generally incident from the west south west and are therefore within the south west quadrant. However, shorelines with a

northerly aspect may be sheltered from the worst of these conditions. Therefore, an assessment was completed to identify storm clusters with directions from the north west quadrant.

Completion of this directional analysis required review of directional wave data. Where directional wave data was not available, a relationship between wind direction and sea wave direction was applied, as discussed in Section 5.1.1. Details of the data periods used in this assessment are provided in Table 5.14.

Table 5.14 Data Period and Type used for the Directional Analysis – Metropolitan/Peel

Data Type	Period of Available Data
Directional Wave Measurements	July 1994 to July 1995 September 2004 to October 2017
Non-Directional Wave Measurements using Relationship between Wind and Sea Directions	January 1994 to December 2004

The periods that have been identified with the highest net cluster power from the north west quadrant are summarised within Appendix F. The top events are summarised in Table 5.15. This table includes events from both the period of directional wave measurement data as well as the period when wave directions were calculated based on the relationship with wind direction. It is noted that the periods identified using the wind / sea directional relationship are apparently more severe than those within the directional wave record. This may be reflective of a greater level of directional severity during this period, or could also be due to the noted conservative nature of the wind / sea directional relationship assumption. Notwithstanding, a period from July 1996 was identified as being the top event for the Metropolitan/Peel Region.

Table 5.15 Key Storm Clusters from the North West Quadrant – Metropolitan/Peel

Start Date	End Date	Duration (Days)	Net Cluster Power Within Directional Band (MWDays)	Data Source
15-07-96 22:00	18-07-96 15:00	2.71	1.75	Wave Buoy (Direction from Wind)
17-06-96 23:00	28-06-96 4:00	10.25	1.15	Wave Buoy (Direction from Wind)
16-10-17 10:59	17-10-17 5:29	0.77	0.30	Wave Buoy (Directional Data)
22-08-06 5:05	22-08-06 20:35	0.65	0.17	Wave Buoy (Directional Data)
28-07-11 1:37	28-07-11 12:37	0.46	0.13	Wave Buoy (Directional Data)

5.2.4 South West (Cape Naturaliste)

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from June to July 1996 was identified as being the top event for the South West (Cape Naturaliste) Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.19.

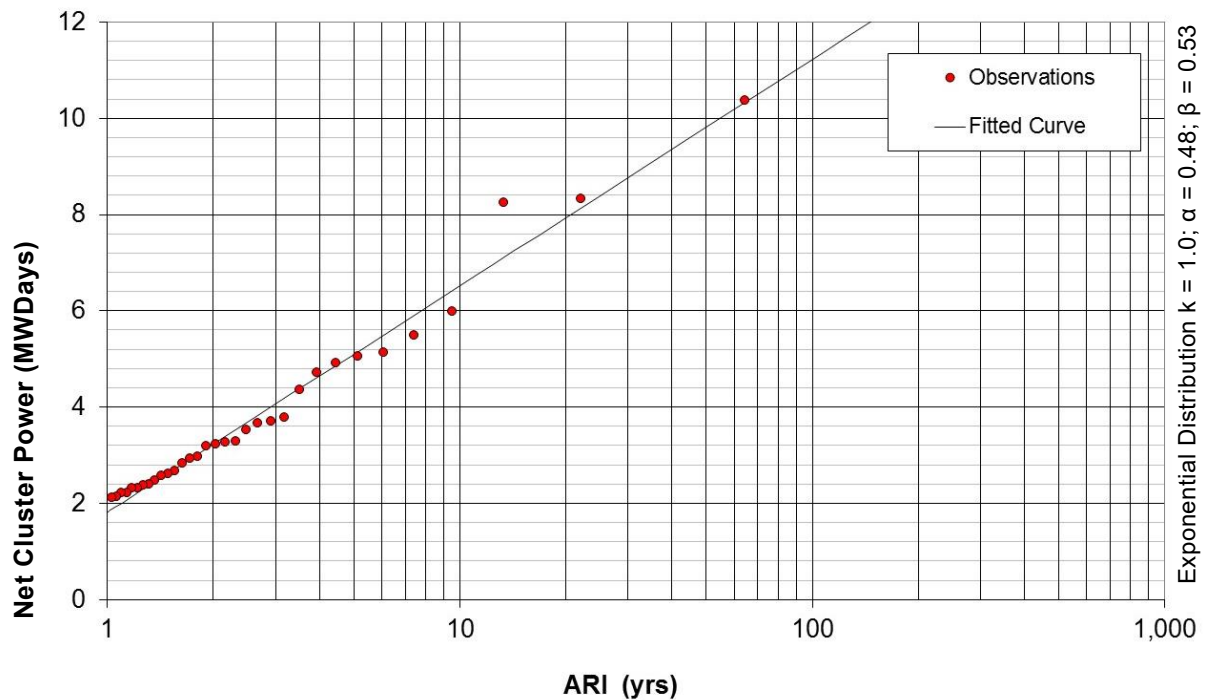


Figure 5.19 Extreme Analysis of Net Cluster Power for South West (Cape Naturaliste)

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.20 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storms are largely consistent with expectations.

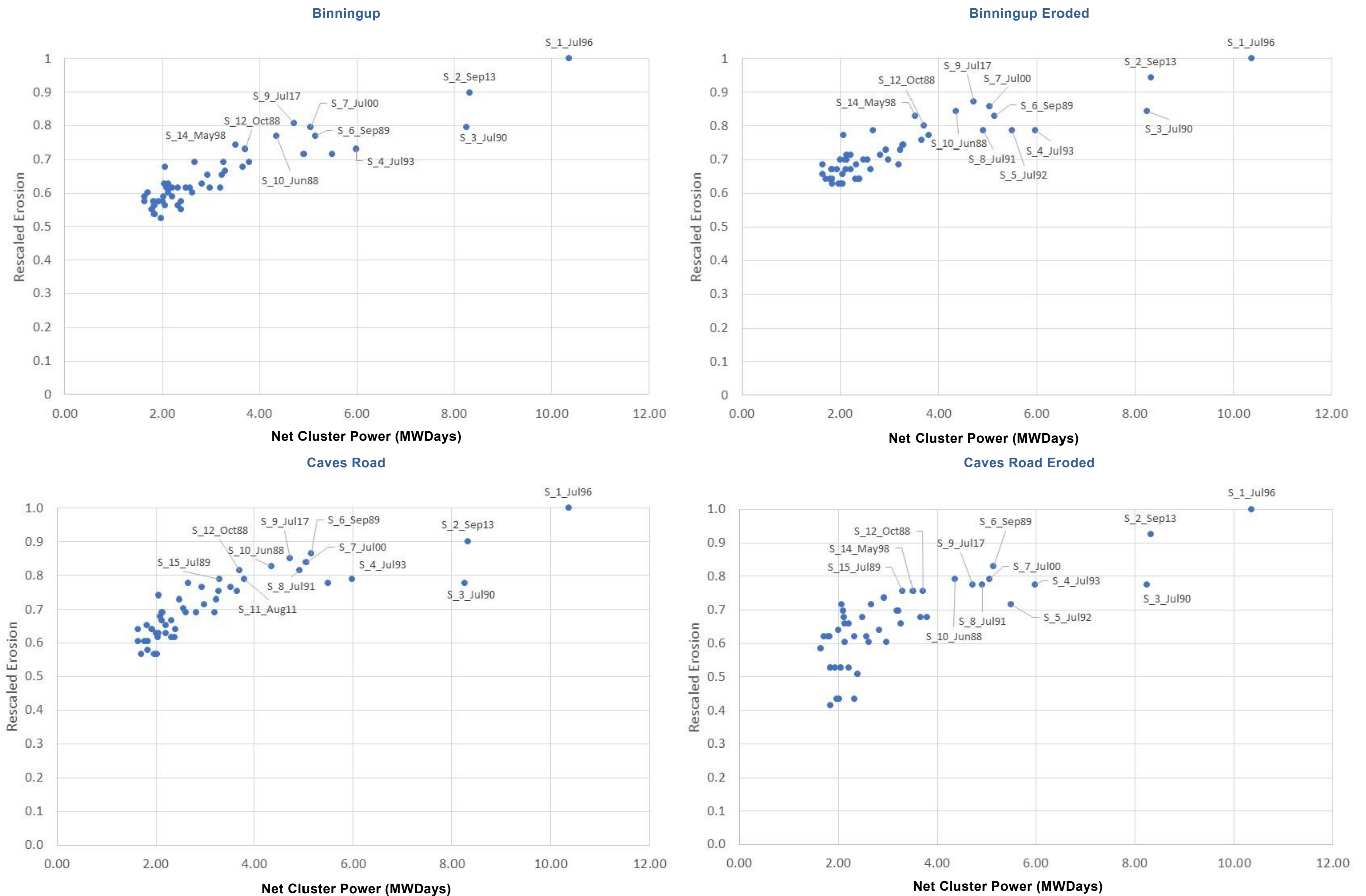


Figure 5.20 Cross Plots of Modelled Profile Erosion versus the Storm Cluster Net Wave Power – South West (Cape Naturaliste)

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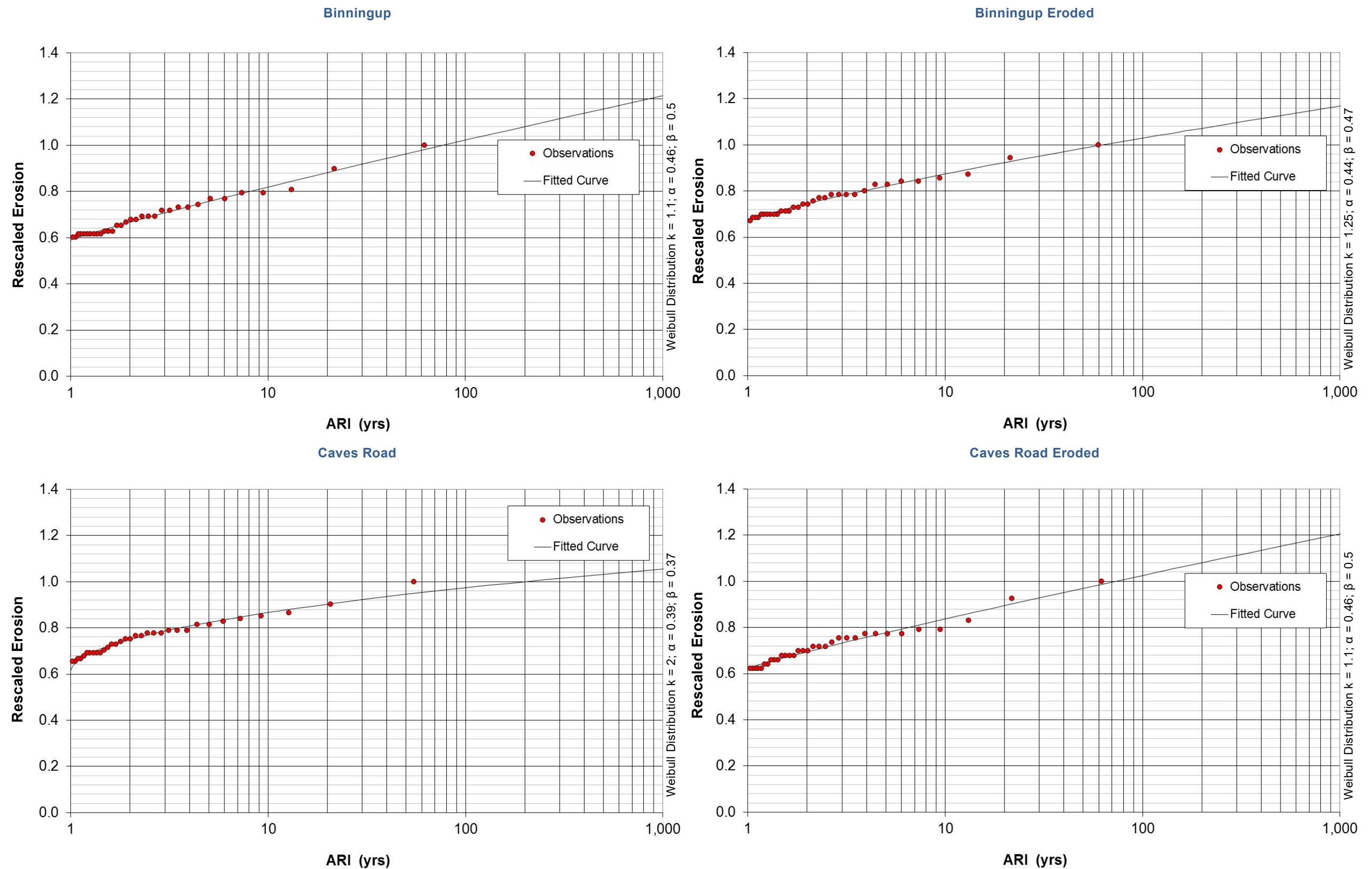


Figure 5.21 Extreme Analysis of Modelled Profile Erosion Potential during the Top Storm Cluster Net Cluster Power Events – South West (Cape Naturaliste)

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.16 for each of the required ARI's.

Table 5.16 Target Net Wave Power & Estimated Rescaled Erosion Potential for Design Event ARI's – South West (Cape Naturaliste)

Average Recurrence Interval (years)	Target Net Wave Power (MW Days)	Estimated Total Rescaled Erosion			
		Binningup	Binningup Eroded	Caves Road	Caves Road Eroded
1	1.81	0.59	0.67	0.62	0.62
10	6.52	0.82	0.87	0.87	0.84
25	8.39	0.90	0.94	0.91	0.91
50	9.81	0.96	0.98	0.94	0.97
100 ²	11.23	1.02	1.03	0.97	1.03

Notes: 1. Data period 1985-2017, data length 33 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.17. The synthesised design storm sequences are presented in Table 5.18. Time histories of these storm sequences are provided in Appendix E.

Table 5.17 Discrete Storms Used in Synthesis – South West (Cape Naturaliste)

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
C1	13-06-02 4:30	15-06-02 9:30	2.21	1.06	5.65	0.29
C2	28-11-12 10:19	01-12-12 4:49	2.77	1.28	5.70	0.33
C3	09-07-02 17:30	13-07-02 9:30	3.67	1.74	5.64	0.23
C4	26-06-09 19:30	01-07-09 2:30	4.29	1.84	5.65	0.41
C5	20-07-90 17:00	25-07-90 5:00	4.50	1.88	5.57	0.07
C6	31-08-02 4:15	04-09-02 19:15	4.63	2.25	5.66	0.13
C7	01-04-12 11:19	06-04-12 6:19	4.79	2.26	5.42	0.30
C8	15-07-96 20:00	20-07-96 2:00	4.25	3.19	6.69	0.42
C9	29-07-91 5:00	05-08-91 23:00	7.75	4.29	5.69	0.27

Table 5.18 Design Storm Sequences for South West (Cape Naturaliste) Region

Storm Sequence	Net Cluster Power (MW Days)	Modelled Erosion Distances				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Binningup	Binningup Eroded	Caves Road	Caves Road Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
C5	1.9	0.55	0.64	0.49	0.57	0.25	-0.25
C4	1.8	0.58	0.68	0.61	0.68	0.10	0.04
10 Year ARI Event							
C9 + C7	6.6	0.82	0.87	0.85	0.92	0.11	0.07
C9 + C6	6.5	0.78	0.84	0.85	0.87	0.11	-0.05
25 Year ARI Event							
2x C9	8.6	0.90	0.93	0.98	1.02	0.18	0.15
2x C8 + 2x C1	8.5	0.86	0.93	0.93	0.98	0.13	0.03
50 Year ARI Event							
2x C9 + C2	9.9	0.95	1.00	1.02	1.02	0.16	0.13
2x C8 + 2x C4	10.1	0.95	1.00	0.98	0.98	0.07	0.04
100 Year ARI Event							
2x C9 + C8	11.8	1.00	1.0	1.07	1.08	0.19	0.14
3x C8 + C3	11.3	0.97	1.0	0.98	1.04	0.10	-0.08

Two different design storm sequences have been identified for each ARI within this region. The purpose of identifying two storm sequences was to test the sensitivity of the profile response to different types of events. Previous stages of this investigation highlighted that the potential modelled profile response was variable based on broader profile characteristics and antecedent beach condition. As a result it is recommended that both storm sequences be simulated by end-users to determine which is most critical for their profile.

Directional Analysis

The most energetic conditions within the South West (Cape Naturaliste) region are generally incident from the west south west and are therefore within the south west quadrant. However,

shorelines with a northerly aspect may be sheltered from the worst of these conditions. Therefore, an assessment was completed to identify storm clusters with directions from the north west quadrant.

Completion of this directional analysis required review of directional wave data. Where directional wave data was not available, a relationship between wind direction and sea wave direction was applied, as discussed in Section 5.1.1. Details of the data periods used in this assessment are provided in Table 5.19.

Table 5.19 Data Period and Type used for the Directional Analysis – South West (Cape Naturaliste)

Data Type	Period of Available Data
Directional Wave Measurements	February 2010 to October 2017
Non-Directional Wave Measurements using Relationship between Wind and Sea Directions	May 1999 to February 2010

The periods that have been identified with the highest net cluster power from the north west quadrant are summarised within Appendix F. The top events are summarised in Table 5.20. This table includes events from both the period of directional wave measurement data as well as the period when wave directions were calculated based on the relationship with wind direction. It is noted that the periods identified using the wind / sea directional relationship are apparently more severe than those within the directional wave record. This may be reflective of a greater level of directional severity during this period, or could also be due to the noted conservative nature of the wind / sea directional relationship assumption. Notwithstanding, a period from July 2000 was identified as being the top event for the South West (Cape Naturaliste) region.

Table 5.20 Key Storm Clusters from the North West Quadrant – South West (Cape Naturaliste)

Start Date	End Date	Duration (Days)	Net Cluster Power Within Directional Band (MWDays)	Data Source
10-07-00 1:15	17-07-00 20:30	7.80	2.11	Wave Buoy (Direction from Wind)
29-07-07 5:15	01-08-07 6:15	3.04	1.45	Wave Buoy (Direction from Wind)
28-11-12 10:49	28-11-12 22:19	0.48	0.14	Wave Buoy (Directional Data)
28-06-11 2:00	28-06-11 11:30	0.40	0.11	Wave Buoy (Directional Data)
26-06-2012 5:19	26-06-2012 16:49	0.48	0.09	Wave Buoy (Directional Data)

5.2.5 South Coast (Albany)

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from September and October 1989 was identified as being the top event for the South Coastal (Albany) Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.22.

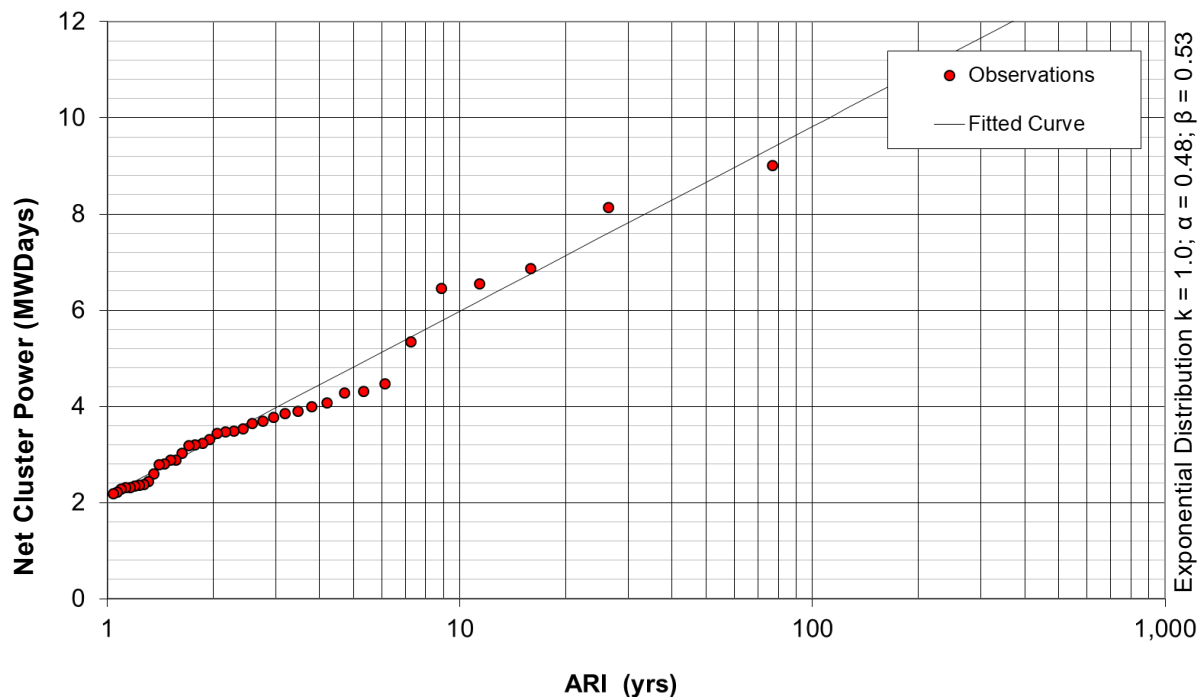


Figure 5.22 Extreme Analysis of Cluster Net Wave Power for South Coastal (Albany) Region

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.23 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storm events are largely consistent with expectations.

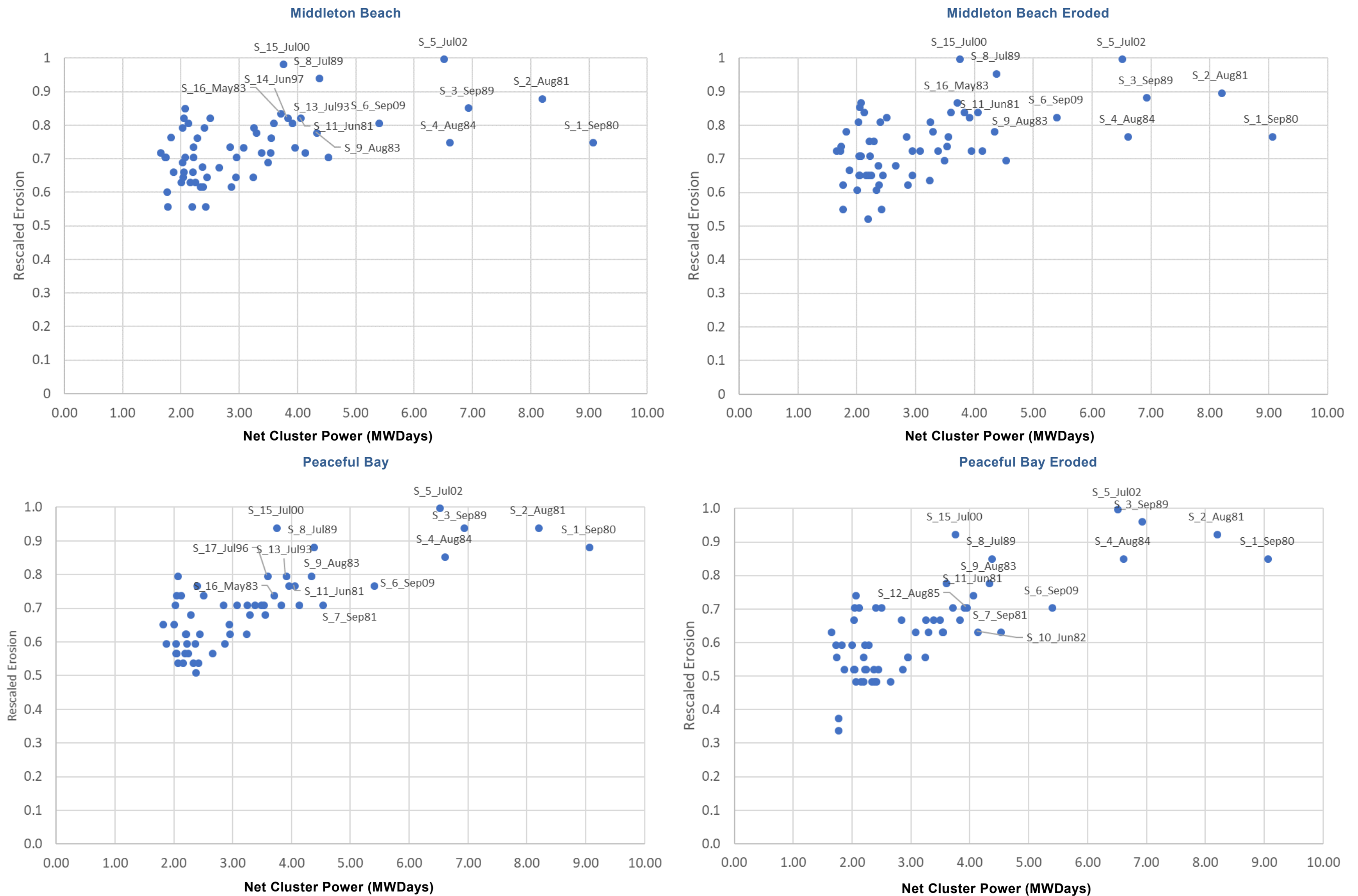


Figure 5.23 Cross Plots of Modelled Profile Erosion versus the Storm Cluster Net Wave Power – South Coast (Albany)

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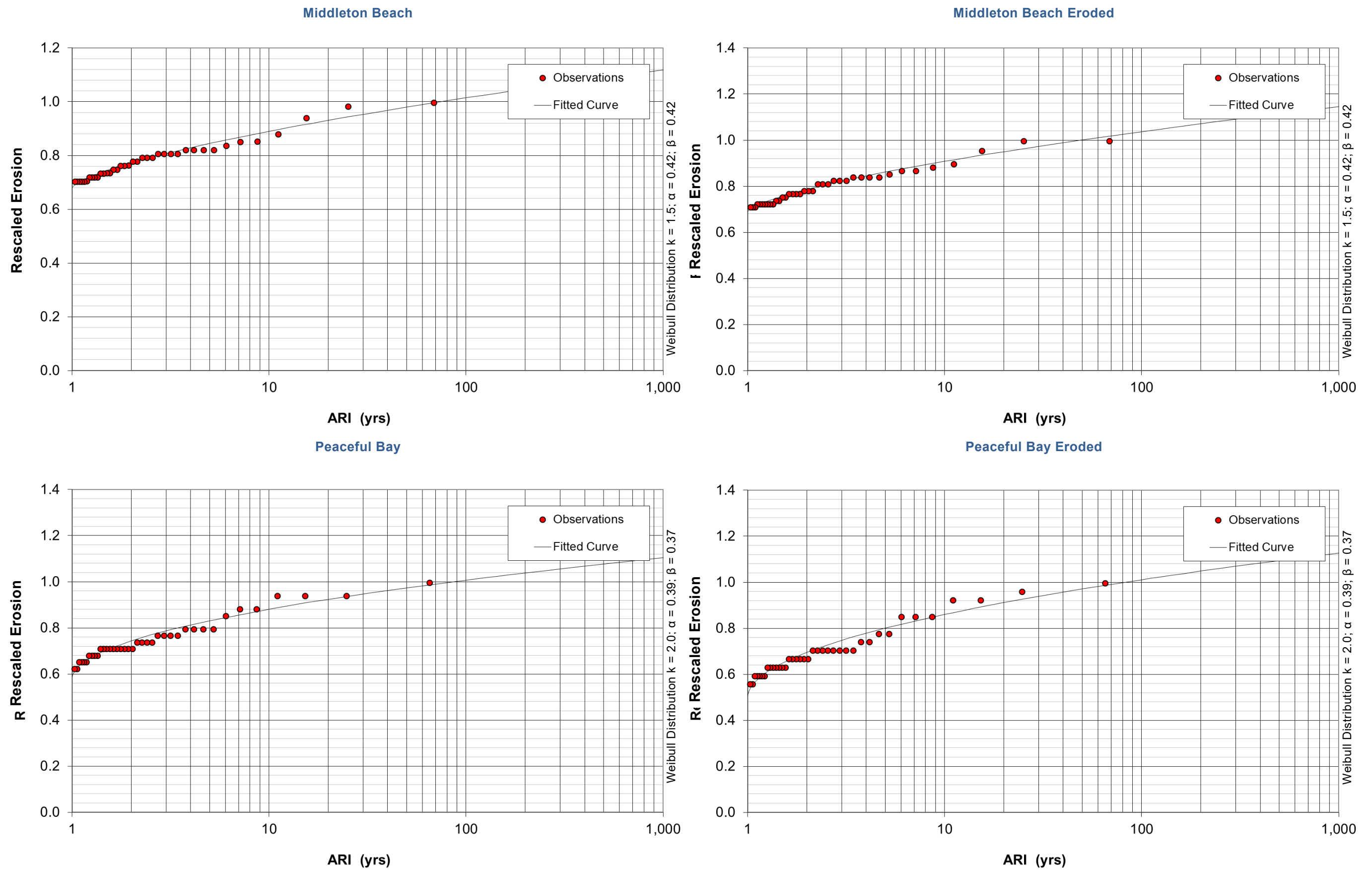


Figure 5.24 Extreme Analysis of Modelled Profile Erosion Potential during the Top Storm Cluster Net Wave Power Events – South Coast (Albany)

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.21 for each of the required ARI's.

Table 5.21 Target Net Wave Power & Estimated Rescaled Erosion Potential for Design Event ARI's – South Coast (Albany)

Average Recurrence Interval (years)	Target Net Wave Power (MW Days)	Estimated Total Rescaled Erosion			
		Middleton	Middleton Eroded	Peaceful Bay	Peaceful Eroded
1	2.14	0.68	0.69	0.6	0.52
10	5.98	0.89	0.91	0.88	0.86
25	7.51	0.94	0.96	0.94	0.93
50	8.67	0.98	1	0.97	0.97
100	9.82	1.01	1.04	1.01	1.01

Notes: 1. Data period 1979-2017, data length 39 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.22. The synthesised design storm sequences are presented in Table 5.23. Time histories of these storm sequences are provided in Appendix E.

Table 5.22 Discrete Storms Used in Synthesis – South Coast (Albany)

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
A1	27-05-15 18:13	29-05-15 16:13	1.92	1.03	5.65	-0.03
A2	09-10-05 2:30	11-10-05 4:30	2.08	1.08	5.48	-0.16
A3	23-09-09 16:59	25-09-09 19:30	2.10	1.18	5.60	-0.06
A4	01-09-09 12:59	03-09-09 21:29	2.35	1.40	6.00	0.00
A5	16-07-96 20:00	20-07-96 8:00	3.50	1.87	5.67	0.32
A6	10-09-09 3:59	13-09-09 18:29	3.60	1.98	5.69	0.17
A7	06-08-84 11:00	10-08-84 17:00	4.25	2.19	5.71	0.08
A8	02-08-91 2:00	06-08-91 2:00	4.00	2.21	5.74	0.20
A9	03-06-97 5:00	06-06-97 20:00	3.63	2.54	6.05	0.27
A10	10-09-08 23:50	16-09-08 1:20	5.06	2.55	5.72	0.22
A11	27-06-81 2:00	01-07-81 17:00	4.63	2.67	5.91	0.22
A12	26-07-93 2:00	31-07-93 2:00	5.00	2.82	5.67	0.24

Table 5.23 Design Storm Sequences for South Coast (Albany) Region

Storm Sequence	Net Cluster Power (MW Days)	Modelled Rescaled Erosion				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Middleton Beach	Middleton Beach Eroded	Peaceful Bay	Peaceful Bay Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
A8	2.2	0.69	0.70	0.60	0.56	0.06	0.06
A7	2.2	0.66	0.67	0.57	0.52	0.07	-0.06
10 Year ARI Event							
2x A9 + A1	6.1	0.90	0.91	0.91	0.78	0.12	-0.03
2x A5 + 2x A3	6.1	0.93	0.94	0.86	0.82	0.14	0.00
25 Year ARI Event							
2x A12 + A6	7.6	0.96	0.96	0.97	0.96	0.08	0.08
2x A11 + 2x A3	7.7	0.93	0.93	0.91	0.89	0.11	-0.11
50 Year ARI Event							
3x A10 + A1	8.7	0.96	0.96	1.00	1.04	0.16	0.03
3x A9 + A2	8.7	0.99	1.00	1.00	0.96	0.04	0.03
100 Year ARI Event							
3x A12 + A4	9.9	1.01	1.01	1.06	1.11	0.18	0.13
3x A11 + A5	9.9	1.03	1.03	1.11	1.18	0.31	0.29

Directional Analysis

The most energetic conditions within the South Coastal (Albany) region are generally incident from the south west quadrant. However, shorelines with a south easterly aspect may be sheltered from the worst of these conditions. Therefore an assessment was completed to determine design events with directions from the south east quadrant.

Completion of this directional analysis required review of directional wave data. Where non-directional wave measurements were available, the directions were filled using WWIII hindcast data. Details of the data used in this assessment are provided in Table 5.24.

Table 5.24 Data Period and Type used for the Directional Analysis – South Coast (Albany)

Data Type	Period of Available Data
Directional Wave Measurements	September 2008 to October 2017
Non-directional wave measurements using WWIII wave directions	July 2005 to September 2008
WWIII Wave Data	1987 to July 2005

The periods that have been identified with the highest net cluster power from the south east quadrant are summarised within Appendix F. The top events are summarised in Table 5.25. This table includes events from both the period of directional wave measurement data as well as the WWIII hindcast data. A period from August 1984 was identified as being the top event for the South Coast (Albany) Region.

Table 5.25 Key Storm Clusters from the South East Quadrant – South Coast (Albany)

Start Date	End Date	Duration (Days)	Net Cluster Power Within Directional Band (MWDays)	Data Source
03-08-84 5:00	04-08-84 11:00	1.25	0.65	WWIII
03-05-88 14:00	04-05-88 2:00	0.50	0.14	WWIII
05-01-07 6:00	05-01-07 13:00	0.29	0.11	Wave Buoy (Direction from WWIII)
26-09-17 3:38	26-09-17 12:08	0.35	0.10	Wave Buoy (Directional Data)
07-06-12 9:24	07-06-12 14:54	0.23	0.02	Wave Buoy (Directional Data)

5.2.6 Hopetoun & Bremer Bay

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from August 2009 was identified as being the top event for the Hopetoun & Bremer Bay Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.25.

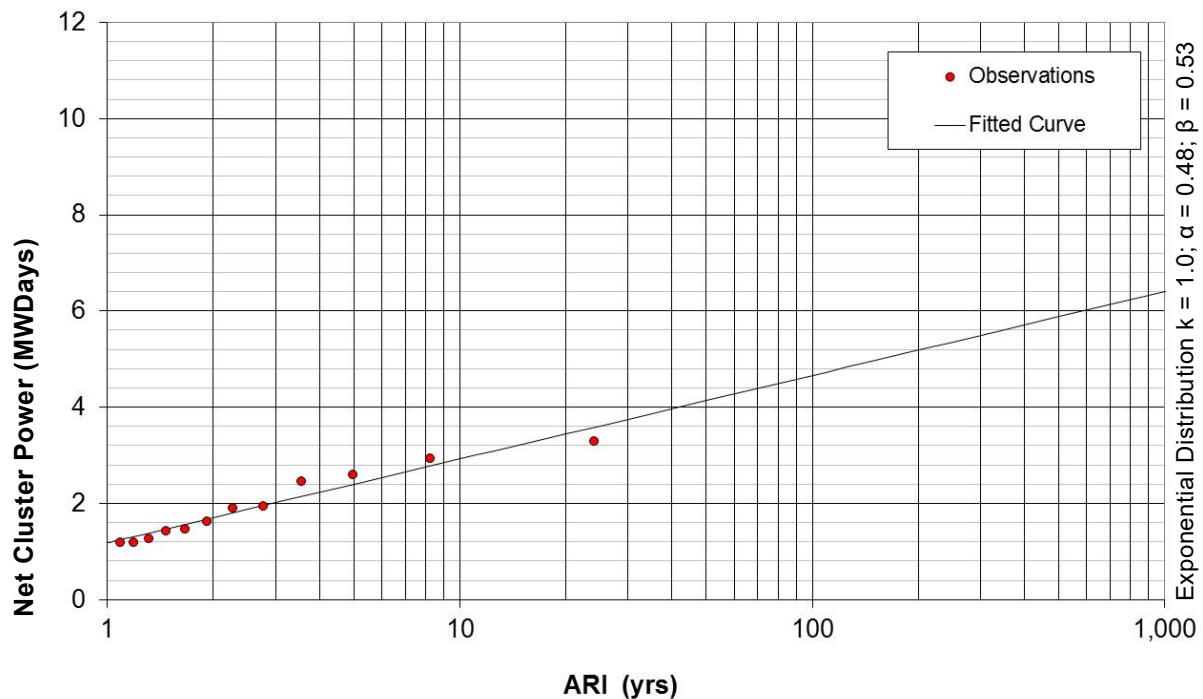


Figure 5.25 Extreme Analysis of Cluster Net Wave Power for Hopetoun & Bremer Bay

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.26 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storm events are largely consistent with expectations.

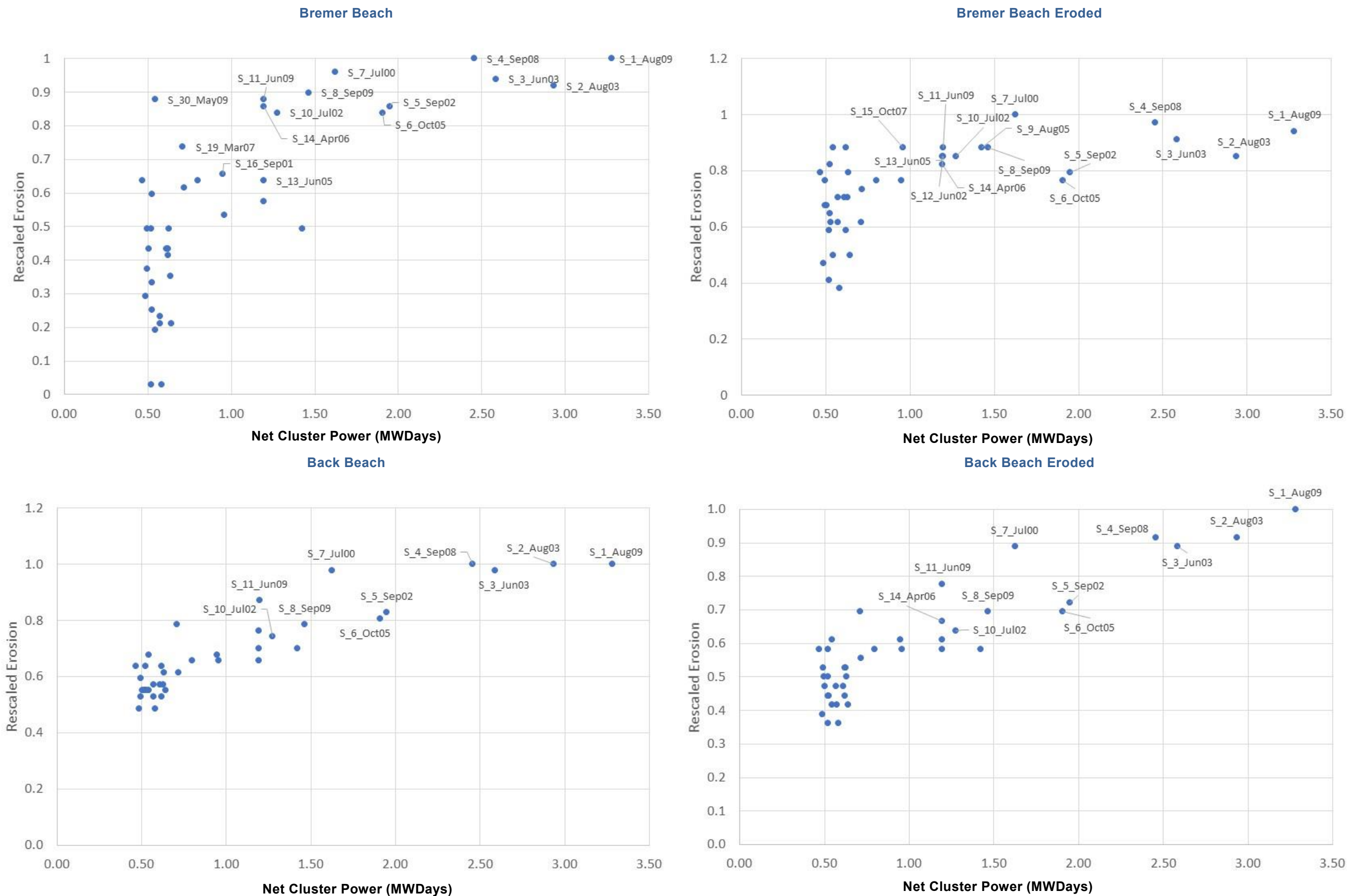


Figure 5.26 Cross Plots of Modelled Profile Erosion versus the Storm Cluster Net Wave Power within – Hopetoun & Bremer Bay

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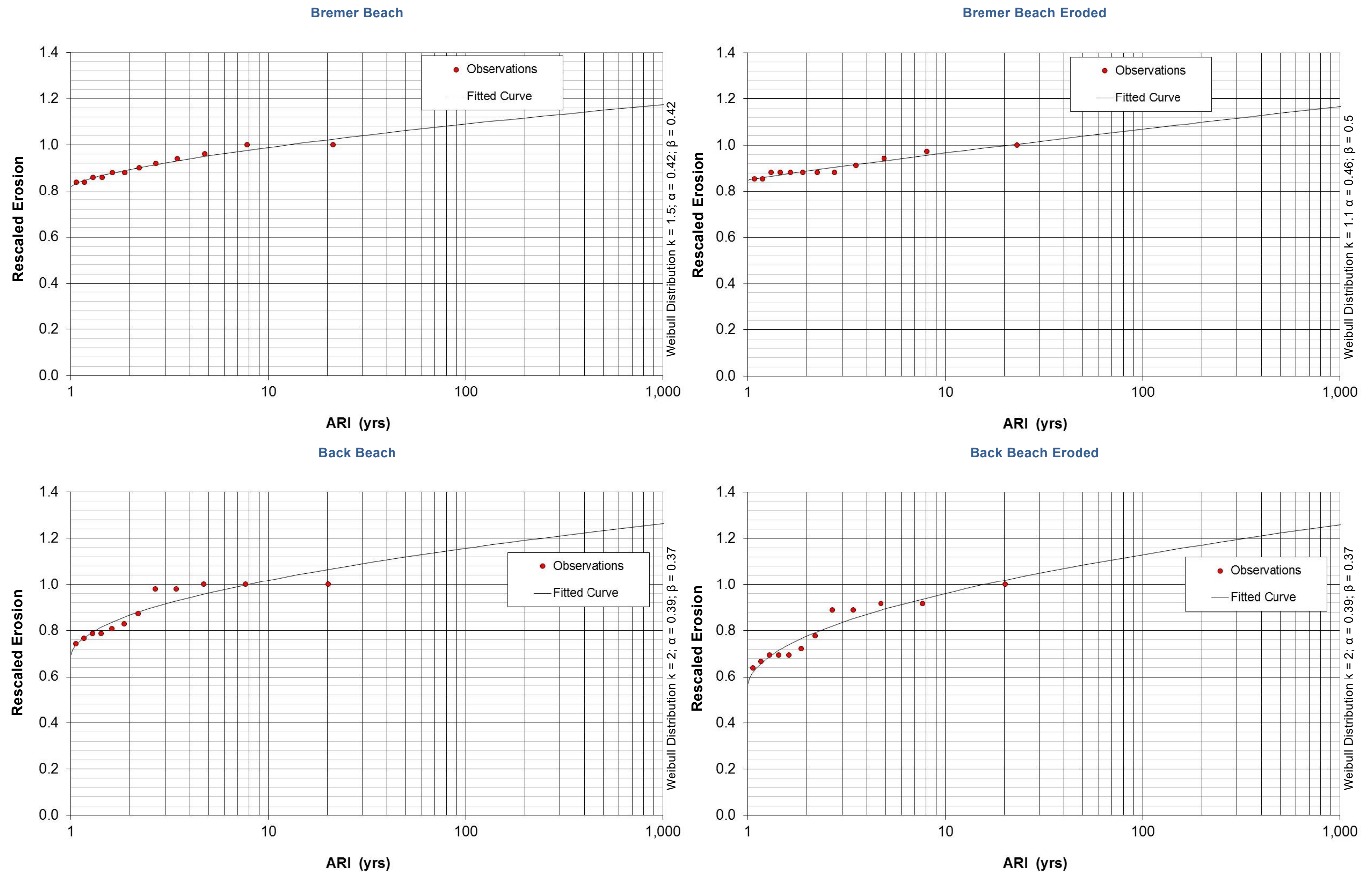


Figure 5.27 Extreme Analysis of Modelled Profile Erosion Potential during the Top Storm Cluster Net Wave Power Events – Hopetoun & Bremer Bay

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.26 for each of the required ARI's.

Table 5.26 Target Net Wave Power & Estimated Rescaled Erosion Potential for Design Event ARI's – Hopetoun & Bremer Bay

Average Recurrence Interval (years)	Target Net Wave Power (MW Days)	Estimated Total Rescaled Erosion			
		Bremer Beach	Bremer Beach Eroded	Back Beach	Back Beach Eroded
1	1.18	0.82	0.85	0.70	0.58
10	2.92	0.99	0.97	1.02	0.96
25	3.62	1.03	1.01	1.08	1.04
50 ²	4.14	1.06	1.04	1.12	1.08
100 ²	4.67	1.09	1.07	1.16	1.13

Notes: 1. Data period 1998-2009, data length 12 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.27. The synthesised design storm sequences are presented in Table 5.28. Time histories of these storm sequences are provided in Appendix E.

Table 5.27 Discrete Storms Used in Synthesis – Hopetoun & Bremer Bay

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
BH1	15-07-04 17:00	16-07-04 23:00	1.25	0.34	4.33	-0.32
BH2	14-07-02 17:00	17-07-02 2:00	2.38	0.72	4.40	-0.17
BH3	20-06-09 14:00	23-06-09 5:00	2.63	0.67	4.58	0.03
BH4	23-09-09 23:00	26-09-09 2:00	2.13	0.79	4.68	-0.17
BH5	18-04-06 8:00	21-04-06 8:00	3.00	0.97	4.63	-0.19
BH6	22-07-00 8:00	25-07-00 11:00	3.13	1.22	4.89	0.10
BH7	05-06-02 20:00	08-06-02 20:00	3.00	1.19	5.11	0.02
BH8	10-06-05 23:00	14-06-05 23:00	4.00	1.27	4.80	-0.03
BH9	02-06-03 23:00	07-06-03 17:00	4.75	1.68	5.00	0.03
BH10	01-09-02 17:00	08-09-02 5:00	6.50	1.95	4.54	-0.12

Table 5.28 Design Storm Sequences for Hopetoun & Bremer Bay Region

Storm Sequence	Net Wave Power (MW Days)	Modelled Erosion Distances				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Bremer Beach	Bremer Beach Eroded	Back Beach	Back Beach Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
BH7	1.2	0.66	0.85	0.74	0.64	0.27	-0.06
BH6	1.2	0.66	0.88	0.72	0.64	0.27	-0.05
10 Year ARI Event							
BH10 + BH5	2.9	0.74	0.97	1.06	1.00	0.34	-0.16
2x BH3 + 2xBH2	2.8	0.76	1.03	1.11	1.06	0.48	0.02
25 Year ARI Event							
BH10 + BH9	3.6	0.84	1.18	1.19	1.14	0.58	0.19
2x BH9 + BH1	3.7	0.80	1.09	1.15	1.11	0.46	-0.01
50 Year ARI Event							
2xBH10 + BH1	4.2	0.86	1.18	1.26	1.25	0.64	0.24
2x BH9 + BH4	4.2	0.84	1.18	1.21	1.19	0.57	0.12
100 Year ARI Event							
2x BH10 + BH4	4.7	0.94	1.29	1.32	1.31	0.72	0.42
2x BH9 + BH8	4.6	0.90	1.26	1.28	1.25	0.63	0.25

Directional Analysis

Given the limited period of water level record available for the Hopetoun and Bremer Bay region the duration of available data was considered too short to adequately identify relatively anomalous events from the south east. Therefore, it is recommended that the directional assessment results from adjacent regions be used for Hopetoun and Bremer Bay.

5.2.7 Great Southern (Esperance)

The periods that have been identified with the highest net cluster power across all directions are summarised within Appendix D. The period from September and October 2009 was identified as being the top event for the Great Southern (Esperance) Region.

To provide context to the severity of the events, as well as to assist in the selection and/or synthesis of the design events, an extreme analysis was completed on the net cluster power. The results of this analysis are presented in Figure 5.28.

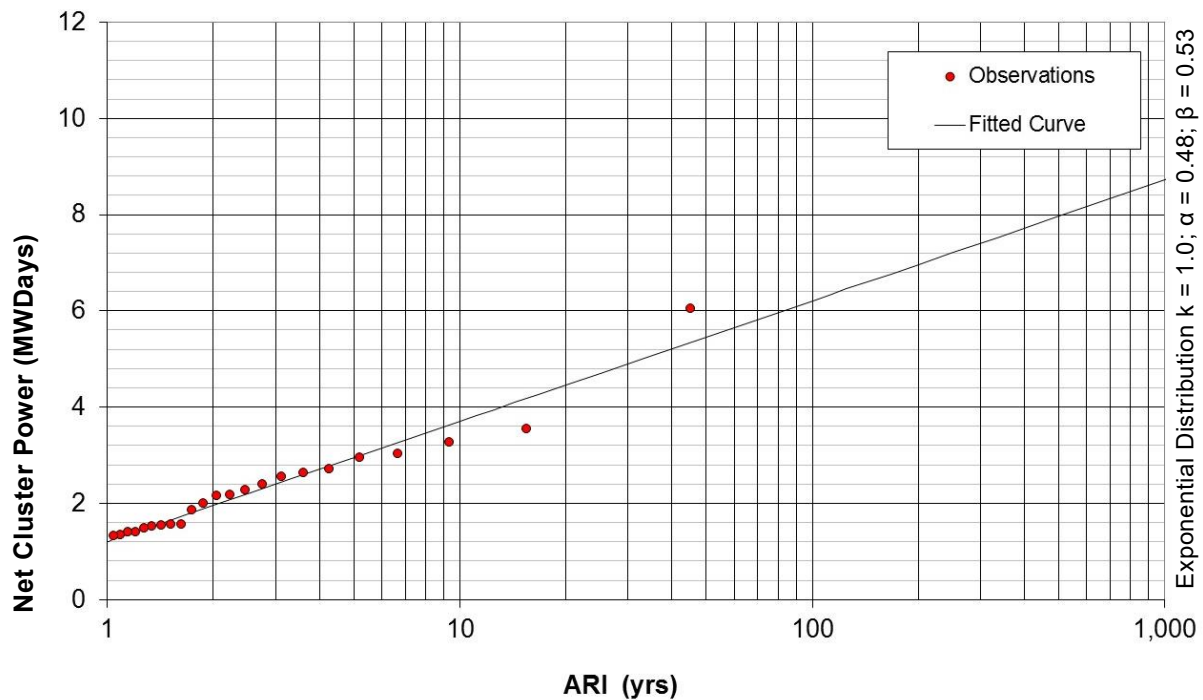


Figure 5.28 Extreme Analysis of Cluster Net Wave Power for Great Southern (Esperance)

The results from Section 4 highlighted that the modelled response to different events can vary across different profiles. As a result, each of the net power events were simulated with SBEACH for each of the profiles previously considered. Cross plots of the modelled erosion response for each profile versus the net cluster power are provided in Figure 5.29 and demonstrate a reasonably consistent relationship.

Extreme analysis was completed on the modelled erosion response to provide an indication of the expected erosion values for each design event. The extreme erosion assessment is provided mainly for context to ensure that the selected storm events are largely consistent with expectations.



Figure 5.29 Cross Plots of Modelled Profile Erosion versus the Storm Cluster Net Wave Power – Great Southern (Esperance)

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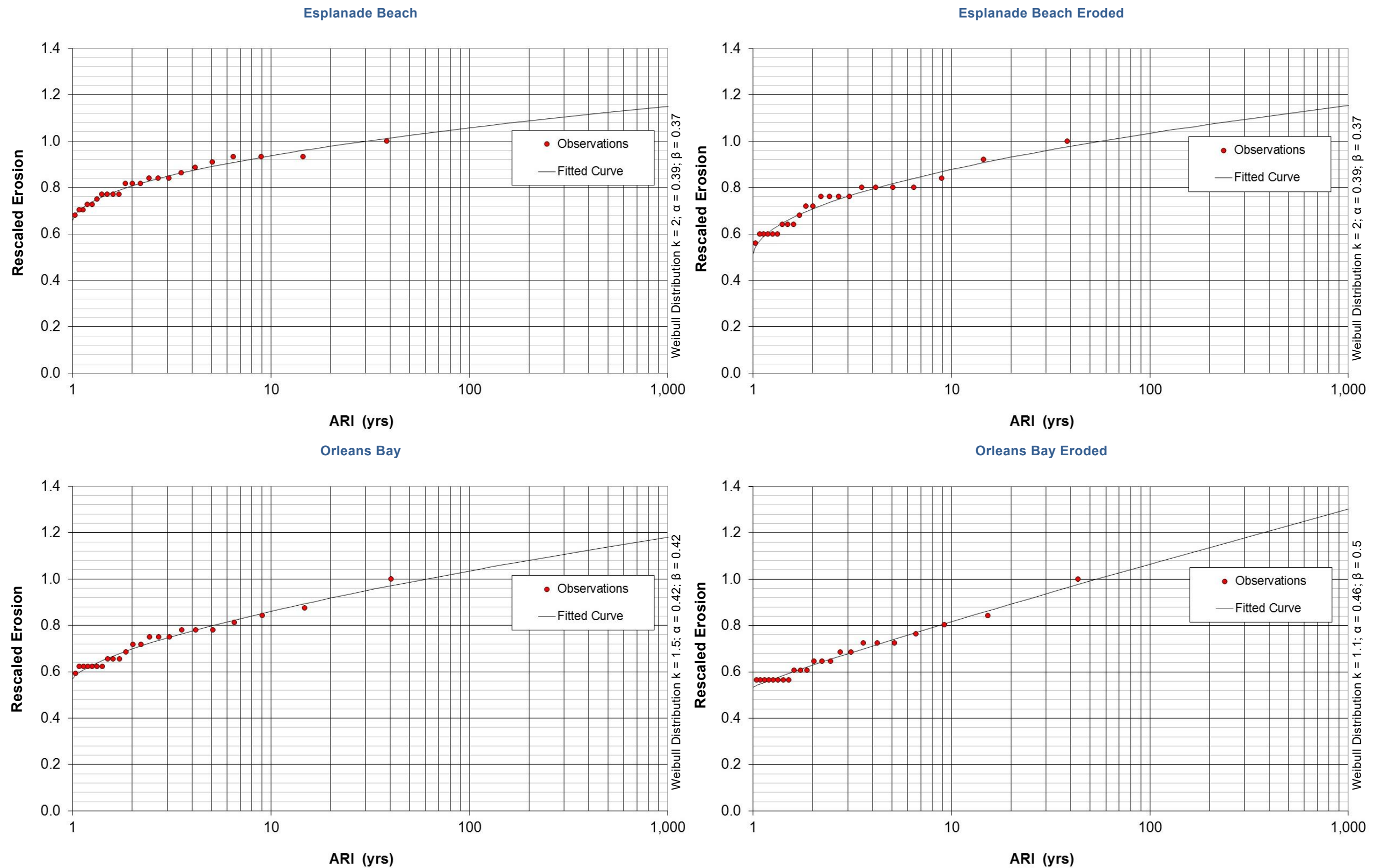


Figure 5.30 Extreme Analysis of Modelled Profile Erosion Potential during the Top Storm Cluster Net Wave Power Events – Great Southern (Esperance)

Given the outcomes of the above assessments, the target net cluster power and estimated erosion response for the given profiles are presented in Table 5.29 for each of the required ARI's.

Table 5.29 Target Net Wave Power & Estimated Rescaled Erosion Potential for Design Event ARI's – Great Southern (Esperance)

Average Recurrence Interval (years)	Target Net Wave Power (MW Days)	Estimated Total Rescaled Erosion			
		Esplanade	Esplanade Eroded	Orleans	Orleans Eroded
1	1.32	0.68	0.56	0.58	0.57
10	3.71	0.94	0.88	0.86	0.82
25	4.70	0.99	0.95	0.93	0.92
50	5.46	1.03	0.99	0.99	0.99
100 ²	6.21	1.06	1.03	1.03	1.06

Notes: 1. Data period 1987-2009, data length 23 years.

2. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

Design storm sequences were synthesised by combining discrete storms identified in Section 4. The discrete storms combined to form the design storm sequences are summarised in Table 5.30. The synthesised design storm sequences are presented in Table 5.31. Time histories of these storm sequences are provided in Appendix E.

Table 5.30 Discrete Storms Used in Synthesis – Great Southern (Esperance)

Storm Reference Number	Start Date	End Date	Duration (days)	Net Exceedance Power (MWDays)	Mean Hs (m)	Mean WL (mAHD)
E1	21-09-06 8:00	23-09-06 8:00	2.00	0.75	4.99	0.19
E2	21-07-03 20:00	24-07-03 2:00	2.25	0.95	5.30	0.07
E3	24-09-09 2:00	26-09-09 5:00	2.13	1.08	5.38	-0.04
E4	18-07-96 2:00	20-07-96 14:00	2.50	1.17	5.21	0.36
E5	22-07-00 11:00	25-07-00 8:00	2.88	1.33	5.36	0.29
E6	03-06-92 8:00	06-06-92 11:00	3.13	1.37	5.11	0.01
E7	03-06-97 20:00	07-06-97 2:00	3.25	1.50	5.25	0.26
E8	29-08-05 14:00	01-09-05 2:00	2.50	1.52	5.90	0.02
E9	02-06-03 23:00	07-06-03 17:00	4.75	1.86	5.29	0.22
E10	22-08-09 5:00	25-08-09 20:00	3.63	1.90	5.63	0.12

Table 5.31 Design Storm Sequences for Great Southern (Esperance) Region

Storm Sequence	Net Cluster Power (MW Days)	Modelled Erosion Distances				Difference Between Modelled & Estimated Erosion Across all Profiles	
		Esplanade	Esplanade Eroded	Orleans	Orleans Eroded	Absolute Difference	Net Difference
1 Year ARI Event							
E6	1.4	0.61	0.56	0.59	0.53	0.12	-0.09
E5	1.3	0.66	0.60	0.62	0.57	0.11	0.06
10 Year ARI Event							
2x E7 + E1	3.8	0.91	0.88	0.94	0.88	0.17	0.11
2x E4 + E8	3.8	0.89	0.84	0.94	0.88	0.23	0.05
25 Year ARI Event							
2x E9 + E3	4.8	0.93	0.92	0.94	0.92	0.09	-0.08
3x E4 + E8	5.0	0.95	0.96	1.00	1.00	0.20	0.13
50 Year ARI Event							
2x E9 + 2x E2	5.6	0.98	0.96	1.00	1.00	0.10	-0.06
3x E7 + E3	5.6	0.98	1.00	1.09	1.04	0.21	0.12
100 Year ARI Event							
3x E9 + E1	6.3	1.05	1.08	1.13	1.12	0.20	0.18
3x E7 + E10	6.4	1.00	1.04	1.13	1.24	0.33	0.21

Two different design storm sequences have been identified for each ARI within this region. The purpose of identifying two storm sequences was to test the sensitivity of the profile response to different types of events. Previous stages of this investigation highlighted that the potential modelled profile response was variable based on broader profile characteristics and antecedent beach condition. As a result it is recommended that both storm sequences be simulated by end-users to determine which is most critical for their profile.

Directional Analysis

The most energetic conditions within the Great Southern (Esperance) region are generally incident from the south west quadrant. However, shorelines with a south easterly aspect may be

sheltered from the worst of these conditions. Therefore an assessment was completed to determine design events with directions from the south east quadrant.

Completion of this directional analysis required review of directional wave data. As only WWIII hindcast data was able to be used for this region, the results of this assessment are reliant on the ability of WWIII to replicate these alternate directions. Details of the data period used in this assessment is provided in Table 5.32.

Table 5.32 Data Period and Type used for the Directional Analysis – Great Southern (Esperance)

Data Type	Period of Available Data
WWIII Wave Data	January 1987 to 2009

The periods that have been identified with the highest net cluster power from the south east quadrant are summarised within Appendix F. The top events are summarised in Table 5.33. A period from June 1989 was identified as being the top event for the Great Southern (Esperance) Region.

Table 5.33 Key Storm Clusters from the South East Quadrant – Great Southern (Esperance)

Start Date	End Date	Duration (Days)	Net Cluster Power Within Directional Band (MWDays)	Data Source
14-06-89 5:00	16-06-89 5:00	2.00	0.60	WWIII
04-01-07 17:00	05-01-07 17:00	1.00	0.46	WWIII
12-05-87 20:00	13-05-87 11:00	0.63	0.24	WWIII
06-10-92 17:00	07-10-92 11:00	0.75	0.18	WWIII
11-07-06 5:00	11-07-06 17:00	0.50	0.18	WWIII

5.3 Discussion of Results

The results from this assessment have highlighted that clustering of storm events can significantly increase the potential for shoreline erosion. This outcome is based on the fact that the net cluster power associated with these storm clusters can be well above the net wave powers experienced during the individual storms which were identified in Section 4.

Whilst there is a level of consistency between the timing of the top individual key storms and the top storm cluster events, this is not always the case. This result is consistent with the findings of Splinter et al (2013) and Karunaratna et al. (2013) who note that whilst coastal managers typically design for the impact of extreme individual beach erosion events, the cumulative impact of smaller closely spaced storm clusters can far outweigh the erosion potential of a single much larger storm.

The methodology that has been presented for the identification of storm clusters, and more specifically the cut-off or termination of those clusters, has been based largely on an assumption of beach erosion and recovery rates from available literature. However, in the absence of findings specific for the regions considered in this study, the beach recovery rates that have been assumed are expected to be slightly conservative.

Clarification or quantification of the actual beach recovery rates would require a detailed monitoring program at a selection of beaches within the regions. This monitoring would need to be completed with a regularity that allowed pre and post storm beach profiles to be measured, together with the rates of beach recovery in the period after storm impact. The monitoring would also need to extend for a period long enough to ensure that a range of event severities would be captured.

If such monitoring was completed the results would be invaluable both for the confirmation or modification of results within this study, as well as for the calibration or validation of beach response models that are used to simulate storm erosion response. As highlighted previously, the observational data that is currently available does not appear to suggest that the scale of cross shore erosion widely predicted by beach erosion models matches what is observed in reality. This is a key consideration, as the design events that have been identified within this study are comprised of actual events, or a combination of actual events, which have been observed within each of the regions. The outcomes of modelling using these events should therefore be reasonably consistent with observed outcomes provided the models are reliable, well set up, calibrated and validated.

6. Assessment of Representative Years

6.1 Assessment Methodology

The identification of individual events or clusters of events is important from a short term beach response perspective, however consideration of longer term changes requires review of longer periods. Typically, assessment periods are at timescales of a year or greater. Consequently, it is useful to identify typical and atypical years so that the full range of shoreline response can be assessed under each of these scenarios. Available wave and water level records have therefore been interrogated to identify an average year for each region (based on the available data) as well as a mild year and a stormy year.

The classification process draws on the results of assessments completed in previous stages of this report. In particular the establishment of statistical metrics within Section 3 provides a foundation for internal comparison relative to long term observations. With regard to wave conditions, the following key metrics were extracted for each year.

- The average wave height over the entire year.
- The cumulative duration, in hours, of wave heights above the storm wave threshold (where the threshold is defined as the mean wave height plus two standard deviations).
- The cumulative wave power during periods when wave heights were above the storm wave threshold.
- The total wave power experienced per year, broken down into different incident wave directions. Total wave power is presented for both sea and swell, where available, or for the total wave where WWII directions are considered appropriate (along the south coast) and is broken down by octant of incident direction. This metric helps to provide information regarding the relative inter-annual variability in incident wave directions.

The above metrics provide a means of quantifying the relative storm wave energy from year to year. However, as previously outlined, elevated water levels can also have an impact on the shoreline response.

Water level itself is not necessarily a good indicator of relative storminess, or potential for shoreline erosion, due to the variability and masking caused by tidal variations that occur over timescales from sub-diurnal to decadal. Instead, water level residuals (the difference between observed and predicted water levels) provide a better representation. MRA (1999) completed a review of relative storminess at Fremantle and attempted to develop a metric to identify stormy periods using the water level record.

Through comparison with a limited period of available offshore wave recordings, MRA found that there was a reasonable correlation between offshore wave heights greater than 4 m and water level residuals greater than 0.35 m. A metric, termed the Rogers Storminess Index, was developed for that study which indexed the total number of hours that the storm surge was equal to or greater than 0.35 m per year against the average annual number of hours of storm surge exceedance.

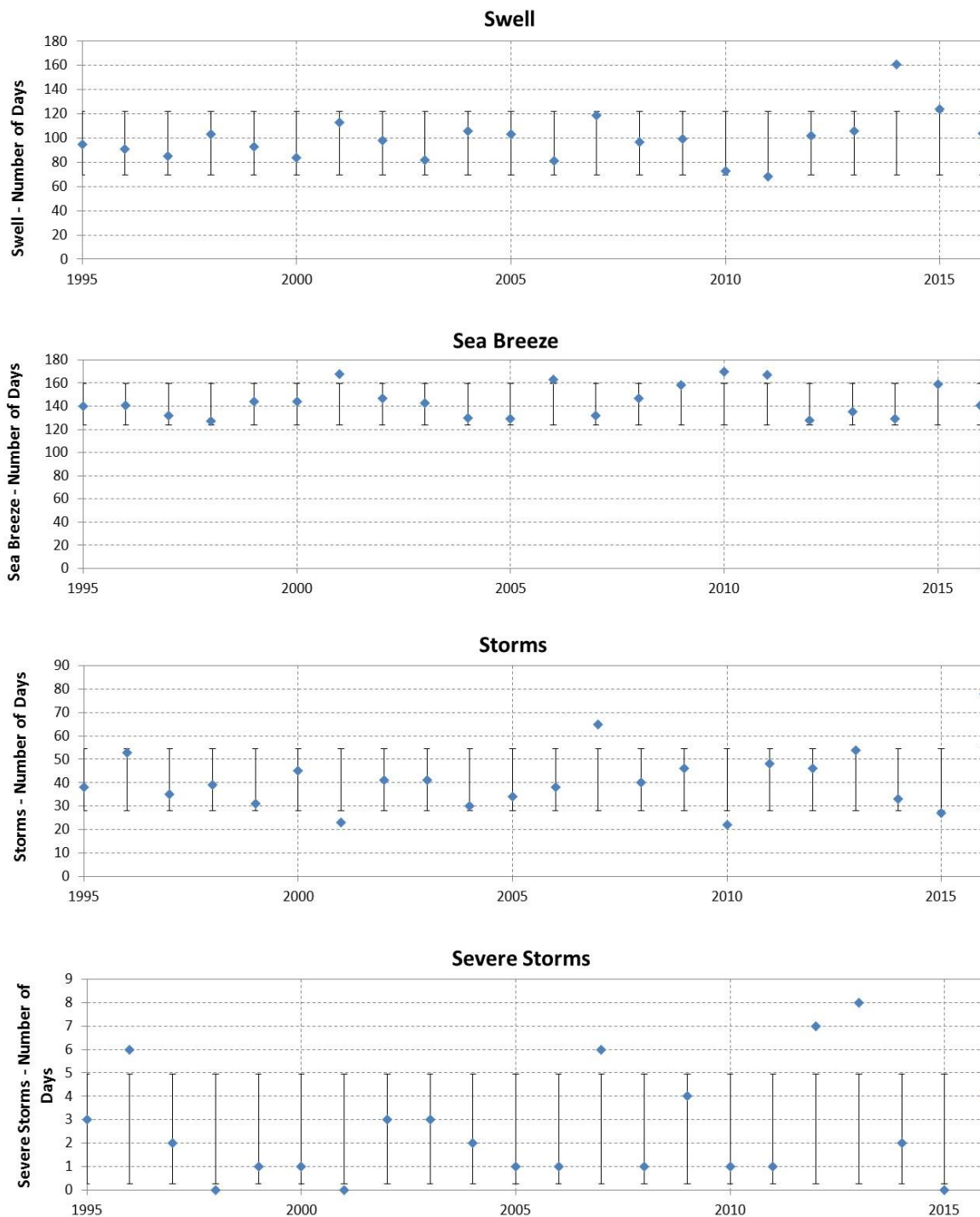
A similar metric would obviously be beneficial when considering relative storminess in this study for two reasons. Firstly, it would provide an indication of the relative differences in storminess from year to year, and secondly it would provide an indication of the relative occurrence of

elevated water levels which could give rise to an increase in beach erosion potential and/or risk. However, the available water level residual data that is available does not distinguish between storm surge and other factors such as ENSO effects on local water levels. Given the relative sensitivity of the Rogers Storminess Index to storm surge exceedance above a fixed value, the offset of water levels caused by factors other than storm surge can limit the usefulness of the results. Nevertheless, the inclusion of these other features within the residual water level data does help to provide a pseudo indication of the relative beach erosion potential, as previously discussed. Therefore, for this assessment it was considered preferable to use the annual net duration of water level residual exceedance above 0.35 m as the water level metric.

In addition to the above metrics, information regarding observations of key wave events within the Metropolitan area were considered. MRA keep statistics on wave event occurrence within the Metropolitan area, with four key events identified from the record. Wave events are classified as either storm, severe storm, sea breeze or swell. Classification details are summarised in Table 6.1, with results of the analysis presented in Figure 6.1. It is noted that the results from this identification of key wave events are not applicable to all regions, however may be relevant to other regions along the west coast.

Table 6.1 Criteria for Selection of Key Wave Events within the Metropolitan Region

Event	Characteristics
Severe Storm	<p>Hs > 6 m Strong sea component of Hs Wind Speed ~ 60 kph Wind direction generally Northerly -> Westerly</p>
Moderate Storm	<p>Hs > 3 m Strong sea component of Hs Wind Speed ~ 40 kph Wind direction generally Northerly -> Westerly</p>
Swell	<p>Hs > 2 m T > 8 s</p>
Sea Breeze	<p>Hs < 2 m (typically) T < 8 - 10 s Wind direction Easterly in morning, South Westerly in afternoon</p>



Note: Error bars represent one Standard Deviation from the Mean

Figure 6.1 Key Wave Event Occurrence within the Metropolitan Area

Using all available information representative years that can be considered to be “average,” “mild” and “stormy” were selected for each region. The criteria for selection of each year are summarised below.

- Mild year: Characterised by wave metric values that are at least one standard deviation below the mean values and are close to, if not the lowest in the record. The duration of storm surge exceedance should also be much lower than the mean.

- Average year: Characterised by metric values that are generally very close to the mean value, though where more than one event matches this criteria stronger weighting was given to those years with storm wave related metrics (duration of threshold exceedance and net power during exceedance) that better approximated the mean.
- Stormy year: Characterised by wave metric values that are at least one standard deviation above the mean values and are close to, if not, the highest in the record. The duration of storm surge exceedance should also be meaningfully above the mean value.

The results of this assessment are outlined hereafter.

6.2 Results

6.2.1 Mid West (Geraldton)

Annual metrics for the Mid West (Geraldton) region are presented in Figure 6.2. The data shows that there is a reasonable level of inter-annual variability within the region, particularly with respect to the duration of storm wave threshold exceedance and the associated net power during periods of exceedance.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 1994.
- Average year – 2005.
- Stormy year – 1988.

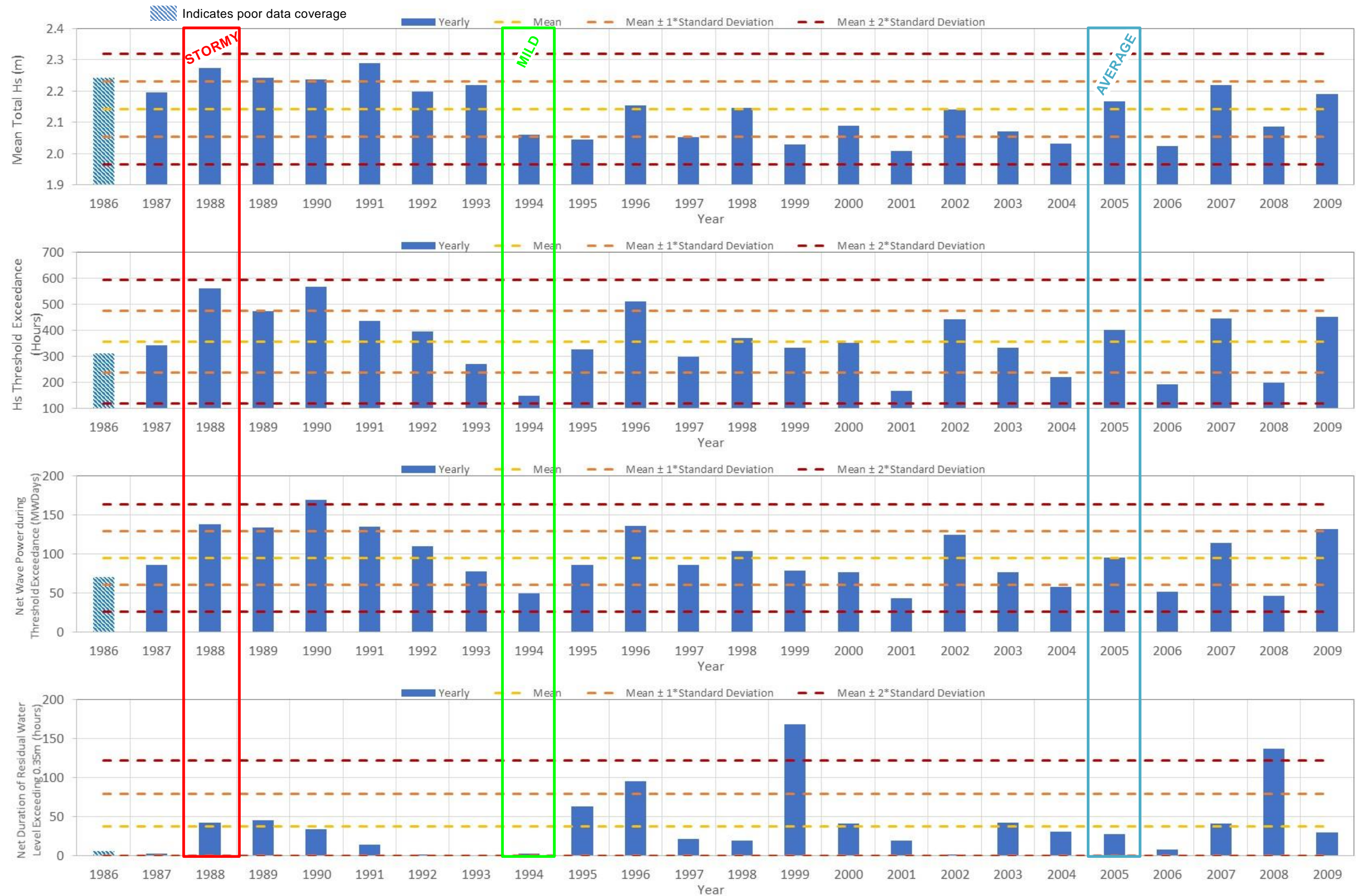


Figure 6.2 Key Wave & Water Level Metrics for Selection of Representative Years in the Mid-West (Geraldton) Region

6.2.2 Wheatbelt (Jurien Bay)

Annual metrics for the Wheatbelt (Jurien Bay) region are presented in Figure 6.3. The data shows that there is a reasonable level of inter-annual variability within the region, particularly with respect to the duration of storm wave threshold exceedance and the associated net power during periods of exceedance.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 2010.
- Average year – 2000.
- Stormy year – 1996.

The selection of 1996 as the stormy year is not surprising given the large number of events and clusters that were identified in previous sections of this report. The identified years also show a level of consistency with the result of the key wave event identification presented in Figure 6.1.

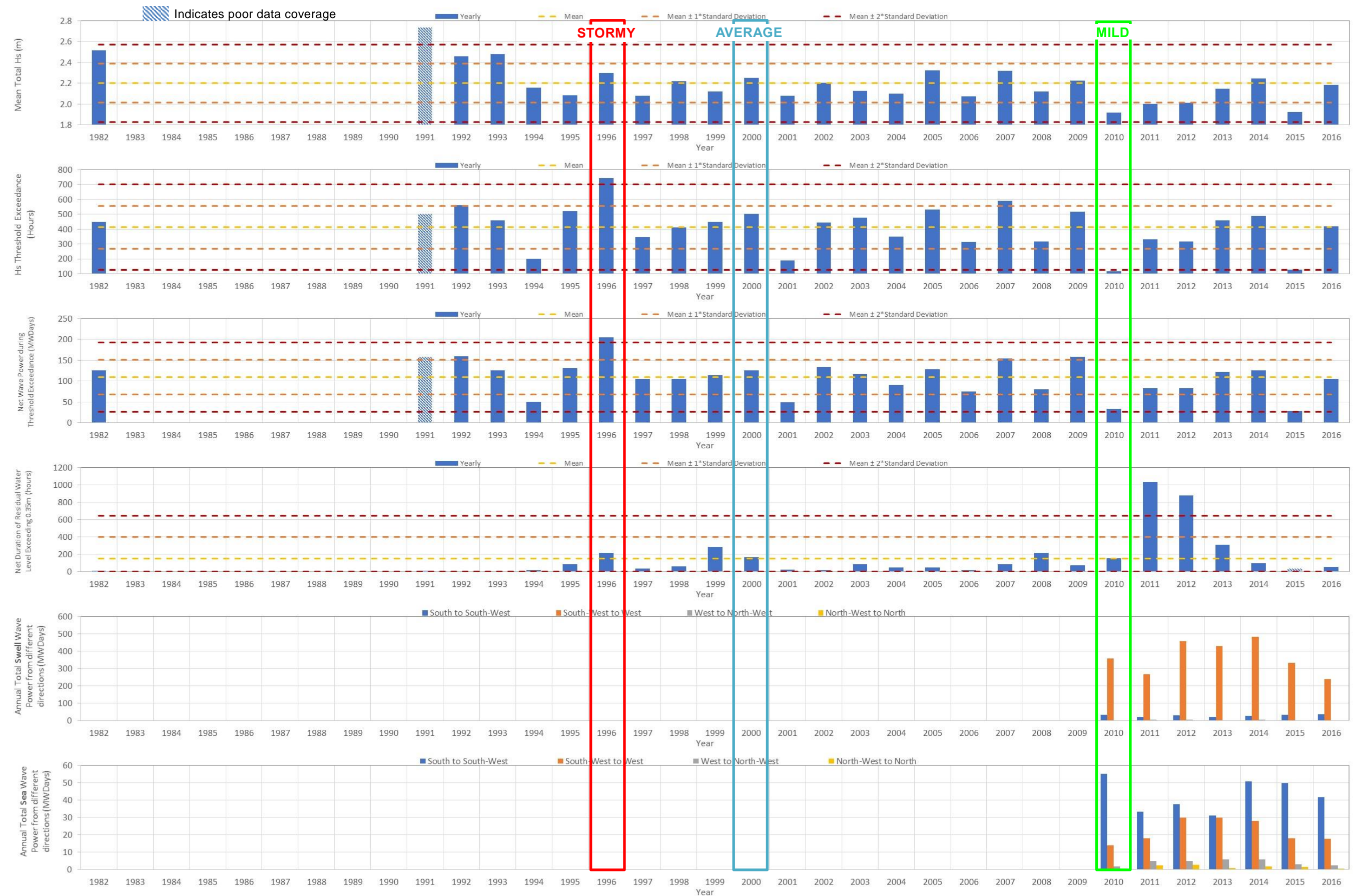


Figure 6.3 Key Wave & Water Level Metrics for Selection of Representative Years in the Wheatbelt (Jurien Bay) Region

6.2.3 Metropolitan/Peel

Annual metrics for the Metropolitan/Peel region are presented in Figure 6.4. The data shows that there is a reasonable level of inter-annual variability within the region, particularly with respect to the duration of storm wave threshold exceedance and the associated net power during periods of exceedance.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 2010.
- Average year – 2000.
- Stormy year – 1996.

These years are the same as those selected for the Wheatbelt (Jurien Bay) region, which is not overly surprising given the relatively small distance between the two locations from a meteorological perspective. Also as with the Wheatbelt (Jurien Bay) region, the selected years also show a level of consistency with the result of the key wave event identification presented in Figure 6.1.

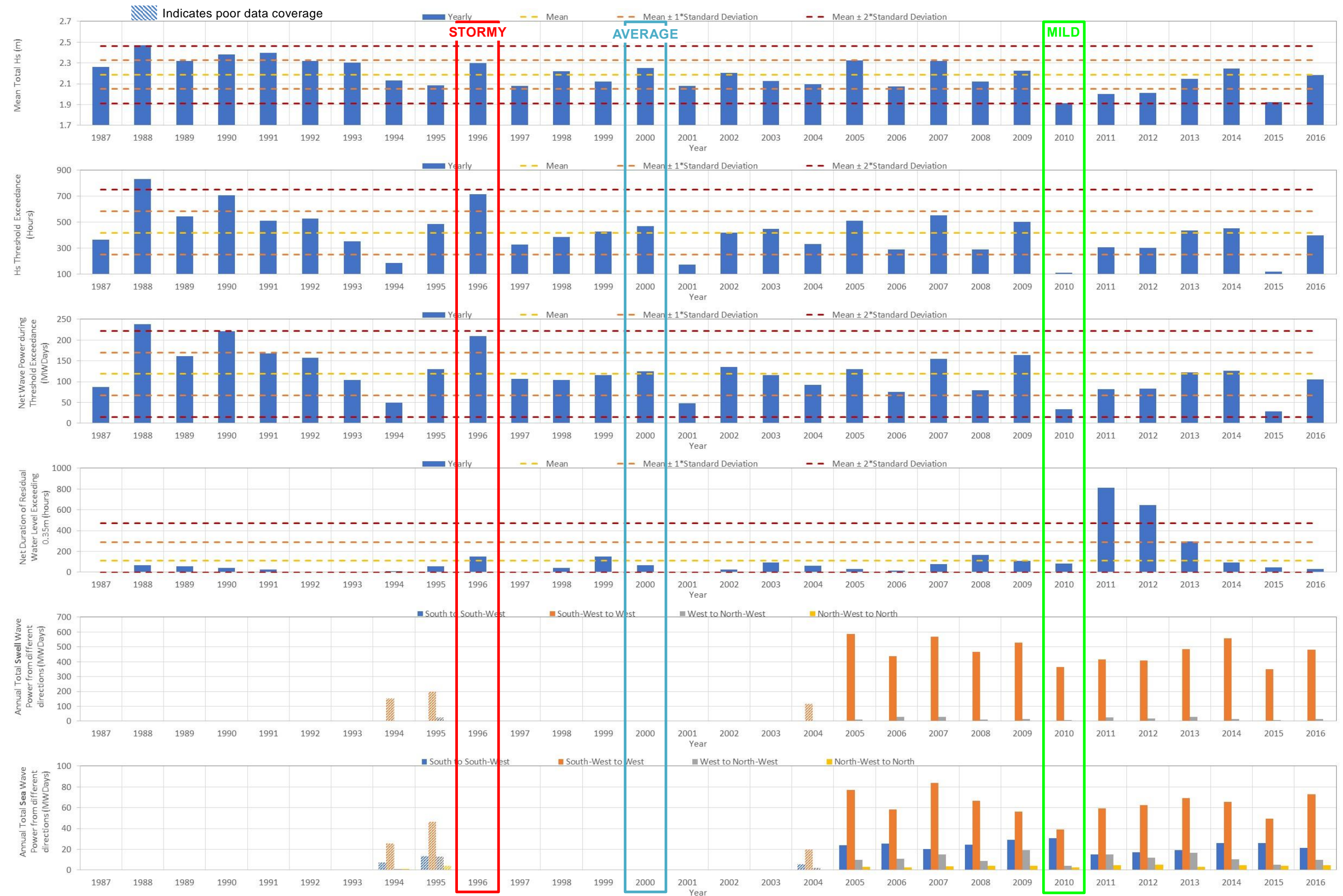


Figure 6.4 Key Wave & Water Level Metrics for Selection of Representative Years in the Metropolitan/Peel Region

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6.2.4 South West (Cape Naturaliste)

Annual metrics for the South West (Cape Naturaliste) region are presented in Figure 6.5. The data shows that there is a reasonable level of inter-annual variability within the region, particularly with respect to the duration of storm wave threshold exceedance and the associated net power during periods of exceedance.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 2010.
- Average year – 2000.
- Stormy year – 1996.

The selected years are also consistent with those selected for the Wheatbelt (Jurien Bay) and Metropolitan/Peel regions.

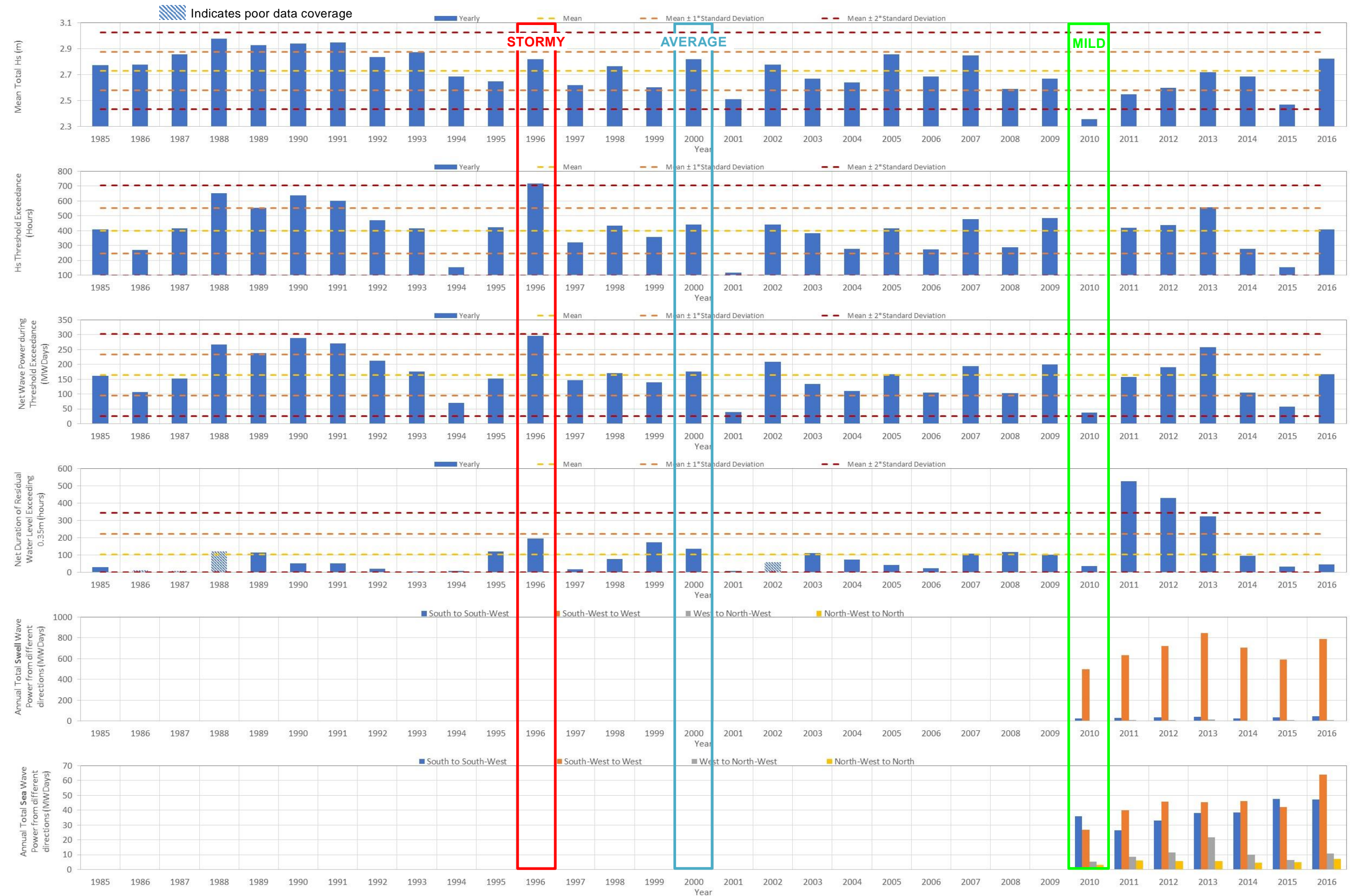


Figure 6.5 Key Wave & Water Level Metrics for Selection of Representative Years in the South West (Cape Naturaliste) Region

6.2.5 South Coast (Albany)

Annual metrics for the South Coast (Albany) region are presented in Figure 6.6. The data shows that a reasonable level of inter-annual variability within the region, however overall there is apparently less variability than was observed in the regions along the west coast.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 2010.
- Average year – 2000.
- Stormy year – 1989.

The mild and average years are consistent with those selected from the Wheatbelt (Jurien Bay), Metropolitan/Peel and South West (Cape Naturaliste) regions, however the stormy year has been selected as 1989 given the higher relative wave energy in this period compared to 1996.

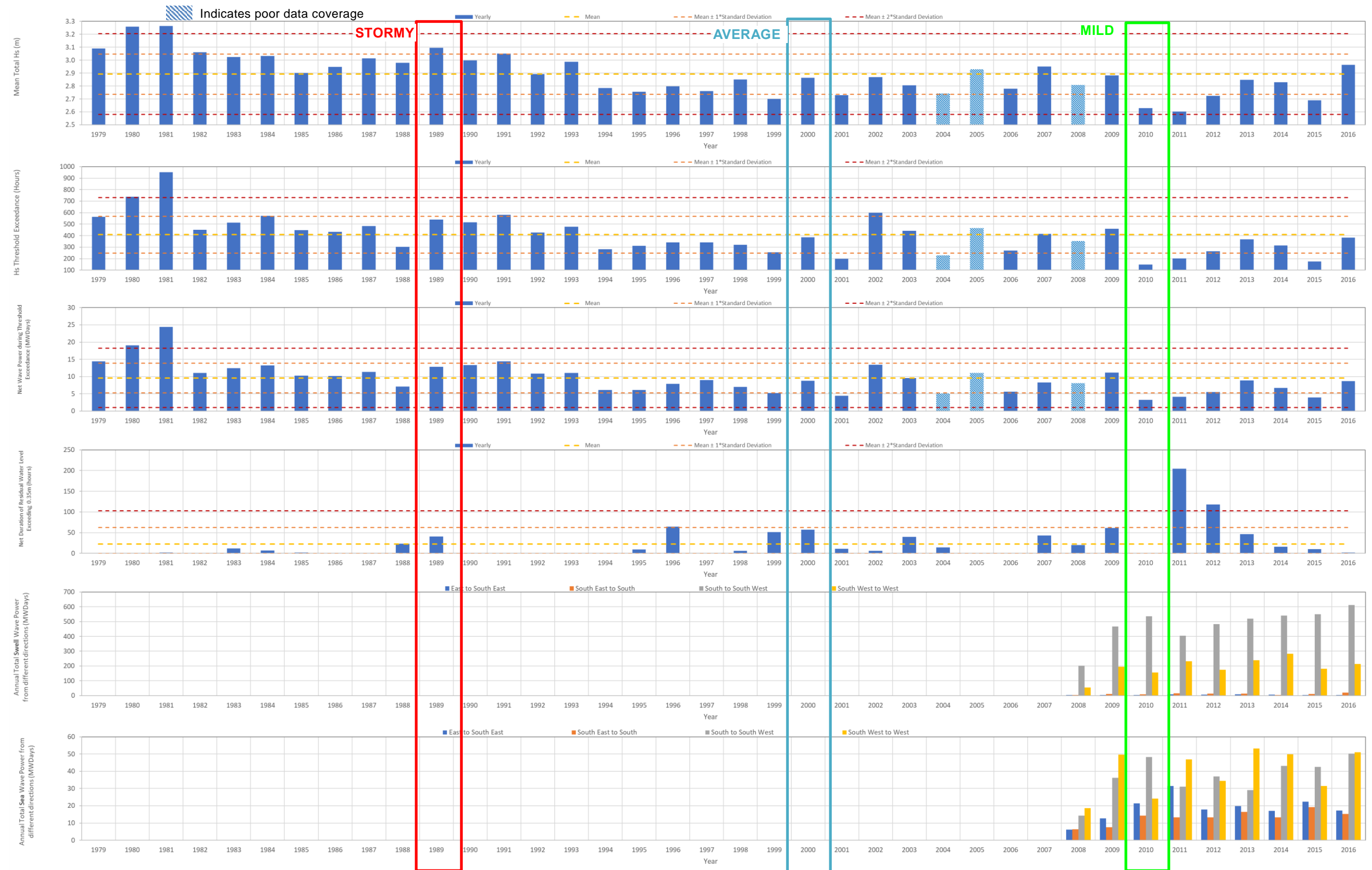


Figure 6.6 Key Wave & Water Level Metrics for Selection of Representative Years in the South Coastal (Albany) Region

6.2.6 Hopetoun & Bremer Bay

Annual metrics for the Hopetoun and Bremer Bay region are presented in Figure 6.7. The period of available data for this region was relatively short (1998 to 2009), consequently, whilst it was possible to identify representative years for this region, the accuracy of the identified years may not be particularly robust over the longer term. Consideration may therefore need to be given to using results from adjacent regions. Nevertheless, based on review of this data, the following years have been selected as the representative years.

- Mild year – 2004.
- Average year – 2007.
- Stormy year – 2009.

Wave data utilised for this region was calibrated WWIII hindcast data. As noted previously, locally wind generated sea waves and their directions were not well represented within this data due to the limitations of the WWIII hindcast.



Figure 6.7 Key Wave & Water Level Metrics for Selection of Representative Years in the Hopetoun & Bremer Bay Region

6.2.7 Great Southern (Esperance)

Annual metrics for the Great Southern (Esperance) region are presented in Figure 6.8. The data shows that there is a reasonable level of inter-annual variability, however this level of variability is apparently less than on the west coast.

Based on review of this data, the following years have been selected as the representative years.

- Mild year – 2004.
- Average year – 2005.
- Stormy year – 1989.

Once again, there are similarities between the years selected and those from other regions. For instance, the stormy year (1989) is the same year that was chosen for Albany. Additionally, the average year (2005) was the same as that chosen for the Geraldton region, despite the regions being the most geographically remote.

Wave data utilised for this region was calibrated WWIII hindcast data. As noted previously, locally wind generated sea waves and their directions were not well represented within this data due to the limitations of the WWIII hindcast.



Figure 6.8 Key Wave & Water Level Metrics for Selection of Representative Years in the Great Southern (Esperance) Region

6.3 Discussion of Results

The assessment of representative years has shown a level of congruence between each of the regions (refer Table 6.2). This result is not surprising given the spatial scale of the separation between adjacent regions is generally less than the scale of the meteorological events that drive the local storm conditions. Whilst not influencing the overall process for selection, this outcome is considered to be informative from the point of view of application of the outcomes to modelling studies.

Table 6.2 Summary of Representative Years for all Regions

Region	Mild Year	Average Year	Stormy Year
Mid-West (Geraldton)	1994	2005	1988
Wheatbelt (Jurien Bay)	2010	2000	1996
Metropolitan/Peel			
South West (Cape Naturaliste)			
South Coast (Albany)			1989
Hopetoun & Bremer Bay	2004	2007	2009
Great Southern (Esperance)		2005	1989

It is also worth noting that the potential for shoreline change is not necessarily reduced during mild years, as an absence of storm conditions can alter the balance of sediment transport along the coast. The distribution of near-shore wave directions also needs to be considered in detail for site specific investigations.

7. Extreme Wave & Water Level Analysis

7.1 Assessment Methodology

Work completed within the previous sections has been focused on the occurrence of long duration events that are expected to contribute significantly to beach erosion and coastal change. Design storm sequences developed in Section 5 are intended to represent ARI erosion events. Hence, the 100 year design storm sequence cannot be used to evaluate the 100 year overtopping level of a seawall, for example, as this is dictated by much shorter duration events.

Within this section an extreme analysis has been completed to determine the instantaneous peak steady water level and significant wave heights for various ARI's. Whilst such information is interesting when reviewing the potential for coastal change, it is most useful for structural design purposes or similar where instantaneous waves and/or water levels can have a significant impact on the item being considered.

Extreme analysis needs to be completed on random and independent events. As a result, it is important that an adequate separation is achieved between measurements that are included within an analysis so that one large event does not dominate the assessment. To ensure that the events are adequately discretised, a 36 hour separation either side of the peak event has been imposed. This is shown diagrammatically in Figure 7.1.

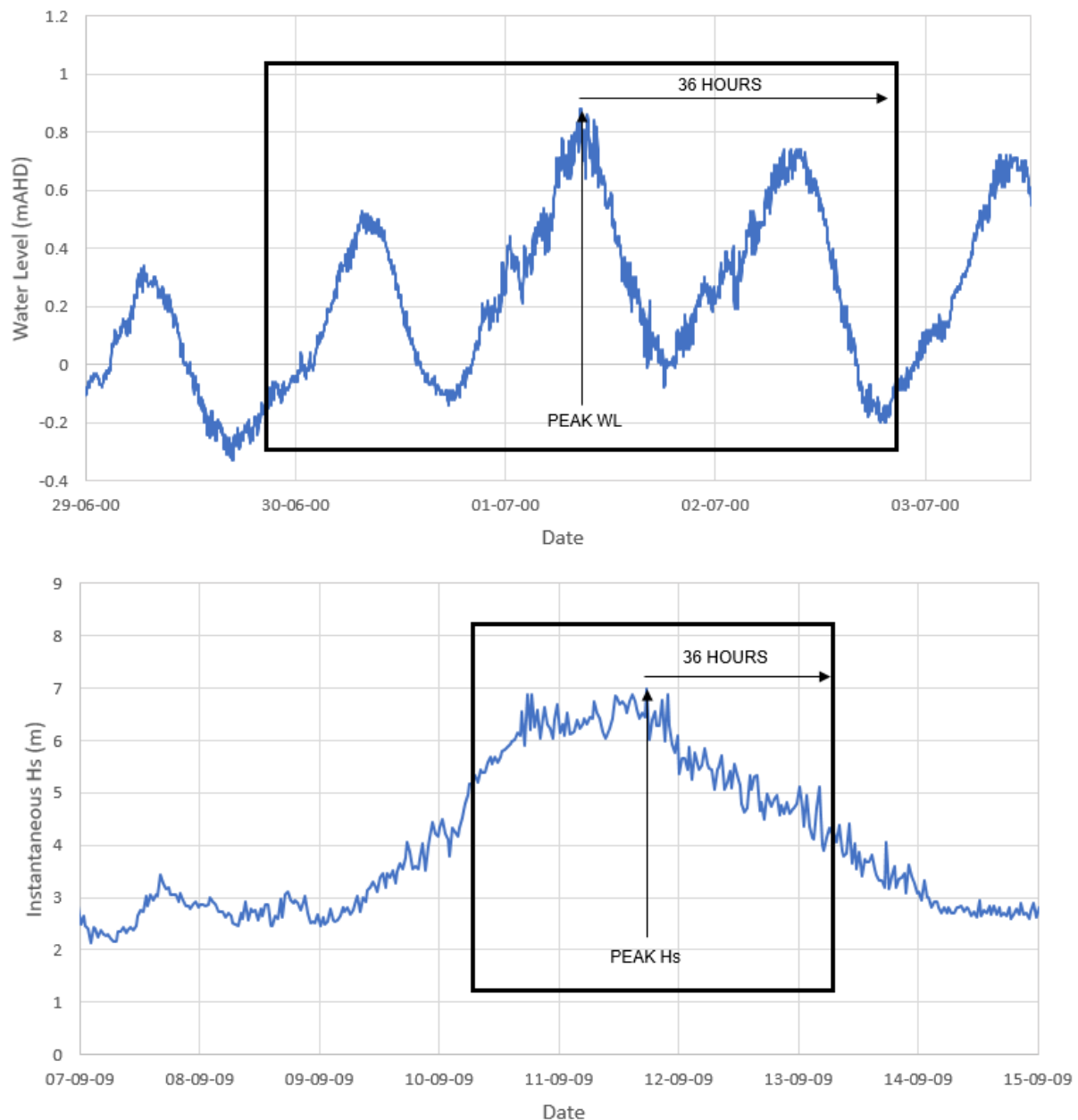


Figure 7.1 Instantaneous Event Separation

Whilst the overall assessment methodology is the same, the assessment of water levels is slightly complicated by the fact that sea level rise has contributed to an apparent increase in peak water level events over the past decades. There are many factors that contribute to extreme water levels, including tide, ENSO effects, storm surge, etc, however it is the joint probability of these factors that generate the extreme water level. The presence of a rising sea level is not related to the joint probability of the water level effects and therefore should be removed from the record prior to analysis. Without de-trending the data set to remove this feature, water level events from the past decade or so will dominate the record.

Water level records have therefore been de-trended to remove water level change as a result of sea level rise, prior to completing the extreme analysis. The de-trending was applied using a linear sea level rise trend consistent across all regions. The trend was determined based on

results from a literature review of studies that sought to quantify the extent of sea level rise globally as well as within WA. A summary of sea level rise estimates presented in recent literature is shown in Table 7.1.

Table 7.1 Summary of Sea Level Rise Rates in Recent Literature

Period	Region	Sea Level Rise	Reference
1900 - 2011	Australia	1.4 ± 0.5 mm/year	IPCC AR5 (2014)
1900 - 2009	Global	1.7 ± 0.2 mm/year	Church & White (2011)
1993 – 2009	Global	3.2 ± 0.2 mm/year	Church & White (2011)
1870 – 2004	Global	1.44 mm/year	Church et al. (2006)
1993-2018	Global	3.31 mm/year	Aviso (2018)
1993-2017	Indian Sea	3.47 mm/year	Aviso (2018)
1966 - 2009	Australia	2.1 mm/year	White et al (2014)
1967 - 2008	Fremantle	1.71 ± 0.68 mm/year	Haigh et al (2011)

Based on review of the relevant documentation, the results from White et al (2014) were applied for this study. Recorded water levels were subsequently corrected using a linear correction across each of the datasets.

In addition to the above, abnormal features that are not the result of metocean variability have been removed from the water level records. This includes occurrences such as the 2004 Boxing Day Tsunami. Cyclone events have also been removed as these require a different modelling process to ensure that meaningful results are achieved. Consideration of cyclone events was not part of this scope of work.

Wave datasets for the extreme analysis were extended using WWIII. This provides a minimum of 31 years wave data for locations where no wave measurements are available and 39 years where measurements are available. These extended data periods allow reasonable estimates of the larger ARI events.

Whilst the overall duration of the measurement period is reasonably long, there is some variability in sampling frequency over this period. Sampling frequency is particularly important when considering instantaneous measurements, as a long interval between samples increases the likelihood that the peak values would not have been captured within the record.

Sampling intervals range from 30 minutes to 3 hours within the extended wave data and from 2 minutes to 40 minutes within the water level data sets. To quantify the potential bias introduced by these different sampling intervals a comparison was conducted for each region and for each sampling frequency. The purpose of this assessment was to identify relevant factors for periods of the data with different sampling frequencies. The factors were then used to correct any biases introduced by different sampling frequencies. In all cases the factors were determined based on

the typical sampling frequencies for waves and water levels which were 30 minutes and 5 minutes respectively.

Factors were determined by analysing the most recent data at the alternative frequencies. For example, to determine the factor for wave data with a 1 hour sampling interval, the 30 minute data was split into two 1 hourly data sets. The first dataset contained timesteps 0, 1, 2, 3 hours and so on, whilst the second dataset contained timesteps 0.5, 1.5, 2.5, 3.5 hours and so on. The top 100 instantaneous wave events were extracted from the raw (30 minute) data set and each of the split 1 hourly data sets. The top 100 events were then compared to determine a factor for each 1 hourly data set. The average of these was then used as the overall factor to increase 1 hourly wave data to be comparable with 30 minute data. This process was completed for all data with different sampling frequency to the most recent data.

Factors for the WWIII hindcast data were determined by directly comparing the top 100 instantaneous significant wave height events in the periods of overlap. The WWIII hindcast data used was the **calibrated WWIII hindcast data** discussed in Section 2. For locations where only WWIII hindcast data was available, (Geraldton, Bremer/Hopetoun and Esperance), the WWIII hindcast data was increased using the factor from the most comparable site. For Geraldton the factor from Jurien was used and for Bremer/Hopetoun and Esperance the Albany factor was used.

It should be noted that the requirement to factor the previously calibrated WWIII hindcast data for the purposes of this instantaneous analysis arises from the sampling interval of the data. Previous calibration of the WWIII hindcast data was completed to ensure that the WWIII data matched the recordings as best as possible. This is illustrated in Figure 7.2.

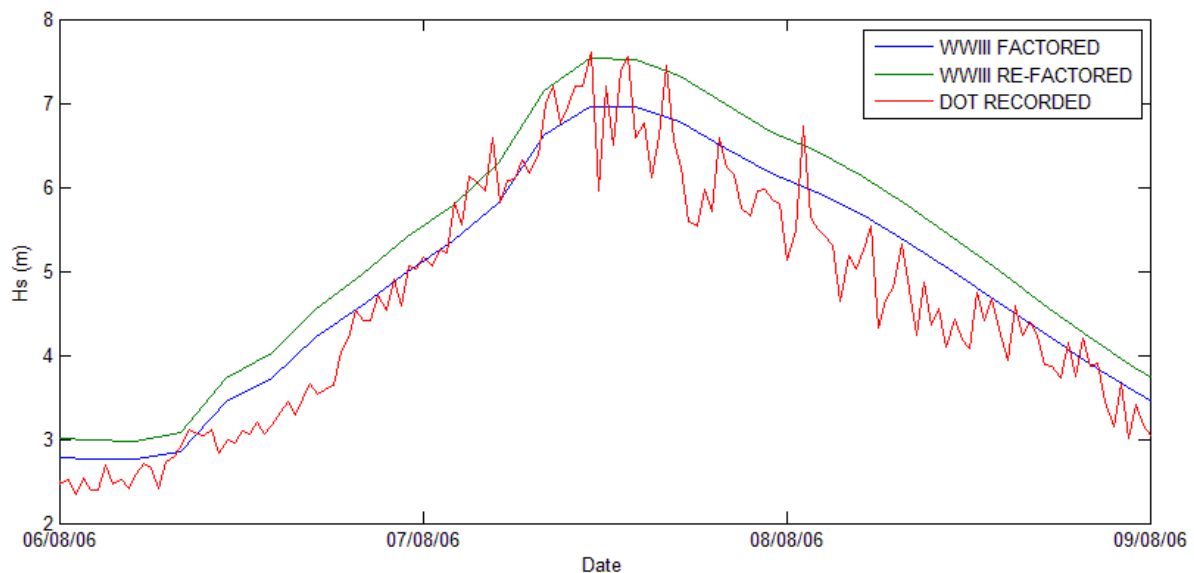


Figure 7.2 WWIII Hindcast Factoring for Instantaneous Event Identification

As shown, the original calibration ensured the WWIII data fit the middle of recorded measurements and therefore provided a good estimate of the overall wave power. However, due to the smoothness of the WWIII data as a result of its 3-hourly data frequency, peak instantaneous wave heights are not accurately represented. Hence, for the purposes of identification of peak values from the WWIII data period, the calibrated WWIII data was factored up to better fit the peaks of measurement data and therefore help to ensure that the severity of instantaneous events

were not underestimated from this dataset. It is noted that this methodology was not applied only to WWII datasets, but rather was applied to all data sets with different sampling frequencies.

The factors determined for each data set, location, sampling frequency and time period are provided in the relevant results sections.

Correction factors were then applied to the relevant data sets, prior to interrogation to extract the top events for extreme analysis.

Limitations of the approach of extreme distribution fitting are acknowledged. For both wave and water level, the length of the data set affects confidence in the estimation of long recurrence interval events. Consequently, estimates of events with ARI longer than 2-3 times the data length should be treated with care. The length of the available datasets for wave and water level are provided in Table 7.2.

Table 7.2 Summary of Data Used for Instantaneous Extreme Analysis

Region	Wave Data Period	Water Level Period
Mid West (Geraldton)	1979-2009, 31 years	1986-2017, 32 years
Wheatbelt (Jurien Bay)	1979-2017, 39 years	1981-1983 & 1991-2017, 30 years
Metropolitan/Peel	1979-2017, 39 years	1950 – 2017, 68 years
South West (Cape Naturaliste)	1979-2017, 39 years	1985-2017, 33 years
South Coast (Albany)	1979-2017, 39 years	1987-2017, 31 years
Hopetoun & Bremer Bay	1979-2009, 31 years	1998-2017, 20 years
Great Southern (Esperance)	1979-2009, 31 years	1987-2017, 31 years

Result of the assessments are presented hereafter.

7.2 Results

7.2.1 Mid West (Geraldton)

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.3 Wave & Water Level Sampling Interval Correction Factors for Mid West (Geraldton) Region

Data	Sampling Interval	Factor
Wave Data	1 hour	1.018
	3 hours	1.050
	3 hours (WWIII)	1.082
Water Level Data	15 minutes	1.020

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.3 and 7.4.

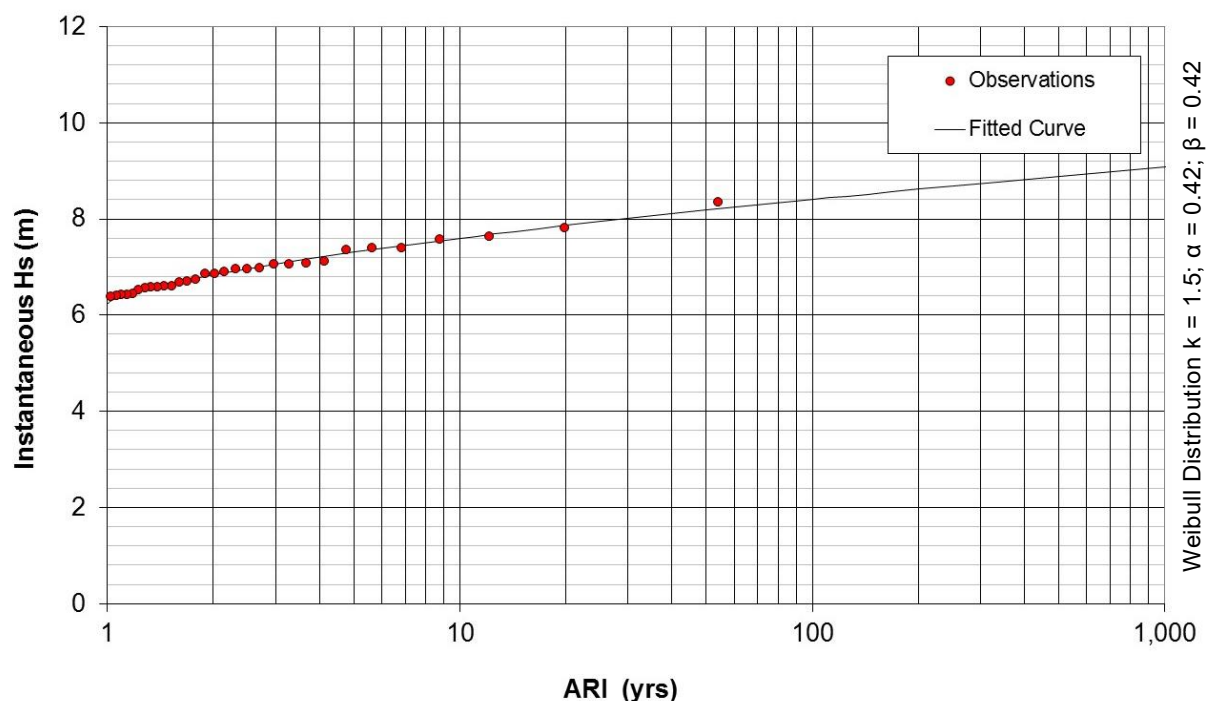


Figure 7.3 Extreme Wave Height Analysis for the Mid West (Geraldton) Region

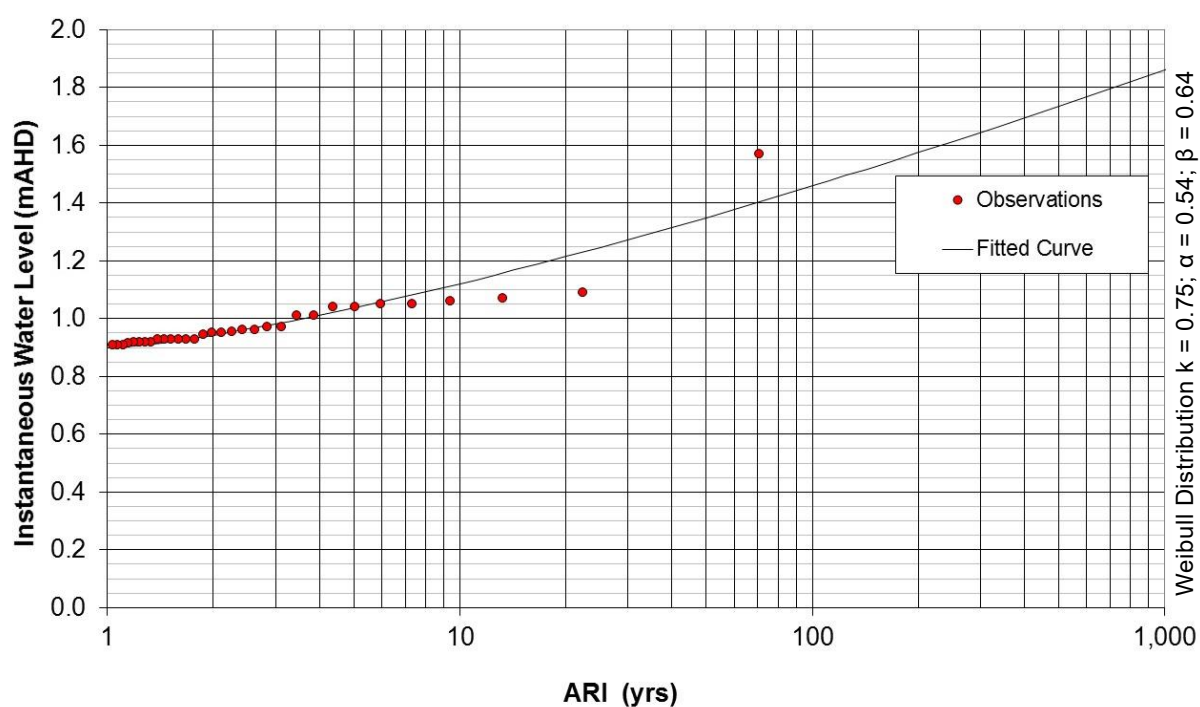


Figure 7.4 Extreme Water Level Analysis for the Mid West (Geraldton) Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.4 Extreme Wave Heights & Water Levels for the Mid West (Geraldton) Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	6.23	0.90
5	7.31	1.04
10	7.60	1.12
25	7.94	1.25
50	8.18	1.35
100	8.40 ³	1.46 ³

Notes: 1. Water level data period 1979-2009, data length 31 years.

2. Wave data period 1986-2017, data length 32 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.2 Wheatbelt (Jurien Bay)

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.5 Wave & Water Level Sampling Interval Correction Factors for Wheatbelt (Jurien Bay) Region

Data	Sampling Interval	Factor
Wave Data	1 hour	1.018
	3 hours	1.050
	3 hours (WWIII)	1.082
Water Level Data	15 minutes	1.017

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.5 and 7.6.

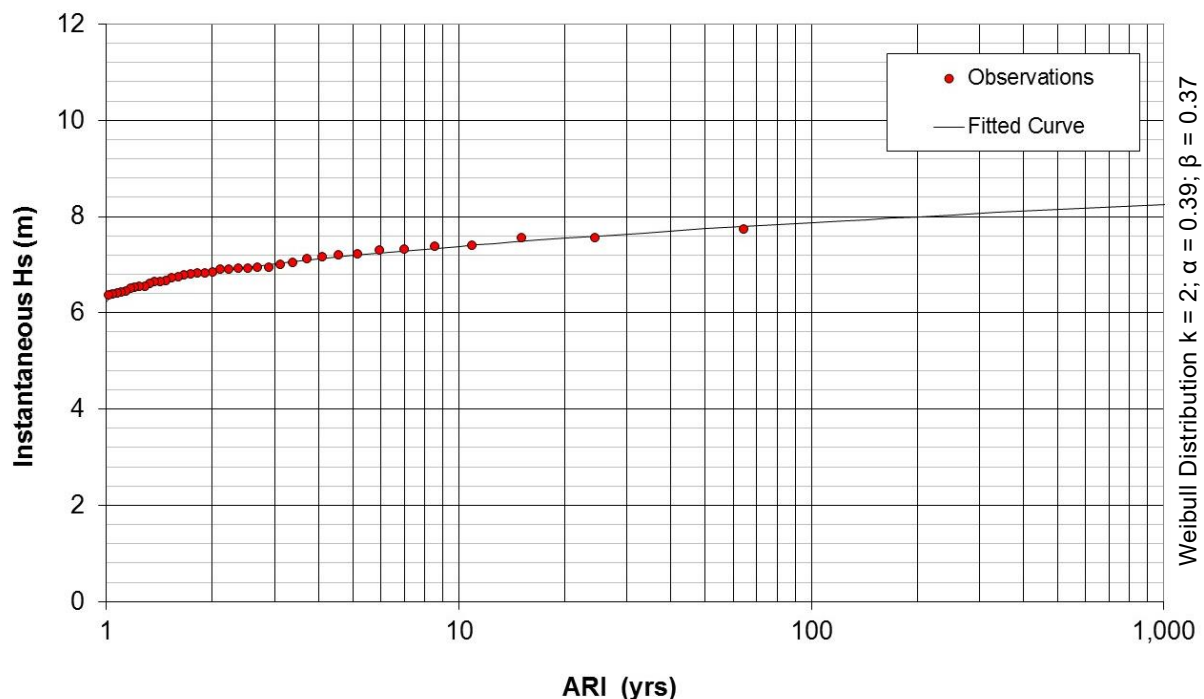


Figure 7.5 Extreme Wave Height Analysis for the Wheatbelt (Jurien Bay) Region

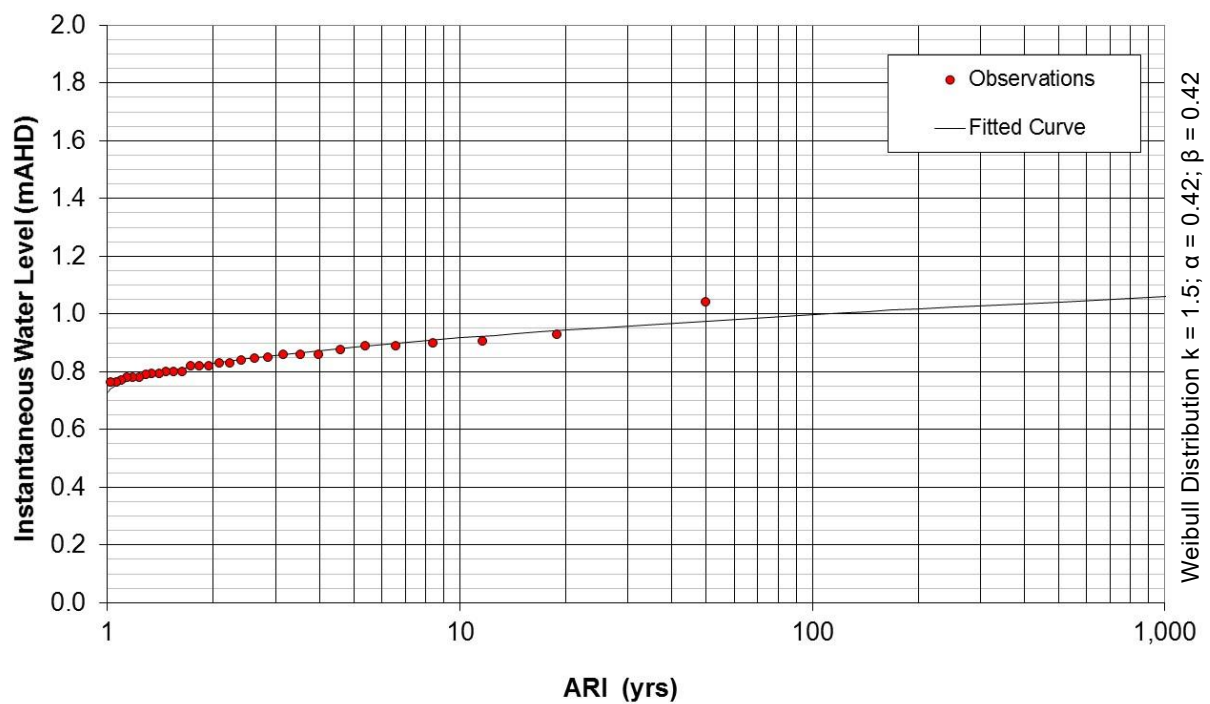


Figure 7.6 Extreme Water Level Analysis for the Wheatbelt (Jurien Bay) Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.6 Extreme Wave Heights & Water Levels for the Wheatbelt (Jurien Bay) Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	6.21	0.72
5	7.19	0.89
10	7.38	0.92
25	7.60	0.96
50	7.74	0.98
100	7.88	0.99 ³

Notes: 1. Water level data period 1979-2017, data length 39 years.

2. Wave data period 1981-1983 & 1991-2017, data length 30 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.3 Metropolitan/Peel Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.7 Wave & Water Level Sampling Interval Correction Factors for Metropolitan/Peel Region

Data	Sampling Interval	Factor
Wave Data	1 hour	1.016
	3 hours (WWIII)	1.081
Water Level Data	2 minutes	0.994
	15 minutes	1.020
	40 minutes	1.049

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.7 and 7.8.

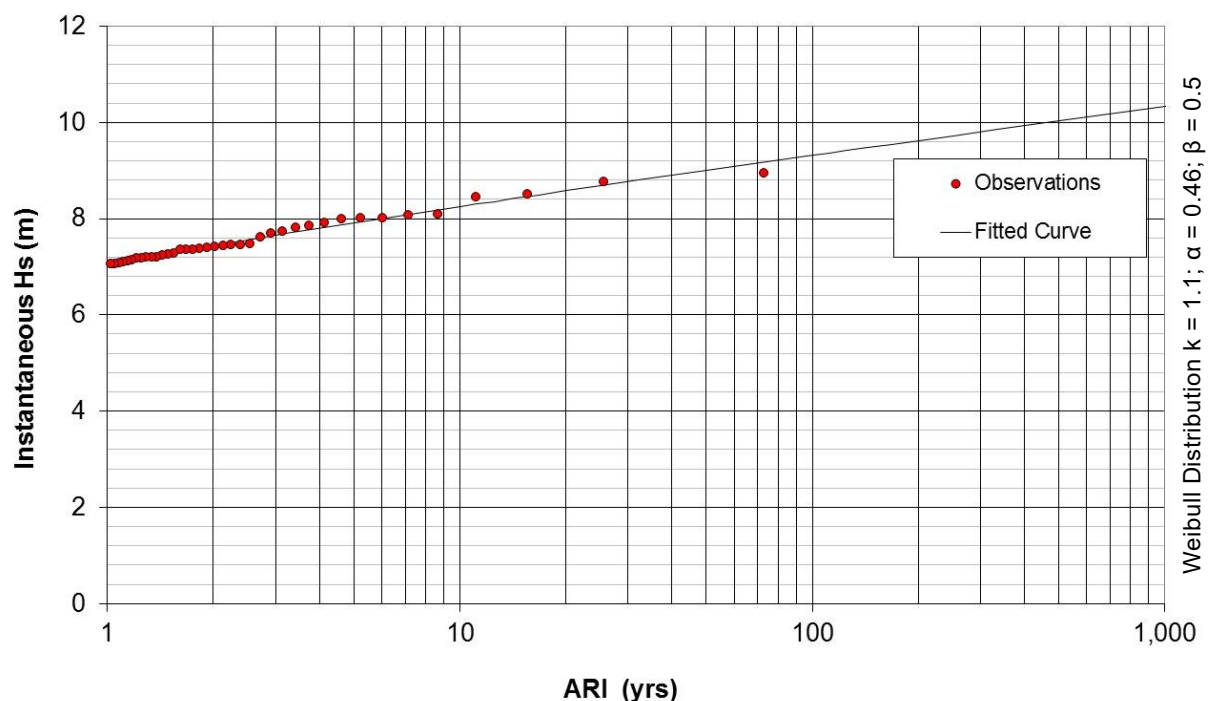


Figure 7.7 Extreme Wave Height Analysis for the Metropolitan/Peel Region

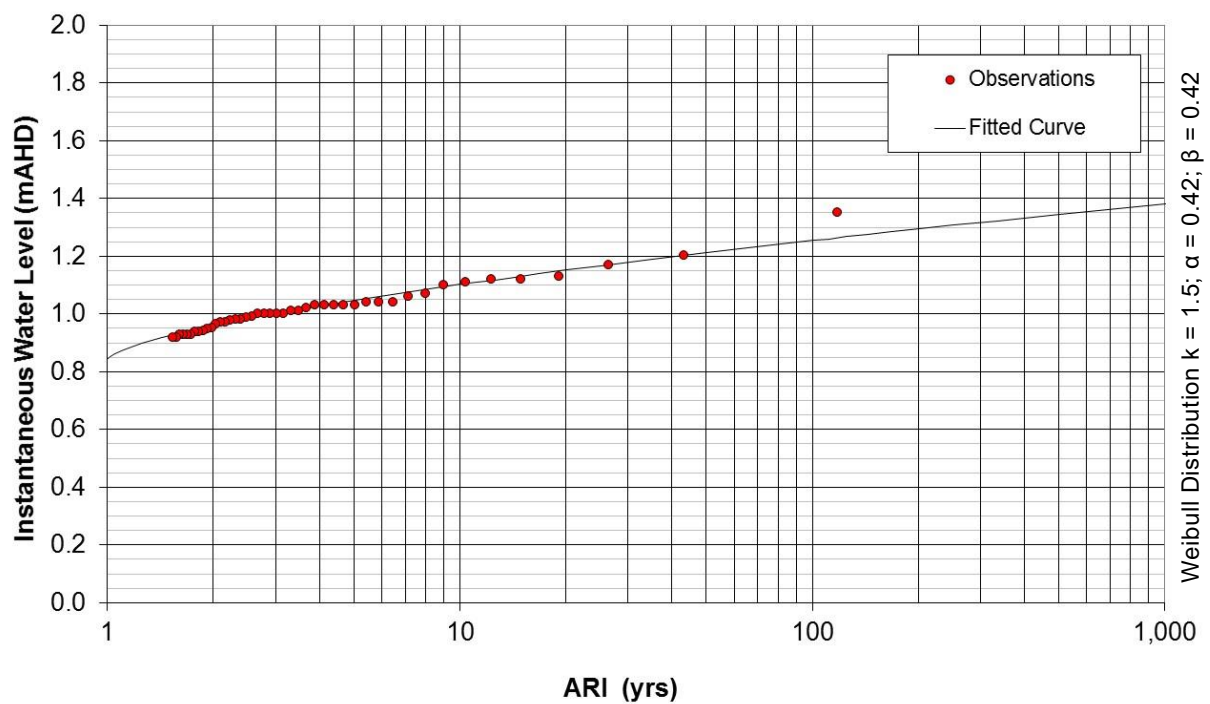


Figure 7.8 Extreme Water Level Analysis for the Metropolitan/Peel Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.8 Extreme Wave Heights & Water Levels for the Metropolitan/ Peel Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	7.05	0.84
5	7.91	1.05
10	8.25	1.10
25	8.68	1.17
50	9.00	1.21
100	9.31	1.25

Notes: 1. Water level data period 1950-2017, data length 68 years.

2. Wave data period 1979-2017, data length 39 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.4 South West (Cape Naturaliste)

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.9 Wave & Water Level Sampling Interval Correction Factors for South West (Cape Naturaliste) Region

Data	Sampling Interval	Factor
Wave Data	1 hour	1.019
	3 hours	1.055
	3 hours (WWIII)	1.055
Water Level Data	15 minutes	1.017
	60 minutes	1.069

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.9 and 7.10.

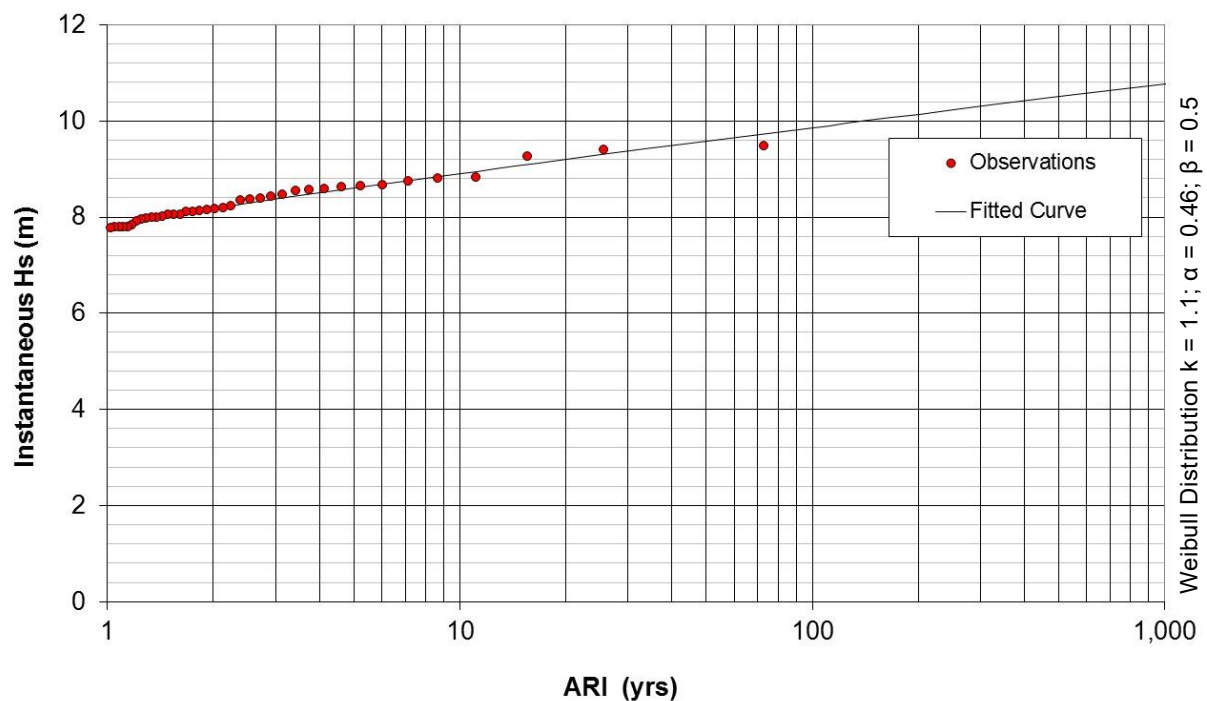


Figure 7.9 Extreme Wave Height Analysis for the South West (Cape Naturaliste) Region

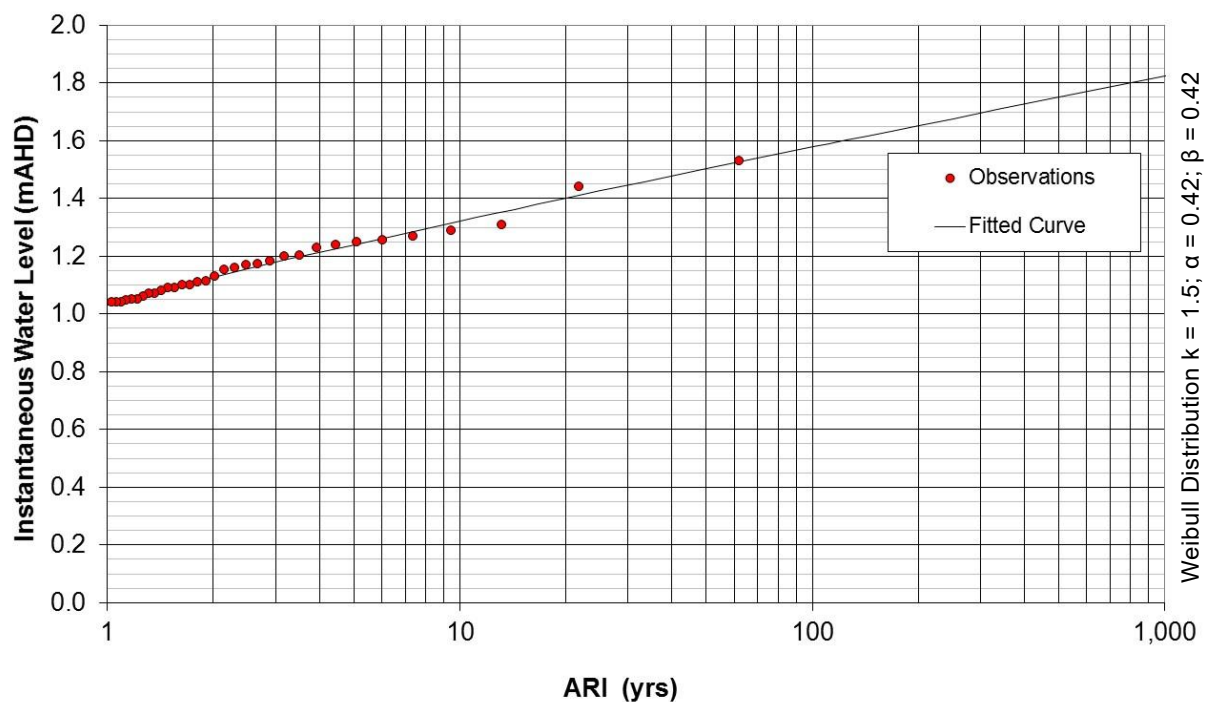


Figure 7.10 Extreme Water Level Analysis for the South West (Cape Naturaliste) Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.10 Extreme Wave Heights & Water Levels for the South West (Cape Naturaliste) Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	7.81	1.03
5	8.60	1.24
10	8.90	1.32
25	9.29	1.43
50	9.58	1.50
100	9.86	1.58 ³

Notes: 1. Water level data period 1985-2017, data length 33 years.

2. Wave data period 1979-2017, data length 39 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.5 South Coast (Albany)

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.11 Wave & Water Level Sampling Interval Correction Factors for South Coast (Albany) Region

Data	Sampling Interval	Factor
Wave Data	1 hour	1.020
	3 hours	1.055
	3 hours (WWIII)	1.053
Water Level Data	15 minutes	1.004
	1 hour	1.021

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.11 and 7.12.

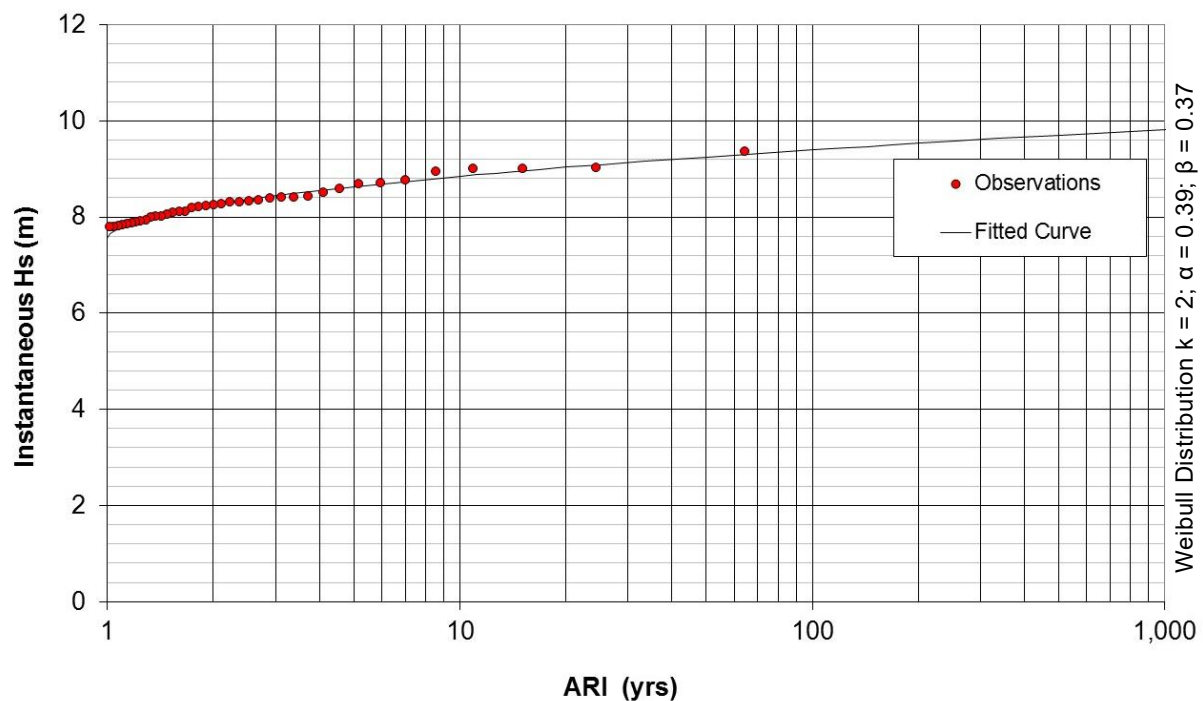


Figure 7.11 Extreme Wave Height Analysis for the South Coast (Albany) Region

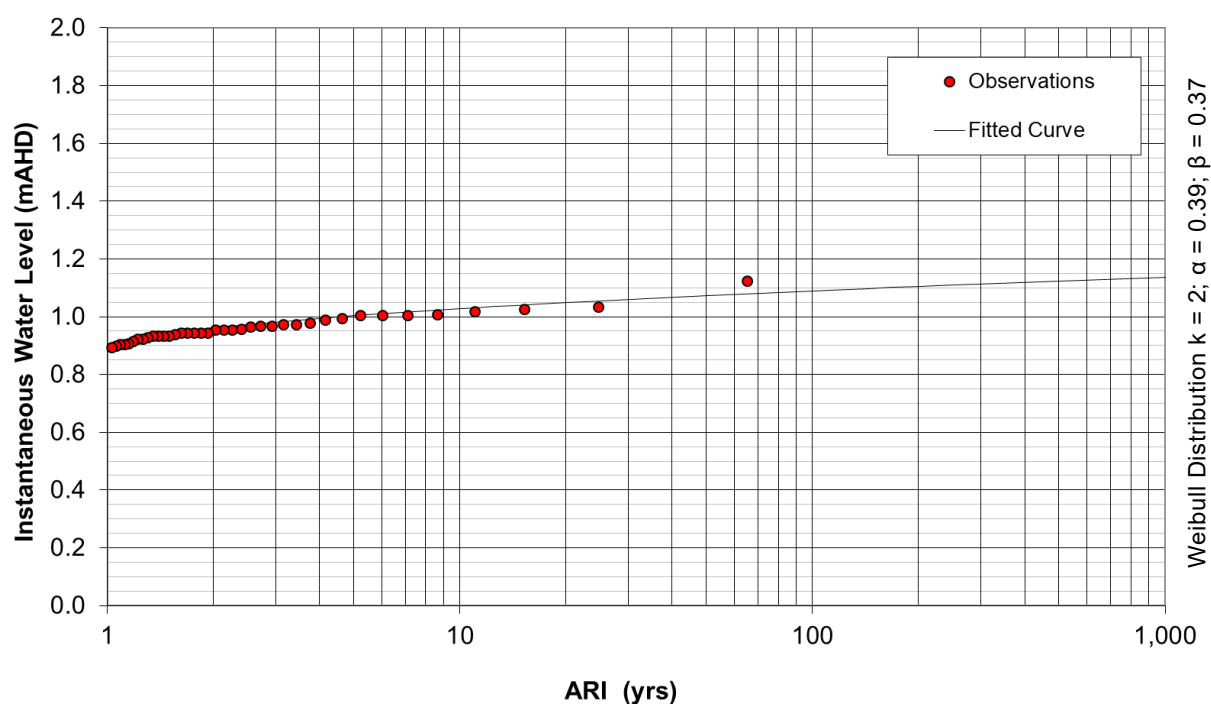


Figure 7.12 Extreme Water Level Analysis for the South Coast (Albany) Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.12 Extreme Wave Heights & Water Levels for the South Coast (Albany) Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	7.54	0.88
5	8.63	1.00
10	8.85	1.03
25	9.09	1.05
50	9.25	1.07
100	9.40	1.09

Notes: 1. Water level data period 1979-2017, data length 39 years.
 2. Wave data period 1979-2017, data length 39 years.
 3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.6 Hopetoun & Bremer Bay

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.13 Wave & Water Level Sampling Interval Correction Factors for Hopetoun & Bremer Bay Region

Data	Sampling Interval	Factor
Wave Data	3 hours (WWIII)	1.053
Water Level Data	15 minutes	1.020

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.13 and 7.14.

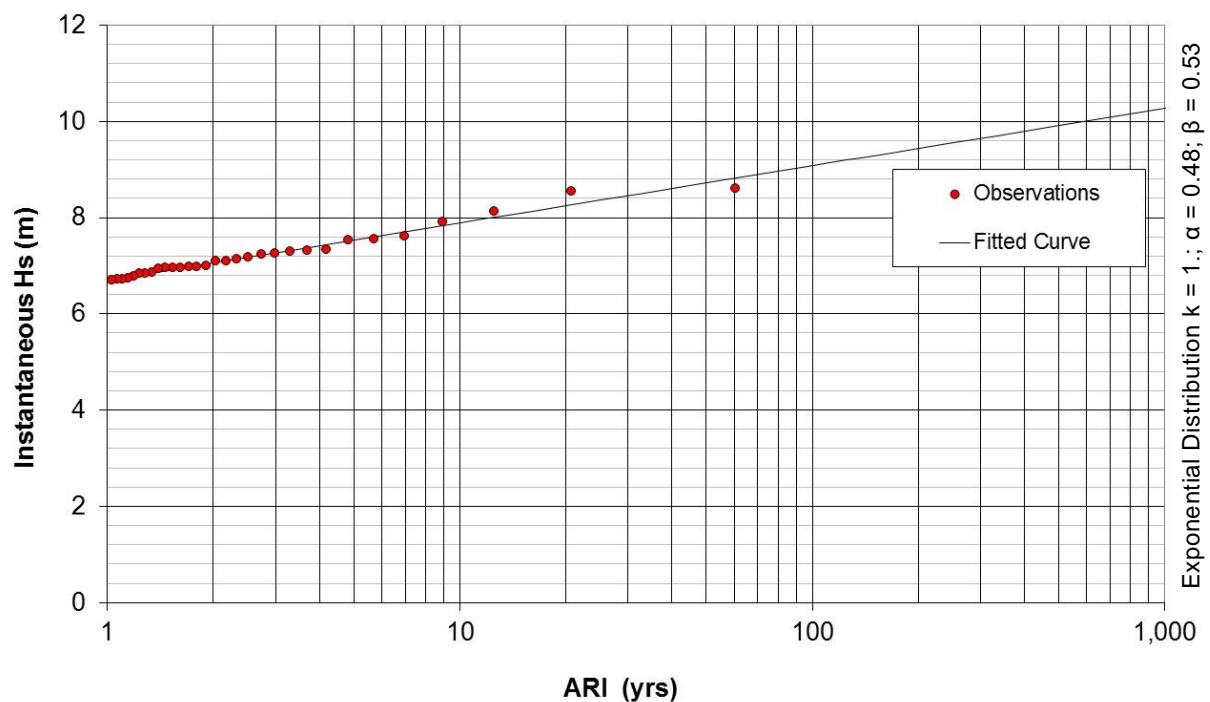


Figure 7.13 Extreme Wave Height Analysis for the Hopetoun & Bremer Bay Region

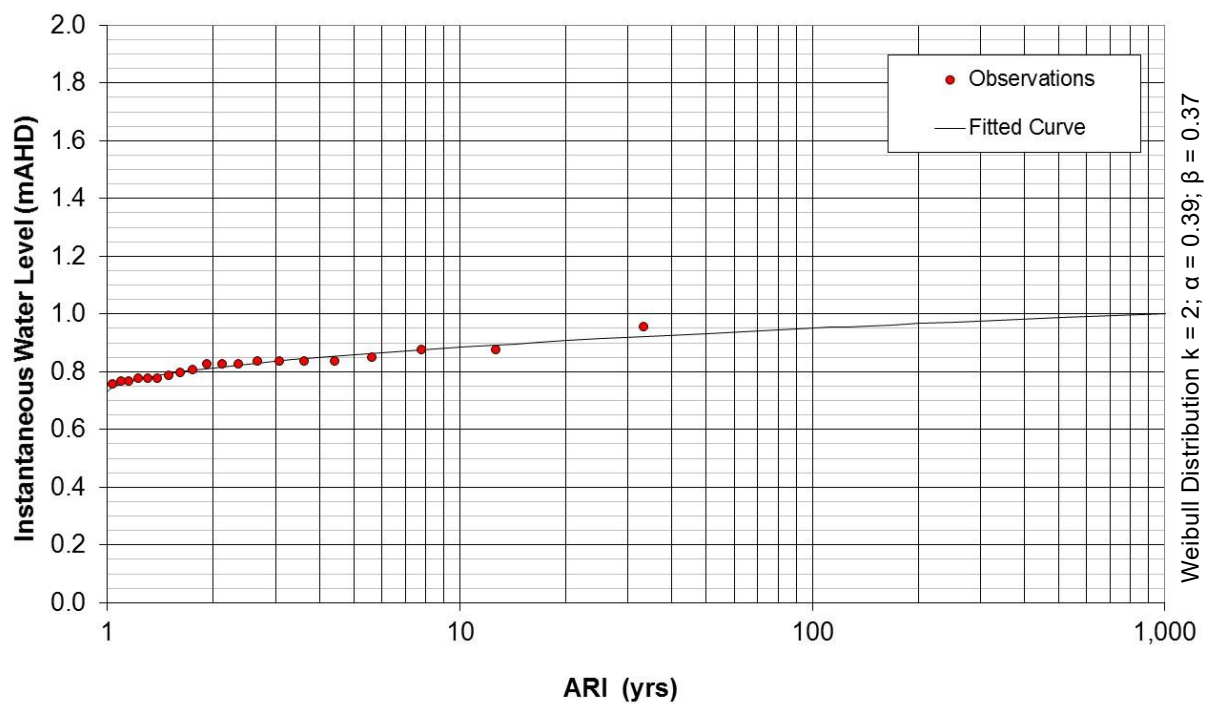


Figure 7.14 Extreme Water Level Analysis for the Hopetoun & Bremer Bay Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.14 Extreme Wave Heights & Water Levels for the Hopetoun & Bremer Bay Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	6.7	0.73
5	7.53	0.86
10	7.89	0.89
25	8.37	0.91
50	8.72	0.93
100	9.08 ³	0.95 ³

Notes: 1. Water level data period 1998-2017, data length 20 years.

2. Wave data period 1979-2009, data length 31 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

7.2.7 Great Southern (Esperance)

Sampling Frequency Assessment

The following table presents the factors calculated for each sampling frequency using the method introduced in Section 7.1. Separate factors were calculated for wave and water level data.

Table 7.15 Wave & Water Level Sampling Interval Correction Factors for Great Southern (Esperance) Region

Data	Sampling Interval	Factor
Wave Data	3 hours (WWIII)	1.053
Water Level Data	15 minutes	1.020

Extreme Analysis

The top 100 instantaneous peak steady water level and significant wave heights were extracted from the datasets that had been corrected to account for sampling intervals. Results from extreme analysis of both data sets are provided in Figures 7.15 and 7.16.

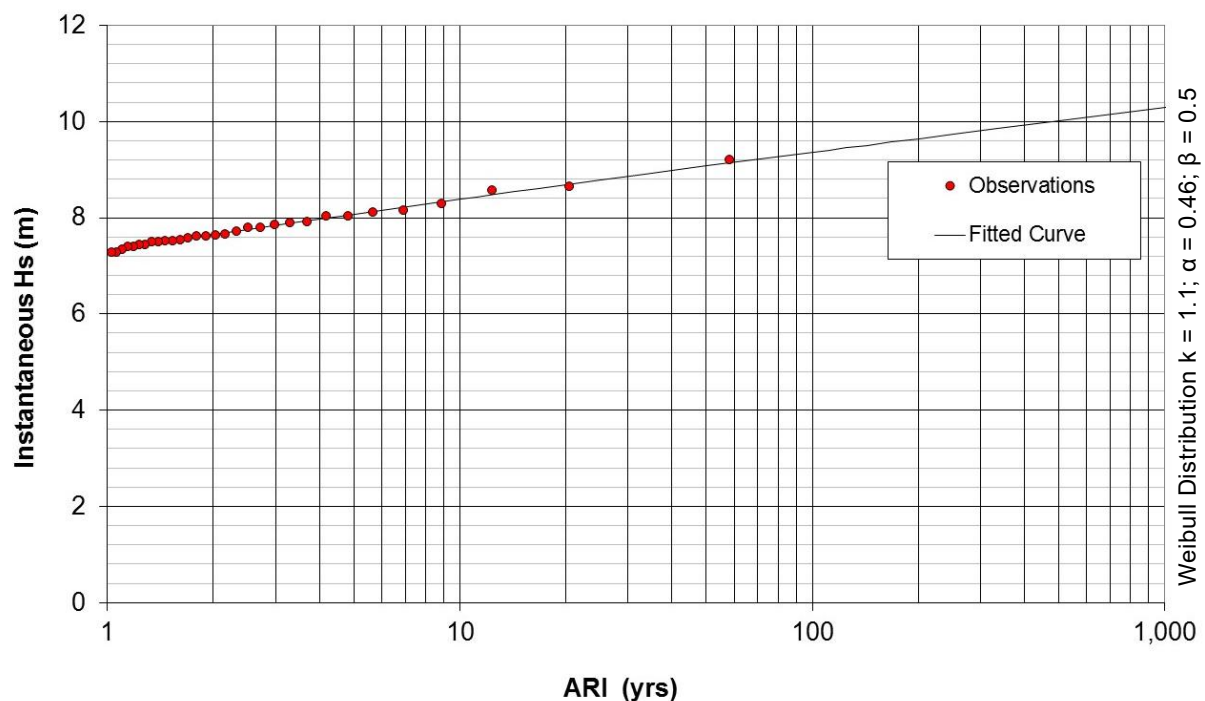


Figure 7.15 Extreme Wave Height Analysis for the Great Southern (Esperance) Region

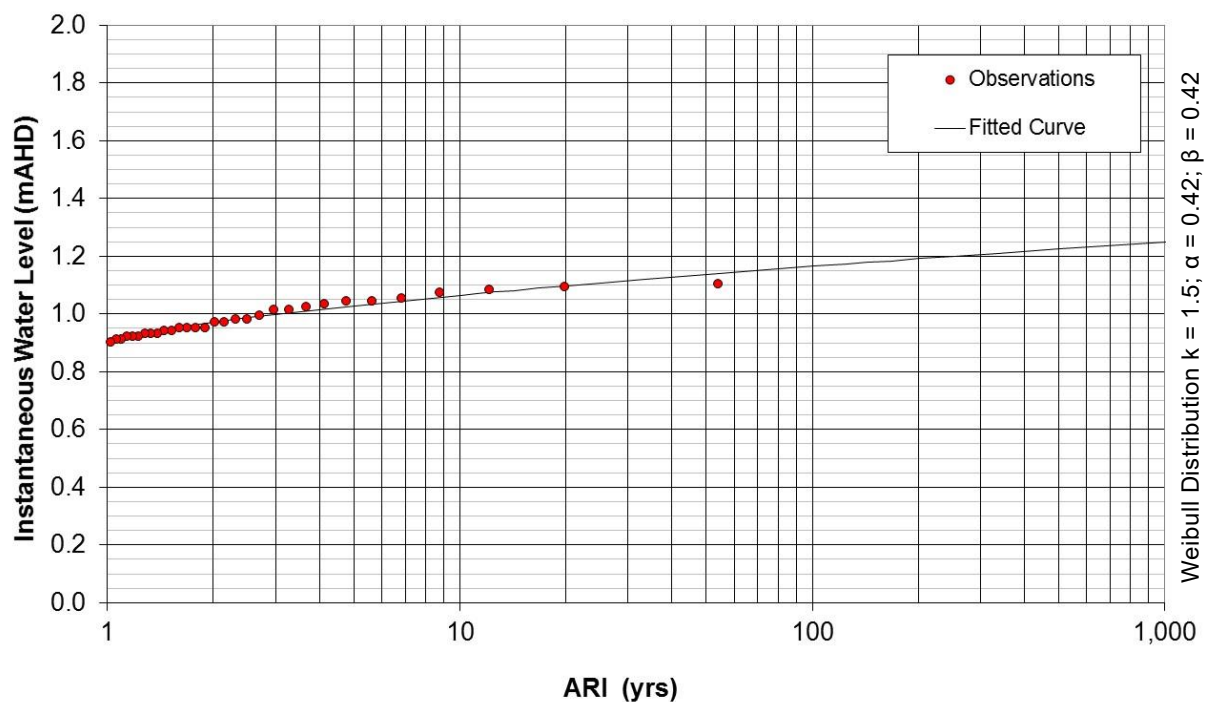


Figure 7.16 Extreme Water Level Analysis for the Great Southern (Esperance) Region

The following table presents the peak instantaneous significant wave heights and steady water levels for various ARI's.

Table 7.16 Extreme Wave Heights & Water Levels for the Great Southern (Esperance) Region

Average Recurrence Interval (years)	Peak Significant Wave Height (m)	Peak Steady Water Level (mAHD)
1	7.28	0.89
5	8.08	1.03
10	8.39	1.06
25	8.78	1.11
50	9.07	1.14
100	9.36 ³	1.16 ³

Notes: 1. Water level data period 1987-2017, data length 31 years.

2. Wave data period 1979-2009, data length 31 years.

3. Estimates of events with ARI longer than 2-3 times the data length should be treated with care.

8. Key Recommendations & Limitations of Assessment

There are a number of limitations inherent in an assessment such as that outlined within this report. The following section outlines some key recommendations which will aid in addressing these in future works.

The validity of any assessment is heavily influenced by the duration and resolution of available data. This includes both metocean information, as well as information regarding beach erosion and recovery. Ideally, long and continuous datasets would be available for such assessments, with a high spatial coverage across all regions. Although a relatively large amount of data is available within the overall study area compared to the remainder of the State, the extent of this data should be widened to assist in further works. For effective management of the south coast, there is a greater case for improved offshore wave data, given that Albany provides the only regionally 'representative' observations. This could involve introduction of a new wave buoy offshore of Bremer/Hopetoun. Similarly for the mid west region, wave buoy data offshore from Geraldton would be useful to validate WWIII hindcast data used hereto. Extensive wave analysis in this study confirmed that substantial discrepancies exist between wave buoy measurements and the WWIII hindcast. The WWIII hindcast is not sufficiently accurate to replace wave buoy measurements, even in offshore deep waters.

Furthermore, the complexities of beach response to storm conditions needs to be further investigated to allow a better understanding of the assumptions - such as the clustering method - outlined within this report.

Given the above, there are a number of recommendations summarised below specifying the collection of further data and/or the development of new processes to assist in future assessments. The most significant of these are outlined below.

- Using SBEACH to provide a summary of wave transformation from offshore to inshore, and therefore provide an indication of the erosion potential of different storms, provides a practical approach to determine the relative severities of different events. However, the erosion results (and mechanisms) modelled within SBEACH are unlikely to be entirely realistic in their own right. Future works should involve modelling with a more sophisticated program coupled with a detailed assessment to gain a better understanding of the offshore to inshore wave transformation and the impact this may have of the design storm sequences identified herein.
- The effects of inner shelf morphology upon inshore wave direction, including sheltering and coastal aspect, were not considered in this assessment. The importance of these processes on storm erosion impacts is high for several sections of coast in the southwest. Evaluation of directional effects should be undertaken for individual sites rather than at a regional scale.
- A reasonable relationship was displayed between net cluster power and modelled erosion potential, matching expected outcomes from use of the SBEACH profile model. However, differences in this relationship were observed between profiles. Future works could include analysis of this relationship across different coastal morphologies and may investigate additional parameters, including profile specific characteristics.
- Detailed beach monitoring or measurement data should be collected to enable tracking of beach profile changes on a storm to post storm timeframe to provide better understanding of the rate of beach recovery during periods of elevated conditions. Within this assessment,

the recovery threshold used for clustering was developed through review of available literature and was assessed to ensure that key historical events which anecdotally caused severe beach erosion were captured within the assessment. Detailed monitoring data, is required to improve the relationships developed within this assessment.

- Although the use of the WWII hindcast data allows extension of the analysis period to 1979; limitations exist with its use. Specifically, anomalous events, particularly those of a small meteorological scale, are not well resolved and can be underestimated by the model.
- WWII hindcast from 2010 is yet to be available in the ozgrid which limited validation of the WWII hindcast against wave buoy measurements. For instance, Jurien Bay directional wave measurement only started in Oct 2009, Cape Naturaliste in Feb 2010, and Albany in Sep 2008. Limitations associated with the use of WWII hindcast data could be reduced in future studies by assessing new model and hindcast datasets as they are released. This might include updates to the WWII Hindcast model or similar available datasets.
- The design events selected in this study are for erosion hazard assessment only. The 100-year design events cannot be used to evaluate the 100-year overtopping level of a seawall, for example.
- Directional wave data available at Jurien Bay, Cape Naturaliste, Albany, and Esperance is limited. Once a significant period of directional wave data has been collected (>10 years), an extension to the assessment of representative years to consider longshore transport could be undertaken. The current assessment for these regions is limited to the magnitude of elevated met-ocean conditions for periods prior to collection of directional wave data.
- Observational information included in the report has largely been limited to historical survey, vegetation line plots and aerial imagery. The information reviewed has not identified significant erosion events across entire regions, contradicting what one would intuitively expect if acute cross shore shoreline erosion was having a large impact on coastlines. Rather, the review has identified areas of localised erosion due to antecedent beach conditions or longshore transport impacts. A further review of anecdotal information including newspaper archives could provide useful information for future regional or localised assessments of these processes.
- Application of the design storm methodology for situations where there is an offshore reef requires significant work at a specific site rather than regional scale, as this varies across shorelines. It is not possible to provide inshore design events without significant nearshore data collection or significant numerical modelling effort.

9. Discussion & Conclusions

This study has utilised a large amount of data to identify a range of events, periods and conditions that are relevant when considering the impact of storm events on the coastline of south Western Australia. Whilst a large amount of data was available for this study there are some substantial data gaps that should be filled to improve the validity of future assessments. As outlined within prior sections of this report, this data collection should ideally include monitoring of beaches to help characterise shoreline erosion and response processes for the local region, together with the ongoing collection of wave and water level data.

Results of the study displayed a distinction between the west coast and south coast regions, which is consistent with differences in aspect and exposure to key meteorological events. Within each of the sub-regions, there was a reasonably high degree of similarity between events identified for the different locations.

One of the more significant outcomes from this study is the fact that the observational data currently available suggests that the scale of cross shore storm erosion widely predicted by beach profile erosion models does not match observations. This is a key consideration, as the design events that have been identified within this study are comprised of actual events, or a combination of actual events, which have been observed within each of the regions. The outcomes of modelling using these events should therefore be reasonably consistent with observed outcomes provided the models are reliable, well set up, calibrated and validated. Review of previous modelling completed within the regions suggests that this may not be the case.

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11. Appendices

Appendix A	Comparison of Peak 72 Hour Average Wave Events, WWIII versus Measurements
Appendix B	Top Periods Identified by Moving Average & Wave Threshold Analysis
Appendix C	Time Histories of Key Storms
Appendix D	Top Storm Clusters Ranked by Net Cluster Power - All Directions
Appendix E	Time Histories of Design Storm Sequences– All Directions
Appendix F	Top Storm Clusters Ranked by Net Cluster Power – Abnormal Directions
Appendix G	Time Histories of Top Storm Clusters from Abnormal Directions

Appendix A Comparison of Peak 72 Hour Average Wave Events, WWill versus Measurements

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Jurien
Moving Average Interval	72
Title	Jurien Top 72 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'25-Aug-2004 07:45:00'	5.56	15.46	1.66	-9999.00
2	'07-Sep-2005 06:15:00'	5.35	14.94	1.47	-9999.00
3	'29-Jun-2009 08:15:00'	5.13	13.50	1.26	-9999.00
4	'22-Sep-2003 16:00:00'	4.96	15.19	1.30	-9999.00
5	'11-Sep-2009 20:15:00'	4.93	16.37	1.36	-9999.00
6	'12-Jul-2002 01:30:00'	4.86	13.79	1.18	-9999.00
7	'21-Jul-2009 05:15:00'	4.63	13.79	1.18	-9999.00
8	'22-May-2009 15:15:00'	4.52	12.89	0.93	-9999.00
9	'02-Sep-2002 05:30:00'	4.51	14.80	1.08	-9999.00
10	'03-Jul-2007 01:30:00'	4.51	13.56	0.97	-9999.00
11	'28-Apr-2000 08:45:00'	4.50	14.83	1.08	-9999.00
12	'17-Jul-1999 08:45:00'	4.41	14.91	1.05	-9999.00
13	'14-Aug-2009 12:15:00'	4.39	14.77	1.00	-9999.00
14	'31-Jul-2007 11:30:00'	4.38	15.57	1.03	-9999.00
15	'08-Aug-2006 11:45:00'	4.38	13.69	0.96	-9999.00
16	'18-Jun-1999 06:45:00'	4.25	14.77	0.96	-9999.00
17	'01-Oct-2005 20:45:00'	4.25	15.64	0.99	-9999.00
18	'17-Aug-2005 18:45:00'	4.25	13.59	NaN	-9999.00
19	'27-Jun-2003 03:30:00'	4.25	11.44	0.72	-9999.00
20	'08-Oct-1999 18:30:00'	4.24	13.07	0.90	-9999.00
21	'17-Jul-2000 01:30:00'	4.23	14.96	0.91	-9999.00
22	'10-Jun-1998 07:45:00'	4.22	13.29	0.85	-9999.00
23	'03-Sep-1999 08:45:00'	4.18	13.27	0.83	-9999.00
24	'13-Jan-2005 14:45:00'	4.17	14.88	0.90	-9999.00
25	'11-Jun-2005 05:15:00'	4.15	12.05	0.75	-9999.00
26	'20-Jun-2009 06:15:00'	4.13	13.42	0.81	-9999.00
27	'02-Aug-2003 23:30:00'	4.12	14.61	0.86	-9999.00
28	'02-Sep-1998 22:45:00'	4.06	12.77	0.79	-9999.00
29	'18-Jul-2008 22:30:00'	4.05	13.56	0.81	-9999.00
30	'09-Sep-2003 16:00:00'	4.05	16.12	0.91	-9999.00
31	'22-Sep-1998 04:45:00'	4.04	13.97	0.85	-9999.00
32	'28-Jul-2006 12:45:00'	4.04	16.06	0.94	-9999.00
33	'06-Aug-1998 22:45:00'	4.04	15.07	0.87	-9999.00
34	'05-Jul-2003 21:30:00'	4.01	13.77	0.79	-9999.00
35	'07-Aug-2007 10:30:00'	4.01	15.72	0.88	-9999.00
36	'11-May-2002 19:30:00'	4.01	13.87	0.83	-9999.00
37	'01-Jul-2004 12:45:00'	3.99	14.73	0.81	-9999.00
38	'04-Aug-2006 10:45:00'	3.96	16.60	0.89	-9999.00
39	'18-Sep-2005 16:15:00'	3.96	14.24	0.77	-9999.00
40	'12-Aug-2003 00:30:00'	3.96	13.16	0.76	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 18:00:00'	6.00	16.34	2.02	246.46
2	'25-Aug-2004 06:00:00'	5.90	15.26	1.87	247.89
3	'11-Jul-2002 21:00:00'	5.84	14.78	1.79	243.92
4	'31-Jul-2007 06:00:00'	5.81	15.85	1.85	246.37
5	'29-Jun-2009 03:00:00'	5.73	13.94	1.63	242.10
6	'22-Sep-2003 06:00:00'	5.63	15.13	1.68	246.53
7	'07-Sep-2005 03:00:00'	5.62	14.59	1.63	246.90
8	'06-Aug-1998 21:00:00'	5.60	15.92	1.74	247.72
9	'14-Aug-2009 09:00:00'	5.54	15.12	1.62	247.90
10	'02-Jul-2007 21:00:00'	5.54	13.90	1.53	247.19
11	'17-Jul-2000 15:00:00'	5.51	14.91	1.61	245.46
12	'09-Sep-2003 06:00:00'	5.40	15.79	1.58	244.75
13	'20-Jul-2009 15:00:00'	5.33	13.70	1.51	245.27
14	'02-Sep-2002 12:00:00'	5.32	14.71	1.51	242.28
15	'23-Jul-2007 06:00:00'	5.31	14.32	1.41	250.39
16	'22-May-2009 06:00:00'	5.30	13.47	1.36	244.00
17	'14-Jul-2000 12:00:00'	5.23	14.22	1.38	248.56
18	'25-Jun-2000 03:00:00'	5.21	16.13	1.53	245.44
19	'09-Jun-1998 18:00:00'	5.18	12.99	1.24	249.64
20	'29-Sep-1998 18:00:00'	5.17	15.86	1.50	245.12
21	'17-Jul-2008 21:00:00'	5.16	14.62	1.35	247.70
22	'26-Jun-2003 21:00:00'	5.14	12.50	1.18	258.39
23	'21-Sep-1998 21:00:00'	5.13	14.84	1.42	244.04
24	'29-Jul-2008 21:00:00'	5.10	14.32	1.29	244.77
25	'19-Jun-2009 21:00:00'	5.10	13.76	1.27	243.01
26	'28-Jul-2006 15:00:00'	5.09	15.75	1.50	243.94
27	'17-Sep-2007 15:00:00'	5.07	16.84	1.46	245.42
28	'06-Aug-2007 21:00:00'	5.07	16.00	1.43	250.51
29	'17-Aug-2005 12:00:00'	5.07	14.32	1.34	243.91
30	'27-Apr-2000 18:00:00'	5.04	13.89	1.26	245.11
31	'05-Aug-2002 06:00:00'	5.03	15.87	1.41	244.97
32	'31-Aug-2007 00:00:00'	5.03	15.79	1.38	247.92
33	'17-Jul-1999 06:00:00'	4.99	14.75	1.34	249.15
34	'05-Jun-1998 12:00:00'	4.99	15.59	1.42	245.18
35	'10-Sep-2001 15:00:00'	4.96	16.20	1.45	243.57
36	'11-May-2002 18:00:00'	4.96	14.83	1.35	247.97
37	'04-Aug-2006 03:00:00'	4.96	16.58	1.39	247.65
38	'05-Jul-1998 09:00:00'	4.95	13.76	1.19	243.70
39	'20-Sep-2008 06:00:00'	4.95	15.40	1.35	241.97
40	'26-Jul-2002 12:00:00'	4.95	15.09	1.31	242.68

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 18:00:00'	5.36	16.34	1.65	246.46
2	'25-Aug-2004 06:00:00'	5.24	15.26	1.50	247.89
3	'11-Jul-2002 21:00:00'	5.14	14.78	1.42	243.92
4	'31-Jul-2007 06:00:00'	5.04	15.85	1.40	246.37
5	'29-Jun-2009 03:00:00'	4.92	13.94	1.22	242.10
6	'06-Aug-1998 21:00:00'	4.83	15.92	1.31	247.72
7	'20-Jul-2009 15:00:00'	4.80	13.70	1.29	245.27
8	'07-Sep-2005 03:00:00'	4.75	14.59	1.17	246.90
9	'22-Sep-2003 06:00:00'	4.74	15.13	1.19	246.53
10	'02-Jul-2007 21:00:00'	4.70	13.90	1.12	247.19
11	'17-Jul-2000 15:00:00'	4.65	14.91	1.15	245.46
12	'14-Aug-2009 09:00:00'	4.64	15.12	1.14	247.90
13	'02-Sep-2002 12:00:00'	4.56	14.71	1.12	242.28
14	'09-Sep-2003 06:00:00'	4.49	15.79	1.10	244.75
15	'23-Jul-2007 06:00:00'	4.48	14.32	1.02	250.39
16	'22-May-2009 06:00:00'	4.43	13.47	0.95	244.00
17	'17-Jul-2008 21:00:00'	4.41	14.62	1.00	247.70
18	'28-Jul-2006 15:00:00'	4.40	15.75	1.15	243.94
19	'21-Sep-1998 21:00:00'	4.36	14.84	1.04	244.04
20	'09-Jun-1998 18:00:00'	4.34	12.99	0.88	249.64
21	'29-Sep-1998 18:00:00'	4.34	15.86	1.06	245.12
22	'25-Jun-2000 03:00:00'	4.32	16.13	1.05	245.44
23	'14-Jul-2000 12:00:00'	4.30	14.22	0.94	248.56
24	'26-Jun-2003 21:00:00'	4.27	12.50	0.82	258.39
25	'05-Jun-1998 12:00:00'	4.25	15.59	1.05	245.18
26	'19-Jun-2009 21:00:00'	4.24	13.76	0.89	243.01
27	'10-Sep-2001 15:00:00'	4.22	16.20	1.06	243.57
28	'17-Aug-2005 12:00:00'	4.21	14.32	0.93	243.91
29	'17-Sep-2007 15:00:00'	4.20	16.84	1.00	245.42
30	'29-Jul-2008 21:00:00'	4.20	14.32	0.88	244.77
31	'11-May-2002 18:00:00'	4.20	14.83	0.98	247.97
32	'05-Aug-2002 06:00:00'	4.19	15.87	0.98	244.97
33	'06-Aug-2007 21:00:00'	4.18	16.00	0.97	250.51
34	'01-Jul-2002 09:00:00'	4.16	15.53	0.96	245.64
35	'17-Jul-1999 06:00:00'	4.16	14.75	0.94	249.15
36	'27-Apr-2000 18:00:00'	4.16	13.89	0.86	245.11
37	'08-Aug-2006 06:00:00'	4.16	13.51	0.90	252.19
38	'31-Aug-2007 00:00:00'	4.16	15.79	0.95	247.92
39	'17-Jun-1999 21:00:00'	4.14	13.97	0.88	248.73
40	'20-Sep-2008 06:00:00'	4.13	15.40	0.95	241.97

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Jurien
Moving Average Interval	36
Title	Jurien Top 36 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'25-Aug-2004 13:45:00'	6.02	16.23	1.01	-9999.00
2	'20-Jul-2009 21:15:00'	5.83	14.65	0.90	-9999.00
3	'07-Sep-2005 02:00:00'	5.68	15.46	0.85	-9999.00
4	'29-Jun-2009 13:15:00'	5.62	13.80	0.76	-9999.00
5	'12-Jul-2002 12:30:00'	5.38	14.94	0.76	-9999.00
6	'08-Oct-1999 07:45:00'	5.37	13.15	0.67	-9999.00
7	'11-Sep-2009 06:15:00'	5.29	16.34	0.76	-9999.00
8	'08-Aug-2006 04:45:00'	5.17	13.45	0.64	-9999.00
9	'02-Sep-2002 02:30:00'	5.16	15.49	0.71	-9999.00
10	'22-Sep-2003 05:00:00'	5.15	15.58	0.71	-9999.00
11	'17-Jul-1999 00:45:00'	5.14	14.96	0.69	-9999.00
12	'16-May-2003 15:30:00'	5.08	12.42	0.58	-9999.00
13	'28-Apr-2000 05:45:00'	5.06	15.28	0.68	-9999.00
14	'06-Oct-2002 06:30:00'	4.99	12.64	0.59	-9999.00
15	'18-Jun-1999 19:45:00'	4.92	14.91	0.63	-9999.00
16	'11-May-2002 15:30:00'	4.88	13.95	0.59	-9999.00
17	'22-May-2009 13:15:00'	4.86	12.63	0.52	-9999.00
18	'18-Jul-2008 21:30:00'	4.85	12.86	0.54	-9999.00
19	'21-Sep-1998 19:45:00'	4.84	13.46	0.55	-9999.00
20	'22-Aug-2003 09:30:00'	4.84	11.24	0.47	-9999.00
21	'03-Sep-1999 08:45:00'	4.82	12.25	0.51	-9999.00
22	'02-Jul-2007 14:30:00'	4.79	13.55	0.55	-9999.00
23	'28-Jul-2006 08:45:00'	4.76	17.14	0.65	-9999.00
24	'14-Aug-2009 20:15:00'	4.75	14.91	0.59	-9999.00
25	'17-Aug-2005 23:45:00'	4.73	13.75	NaN	-9999.00
26	'08-Sep-2005 14:45:00'	4.72	14.95	0.58	-9999.00
27	'31-Jul-2007 09:30:00'	4.70	14.92	0.57	-9999.00
28	'01-Oct-2005 04:30:00'	4.68	17.00	0.63	-9999.00
29	'15-Aug-2002 16:30:00'	4.67	15.31	0.56	-9999.00
30	'23-Sep-2003 18:00:00'	4.64	15.13	0.57	-9999.00
31	'12-Apr-2003 09:30:00'	4.63	13.72	0.50	-9999.00
32	'05-Sep-2005 13:15:00'	4.63	16.09	0.55	-9999.00
33	'11-May-2004 08:45:00'	4.63	14.24	0.56	-9999.00
34	'11-Aug-2003 14:30:00'	4.61	13.92	0.52	-9999.00
35	'24-Aug-2004 00:45:00'	4.60	14.13	0.53	-9999.00
36	'29-Sep-2001 19:45:00'	4.57	12.10	0.48	-9999.00
37	'16-May-2005 08:15:00'	4.52	16.79	0.57	-9999.00
38	'08-Jun-2004 13:45:00'	4.51	15.41	0.54	-9999.00
39	'18-Aug-1999 11:45:00'	4.51	12.64	0.46	-9999.00
40	'11-Aug-1999 06:45:00'	4.51	13.31	0.47	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'20-Jul-2009 15:00:00'	6.36	14.44	1.06	247.39
2	'11-Sep-2009 09:00:00'	6.32	16.85	1.14	247.02
3	'25-Aug-2004 00:00:00'	6.25	15.39	1.04	248.49
4	'11-Jul-2002 18:00:00'	6.14	15.24	1.00	245.31
5	'31-Jul-2007 00:00:00'	6.05	15.97	1.00	247.56
6	'06-Aug-1998 06:00:00'	6.04	16.36	1.02	249.77
7	'29-Jun-2009 09:00:00'	6.01	14.24	0.91	241.45
8	'01-Sep-2002 21:00:00'	5.96	15.29	0.95	244.91
9	'18-Jul-2006 03:00:00'	5.95	16.90	1.02	245.68
10	'05-Jun-1998 09:00:00'	5.86	15.61	0.93	246.35
11	'02-Jul-2007 15:00:00'	5.86	14.33	0.88	248.20
12	'21-Sep-1998 18:00:00'	5.85	14.75	0.89	245.48
13	'07-Sep-2005 00:00:00'	5.85	14.92	0.89	248.30
14	'17-Jul-2000 15:00:00'	5.84	14.83	0.88	246.31
15	'10-Sep-2001 00:00:00'	5.82	17.03	0.98	244.47
16	'08-Aug-2006 03:00:00'	5.80	13.75	0.83	255.04
17	'14-Aug-2009 18:00:00'	5.78	14.84	0.87	247.51
18	'22-Sep-2003 06:00:00'	5.75	15.20	0.87	247.46
19	'22-May-2009 06:00:00'	5.74	12.97	0.75	247.88
20	'11-May-2002 12:00:00'	5.70	15.14	0.87	250.53
21	'18-Jul-2008 21:00:00'	5.70	13.69	0.80	249.47
22	'22-Jul-2007 09:00:00'	5.69	15.68	0.89	250.68
23	'11-Aug-1999 03:00:00'	5.68	14.85	0.85	246.30
24	'29-Sep-1998 06:00:00'	5.67	16.72	0.92	244.62
25	'01-Jul-2002 18:00:00'	5.66	14.96	0.85	246.76
26	'16-Jul-1999 21:00:00'	5.63	15.14	0.84	250.60
27	'10-May-2004 12:00:00'	5.61	14.40	0.81	254.05
28	'05-Aug-2002 00:00:00'	5.60	15.70	0.85	245.01
29	'14-Jun-2002 12:00:00'	5.59	14.12	0.81	243.60
30	'18-Jun-1999 15:00:00'	5.56	14.38	0.80	248.32
31	'17-Aug-2005 09:00:00'	5.54	14.62	0.79	245.20
32	'07-May-2002 09:00:00'	5.53	14.67	0.80	250.74
33	'03-Sep-1999 06:00:00'	5.53	13.02	0.71	245.98
34	'08-Oct-1999 00:00:00'	5.52	12.49	0.70	249.10
35	'15-Aug-2002 15:00:00'	5.51	16.83	0.87	247.55
36	'11-Jun-1998 00:00:00'	5.51	13.74	0.76	242.46
37	'18-Aug-1999 09:00:00'	5.50	13.46	0.74	250.66
38	'22-Aug-2003 09:00:00'	5.50	12.43	0.66	240.55
39	'25-Jun-2000 06:00:00'	5.50	16.56	0.85	245.46
40	'24-Sep-2009 15:00:00'	5.49	17.54	0.89	246.31

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'20-Jul-2009 15:00:00'	6.02	14.44	0.98	247.39
2	'11-Sep-2009 09:00:00'	5.95	16.85	1.02	247.02
3	'25-Aug-2004 00:00:00'	5.81	15.39	0.91	248.49
4	'11-Jul-2002 18:00:00'	5.61	15.24	0.84	245.31
5	'31-Jul-2007 00:00:00'	5.41	15.97	0.80	247.56
6	'06-Aug-1998 06:00:00'	5.39	16.36	0.82	249.77
7	'29-Jun-2009 09:00:00'	5.35	14.24	0.73	241.45
8	'28-Jul-2006 03:00:00'	5.29	16.90	0.82	245.68
9	'01-Sep-2002 21:00:00'	5.25	15.29	0.75	244.91
10	'02-Jul-2007 15:00:00'	5.10	14.33	0.68	248.20
11	'05-Jun-1998 09:00:00'	5.10	15.61	0.71	246.35
12	'21-Sep-1998 18:00:00'	5.07	14.75	0.67	245.48
13	'10-Sep-2001 00:00:00'	5.04	17.03	0.74	244.47
14	'08-Aug-2006 03:00:00'	5.03	13.75	0.63	255.04
15	'07-Sep-2005 00:00:00'	5.03	14.92	0.66	248.30
16	'17-Jul-2000 15:00:00'	5.02	14.83	0.66	246.31
17	'18-Jul-2008 21:00:00'	4.99	13.69	0.63	249.47
18	'14-Aug-2009 18:00:00'	4.92	14.84	0.63	247.51
19	'11-May-2002 12:00:00'	4.90	15.14	0.65	250.53
20	'22-Jul-2007 09:00:00'	4.89	15.68	0.67	250.68
21	'22-Sep-2003 06:00:00'	4.87	15.20	0.62	247.46
22	'11-Aug-1999 03:00:00'	4.86	14.85	0.63	246.30
23	'22-May-2009 06:00:00'	4.85	12.97	0.54	247.88
24	'01-Jul-2002 18:00:00'	4.82	14.96	0.62	246.76
25	'29-Sep-1998 06:00:00'	4.81	16.72	0.67	244.62
26	'14-Jun-2002 12:00:00'	4.80	14.12	0.61	243.60
27	'10-May-2004 12:00:00'	4.75	14.40	0.59	254.05
28	'18-Jun-1999 15:00:00'	4.73	14.38	0.59	248.32
29	'16-Jul-1999 21:00:00'	4.72	15.14	0.60	250.60
30	'08-Oct-1999 00:00:00'	4.68	12.49	0.51	249.10
31	'05-Aug-2002 00:00:00'	4.68	15.70	0.60	245.01
32	'03-Sep-1999 06:00:00'	4.66	13.02	0.51	245.98
33	'24-Sep-2009 15:00:00'	4.65	17.54	0.65	246.31
34	'07-May-2002 09:00:00'	4.65	14.67	0.57	250.74
35	'11-Jun-1998 00:00:00'	4.65	13.74	0.54	242.46
36	'17-Aug-2005 09:00:00'	4.64	14.62	0.55	245.20
37	'16-May-2003 09:00:00'	4.63	12.62	0.49	251.62
38	'22-Aug-2003 09:00:00'	4.62	12.43	0.47	240.55
39	'15-Aug-2002 15:00:00'	4.61	16.83	0.62	247.55
40	'08-Sep-2003 18:00:00'	4.59	16.23	0.58	244.90

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Rottnest
Moving Average Interval	72
Title	Rottnest Top 72 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'17-Jul-1996 16:00:00'	6.48	14.01	2.06	-9999.00
2	'25-Aug-2004 10:30:00'	5.99	14.76	1.88	-9999.00
3	'11-Sep-2009 17:10:00'	5.72	15.51	1.78	257.00
4	'31-Jul-2007 09:42:00'	5.58	15.08	1.65	257.88
5	'29-Jun-2009 02:40:00'	5.47	13.16	1.40	254.71
6	'11-Jul-2002 18:30:00'	5.37	14.15	1.49	-9999.00
7	'28-Jul-1996 19:00:00'	5.29	14.57	1.42	-9999.00
8	'03-Jul-2007 00:12:00'	5.15	13.24	1.24	259.03
9	'06-Sep-2005 23:00:00'	5.12	13.63	1.26	257.36
10	'20-Jul-2009 11:32:00'	5.11	13.03	1.47	257.49
11	'04-Jun-1997 16:00:00'	5.08	15.70	1.49	-9999.00
12	'08-Jun-1995 00:29:00'	5.08	12.82	1.15	264.26
13	'21-Sep-2003 17:45:00'	5.07	13.36	1.20	-9999.00
14	'10-Oct-1997 04:00:00'	5.05	13.17	1.18	-9999.00
15	'20-Jun-1996 01:00:00'	5.04	12.92	1.14	-9999.00
16	'15-Sep-1996 13:00:00'	5.01	13.65	1.24	-9999.00
17	'25-Jul-1996 19:00:00'	4.86	14.39	1.20	-9999.00
18	'17-Jul-2000 05:30:00'	4.85	14.03	1.17	-9999.00
19	'23-May-1994 18:59:59'	4.82	12.01	1.06	-9999.00
20	'01-Aug-1996 00:00:00'	4.79	13.70	1.10	-9999.00
21	'17-Jul-1999 08:39:00'	4.79	13.95	1.14	-9999.00
22	'27-Jun-2003 02:30:00'	4.71	11.42	0.89	-9999.00
23	'08-Aug-2006 07:05:00'	4.70	13.01	1.11	270.80
24	'15-Aug-1997 23:00:00'	4.68	14.33	1.19	-9999.00
25	'22-May-2009 10:51:00'	4.67	12.56	0.97	257.89
26	'14-Jul-2000 04:30:00'	4.65	13.77	1.07	-9999.00
27	'23-Aug-1995 12:59:59'	4.64	14.38	1.08	-9999.00
28	'20-Jun-2009 04:10:00'	4.57	13.55	1.01	255.38
29	'02-Sep-2002 03:30:00'	4.54	13.92	1.02	-9999.00
30	'14-Aug-2009 18:10:00'	4.53	13.28	0.96	263.74
31	'09-Jun-1998 22:40:00'	4.53	12.58	0.94	-9999.00
32	'18-Jul-2008 11:37:00'	4.51	13.72	1.02	260.54
33	'03-Aug-2003 20:00:00'	4.51	12.81	0.91	-9999.00
34	'14-Jun-2002 13:00:00'	4.43	12.54	1.02	-9999.00
35	'23-Jul-2007 05:42:00'	4.38	12.72	0.85	271.18
36	'14-Sep-1999 16:39:00'	4.38	12.71	0.87	-9999.00
37	'18-Jun-1999 10:39:00'	4.38	13.91	0.97	-9999.00
38	'05-Jun-1998 15:40:00'	4.35	13.95	0.97	-9999.00
39	'05-Jul-2003 13:00:00'	4.34	12.65	0.85	-9999.00
40	'10-May-2004 20:30:00'	4.33	12.35	0.92	-9999.00
41	'09-Sep-2003 13:30:00'	4.32	16.15	1.07	-9999.00
42	'15-Aug-2005 05:49:00'	4.32	13.91	0.91	252.22
43	'08-May-2002 02:00:00'	4.30	13.65	0.94	-9999.00
44	'20-Sep-2008 10:37:00'	4.30	14.76	0.97	251.32
45	'14-Aug-1995 11:59:59'	4.29	14.42	0.94	-9999.00
46	'28-Apr-2000 01:45:00'	4.28	14.30	0.94	-9999.00
47	'04-Jul-2005 22:00:00'	4.28	14.31	1.02	253.62
48	'18-Aug-1999 14:39:00'	4.25	12.34	0.87	-9999.00
49	'13-Sep-2008 22:37:00'	4.24	14.44	0.93	253.53
50	'26-Aug-2007 23:42:00'	4.21	13.85	0.92	262.67
51	'14-Sep-2007 02:27:00'	4.20	12.99	0.83	258.01
52	'30-Apr-2007 20:35:00'	4.20	13.14	0.83	250.62
53	'02-Jul-2002 01:00:00'	4.19	14.93	0.96	-9999.00
54	'03-Sep-1999 02:40:00'	4.18	12.94	0.81	-9999.00
55	'05-Jul-1998 10:40:00'	4.17	13.22	0.80	-9999.00
56	'20-Aug-1995 11:59:59'	4.17	14.80	0.92	-9999.00
57	'11-May-1995 22:59:00'	4.16	11.38	0.81	254.21
58	'28-Sep-1998 17:40:00'	4.16	14.96	0.92	-9999.00
59	'11-May-2002 16:45:00'	4.16	13.31	0.85	-9999.00
60	'12-Jun-2004 03:45:00'	4.15	12.08	0.73	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'17-Jul-1996 09:00:00'	7.76	13.79	3.02	260.61
2	'25-Aug-2004 03:00:00'	6.56	14.63	2.29	250.93
3	'11-Sep-2009 09:00:00'	6.45	15.98	2.39	249.55
4	'07-Jun-1995 12:00:00'	6.34	12.64	1.79	258.27
5	'11-Jul-2002 15:00:00'	6.21	13.79	1.99	247.63
6	'28-Jun-2009 18:00:00'	6.21	12.65	1.73	249.69
7	'31-Jul-2007 03:00:00'	6.12	15.06	2.02	249.01
8	'15-Sep-1996 12:00:00'	6.11	14.46	2.02	252.64
9	'07-Sep-2005 06:00:00'	5.98	13.74	1.76	249.70
10	'19-Jun-1996 21:00:00'	5.96	12.20	1.54	256.48
11	'02-Jul-2007 18:00:00'	5.95	13.18	1.72	251.71
12	'17-Jul-2000 00:00:00'	5.80	13.93	1.68	246.88
13	'14-Aug-2009 09:00:00'	5.75	14.37	1.70	248.91
14	'28-Jul-1996 12:00:00'	5.68	14.07	1.61	254.57
15	'26-Jun-2003 15:00:00'	5.68	11.37	1.31	272.13
16	'23-May-1994 18:00:00'	5.68	12.86	1.64	248.96
17	'20-Jul-2009 06:00:00'	5.68	12.80	1.76	247.73
18	'22-Sep-2003 00:00:00'	5.66	14.40	1.66	248.22
19	'04-Jun-1997 12:00:00'	5.65	15.61	1.87	245.88
20	'23-Jul-1996 15:00:00'	5.45	14.52	1.52	250.82
21	'08-Aug-2006 00:00:00'	5.44	12.84	1.48	259.05
22	'01-Sep-2002 15:00:00'	5.43	13.53	1.52	246.31
23	'23-Jul-2007 03:00:00'	5.41	13.16	1.43	255.02
24	'06-Aug-1998 15:00:00'	5.37	15.14	1.60	249.58
25	'10-Oct-1997 00:00:00'	5.35	14.11	1.50	248.40
26	'09-Jun-1998 12:00:00'	5.34	11.45	1.13	261.23
27	'31-Jul-1996 15:00:00'	5.34	13.25	1.34	247.62
28	'22-May-2009 00:00:00'	5.32	12.79	1.30	249.05
29	'17-Jul-1999 03:00:00'	5.20	13.51	1.36	251.20
30	'07-May-2002 15:00:00'	5.18	13.18	1.33	253.13
31	'27-Jun-1996 18:00:00'	5.17	13.96	1.40	255.14
32	'19-Jun-2009 15:00:00'	5.12	13.25	1.25	244.06
33	'13-Jul-2000 21:00:00'	5.05	13.21	1.22	251.97
34	'11-May-2002 12:00:00'	5.03	13.96	1.38	249.55
35	'18-Aug-1999 03:00:00'	5.02	12.52	1.17	258.03
36	'17-Jun-1999 21:00:00'	4.95	13.25	1.22	252.25
37	'12-Jun-2004 00:00:00'	4.94	12.49	1.10	249.94
38	'27-Apr-2000 09:00:00'	4.93	13.51	1.18	247.86
39	'17-Jul-2008 18:00:00'	4.93	13.79	1.19	250.57
40	'29-Jul-2008 18:00:00'	4.92	13.43	1.11	249.25
41	'04-Jul-2003 21:00:00'	4.91	12.65	1.10	247.16
42	'10-May-2004 15:00:00'	4.91	12.48	1.20	261.44
43	'14-Jun-2002 06:00:00'	4.91	12.10	1.21	247.63
44	'10-Jun-2005 15:00:00'	4.88	11.58	0.97	238.92
45	'09-Sep-2003 09:00:00'	4.84	15.32	1.25	245.67
46	'02-Sep-1998 09:00:00'	4.84	12.02	1.03	252.95
47	'20-Jul-1995 06:00:00'	4.84	12.23	1.06	251.49
48	'02-Aug-2003 21:00:00'	4.82	13.55	1.09	248.04
49	'02-Jul-2002 03:00:00'	4.80	13.51	1.21	246.75
50	'08-Jul-1995 15:00:00'	4.77	13.07	1.06	253.77
51	'05-Jun-1998 12:00:00'	4.77	13.94	1.21	247.02
52	'11-Aug-1999 00:00:00'	4.77	13.82	1.21	244.01
53	'28-Sep-1998 06:00:00'	4.77	14.26	1.15	245.15
54	'28-Jul-2006 06:00:00'	4.75	14.93	1.30	244.22
55	'07-Aug-2007 00:00:00'	4.74	15.55	1.26	251.22
56	'24-May-1997 12:00:00'	4.73	13.09	1.07	252.99
57	'08-Jun-2004 00:00:00'	4.72	13.62	1.13	247.42
58	'03-Sep-1999 00:00:00'	4.69	12.66	1.01	246.65
59	'05-Jul-1998 00:00:00'	4.69	13.22	1.02	246.24
60	'15-Aug-1997 18:00:00'	4.68	13.50	1.15	256.96

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'17-Jul-1996 09:00:00'	6.94	13.79	2.42	260.61
2	'25-Aug-2004 03:00:00'	5.88	14.63	1.83	250.93
3	'11-Sep-2009 09:00:00'	5.78	15.98	1.92	249.55
4	'07-Jun-1995 12:00:00'	5.68	12.64	1.44	258.27
5	'11-Jul-2002 15:00:00'	5.57	13.79	1.60	247.63
6	'28-Jun-2009 18:00:00'	5.56	12.65	1.39	249.69
7	'31-Jul-2007 03:00:00'	5.49	15.06	1.62	249.01
8	'15-Sep-1996 12:00:00'	5.49	14.46	1.62	252.64
9	'07-Sep-2005 06:00:00'	5.36	13.74	1.42	249.70
10	'19-Jun-1996 21:00:00'	5.35	12.20	1.24	256.48
11	'02-Jul-2007 18:00:00'	5.35	13.18	1.38	251.71
12	'17-Jul-2000 00:00:00'	5.21	13.93	1.36	246.88
13	'14-Aug-2009 09:00:00'	5.17	14.37	1.37	248.91
14	'28-Jul-1996 12:00:00'	5.11	14.07	1.30	254.57
15	'23-May-1994 18:00:00'	5.11	12.86	1.32	248.96
16	'26-Jun-2003 15:00:00'	5.11	11.37	1.06	272.13
17	'20-Jul-2009 06:00:00'	5.11	12.80	1.41	247.73
18	'22-Sep-2003 00:00:00'	5.09	14.40	1.34	248.22
19	'04-Jun-1997 12:00:00'	5.08	15.61	1.51	245.88
20	'23-Jul-1996 15:00:00'	4.90	14.52	1.23	250.82
21	'08-Aug-2006 00:00:00'	4.89	12.84	1.19	259.05
22	'01-Sep-2002 15:00:00'	4.88	13.53	1.22	246.31
23	'23-Jul-2007 03:00:00'	4.88	13.16	1.16	255.02
24	'06-Aug-1998 15:00:00'	4.84	15.14	1.29	249.58
25	'10-Oct-1997 00:00:00'	4.82	14.11	1.21	248.40
26	'31-Jul-1996 15:00:00'	4.81	13.25	1.09	247.62
27	'09-Jun-1998 12:00:00'	4.81	11.45	0.92	261.23
28	'22-May-2009 00:00:00'	4.78	12.79	1.05	249.05
29	'17-Jul-1999 03:00:00'	4.68	13.51	1.10	251.20
30	'07-May-2002 15:00:00'	4.66	13.18	1.08	253.13
31	'27-Jun-1996 18:00:00'	4.66	13.96	1.13	255.14
32	'19-Jun-2009 15:00:00'	4.62	13.25	1.02	244.06
33	'13-Jul-2000 21:00:00'	4.56	13.21	0.99	251.97
34	'11-May-2002 12:00:00'	4.53	13.96	1.12	249.55
35	'18-Aug-1999 03:00:00'	4.52	12.52	0.95	258.03
36	'17-Jun-1999 21:00:00'	4.47	13.25	0.99	252.25
37	'12-Jun-2004 00:00:00'	4.47	12.49	0.90	249.94
38	'27-Apr-2000 09:00:00'	4.46	13.51	0.96	247.86
39	'29-Jul-2008 18:00:00'	4.45	13.43	0.91	249.25
40	'17-Jul-2008 18:00:00'	4.45	13.79	0.97	250.57
41	'04-Jul-2003 21:00:00'	4.44	12.65	0.90	247.16
42	'10-May-2004 15:00:00'	4.43	12.48	0.97	261.44
43	'14-Jun-2002 06:00:00'	4.42	12.10	0.98	247.63
44	'10-Jun-2005 15:00:00'	4.40	11.58	0.79	238.92
45	'09-Sep-2003 09:00:00'	4.38	15.32	1.03	245.67
46	'02-Sep-1998 09:00:00'	4.37	12.02	0.84	252.95
47	'20-Jul-1995 06:00:00'	4.37	12.23	0.86	251.49
48	'02-Aug-2003 21:00:00'	4.35	13.55	0.89	248.04
49	'02-Jul-2002 03:00:00'	4.33	13.51	0.98	246.75
50	'28-Sep-1998 06:00:00'	4.31	14.26	0.94	245.15
51	'08-Jul-1995 15:00:00'	4.31	13.07	0.86	253.77
52	'11-Aug-1999 00:00:00'	4.30	13.82	0.98	244.01
53	'05-Jun-1998 12:00:00'	4.30	13.94	0.98	247.02
54	'28-Jul-2006 06:00:00'	4.28	14.93	1.06	244.22
55	'07-Aug-2007 00:00:00'	4.28	15.55	1.03	251.22
56	'24-May-1997 12:00:00'	4.28	13.09	0.87	252.99
57	'08-Jun-2004 00:00:00'	4.26	13.62	0.92	247.42
58	'05-Jul-1998 00:00:00'	4.24	13.22	0.84	246.24
59	'03-Sep-1999 00:00:00'	4.24	12.66	0.82	246.65
60	'15-Aug-1997 18:00:00'	4.22	13.50	0.93	256.96

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Rottnest
Moving Average Interval	36
Title	Rottnest Top 36 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'17-Jul-1996 11:00:00'	6.84	13.84	1.10	-9999.00
2	'20-Jul-2009 23:40:00'	6.60	15.13	1.22	257.59
3	'25-Aug-2004 09:30:00'	6.53	15.40	1.14	-9999.00
4	'11-Sep-2009 06:40:00'	6.33	15.14	1.06	257.29
5	'12-Jul-2002 02:30:00'	6.03	14.52	0.95	-9999.00
6	'28-Jul-1996 03:00:00'	5.99	14.01	0.85	-9999.00
7	'30-Jul-2007 18:42:00'	5.92	15.06	0.92	255.69
8	'24-May-1994 08:59:59'	5.90	12.82	0.80	-9999.00
9	'08-Aug-2006 03:05:00'	5.86	13.28	0.82	268.03
10	'04-Jun-1997 21:00:00'	5.85	16.14	0.97	-9999.00
11	'29-Jun-2009 16:10:00'	5.81	13.52	0.80	254.17
12	'02-Jul-2007 10:12:00'	5.77	12.94	0.75	259.11
13	'14-Jun-2002 14:00:00'	5.66	14.18	0.83	-9999.00
14	'15-Sep-1996 14:00:00'	5.64	13.89	0.75	-9999.00
15	'15-Aug-1997 14:00:00'	5.60	15.18	0.84	-9999.00
16	'06-Sep-2005 20:00:00'	5.56	13.62	0.74	257.35
17	'19-Jul-2008 01:07:00'	5.54	13.31	0.73	261.94
18	'08-Jun-1995 07:30:00'	5.51	12.51	0.66	264.94
19	'16-May-2003 15:00:00'	5.47	11.68	0.66	-9999.00
20	'10-Oct-1997 10:00:00'	5.46	13.91	0.72	-9999.00
21	'18-Jul-1996 23:00:00'	5.44	15.41	0.82	-9999.00
22	'25-Jul-1996 03:00:00'	5.44	14.80	0.75	-9999.00
23	'16-Jul-1999 20:39:00'	5.40	13.79	0.70	-9999.00
24	'11-May-1995 19:00:00'	5.32	12.73	0.66	254.89
25	'06-Oct-2002 07:30:00'	5.31	12.44	0.68	-9999.00
26	'12-Jul-1995 16:30:00'	5.30	12.75	0.67	276.57
27	'18-Aug-1999 13:39:00'	5.28	13.21	0.65	-9999.00
28	'19-Jun-1996 08:00:00'	5.27	14.11	0.66	-9999.00
29	'01-Jul-2002 21:00:00'	5.25	14.73	0.68	-9999.00
30	'22-May-2009 10:51:00'	5.24	12.24	0.59	261.25
31	'05-Jun-1998 10:40:00'	5.24	14.06	0.68	-9999.00
32	'08-Oct-1999 05:39:00'	5.23	13.09	0.65	-9999.00
33	'04-Jul-2005 13:00:00'	5.23	14.84	0.73	253.16
34	'17-Jul-2000 17:30:00'	5.22	13.84	0.66	-9999.00
35	'10-May-2004 15:30:00'	5.19	13.80	0.68	-9999.00
36	'14-Jul-2000 01:30:00'	5.16	13.85	0.65	-9999.00
37	'22-Sep-2003 11:45:00'	5.16	13.86	0.64	-9999.00
38	'02-Sep-2002 01:00:00'	5.16	15.13	0.68	-9999.00
39	'26-Aug-2007 21:42:00'	5.14	13.80	0.65	262.74
40	'18-Jun-1999 20:39:00'	5.13	13.88	0.66	-9999.00
41	'03-Sep-1999 05:40:00'	5.12	11.95	0.55	-9999.00
42	'01-Aug-2007 07:12:00'	5.11	14.81	0.69	260.66
43	'28-Jun-2009 03:40:00'	5.07	12.29	0.56	257.87
44	'20-Jun-2009 04:40:00'	5.06	13.40	0.61	257.06
45	'08-Jun-1998 15:40:00'	5.04	12.43	0.56	-9999.00
46	'14-Sep-1999 12:40:00'	5.03	12.29	0.53	-9999.00
47	'31-Jul-1996 23:00:00'	5.02	13.87	0.60	-9999.00
48	'03-Aug-2003 11:00:00'	5.01	12.08	0.53	-9999.00
49	'11-May-2002 08:45:00'	5.00	13.32	0.59	-9999.00
50	'20-Sep-2003 22:45:00'	4.96	12.73	0.55	-9999.00
51	'02-Aug-2000 16:30:00'	4.96	15.29	0.66	-9999.00
52	'07-May-2002 15:00:00'	4.91	14.69	0.63	-9999.00
53	'27-Sep-2005 22:36:00'	4.91	13.59	0.58	252.02
54	'14-Aug-2009 16:40:00'	4.90	13.56	0.56	264.50
55	'26-Jun-2003 07:30:00'	4.89	11.91	0.51	-9999.00
56	'05-Jul-2003 22:00:00'	4.89	12.78	0.53	-9999.00
57	'14-Aug-2005 07:49:00'	4.88	12.85	0.53	254.93
58	'20-Jul-1995 17:30:00'	4.88	11.91	0.49	266.79
59	'13-Sep-2007 04:57:00'	4.86	12.68	0.53	258.62
60	'17-Jul-2009 00:40:00'	4.85	13.18	0.57	253.54

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'17-Jul-1996 06:00:00'	8.42	13.80	1.74	261.35
2	'11-Sep-2009 03:00:00'	7.24	16.01	1.48	250.20
3	'24-Aug-2004 18:00:00'	7.23	14.76	1.38	252.07
4	'20-Jul-2009 15:00:00'	7.21	14.16	1.42	250.97
5	'15-Sep-1996 09:00:00'	7.00	14.89	1.32	254.53
6	'11-Jul-2002 15:00:00'	6.88	14.49	1.24	248.16
7	'24-May-1994 00:00:00'	6.84	14.07	1.22	251.21
8	'30-Jul-2007 21:00:00'	6.73	14.67	1.17	250.98
9	'02-Jul-2007 09:00:00'	6.71	13.35	1.08	253.60
10	'07-Aug-2006 21:00:00'	6.71	13.11	1.08	261.95
11	'08-Jun-1995 03:00:00'	6.55	12.81	0.97	254.97
12	'04-Jun-1997 06:00:00'	6.52	15.94	1.22	247.27
13	'29-Jun-2009 06:00:00'	6.49	12.92	0.96	247.98
14	'06-Sep-2005 18:00:00'	6.47	13.86	1.03	251.13
15	'01-Sep-2002 18:00:00'	6.38	14.35	1.05	247.81
16	'17-Jul-2000 12:00:00'	6.35	13.76	0.98	248.83
17	'27-Jul-1996 18:00:00'	6.30	13.28	0.95	255.66
18	'19-Jun-1996 06:00:00'	6.30	13.21	0.94	254.54
19	'27-Jun-1996 15:00:00'	6.26	13.50	0.97	260.26
20	'14-Aug-2009 15:00:00'	6.19	14.14	0.96	249.21
21	'06-Aug-1998 00:00:00'	6.14	15.24	1.03	251.91
22	'14-Jun-2002 06:00:00'	6.14	13.21	0.95	247.54
23	'22-May-2009 00:00:00'	6.14	11.97	0.79	254.48
24	'25-Jun-2003 21:00:00'	6.12	11.85	0.81	271.18
25	'11-May-2002 06:00:00'	6.11	14.31	0.98	252.35
26	'12-Jul-1995 09:00:00'	6.08	12.58	0.94	268.25
27	'22-Jul-2007 06:00:00'	6.04	14.87	1.02	255.13
28	'18-Aug-1999 06:00:00'	6.03	12.60	0.83	256.48
29	'10-May-2004 06:00:00'	6.03	13.06	0.87	264.50
30	'09-Oct-1997 18:00:00'	6.02	14.46	0.95	251.26
31	'16-Jul-1999 15:00:00'	6.01	13.59	0.88	253.17
32	'22-Sep-2003 03:00:00'	5.99	14.46	0.90	248.73
33	'05-Jun-1998 03:00:00'	5.97	13.56	0.87	249.39
34	'06-Jun-1995 12:00:00'	5.95	12.16	0.78	263.66
35	'07-May-2002 03:00:00'	5.92	14.02	0.89	256.83
36	'01-Jul-2002 12:00:00'	5.92	13.54	0.88	250.86
37	'18-Jul-1996 21:00:00'	5.92	15.31	1.02	244.27
38	'11-May-1995 12:00:00'	5.84	12.30	0.79	252.21
39	'24-Jul-1996 18:00:00'	5.82	14.29	0.87	251.11
40	'18-Jul-2008 15:00:00'	5.80	12.64	0.79	254.03
41	'27-Jul-2006 21:00:00'	5.75	15.58	0.94	246.87
42	'27-Jun-2009 15:00:00'	5.75	11.69	0.68	254.93
43	'18-Jun-1999 12:00:00'	5.74	13.64	0.84	252.08
44	'20-Jul-1995 06:00:00'	5.71	12.00	0.70	254.38
45	'08-Oct-1999 00:00:00'	5.70	12.10	0.74	252.46
46	'03-Sep-1999 00:00:00'	5.66	11.65	0.67	249.84
47	'10-Aug-1999 21:00:00'	5.65	14.15	0.82	246.72
48	'19-Jun-2009 21:00:00'	5.63	12.97	0.73	245.52
49	'15-Aug-1997 09:00:00'	5.63	14.23	0.82	256.10
50	'08-Jul-1995 18:00:00'	5.62	12.24	0.68	258.72
51	'31-Jul-1996 12:00:00'	5.62	13.01	0.72	250.74
52	'04-Jul-2005 06:00:00'	5.60	14.17	0.81	247.90
53	'21-Sep-1998 15:00:00'	5.58	13.76	0.77	246.87
54	'16-May-2003 06:00:00'	5.57	11.19	0.64	266.49
55	'08-Jun-1998 09:00:00'	5.55	11.82	0.65	270.71
56	'20-Jun-1996 21:00:00'	5.54	11.15	0.58	255.92
57	'14-Sep-1999 03:00:00'	5.53	13.06	0.71	247.49
58	'13-Jul-2000 21:00:00'	5.52	13.40	0.72	252.84
59	'26-Aug-2007 18:00:00'	5.51	12.78	0.72	251.34
60	'05-Jul-2003 12:00:00'	5.49	12.99	0.70	247.45

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'17-Jul-1996 06:00:00'	7.53	13.80	1.39	261.35
2	'11-Sep-2009 03:00:00'	6.48	16.01	1.18	250.20
3	'24-Aug-2004 18:00:00'	6.47	14.76	1.10	252.07
4	'20-Jul-2009 15:00:00'	6.46	14.16	1.14	250.97
5	'15-Sep-1996 09:00:00'	6.26	14.89	1.06	254.53
6	'11-Jul-2002 15:00:00'	6.16	14.49	0.99	248.16
7	'24-May-1994 00:00:00'	6.13	14.07	0.98	251.21
8	'30-Jul-2007 21:00:00'	6.02	14.67	0.94	250.98
9	'02-Jul-2007 09:00:00'	6.01	13.35	0.86	253.60
10	'07-Aug-2006 21:00:00'	6.01	13.11	0.87	261.95
11	'08-Jun-1995 03:00:00'	5.86	12.81	0.78	254.97
12	'04-Jun-1997 06:00:00'	5.84	15.94	0.98	247.27
13	'29-Jun-2009 06:00:00'	5.82	12.92	0.77	247.98
14	'06-Sep-2005 18:00:00'	5.79	13.86	0.83	251.13
15	'01-Sep-2002 18:00:00'	5.72	14.35	0.84	247.81
16	'17-Jul-2000 12:00:00'	5.69	13.76	0.79	248.83
17	'27-Jul-1996 18:00:00'	5.65	13.28	0.77	255.66
18	'19-Jun-1996 06:00:00'	5.64	13.21	0.75	254.54
19	'27-Jun-1996 15:00:00'	5.62	13.50	0.78	260.26
20	'14-Aug-2009 15:00:00'	5.54	14.14	0.77	249.21
21	'14-Jun-2002 06:00:00'	5.51	13.21	0.76	247.54
22	'06-Aug-1998 00:00:00'	5.50	15.24	0.83	251.91
23	'22-May-2009 00:00:00'	5.50	11.97	0.63	254.48
24	'25-Jun-2003 21:00:00'	5.50	11.85	0.65	271.18
25	'11-May-2002 06:00:00'	5.48	14.31	0.79	252.35
26	'12-Jul-1995 09:00:00'	5.47	12.58	0.75	268.25
27	'22-Jul-2007 06:00:00'	5.43	14.87	0.82	255.13
28	'10-May-2004 06:00:00'	5.41	13.06	0.70	264.50
29	'18-Aug-1999 06:00:00'	5.41	12.60	0.67	256.48
30	'09-Oct-1997 18:00:00'	5.40	14.46	0.76	251.26
31	'16-Jul-1999 15:00:00'	5.39	13.59	0.71	253.17
32	'22-Sep-2003 03:00:00'	5.38	14.46	0.73	248.73
33	'05-Jun-1998 03:00:00'	5.36	13.56	0.70	249.39
34	'06-Jun-1995 12:00:00'	5.34	12.16	0.63	263.66
35	'18-Jul-1996 21:00:00'	5.32	15.31	0.82	244.27
36	'07-May-2002 03:00:00'	5.31	14.02	0.72	256.83
37	'01-Jul-2002 12:00:00'	5.31	13.54	0.70	250.86
38	'11-May-1995 12:00:00'	5.24	12.30	0.63	252.21
39	'24-Jul-1996 18:00:00'	5.22	14.29	0.70	251.11
40	'18-Jul-2008 15:00:00'	5.22	12.64	0.63	254.03
41	'27-Jul-2006 21:00:00'	5.17	15.58	0.75	246.87
42	'27-Jun-2009 15:00:00'	5.16	11.69	0.55	254.93
43	'18-Jun-1999 12:00:00'	5.16	13.64	0.68	2

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Albany
Moving Average Interval	72
Title	Albany Top 72 Hour Moving Average Events

Note 1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'13-Sep-2008 22:50:00'	6.34	14.76	2.11	216.24
2	'11-Sep-2009 22:59:00'	5.94	15.69	1.96	224.78
3	'30-Aug-2005 10:30:00'	5.84	13.78	1.88	-9999.00
4	'29-Jun-2009 22:59:00'	5.70	13.50	1.54	215.64
5	'02-Sep-2009 15:59:00'	5.51	14.67	1.69	208.22
6	'21-Jun-2009 00:29:00'	5.49	13.47	1.43	215.45
7	'01-Oct-2005 16:30:00'	5.48	14.97	1.60	-9999.00
8	'08-Sep-2005 01:30:00'	5.47	13.91	1.45	-9999.00
9	'28-Oct-2007 07:30:00'	5.44	12.96	1.44	-9999.00
10	'31-Jul-2007 13:30:00'	5.28	15.13	1.50	-9999.00
11	'29-Jun-2008 15:00:00'	5.18	14.77	1.47	-9999.00
12	'28-Jul-2006 09:00:00'	5.13	16.01	1.58	-9999.00
13	'23-Sep-2009 11:59:00'	5.13	14.96	1.57	215.33
14	'20-Sep-2008 17:20:00'	5.01	14.84	1.33	220.20
15	'22-Sep-2006 15:00:00'	5.00	13.17	1.19	-9999.00
16	'01-May-2007 12:15:00'	4.97	13.11	1.11	-9999.00
17	'28-Sep-2005 15:30:00'	4.94	13.01	1.15	-9999.00
18	'04-Jul-2007 01:30:00'	4.93	13.54	1.15	-9999.00
19	'09-Oct-2005 18:30:00'	4.91	15.93	1.49	-9999.00
20	'13-Oct-2006 04:00:00'	4.81	14.07	1.17	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'23-Aug-2009 06:00:00'	6.65	14.90	2.44	203.63
2	'11-Sep-2009 18:00:00'	6.65	15.94	2.54	214.94
3	'13-Sep-2008 12:00:00'	6.53	14.76	2.27	208.33
4	'30-Aug-2005 06:00:00'	6.02	13.40	2.09	210.61
5	'31-Jul-2007 06:00:00'	6.00	15.43	2.00	214.96
6	'02-Sep-2009 06:00:00'	5.85	14.09	1.82	204.55
7	'29-Jun-2009 06:00:00'	5.81	13.63	1.63	215.75
8	'20-Jun-2009 12:00:00'	5.77	13.04	1.56	213.02
9	'07-Sep-2005 18:00:00'	5.71	13.89	1.60	218.81
10	'19-Sep-2008 21:00:00'	5.71	14.98	1.83	212.95
11	'03-Jul-2007 06:00:00'	5.64	13.94	1.62	215.71
12	'22-Sep-2006 06:00:00'	5.57	15.05	1.75	211.38
13	'28-Oct-2007 03:00:00'	5.54	12.29	1.44	207.60
14	'01-Oct-2005 06:00:00'	5.52	15.41	1.75	209.00
15	'15-Aug-2009 00:00:00'	5.44	14.39	1.51	215.79
16	'17-Sep-2007 00:00:00'	5.41	16.46	1.72	212.88
17	'23-Sep-2009 03:00:00'	5.38	15.00	1.75	211.74
18	'28-Jul-2006 12:00:00'	5.28	15.58	1.70	212.44
19	'13-Oct-2006 00:00:00'	5.28	14.40	1.49	212.87
20	'22-May-2009 18:00:00'	5.28	12.62	1.36	211.90

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 18:00:00'	6.37	15.94	2.33	214.94
2	'23-Aug-2009 06:00:00'	6.37	14.90	2.24	203.63
3	'13-Sep-2008 12:00:00'	6.25	14.76	2.08	208.33
4	'30-Aug-2005 06:00:00'	5.75	13.40	1.92	210.61
5	'31-Jul-2007 06:00:00'	5.74	15.43	1.84	214.96
6	'02-Sep-2009 06:00:00'	5.60	14.09	1.66	204.55
7	'29-Jun-2009 06:00:00'	5.58	13.63	1.50	215.75
8	'20-Jun-2009 12:00:00'	5.53	13.04	1.43	213.02
9	'07-Sep-2005 18:00:00'	5.48	13.89	1.47	218.81
10	'19-Sep-2008 21:00:00'	5.46	14.98	1.67	212.95
11	'03-Jul-2007 06:00:00'	5.39	13.94	1.49	215.71
12	'22-Sep-2006 06:00:00'	5.32	15.05	1.60	211.38
13	'28-Oct-2007 03:00:00'	5.29	12.29	1.32	207.60
14	'01-Oct-2005 06:00:00'	5.27	15.41	1.60	209.00
15	'15-Aug-2009 00:00:00'	5.20	14.39	1.38	215.79
16	'17-Sep-2007 00:00:00'	5.16	16.46	1.57	212.88
17	'23-Sep-2009 03:00:00'	5.14	15.00	1.60	211.74
18	'28-Jul-2006 12:00:00'	5.04	15.58	1.55	212.44
19	'13-Oct-2006 00:00:00'	5.04	14.40	1.36	212.87
20	'22-May-2009 18:00:00'	5.03	12.62	1.24	211.90

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	Albany
Moving Average Interval	36
Title	Albany Top 36 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'30-Aug-2005 07:30:00'	7.29	14.95	1.45	-9999.00
2	'02-Sep-2009 14:29:00'	6.55	14.98	1.17	211.42
3	'28-Oct-2007 01:30:00'	6.41	14.03	1.01	-9999.00
4	'14-Sep-2008 18:50:00'	6.36	14.30	1.03	217.85
5	'12-Sep-2008 22:20:00'	6.33	15.18	1.09	215.74
6	'12-Sep-2009 05:59:00'	6.31	16.16	1.13	224.67
7	'24-Sep-2009 16:29:00'	6.14	17.98	1.21	217.10
8	'29-Jun-2008 12:00:00'	6.10	15.60	1.01	-9999.00
9	'10-Oct-2005 03:30:00'	5.99	17.07	1.11	-9999.00
10	'28-Jul-2006 07:00:00'	5.98	17.35	1.10	-9999.00
11	'21-Jun-2009 11:29:00'	5.94	13.67	0.85	213.76
12	'29-Jun-2009 17:59:00'	5.86	13.52	0.81	219.27
13	'31-Jul-2007 19:30:00'	5.81	14.85	0.89	-9999.00
14	'01-Oct-2005 01:30:00'	5.73	16.03	0.95	-9999.00
15	'07-Sep-2005 10:15:00'	5.65	14.27	0.77	-9999.00
16	'28-Sep-2005 01:30:00'	5.64	13.56	0.77	-9999.00
17	'20-Sep-2008 01:20:00'	5.56	15.74	0.85	219.94
18	'22-Sep-2006 02:00:00'	5.53	14.21	0.78	-9999.00
19	'04-Jul-2007 09:00:00'	5.42	13.82	0.69	-9999.00
20	'16-Aug-2009 03:29:00'	5.38	12.81	0.64	225.52

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'30-Aug-2005 03:00:00'	7.72	14.72	1.68	205.83
2	'23-Aug-2009 12:00:00'	7.51	15.50	1.57	202.61
3	'11-Sep-2009 21:00:00'	7.03	16.58	1.44	215.12
4	'02-Sep-2009 09:00:00'	6.91	14.40	1.26	206.54
5	'24-Sep-2009 09:00:00'	6.72	18.23	1.50	213.07
6	'27-Oct-2007 15:00:00'	6.68	13.00	1.05	209.82
7	'31-Jul-2007 12:00:00'	6.56	15.16	1.18	214.92
8	'14-Sep-2008 00:00:00'	6.55	14.39	1.10	210.01
9	'23-May-2009 00:00:00'	6.42	12.81	1.01	209.70
10	'19-Sep-2008 18:00:00'	6.39	16.27	1.24	210.87
11	'12-Sep-2008 09:00:00'	6.33	15.00	1.08	206.67
12	'27-Jul-2006 21:00:00'	6.30	16.78	1.23	213.08
13	'03-Jul-2007 09:00:00'	6.25	14.51	1.02	214.33
14	'21-Sep-2006 18:00:00'	6.24	16.22	1.17	208.89
15	'29-Jun-2008 06:00:00'	6.22	14.99	1.05	209.31
16	'30-Sep-2005 12:00:00'	6.17	16.80	1.17	205.95
17	'20-Jun-2009 12:00:00'	6.16	13.37	0.91	215.30
18	'01-Sep-2007 09:00:00'	6.10	17.58	1.18	208.94
19	'29-Jun-2009 15:00:00'	6.02	13.69	0.86	214.23
20	'09-Oct-2005 21:00:00'	6.02	15.09	1.03	208.30

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'30-Aug-2005 03:00:00'	7.39	14.72	1.54	205.83
2	'23-Aug-2009 12:00:00'	7.19	15.50	1.44	202.61
3	'11-Sep-2009 21:00:00'	6.72	16.58	1.32	215.12
4	'02-Sep-2009 09:00:00'	6.62	14.40	1.16	206.54
5	'24-Sep-2009 09:00:00'	6.43	18.23	1.38	213.07
6	'27-Oct-2007 15:00:00'	6.40	13.00	0.96	209.82
7	'31-Jul-2007 12:00:00'	6.29	15.16	1.08	214.92
8	'14-Sep-2008 00:00:00'	6.27	14.39	1.01	210.01
9	'23-May-2009 00:00:00'	6.14	12.81	0.92	209.70
10	'19-Sep-2008 18:00:00'	6.12	16.27	1.14	210.87
11	'12-Sep-2008 09:00:00'	6.07	15.00	0.99	206.67
12	'27-Jul-2006 21:00:00'	6.04	16.78	1.13	213.08
13	'03-Jul-2007 09:00:00'	6.00	14.51	0.94	214.33
14	'21-Sep-2006 18:00:00'	5.97	16.22	1.08	208.89
15	'29-Jun-2008 06:00:00'	5.97	14.99	0.97	209.31
16	'30-Sep-2005 12:00:00'	5.91	16.80	1.08	205.95
17	'20-Jun-2009 12:00:00'	5.91	13.37	0.83	215.30
18	'01-Sep-2007 09:00:00'	5.85	17.58	1.09	208.94
19	'29-Jun-2009 15:00:00'	5.79	13.69	0.80	214.23
20	'09-Oct-2005 21:00:00'	5.76	15.09	0.94	208.30

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	CapeNat
Moving Average Interval	72
Title	CapeNat Top 72 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'11-Sep-2009 15:30:00'	6.43	15.81	2.26	-9999.00
2	'02-Sep-2002 04:15:00'	6.27	15.14	2.18	-9999.00
3	'28-Jun-2009 23:30:00'	6.15	13.11	1.75	-9999.00
4	'31-Jul-2007 06:15:00'	6.14	15.19	2.04	-9999.00
5	'11-Jul-2002 14:30:00'	5.98	14.09	1.80	-9999.00
6	'25-Aug-2004 12:45:00'	5.95	14.87	1.88	-9999.00
7	'16-Jul-2000 05:15:00'	5.91	14.55	1.75	-9999.00
8	'22-Sep-2003 07:15:00'	5.69	14.27	1.63	-9999.00
9	'17-Jul-1999 07:45:00'	5.52	13.34	1.47	-9999.00
10	'08-May-2002 02:30:00'	5.51	13.88	1.60	-9999.00
11	'13-Sep-2008 22:45:00'	5.43	14.72	1.54	-9999.00
12	'01-Oct-2005 14:00:00'	5.27	14.66	1.49	-9999.00
13	'15-Aug-2009 01:30:00'	5.22	13.48	1.28	-9999.00
14	'28-Apr-2000 03:45:00'	5.20	13.73	1.34	-9999.00
15	'03-Aug-2003 01:15:00'	5.19	13.63	1.27	-9999.00
16	'11-Jun-2005 02:30:00'	5.16	12.11	1.20	-9999.00
17	'20-Jun-2009 05:30:00'	5.15	13.33	1.25	-9999.00
18	'10-May-2004 19:45:00'	5.13	12.33	1.25	-9999.00
19	'11-May-2002 06:30:00'	5.10	13.93	1.37	-9999.00
20	'12-Jun-2004 13:45:00'	5.07	13.40	1.20	-9999.00
21	'05-Jul-2003 08:15:00'	5.07	12.81	1.18	-9999.00
22	'31-Aug-2007 23:15:00'	5.06	16.25	1.54	-9999.00
23	'04-Jul-2005 10:30:00'	5.04	13.79	1.32	-9999.00
24	'09-Jun-2004 04:45:00'	5.03	13.72	1.24	-9999.00
25	'21-Jul-2009 06:45:00'	5.01	13.63	1.40	-9999.00
26	'14-Jun-2002 07:30:00'	4.99	12.42	1.29	-9999.00
27	'17-Sep-2007 09:15:00'	4.99	16.24	1.40	-9999.00
28	'15-Sep-2000 04:30:00'	4.98	14.84	1.38	-9999.00
29	'20-Sep-2008 01:45:00'	4.96	14.20	1.21	-9999.00
30	'22-May-2009 07:45:00'	4.95	12.41	1.07	-9999.00
31	'13-Jul-2000 04:15:00'	4.95	13.11	1.13	-9999.00
32	'25-Jun-2000 04:45:00'	4.95	16.69	1.44	-9999.00
33	'26-Aug-2007 15:15:00'	4.90	14.09	1.23	-9999.00
34	'01-Jul-2002 06:30:00'	4.88	14.22	1.23	-9999.00
35	'18-Jun-1999 05:45:00'	4.84	14.98	1.29	-9999.00
36	'26-Jul-2002 13:30:00'	4.83	14.87	1.25	-9999.00
37	'14-Sep-2002 12:15:00'	4.82	13.27	1.08	-9999.00
38	'04-Aug-2006 04:45:00'	4.81	16.35	1.33	-9999.00
39	'07-Aug-2007 04:15:00'	4.79	15.42	1.25	-9999.00
40	'14-Aug-2006 07:45:00'	4.79	13.94	1.12	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 09:00:00'	8.02	15.93	3.68	242.87
2	'25-Aug-2004 03:00:00'	7.80	14.64	3.26	247.62
3	'11-Jul-2002 12:00:00'	7.55	14.21	2.99	240.29
4	'31-Jul-2007 00:00:00'	7.46	15.27	3.04	242.35
5	'28-Jun-2009 18:00:00'	7.37	13.28	2.58	241.64
6	'07-Sep-2005 09:00:00'	7.16	13.90	2.57	244.21
7	'02-Jul-2007 18:00:00'	6.96	13.41	2.35	246.59
8	'16-Jul-2000 21:00:00'	6.83	14.15	2.35	242.66
9	'22-Sep-2003 00:00:00'	6.79	14.68	2.44	241.89
10	'14-Aug-2009 09:00:00'	6.67	14.43	2.29	242.97
11	'02-Sep-2002 03:00:00'	6.64	14.10	2.32	237.21
12	'22-May-2009 00:00:00'	6.44	12.73	1.89	240.86
13	'19-Jun-2009 15:00:00'	6.33	13.32	1.90	237.93
14	'07-May-2002 12:00:00'	6.28	13.15	1.97	253.48
15	'20-Jul-2009 09:00:00'	6.22	13.53	2.21	241.80
16	'17-Jul-1999 03:00:00'	6.19	13.60	1.93	245.45
17	'10-Jun-2005 12:00:00'	6.12	11.75	1.57	229.15
18	'28-Jul-2006 06:00:00'	6.08	15.26	2.20	236.25
19	'03-Aug-2003 12:00:00'	6.05	13.25	1.72	239.39
20	'23-Jul-2007 03:00:00'	6.04	13.40	1.83	249.71
21	'09-Sep-2003 06:00:00'	6.03	15.39	1.97	237.96
22	'13-Sep-2008 12:00:00'	6.02	14.39	1.88	227.40
23	'07-Aug-2006 15:00:00'	6.02	13.00	1.81	257.90
24	'14-Jun-2002 03:00:00'	5.98	12.13	1.84	246.83
25	'27-Apr-2000 18:00:00'	5.95	13.44	1.73	239.50
26	'04-Jul-2003 21:00:00'	5.88	12.95	1.66	244.11
27	'11-May-2002 06:00:00'	5.88	14.18	1.89	244.98
28	'13-Jul-2000 18:00:00'	5.86	13.15	1.63	251.19
29	'01-Jul-2002 09:00:00'	5.86	14.17	1.81	242.41
30	'24-Jun-2000 18:00:00'	5.84	15.78	1.94	238.03
31	'19-Sep-2008 18:00:00'	5.83	14.73	1.81	235.19
32	'17-Sep-2007 03:00:00'	5.83	16.40	1.96	237.97
33	'04-Jul-2005 12:00:00'	5.83	13.55	1.79	238.43
34	'26-Jun-2003 12:00:00'	5.79	11.26	1.35	275.96
35	'26-Jul-2002 06:00:00'	5.75	14.44	1.73	233.50
36	'10-Aug-1999 21:00:00'	5.74	14.02	1.74	238.02
37	'10-May-2004 15:00:00'	5.73	12.37	1.58	260.14
38	'08-Jun-2004 00:00:00'	5.72	13.86	1.68	241.55
39	'11-Jun-2004 21:00:00'	5.72	12.74	1.49	246.45
40	'09-Sep-2001 15:00:00'	5.71	15.14	1.94	234.53

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 09:00:00'	6.89	15.93	2.71	242.87
2	'25-Aug-2004 03:00:00'	6.70	14.64	2.40	247.62
3	'11-Jul-2002 12:00:00'	6.49	14.21	2.21	240.29
4	'31-Jul-2007 00:00:00'	6.41	15.27	2.24	242.35
5	'28-Jun-2009 18:00:00'	6.33	13.28	1.90	241.64
6	'07-Sep-2005 09:00:00'	6.16	13.90	1.90	244.21
7	'02-Jul-2007 18:00:00'	5.99	13.41	1.74	246.59
8	'16-Jul-2000 21:00:00'	5.88	14.15	1.75	242.66
9	'22-Sep-2003 00:00:00'	5.85	14.68	1.81	241.89
10	'14-Aug-2009 09:00:00'	5.75	14.43	1.70	242.97
11	'02-Sep-2002 03:00:00'	5.73	14.10	1.72	237.21
12	'22-May-2009 00:00:00'	5.57	12.73	1.41	240.86
13	'19-Jun-2009 15:00:00'	5.47	13.32	1.42	237.93
14	'07-May-2002 12:00:00'	5.43	13.15	1.47	253.48
15	'20-Jul-2009 09:00:00'	5.38	13.53	1.64	241.80
16	'17-Jul-1999 03:00:00'	5.36	13.60	1.44	245.45
17	'10-Jun-2005 12:00:00'	5.29	11.75	1.17	229.15
18	'28-Jul-2006 06:00:00'	5.27	15.26	1.64	236.25
19	'03-Aug-2003 12:00:00'	5.24	13.25	1.29	239.39
20	'23-Jul-2007 03:00:00'	5.23	13.40	1.37	249.71
21	'09-Sep-2003 06:00:00'	5.22	15.39	1.48	237.96
22	'13-Sep-2008 12:00:00'	5.22	14.39	1.41	227.40
23	'07-Aug-2006 15:00:00'	5.21	13.00	1.35	257.90
24	'14-Jun-2002 03:00:00'	5.18	12.13	1.37	246.83
25	'27-Apr-2000 18:00:00'	5.16	13.44	1.30	239.50
26	'04-Jul-2003 21:00:00'	5.10	12.95	1.25	244.11
27	'11-May-2002 06:00:00'	5.10	14.18	1.41	244.98
28	'13-Jul-2000 18:00:00'	5.08	13.15	1.22	251.19
29	'24-Jun-2000 18:00:00'	5.08	15.78	1.46	238.03
30	'01-Jul-2002 09:00:00'	5.08	14.17	1.35	242.41
31	'19-Sep-2008 18:00:00'	5.07	14.73	1.36	235.19
32	'17-Sep-2007 03:00:00'	5.06	16.40	1.47	237.97
33	'04-Jul-2005 12:00:00'	5.05	13.55	1.34	238.43
34	'26-Jun-2003 12:00:00'	5.03	11.26	1.02	275.96
35	'26-Jul-2002 06:00:00'	5.00	14.44	1.31	233.50
36	'10-Aug-1999 21:00:00'	4.98	14.02	1.30	238.02
37	'08-Jun-2004 00:00:00'	4.98	13.86	1.27	241.55
38	'11-Jun-2004 21:00:00'	4.97	12.74	1.13	246.45
39	'10-May-2004 15:00:00'	4.97	12.37	1.18	260.14
40	'14-Sep-2000 15:00:00'	4.95	13.95	1.27	243.78

K1509 - South West Storm Selection
WWIII Moving Averaged Events Comparison

Location	CapeNat
Moving Average Interval	36
Title	CapeNat Top 36 Hour Moving Average Events

Note1 MW Day = 24 MW Hours

Recorded Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	'ave Swell Dir (deg)'
1	'01-Sep-2002 18:15:00'	7.13	15.74	1.39	-9999.00
2	'11-Sep-2009 03:45:00'	6.95	15.64	1.29	-9999.00
3	'25-Aug-2004 12:45:00'	6.58	15.84	1.20	-9999.00
4	'07-May-2002 14:30:00'	6.52	14.73	1.13	-9999.00
5	'11-Jul-2002 19:30:00'	6.51	14.15	1.05	-9999.00
6	'29-Jun-2009 05:30:00'	6.38	13.82	0.99	-9999.00
7	'14-Jun-2002 10:30:00'	6.37	14.07	1.03	-9999.00
8	'16-Jul-1999 18:45:00'	6.33	13.42	0.95	-9999.00
9	'20-Jul-2009 20:30:00'	6.33	14.76	1.09	-9999.00
10	'30-Jul-2007 16:15:00'	6.26	15.25	1.05	-9999.00
11	'10-May-2004 10:30:00'	6.18	13.37	0.91	-9999.00
12	'08-Oct-1999 08:45:00'	6.12	13.46	0.94	-9999.00
13	'17-Jul-2000 09:30:00'	6.04	13.66	0.85	-9999.00
14	'11-May-2002 09:30:00'	6.02	14.49	0.96	-9999.00
15	'01-Sep-2007 16:15:00'	5.94	17.67	1.08	-9999.00
16	'01-Jul-2002 17:30:00'	5.88	13.98	0.86	-9999.00
17	'01-Oct-2005 00:00:00'	5.88	15.54	0.96	-9999.00
18	'12-Jun-2005 05:30:00'	5.87	13.60	0.85	-9999.00
19	'15-Jul-2000 04:15:00'	5.87	15.13	0.91	-9999.00
20	'15-Sep-2000 22:15:00'	5.86	15.38	0.96	-9999.00
21	'01-Aug-2007 05:15:00'	5.85	14.79	0.91	-9999.00
22	'04-Jul-2005 11:30:00'	5.83	14.72	0.90	-9999.00
23	'23-Sep-2003 00:15:00'	5.79	14.05	0.83	-9999.00
24	'18-Aug-1999 11:45:00'	5.74	12.93	0.75	-9999.00
25	'18-Jun-1999 23:45:00'	5.73	14.98	0.88	-9999.00
26	'13-Sep-2008 14:45:00'	5.73	14.92	0.86	-9999.00
27	'12-Sep-2009 16:45:00'	5.71	15.63	0.87	-9999.00
28	'05-Jul-2003 20:15:00'	5.68	13.05	0.74	-9999.00
29	'27-Jun-2009 16:30:00'	5.64	11.39	0.64	-9999.00
30	'21-Sep-2003 01:15:00'	5.62	13.65	0.75	-9999.00
31	'19-Jul-2008 00:15:00'	5.60	12.96	0.71	-9999.00
32	'03-Aug-2003 08:15:00'	5.59	12.46	0.68	-9999.00
33	'02-Aug-2000 13:30:00'	5.56	14.86	0.80	-9999.00
34	'16-Jul-2009 23:45:00'	5.55	13.44	0.76	-9999.00
35	'28-Apr-2000 06:45:00'	5.55	14.18	0.77	-9999.00
36	'26-Aug-2007 21:15:00'	5.53	13.86	0.77	-9999.00
37	'22-May-2009 12:45:00'	5.53	12.30	0.66	-9999.00
38	'23-Jul-2000 05:15:00'	5.48	15.17	0.81	-9999.00
39	'25-Jun-2000 07:15:00'	5.47	17.45	0.88	-9999.00
40	'08-Jun-2004 08:45:00'	5.46	14.28	0.75	-9999.00

UnFactored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 00:00:00'	8.86	16.12	2.22	245.00
2	'24-Aug-2004 15:00:00'	8.64	14.73	1.96	248.91
3	'11-Jul-2002 12:00:00'	8.29	14.53	1.79	242.94
4	'30-Jul-2007 18:00:00'	8.04	15.01	1.70	245.20
5	'20-Jul-2009 12:00:00'	7.90	14.21	1.74	245.87
6	'06-Sep-2005 18:00:00'	7.79	13.93	1.52	247.36
7	'01-Sep-2002 15:00:00'	7.70	14.55	1.55	242.82
8	'29-Jun-2009 00:00:00'	7.60	13.83	1.42	236.64
9	'02-Jul-2007 06:00:00'	7.56	13.48	1.38	251.32
10	'14-Jun-2002 03:00:00'	7.55	13.47	1.47	244.41
11	'07-Aug-2006 18:00:00'	7.45	12.93	1.31	264.52
12	'27-Jul-2006 18:00:00'	7.31	16.20	1.59	239.41
13	'17-Jul-2000 06:00:00'	7.25	13.96	1.29	244.88
14	'22-Sep-2003 12:00:00'	7.17	14.46	1.34	240.34
15	'07-May-2002 03:00:00'	7.16	14.18	1.33	256.16
16	'22-May-2009 06:00:00'	7.06	12.47	1.11	242.29
17	'16-Jul-1999 15:00:00'	7.03	13.86	1.23	249.97
18	'01-Jul-2002 12:00:00'	7.03	13.94	1.26	246.59
19	'14-Aug-2009 03:00:00'	7.02	14.68	1.30	244.09
20	'10-May-2004 03:00:00'	6.98	12.72	1.14	269.64
21	'11-May-2002 03:00:00'	6.97	14.59	1.30	247.57
22	'22-Jul-2007 03:00:00'	6.96	14.39	1.33	253.82
23	'09-Sep-2001 18:00:00'	6.90	16.51	1.41	237.96
24	'04-Jul-2005 03:00:00'	6.90	14.23	1.25	244.30
25	'19-Jun-2009 18:00:00'	6.78	13.03	1.06	240.37
26	'12-Sep-2009 15:00:00'	6.77	15.12	1.25	236.51
27	'18-Aug-1999 03:00:00'	6.76	12.41	1.04	257.68
28	'05-Jul-2003 12:00:00'	6.72	13.37	1.11	243.31
29	'27-Jun-2009 09:00:00'	6.72	11.37	0.92	259.60
30	'11-Jun-2005 21:00:00'	6.70	12.88	1.04	225.86
31	'16-Jul-2009 18:00:00'	6.69	12.99	1.13	243.14
32	'26-Aug-2004 06:00:00'	6.57	15.04	1.16	241.09
33	'18-Jun-1999 12:00:00'	6.53	14.06	1.15	247.03
34	'03-Aug-2003 06:00:00'	6.52	12.36	0.95	244.64
35	'10-Aug-1999 18:00:00'	6.51	14.42	1.10	240.66
36	'26-Aug-2007 15:00:00'	6.50	12.94	1.02	251.20
37	'25-Jun-2003 18:00:00'	6.47	11.68	0.89	277.06
38	'27-Sep-2005 15:00:00'	6.45	13.65	1.05	235.85
39	'27-Apr-2000 21:00:00'	6.43	13.32	0.98	239.95
40	'15-Sep-2000 18:00:00'	6.40	14.40	1.11	246.30

Factored WWIII Data					
Rank	Event Centre'	'mean Hs (m)'	'mean Tp (s)'	Net Power (MW Days)'	ave Total Dir (deg)'
1	'11-Sep-2009 00:00:00'	7.60	16.12	1.63	245.00
2	'24-Aug-2004 15:00:00'	7.40	14.73	1.44	248.91
3	'11-Jul-2002 12:00:00'	7.11	14.53	1.32	242.94
4	'30-Jul-2007 18:00:00'	6.90	15.01	1.25	245.20
5	'20-Jul-2009 12:00:00'	6.79	14.21	1.28	245.87
6	'06-Sep-2005 18:00:00'	6.68	13.93	1.11	247.36
7	'01-Sep-2002 15:00:00'	6.60	14.55	1.14	242.82
8	'29-Jun-2009 00:00:00'	6.52	13.83	1.05	236.64
9	'14-Jun-2002 03:00:00'	6.49	13.47	1.09	244.41
10	'02-Jul-2007 06:00:00'	6.49	13.48	1.01	251.32
11	'07-Aug-2006 18:00:00'	6.40	12.93	0.96	264.52
12	'27-Jul-2006 18:00:00'	6.29	16.20	1.17	239.41
13	'17-Jul-2000 06:00:00'	6.23	13.96	0.95	244.88
14	'22-Sep-2003 12:00:00'	6.17	14.46	0.99	240.34
15	'07-May-2002 03:00:00'	6.16	14.18	0.98	256.16
16	'22-May-2009 06:00:00'	6.08	12.47	0.82	242.29
17	'01-Jul-2002 12:00:00'	6.05	13.94	0.93	246.59
18	'16-Jul-1999 15:00:00'	6.05	13.86	0.91	249.97
19	'14-Aug-2009 03:00:00'	6.04	14.68	0.96	244.09
20	'10-May-2004 03:00:00'	6.01	12.72	0.84	269.64
21	'22-Jul-2007 03:00:00'	6.00	14.39	0.98	253.82
22	'11-May-2002 03:00:00'	6.00	14.59	0.96	247.57
23	'09-Sep-2001 18:00:00'	5.94	16.51	1.04	237.96
24	'04-Jul-2005 03:00:00'	5.94	14.23	0.92	244.30
25	'12-Sep-2009 15:00:00'	5.84	15.12	0.93	236.51
26	'19-Jun-2009 18:00:00'	5.84	13.03	0.78	240.37
27	'18-Aug-1999 03:00:00'	5.82	12.41	0.77	257.68
28	'05-Jul-2003 12:00:00'	5.79	13.37	0.82	243.31
29	'27-Jun-2009 09:00:00'	5.79	11.37	0.68	259.60
30	'16-Jul-2009 18:00:00'	5.77	12.99	0.84	243.14
31	'11-Jun-2005 21:00:00'	5.77	12.88	0.77	225.86
32	'26-Aug-2004 06:00:00'	5.67	15.04	0.86	241.09
33	'18-Jun-1999 12:00:00'	5.64	14.06	0.85	247.03
34	'03-Aug-2003 06:00:00'	5.63	12.36	0.70	244.64
35	'10-Aug-1999 18:00:00'	5.62	14.42	0.82	240.66
36	'26-Aug-2007 15:00:00'	5.62	12.94	0.76	251.20
37	'25-Jun-2003 18:00:00'	5.59	11.68	0.66	277.06
38	'27-Sep-2005 15:00:00'	5.58	13.65	0.78	235.85
39	'27-Apr-2000 21:00:00'	5.56	13.32	0.73	239.95
40	'15-Sep-2000 18:00:00'	5.53	14.40	0.83	246.30

Appendix B Top Periods Identified by Moving Average & Wave Threshold Analysis

Location	Geraldton
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'18-Jul-1996 02:00:00'	72	5.67	14.85	6.52	1.74	99.23	228.99	-9999.00	-9999.00	0.27	0.84
2	a	'16-Jul-1990 17:00:00'	72	5.49	15.26	7.22	1.73	95.93	227.00	-9999.00	-9999.00	0.04	0.41
3	a	'28-Jul-1993 23:00:00'	72	5.41	16.54	5.92	1.68	88.34	224.19	-9999.00	-9999.00	0.07	0.62
4	a	'08-Jun-1995 05:00:00'	72	5.24	13.64	6.83	1.39	85.82	229.72	-9999.00	-9999.00	0.29	0.77
5	a	'02-Aug-1991 23:00:00'	72	5.09	15.61	6.43	1.46	79.98	226.10	-9999.00	-9999.00	0.10	0.62
6	a	'12-Sep-2009 02:00:00'	72	5.00	16.37	6.11	1.50	78.70	224.83	-9999.00	-9999.00	0.09	0.52
7	a	'25-Aug-2004 14:00:00'	72	4.92	15.22	6.34	1.37	76.65	226.78	-9999.00	-9999.00	0.05	0.60
8	a	'05-Jun-1997 05:00:00'	72	4.86	16.14	6.45	1.43	75.54	221.48	-9999.00	-9999.00	0.07	0.54
9	a	'12-Jul-2002 08:00:00'	72	4.81	14.75	6.58	1.28	73.13	222.93	-9999.00	-9999.00	0.09	0.60
10	a	'24-May-1994 17:00:00'	72	4.71	13.60	7.71	1.26	76.57	225.01	-9999.00	-9999.00	0.15	0.66
11	a	'23-Jul-1990 23:00:00'	72	4.71	13.70	6.34	1.21	72.05	223.06	-9999.00	-9999.00	-0.01	0.56
12	a	'21-Jul-2009 02:00:00'	72	4.70	13.39	7.00	1.26	76.20	226.23	-9999.00	-9999.00	0.16	0.84
13	a	'31-Jul-2007 17:00:00'	72	4.67	15.68	5.54	1.24	67.69	225.29	-9999.00	-9999.00	0.15	0.78
14	a	'29-Jun-2009 14:00:00'	72	4.51	13.93	6.04	1.05	64.14	221.53	-9999.00	-9999.00	0.28	0.65
15	a	'24-Jul-1996 05:00:00'	72	4.45	14.82	5.75	1.06	62.06	229.49	-9999.00	-9999.00	0.15	0.63
16	a	'07-Aug-1998 05:00:00'	72	4.44	15.72	5.94	1.17	63.04	226.55	-9999.00	-9999.00	0.05	0.41
17	a	'19-Nov-1992 23:00:00'	72	4.41	13.89	6.84	1.12	65.65	217.74	-9999.00	-9999.00	-0.15	0.14
18	a	'04-Jul-1991 02:00:00'	72	4.40	15.58	6.52	1.22	65.34	224.05	-9999.00	-9999.00	0.05	0.42
19	a	'20-Jul-1989 14:00:00'	72	4.39	17.19	5.93	1.22	62.18	224.64	-9999.00	-9999.00	0.24	0.71
20	a	'29-Aug-1989 23:00:00'	72	4.38	16.34	5.95	1.14	60.51	222.30	-9999.00	-9999.00	0.00	0.41
21	a	'22-Sep-2003 17:00:00'	72	4.33	15.06	5.02	1.02	57.41	225.69	-9999.00	-9999.00	-0.02	0.38
22	a	'02-Jul-1992 05:00:00'	72	4.32	14.81	5.35	1.01	57.61	225.68	-9999.00	-9999.00	-0.01	0.48
23	a	'10-Oct-1997 14:00:00'	72	4.31	14.88	4.82	1.01	57.47	224.77	-9999.00	-9999.00	-0.14	0.40
24	a	'07-Sep-2005 11:00:00'	72	4.28	14.45	4.77	0.95	56.22	226.65	-9999.00	-9999.00	0.14	0.59
25	a	'07-Sep-1991 23:00:00'	72	4.28	16.80	5.23	1.10	56.74	224.90	-9999.00	-9999.00	-0.05	0.39
26	a	'22-May-2009 20:00:00'	72	4.24	13.27	5.38	0.88	56.75	224.31	-9999.00	-9999.00	0.37	0.89
27	a	'22-Sep-1998 08:00:00'	72	4.23	14.69	5.85	1.02	59.52	223.37	-9999.00	-9999.00	-0.01	0.40
28	a	'03-Jul-2007 05:00:00'	72	4.23	13.79	6.05	0.94	56.49	227.66	-9999.00	-9999.00	0.24	0.80
29	a	'02-Sep-2002 23:00:00'	72	4.22	14.64	5.61	1.00	57.27	221.48	-9999.00	-9999.00	-0.03	0.31
30	a	'14-Jul-1986 14:00:00'	72	4.19	15.03	6.17	1.00	56.69	220.62	-9999.00	-9999.00	0.14	0.39
31	a	'14-Aug-2009 20:00:00'	72	4.18	15.03	5.59	0.95	54.33	227.01	-9999.00	-9999.00	0.18	0.69
32	a	'16-Sep-1996 02:00:00'	72	4.17	15.10	6.08	1.02	56.04	230.47	-9999.00	-9999.00	0.17	0.47
33	a	'15-Jul-1988 02:00:00'	72	4.16	15.52	5.60	1.04	55.38	224.33	-9999.00	-9999.00	0.05	0.46
34	a	'21-Sep-1989 08:00:00'	72	4.14	16.46	5.43	1.03	53.98	222.30	-9999.00	-9999.00	-0.01	0.51
35	a	'18-Jul-2000 02:00:00'	72	4.13	14.85	5.41	0.94	53.62	224.63	-9999.00	-9999.00	0.19	0.76
36	a	'18-Jul-2008 08:00:00'	72	4.13	14.60	6.19	0.91	55.50	227.00	-9999.00	-9999.00	0.21	0.72
37	a	'16-Aug-1988 02:00:00'	72	4.09	13.78	5.65	0.91	53.87	231.09	-9999.00	-9999.00	0.14	0.51
38	a	'17-Aug-2005 23:00:00'	72	4.08	14.14	5.86	0.90	54.02	224.24	-9999.00	-9999.00	0.09	0.59
39	a	'26-Aug-1987 23:00:00'	72	4.07	16.12	5.82	1.03	54.74	221.19	-9999.00	-9999.00	-0.21	0.48
40	a	'23-Jul-2007 14:00:00'	72	4.06	14.18	5.45	0.86	51.35	230.61	-9999.00	-9999.00	0.29	0.66
41	a	'20-Jun-1996 14:00:00'	72	4.05	13.01	4.68	0.75	49.61	229.68	-9999.00	-9999.00	0.29	0.73
42	a	'28-Jul-2006 23:00:00'	72	4.02	15.76	6.08	1.03	54.28	222.83	-9999.00	-9999.00	0.02	0.50
43	a	'19-Jun-1988 11:00:00'	72	4.02	15.04	5.67	0.92	51.21	226.24	-9999.00	-9999.00	0.10	0.42
44	a	'29-Jul-1996 08:00:00'	72	4.01	14.72	4.85	0.84	48.96	230.60	-9999.00	-9999.00	0.31	0.91
45	a	'13-Jul-1990 14:00:00'	72	3.98	14.13	5.79	0.91	52.55	227.92	-9999.00	-9999.00	0.15	0.57
46	a	'10-Jun-1998 05:00:00'	72	3.98	13.02	5.40	0.75	48.59	229.76	-9999.00	-9999.00	0.26	0.80
47	a	'09-Jun-1990 20:00:00'	72	3.97	14.58	5.54	0.88	50.50	224.87	-9999.00	-9999.00	0.10	0.59
48	a	'27-Jun-1991 05:00:00'	72	3.92	14.97	5.41	0.84	47.88	219.05	-9999.00	-9999.00	0.16	0.62
49	a	'09-Sep-2003 17:00:00'	72	3.92	15.67	4.70	0.85	46.44	223.27	-9999.00	-9999.00	-0.02	0.34
50	a	'12-Aug-1990 08:00:00'	72	3.91	15.64	5.55	0.91	48.87	222.10	-9999.00	-9999.00	-0.11	0.17
51	a	'05-Jun-1998 20:00:00'	72	3.90	15.62	5.52	0.92	50.91	223.95	-9999.00	-9999.00	0.27	0.57
52	a	'24-Jul-1988 08:00:00'	72	3.88	14.58	5.14	0.76	46.61	232.62	-9999.00	-9999.00	0.20	0.73
53	a	'02-Oct-1991 11:00:00'	72	3.86	16.18	5.49	0.88	46.54	229.45	-9999.00	-9999.00	-0.21	0.08
54	a	'23-Aug-2003 02:00:00'	72	3.86	12.48	5.61	0.69	49.64	224.44	-9999.00	-9999.00	-0.05	0.57
55	a	'19-Jun-1987 17:00:00'	72	3.85	15.04	4.57	0.76	44.16	223.05	-9999.00	-9999.00	0.13	0.39
56	a	'20-Jul-1995 23:00:00'	72	3.85	13.17	5.09	0.75	47.82	230.72	-9999.00	-9999.00	0.08	0.52
57	a	'13-May-1988 20:00:00'	72	3.83	14.71	5.26	0.81	46.76	223.15	-9999.00	-9999.00	0.34	0.65
58	a	'11-Sep-2001 02:00:00'	72	3.82	16.11	5.55	0.92	48.37	221.90	-9999.00	-9999.00	-0.08	0.23
59	a	'29-Jun-1992 02:00:00'	72	3.82	13.72	5.09	0.74	45.93	230.19	-9999.00	-9999.00	0.16	0.69
60	a	'02-Jun-1988 05:00:00'	72	3.78	13.10	4.76	0.66	43.94	229.84	-9999.00	-9999.00	0.29	0.89
61	a	'30-Sep-1998 05:00:00'	72	3.78	15.78	5.08	0.83	44.53	223.78	-9999.00	-9999.00	0.05	0.37
62	a	'28-Jun-1996 02:00:00'	72	3.78	15.31	5.47	0.83	46.81	229.50	-9999.00	-9999.00	0.26	0.71
63	a	'08-Aug-2006 17:00:00'	72	3.77	13.45	5.66	0.76	47.83	232.56	-9999.00	-9999.00	-0.04	0.64
64	a	'12-May-2002 05:00:00'	72	3.77	14.72	5.57	0.83	46.98	227.47	-9999.00	-9999.00	0.19	0.59
65	a	'05-Aug-2002 17:00:00'	72	3.77	15.68	4.98	0.82	45.15	223.83	-9999.00	-9999.00	0.00	0.55
66	a	'05-Jul-1998 20:00:00'	72	3.77	13.40	5.37	0.69	44.27	223.86	-9999.00	-9999.00	0.13	0.63
67	a	'01-Aug-1996 11:00:00'	72	3.75	14.21	4.22	0.71	42.59	224.48	-9999.00	-9999.00	0.10	0.53
68	a	'14-Jul-1989 11:00:00'	72	3.75	14.73	5.49	0.77	44.69	220.38	-9999.00	-9999.00	0.05	0.42
69	a	'11-Aug-1999 17:00:00'	72	3.75	14.38	5.68	0.80	47.07	224.61	-9999.00	-9999.00	-0.01	0.53
70	a	'19-Aug-1989 02:00:00'	72	3.75	15.20	5.65	0.83	46.32	226.23	-9999.00	-9999.00	0.06	0.48
71	a	'20-Jun-2009 08:00:00'	72	3.74	13.68	5.41	0.70	43.46	223.07	-9999.00	-9999.00	0.22	0.76
72	a	'27-Jun-2003 08:00:00'	72	3.74	12.42	4.65	0.62	43.06	239.52	-9999.00	-9999.00	0.37	0.91
73	a	'14-Jul-2000 20:00:00'	72	3.73	14.00	4.26	0.70	42.52	229.10	-9999.00	-9999.00	0.22	0.79
74	a	'30-Jun-1989 05:00:00'	72	3.73	14.53	4.87	0.73	43.25	223.09	-9999.00	-9999.00	0.17	0.63
75	a	'24-Sep-1990 05:00:00'	72	3.73	16.67	4.36	0.81	42.39	222.67	-9999.00	-9999.00	-0.01	0.53
76	a	'03-Aug-1990 14:00:00'	72	3.72	14.57	4.31	0.73	42.93	228.55	-9999.00	-9999.00	0.09	0.64
77	a	'10-Apr-1991 14:00:00'	72	3.72	15.62	4.93	0.81	43.92	223.91	-9999.00	-9999.00	0.24	0.53
78	a	'21-Sep-1988 08:00:00'	72	3.72	13.95	5.18	0.68	42.29	228.57	-9999.00	-9999.00	0.16	0.69
79	a	'01-Jul-2002 20:00:00'	72	3.72	15.50	5.47	0.80	44.67	224.54	-9999.00	-9999.00	0.11	0.44
80	a	'27-Aug-1992 11:00:00'	72	3.71	14.23	4.95	0.73	43.07	224.67	-9999.00	-9999.00	0.08	0.49
81	a	'18-Jun-1999 08:00:00'	72	3.71	13.83	5.51	0.73	44.07	229.33	-9999.00	-9999.00	0.27	0.63
82	a	'03-Sep-1999 11:00:00'	72	3.71	13.64	5.52	0.69	44.64	225.85	-9999.00	-9999.00	-0.01	0.49
83	a	'14-Jul-1987 14:00:00'	72	3.71	15.84	4.36	0.79	42.57	217.99	-9999.00	-9999.00	-0.09	0.38
84	a	'23-May-1995 02:00:00'	72	3.70	14.55	5.66							

Location	Geraldton
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'27-May-1999 01:30:00'	72	2.28	10.96	3.59	0.19	15.91	240.87	-9999.00	-9999.00	0.56	0.93
2	c	'14-May-1999 01:30:00'	72	1.26	12.65	1.43	0.07	4.53	221.38	-9999.00	-9999.00	0.54	0.89
3	c	'16-Jul-1996 10:30:00'	72	3.92	12.79	6.52	0.77	51.74	236.14	-9999.00	-9999.00	0.50	0.96
4	c	'05-Apr-2008 01:30:00'	72	1.21	13.60	1.50	0.07	4.27	224.56	-9999.00	-9999.00	0.50	0.75
5	c	'26-Jun-2003 01:30:00'	72	3.18	14.31	4.65	0.53	32.04	234.29	-9999.00	-9999.00	0.49	0.91
6	c	'21-May-2009'	72	3.30	14.27	5.38	0.56	34.82	227.04	-9999.00	-9999.00	0.49	0.93
7	c	'30-Mar-2008 13:30:00'	72	1.10	12.92	1.52	0.05	3.51	216.72	-9999.00	-9999.00	0.48	0.91
8	c	'25-Apr-2000 19:30:00'	72	2.32	14.14	3.72	0.29	17.04	228.63	-9999.00	-9999.00	0.46	0.77
9	c	'29-May-2000 22:30:00'	72	0.98	14.70	2.16	0.06	3.16	223.05	-9999.00	-9999.00	0.45	0.82
10	c	'26-Jun-1986 16:30:00'	72	3.03	11.44	3.74	0.36	28.99	238.87	-9999.00	-9999.00	0.45	0.81
11	c	'21-Jun-1995 01:30:00'	72	1.75	13.44	2.01	0.14	9.03	232.15	-9999.00	-9999.00	0.44	0.79
12	c	'02-Jun-2005 22:30:00'	72	1.32	13.19	1.48	0.08	5.08	222.06	-9999.00	-9999.00	0.44	0.78
13	c	'13-Jun-2000 22:30:00'	72	2.76	14.56	3.68	0.40	23.14	229.60	-9999.00	-9999.00	0.44	0.88
14	c	'09-Apr-1999 13:30:00'	72	1.50	12.56	1.69	0.09	6.51	218.46	-9999.00	-9999.00	0.43	0.67
15	c	'20-Apr-1991 13:30:00'	72	1.47	14.31	2.25	0.11	6.50	230.31	-9999.00	-9999.00	0.43	0.84
16	c	'05-Mar-1990 13:30:00'	72	14.27	14.27	2.71	0.27	15.94	222.60	-9999.00	-9999.00	0.43	0.90
17	c	'23-Mar-1999 13:30:00'	72	1.43	13.55	1.59	0.09	5.91	223.09	-9999.00	-9999.00	0.43	0.79
18	c	'13-Apr-1999 22:30:00'	72	1.19	12.76	1.51	0.06	4.07	223.25	-9999.00	-9999.00	0.42	0.60
19	c	'30-May-2001 16:30:00'	72	2.45	14.21	3.23	0.31	18.37	226.49	-9999.00	-9999.00	0.42	0.75
20	c	'03-Jun-2002 19:30:00'	72	2.73	13.93	3.54	0.37	22.28	228.44	-9999.00	-9999.00	0.42	0.70
21	c	'01-Jul-2007 07:30:00'	72	3.25	12.87	4.56	0.47	31.08	232.00	-9999.00	-9999.00	0.41	0.97
22	c	'10-Jun-2000 22:30:00'	72	1.66	14.22	2.71	0.15	9.12	229.25	-9999.00	-9999.00	0.41	0.75
23	c	'27-Mar-2008 10:30:00'	72	1.09	13.70	1.23	0.06	3.65	217.38	-9999.00	-9999.00	0.41	0.81
24	c	'26-Feb-1989 22:30:00'	72	1.49	13.14	2.00	0.10	6.43	216.69	-9999.00	-9999.00	0.41	0.70
25	c	'09-Jun-1998 01:30:00'	72	3.53	12.03	4.58	0.53	37.42	239.92	-9999.00	-9999.00	0.40	0.92
26	c	'28-Jul-2001 22:30:00'	72	1.89	13.87	2.41	0.17	10.39	225.60	-9999.00	-9999.00	0.40	0.76
27	c	'26-May-1989 19:30:00'	72	2.41	15.32	3.56	0.33	18.00	221.69	-9999.00	-9999.00	0.40	0.79
28	c	'08-Jun-2008 19:30:00'	72	1.65	13.14	3.10	0.14	9.40	227.49	-9999.00	-9999.00	0.40	0.93
29	c	'15-May-2003 04:30:00'	72	2.47	12.85	5.64	0.28	19.76	230.60	-9999.00	-9999.00	0.40	0.91
30	c	'12-Jun-1989 19:30:00'	72	2.07	15.08	2.38	0.22	12.46	224.74	-9999.00	-9999.00	0.39	0.66
31	c	'28-Jun-2007 04:30:00'	72	2.15	14.33	2.94	0.24	14.30	230.16	-9999.00	-9999.00	0.39	0.87
32	c	'01-Apr-1989 22:30:00'	72	2.58	14.42	3.75	0.33	19.83	223.96	-9999.00	-9999.00	0.39	0.67
33	c	'15-Apr-2008 19:30:00'	72	1.33	12.65	2.00	0.08	5.61	227.30	-9999.00	-9999.00	0.39	0.59
34	c	'02-Jul-1998 19:30:00'	72	2.19	15.79	3.21	0.27	14.39	227.91	-9999.00	-9999.00	0.39	0.67
35	c	'07-Mar-2008 01:30:00'	72	1.88	12.57	2.20	0.15	10.34	221.74	-9999.00	-9999.00	0.39	0.74
36	c	'20-Mar-2000 04:30:00'	72	2.08	14.57	2.73	0.23	12.94	219.21	-9999.00	-9999.00	0.39	0.72
37	c	'01-May-2005 22:30:00'	72	1.42	11.52	1.97	0.08	5.96	219.95	-9999.00	-9999.00	0.38	0.78
38	c	'22-Jun-2003 22:30:00'	72	1.69	14.22	1.89	0.14	8.29	228.70	-9999.00	-9999.00	0.38	0.70
39	c	'30-May-2008 22:30:00'	72	1.90	13.72	2.68	0.16	10.63	219.73	-9999.00	-9999.00	0.38	0.75
40	c	'01-Jun-1988 04:30:00'	72	3.59	14.18	4.76	0.61	37.84	227.96	-9999.00	-9999.00	0.38	0.89
41	c	'20-May-2001'	72	1.77	15.24	2.29	0.17	9.18	227.16	-9999.00	-9999.00	0.38	0.78
42	c	'09-May-1995 22:30:00'	72	1.62	14.02	2.74	0.11	7.88	226.16	-9999.00	-9999.00	0.38	0.54
43	c	'05-May-1999 07:30:00'	72	2.45	14.85	2.78	0.30	17.22	221.15	-9999.00	-9999.00	0.38	0.75
44	c	'27-Apr-2008 19:30:00'	72	1.49	14.75	2.17	0.11	6.56	221.81	-9999.00	-9999.00	0.38	0.72
45	c	'09-May-2000 19:30:00'	72	1.63	12.95	2.48	0.12	7.75	217.73	-9999.00	-9999.00	0.38	0.74
46	c	'06-Jun-1995 22:30:00'	72	4.03	13.64	5.75	0.76	49.17	233.86	-9999.00	-9999.00	0.38	0.77
47	c	'12-Jun-1992 01:30:00'	72	2.57	14.91	3.17	0.36	20.43	226.55	-9999.00	-9999.00	0.38	0.77
48	c	'18-May-1999 10:30:00'	72	1.54	14.06	2.56	0.11	7.08	231.39	-9999.00	-9999.00	0.38	0.92
49	c	'25-Mar-2000 07:30:00'	72	1.96	13.73	3.00	0.20	11.72	217.87	-9999.00	-9999.00	0.37	0.65
50	c	'07-Apr-2000 04:30:00'	72	1.17	13.96	1.67	0.07	4.41	222.46	-9999.00	-9999.00	0.37	0.74
51	c	'13-May-1988'	72	3.68	15.50	5.26	0.74	41.55	225.95	-9999.00	-9999.00	0.37	0.65
52	c	'23-Apr-1989 04:30:00'	72	2.57	15.28	3.93	0.37	20.41	222.89	-9999.00	-9999.00	0.37	0.89
53	c	'06-Jun-2005 04:30:00'	72	2.33	12.60	3.55	0.21	16.37	227.22	-9999.00	-9999.00	0.37	0.88
54	c	'22-Jul-2007 19:30:00'	72	3.86	14.60	5.45	0.80	46.08	228.40	-9999.00	-9999.00	0.37	0.66
55	c	'10-May-1999 22:30:00'	72	1.46	14.00	1.86	0.12	6.92	215.15	-9999.00	-9999.00	0.37	0.68
56	c	'03-Jul-2000 07:30:00'	72	2.58	11.44	3.55	0.27	20.13	224.71	-9999.00	-9999.00	0.37	0.93
57	c	'24-Jun-2009 07:30:00'	72	2.67	12.54	4.09	0.37	23.62	229.47	-9999.00	-9999.00	0.37	1.06
58	c	'21-Apr-2000 07:30:00'	72	1.11	12.19	1.43	0.05	3.53	218.81	-9999.00	-9999.00	0.37	0.71
59	c	'09-May-2004 10:30:00'	72	2.92	12.51	5.15	0.39	26.54	235.21	-9999.00	-9999.00	0.36	1.05
60	c	'24-Jun-1988 19:30:00'	72	2.92	14.77	3.53	0.43	24.92	231.38	-9999.00	-9999.00	0.36	0.79
61	c	'02-May-1999 04:30:00'	72	1.93	13.18	3.19	0.21	12.73	223.80	-9999.00	-9999.00	0.36	0.67
62	c	'27-Jun-1999 01:30:00'	72	2.46	13.64	3.02	0.29	17.85	230.24	-9999.00	-9999.00	0.36	0.72
63	c	'19-Jun-1996 04:30:00'	72	3.91	13.19	4.68	0.69	45.31	232.86	-9999.00	-9999.00	0.36	0.73
64	c	'23-Jun-2008 18:00:00'	72	1.53	14.29	2.10	0.12	6.81	230.47	-9999.00	-9999.00	0.36	0.66
65	c	'08-Apr-2008 04:30:00'	72	1.97	13.80	2.68	0.19	11.84	221.56	-9999.00	-9999.00	0.36	0.75
66	c	'17-May-2009 22:30:00'	72	1.38	14.00	1.68	0.09	5.54	223.69	-9999.00	-9999.00	0.36	0.55
67	c	'02-Jan-2008 13:30:00'	72	2.08	13.20	2.61	0.19	12.46	219.02	-9999.00	-9999.00	0.36	0.70
68	c	'04-Jul-1999 19:30:00'	72	2.10	14.01	2.80	0.24	14.35	232.01	-9999.00	-9999.00	0.35	0.60
69	c	'18-Dec-1999 10:30:00'	72	1.08	11.81	1.54	0.05	3.38	220.47	-9999.00	-9999.00	0.35	0.69
70	c	'06-May-2001 01:30:00'	72	1.58	11.26	2.12	0.09	7.55	223.36	-9999.00	-9999.00	0.35	0.88
71	c	'09-Apr-2009 01:30:00'	72	1.22	14.01	1.75	0.08	4.74	225.14	-9999.00	-9999.00	0.35	0.62
72	c	'28-Jun-2009 13:30:00'	72	4.16	12.84	6.04	0.79	51.20	226.70	-9999.00	-9999.00	0.35	0.65
73	c	'03-Jun-1998 22:30:00'	72	2.57	18.07	5.32	0.42	21.40	222.37	-9999.00	-9999.00	0.35	0.56
74	c	'05-Jun-1987 22:30:00'	72	1.56	13.06	2.49	0.10	7.73	237.84	-9999.00	-9999.00	0.35	0.64
75	c	'21-Mar-2008 01:30:00'	72	1.37	12.23	1.50	0.08	5.38	214.59	-9999.00	-9999.00	0.35	0.61
76	c	'11-Apr-2000 10:30:00'	72	1.72	14.00	2.17	0.14	8.56	218.77	-9999.00	-9999.00	0.35	0.70
77	c	'17-May-1997 22:30:00'	72	1.95	12.09	3.54	0.15	12.19	232.40	-9999.00	-9999.00	0.35	0.70
78	c	'13-Dec-1995 04:30:00'	72	1.23	12.33	1.65	0.06	4.42	218.35	-9999.00	-9999.00	0.35	0.65
79	c	'22-Apr-2008 04:30:00'	72	1.90	13.82	2.67	0.17	10.88	222.82	-9999.00	-9999.00	0.35	0.70
80	c	'21-Jul-2004 16:30:00'	72	2.27	14.82	2.82	0.27	15.48	223.03	-9999.00	-9999.00	0.35	0.92
81	c	'12-Jul-1995 04:30:00'	72	3.38	13.61	5.63	0.64	38.63	232.68	-9999.00	-9999.00	0.35	0.97
82	c	'08-Feb-1999 10:30:00'	72	1.58	11.88	2.46	0.10	7.15	216.79	-9999.00	-9999.00	0.34	0.61
83	c	'27-Jun-2008 22:30:00'	72	2.95	14.03	3.64	0.42	25.17	222.73	-9999.00	-9999.00	0.34	0.65
84	c	'08-Apr-2006 16:30:00'	72	1.52	14.91	2.08	0.12	6.89	221.37	-9999.00	-9999.00	0.34	

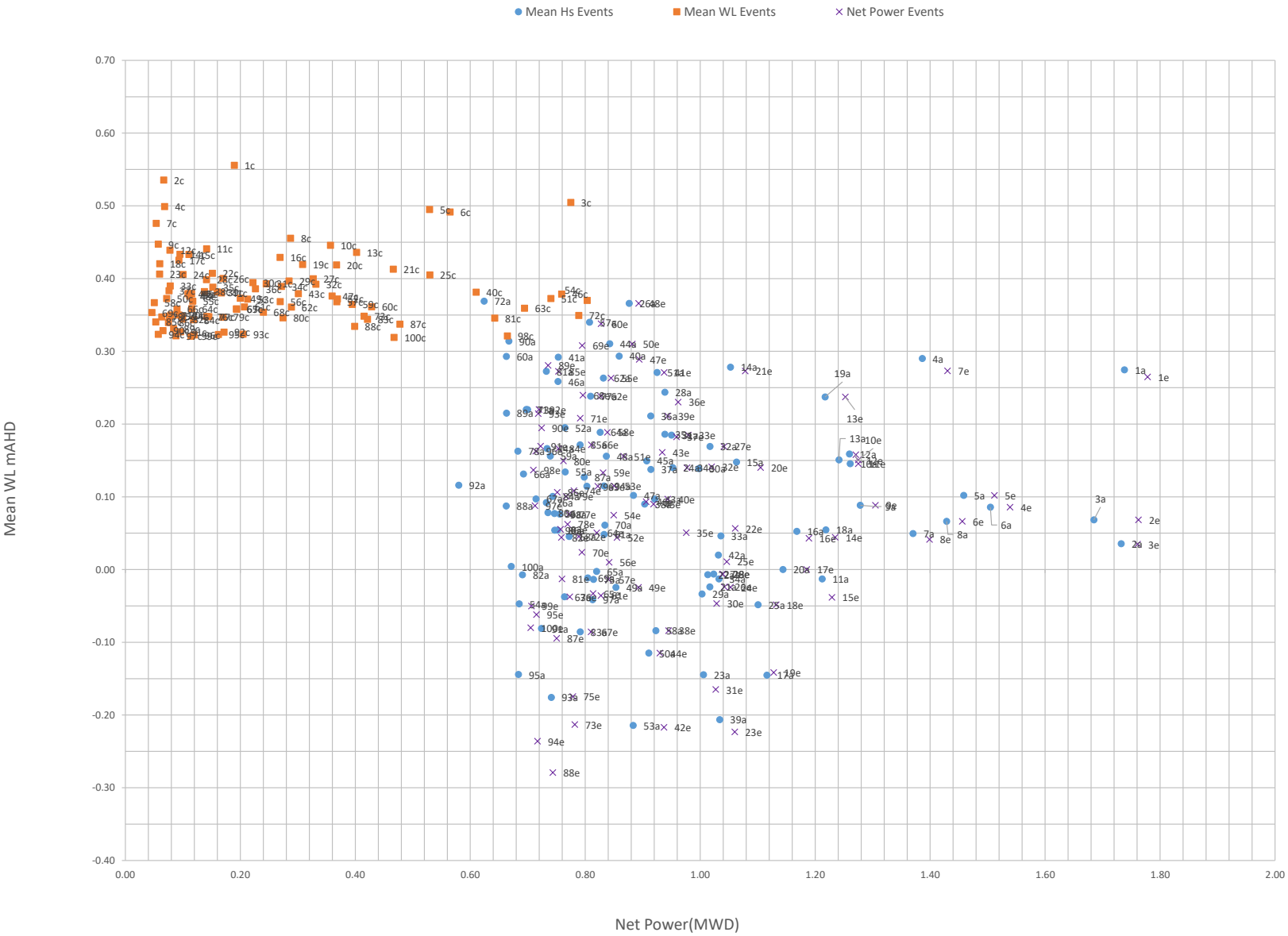
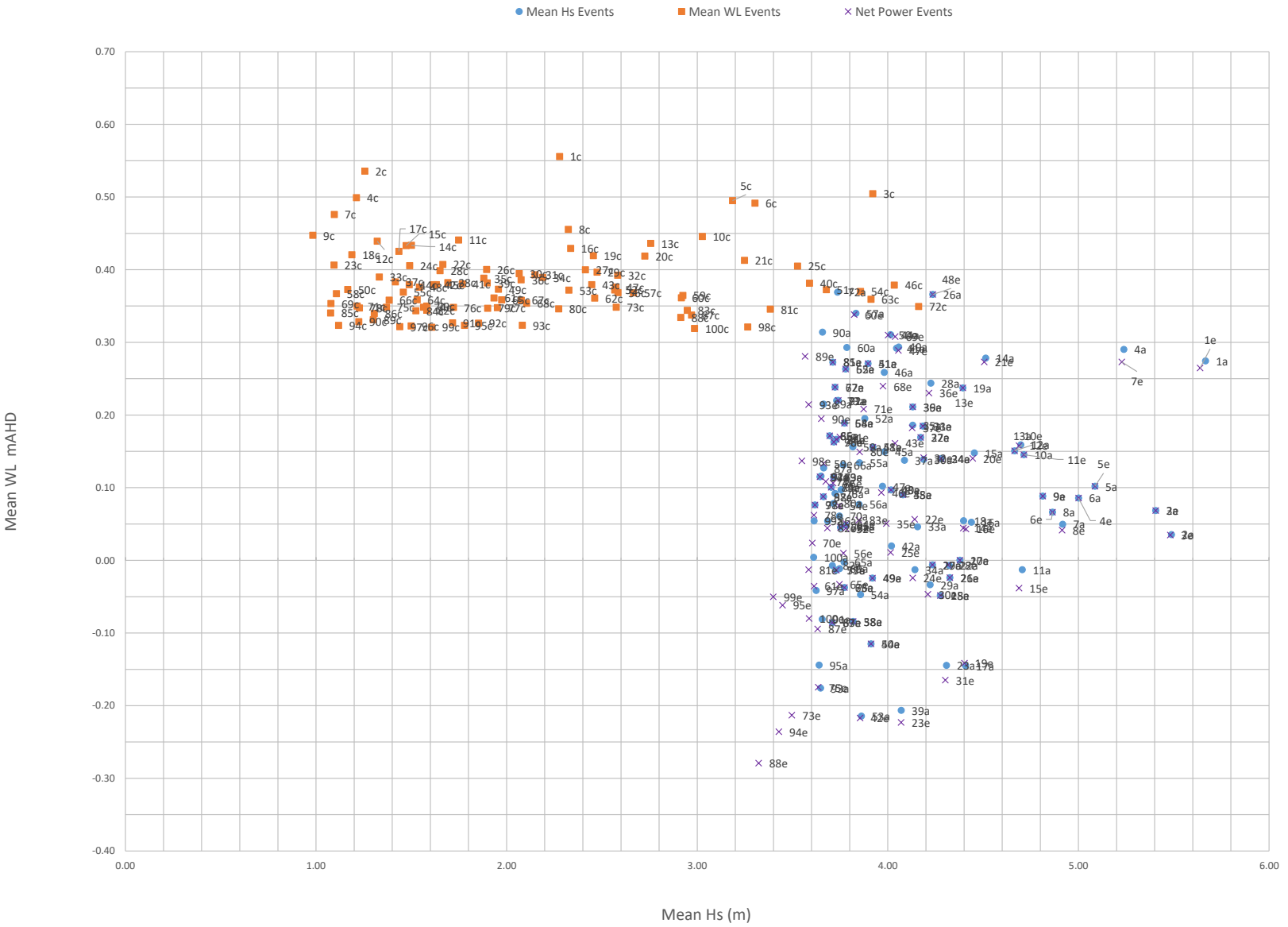
Location	Geraldton
Method	72 Hour Net Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'18-Jul-1996 05:00:00'	72	5.64	14.98	6.52	1.78	98.67	228.09	-9999.00	-9999.00	0.26	0.84
2	e	'28-Jul-1993 23:00:00'	72	5.41	16.54	5.92	1.76	88.34	224.19	-9999.00	-9999.00	0.07	0.62
3	e	'16-Jul-1990 20:00:00'	72	5.48	15.25	7.22	1.76	95.63	227.04	-9999.00	-9999.00	0.03	0.41
4	e	'12-Sep-2009 02:00:00'	72	5.00	16.37	6.11	1.54	78.70	224.83	-9999.00	-9999.00	0.09	0.52
5	e	'02-Aug-1991 23:00:00'	72	5.09	15.61	6.43	1.51	79.98	226.10	-9999.00	-9999.00	0.10	0.62
6	e	'05-Jun-1997 05:00:00'	72	4.86	16.14	6.45	1.46	75.54	221.48	-9999.00	-9999.00	0.07	0.54
7	e	'08-Jun-1995 08:00:00'	72	5.23	13.68	6.83	1.43	85.85	229.01	-9999.00	-9999.00	0.27	0.77
8	e	'25-Aug-2004 17:00:00'	72	4.91	15.23	6.34	1.40	76.46	226.61	-9999.00	-9999.00	0.04	0.60
9	e	'12-Jul-2002 08:00:00'	72	4.81	14.75	6.58	1.30	73.13	222.93	-9999.00	-9999.00	0.09	0.60
10	e	'31-Jul-2007 17:00:00'	72	4.67	15.68	5.54	1.28	67.69	225.29	-9999.00	-9999.00	0.15	0.78
11	e	'24-May-1994 17:00:00'	72	4.71	13.60	7.71	1.28	76.57	225.01	-9999.00	-9999.00	0.15	0.66
12	e	'21-Jul-2009 05:00:00'	72	4.69	13.50	7.00	1.27	76.07	226.17	-9999.00	-9999.00	0.16	0.84
13	e	'20-Jul-1989 14:00:00'	72	4.39	17.19	5.93	1.25	62.18	224.64	-9999.00	-9999.00	0.24	0.71
14	e	'04-Jul-1991 05:00:00'	72	4.40	15.61	6.52	1.23	65.34	223.96	-9999.00	-9999.00	0.04	0.42
15	e	'24-Jul-1990 05:00:00'	72	4.69	13.81	6.34	1.23	71.73	221.75	-9999.00	-9999.00	-0.04	0.50
16	e	'07-Aug-1998 08:00:00'	72	4.41	15.91	5.94	1.19	62.03	226.50	-9999.00	-9999.00	0.04	0.41
17	e	'29-Aug-1989 23:00:00'	72	4.38	16.34	5.95	1.19	60.51	222.30	-9999.00	-9999.00	0.00	0.41
18	e	'07-Sep-1991 23:00:00'	72	4.28	16.80	5.23	1.13	56.74	224.90	-9999.00	-9999.00	-0.05	0.39
19	e	'20-Nov-1992 02:00:00'	72	4.40	13.88	6.84	1.13	65.42	217.46	-9999.00	-9999.00	-0.14	0.14
20	e	'24-Jul-1996 08:00:00'	72	4.44	14.81	5.75	1.10	62.04	229.41	-9999.00	-9999.00	0.14	0.63
21	e	'29-Jun-2009 17:00:00'	72	4.51	13.94	6.04	1.08	63.93	221.24	-9999.00	-9999.00	0.27	0.65
22	e	'15-Jul-1988 08:00:00'	72	4.14	15.69	5.60	1.06	55.29	223.82	-9999.00	-9999.00	0.06	0.46
23	e	'27-Aug-1987 02:00:00'	72	4.07	16.11	5.82	1.06	54.33	221.15	-9999.00	-9999.00	-0.22	0.12
24	e	'21-Sep-1989 11:00:00'	72	4.13	16.47	5.43	1.05	53.70	222.19	-9999.00	-9999.00	-0.02	0.51
25	e	'29-Jul-2006 02:00:00'	72	4.01	15.74	6.08	1.05	54.07	222.81	-9999.00	-9999.00	0.01	0.28
26	e	'22-Sep-2003 17:00:00'	72	4.33	15.06	5.02	1.04	57.41	225.69	-9999.00	-9999.00	-0.02	0.38
27	e	'16-Sep-1996 02:00:00'	72	4.17	15.10	6.08	1.04	56.04	230.47	-9999.00	-9999.00	0.17	0.47
28	e	'02-Jul-1992 08:00:00'	72	4.32	14.93	5.35	1.04	57.46	225.68	-9999.00	-9999.00	-0.01	0.48
29	e	'22-Sep-1998 08:00:00'	72	4.23	14.69	5.85	1.04	59.52	223.37	-9999.00	-9999.00	-0.01	0.40
30	e	'03-Sep-2002 02:00:00'	72	4.21	14.72	5.61	1.03	56.68	221.10	-9999.00	-9999.00	-0.05	0.31
31	e	'10-Oct-1997 17:00:00'	72	4.30	14.91	4.82	1.03	57.19	224.48	-9999.00	-9999.00	-0.16	0.19
32	e	'14-Jul-1986 11:00:00'	72	4.19	15.12	6.17	1.02	56.63	220.91	-9999.00	-9999.00	0.14	0.39
33	e	'14-Aug-2009 20:00:00'	72	4.18	15.03	5.59	0.98	54.33	227.01	-9999.00	-9999.00	0.18	0.69
34	e	'07-Sep-2005 11:00:00'	72	4.28	14.45	4.77	0.98	56.22	226.65	-9999.00	-9999.00	0.14	0.59
35	e	'17-Aug-1988 02:00:00'	72	3.99	15.93	5.65	0.98	51.80	227.85	-9999.00	-9999.00	0.05	0.26
36	e	'03-Jul-2007 08:00:00'	72	4.22	13.88	6.05	0.96	56.25	226.86	-9999.00	-9999.00	0.23	0.80
37	e	'18-Jul-2000 05:00:00'	72	4.13	14.86	5.41	0.96	53.54	224.58	-9999.00	-9999.00	0.18	0.76
38	e	'11-Sep-2001 02:00:00'	72	3.82	16.11	5.55	0.94	48.37	221.90	-9999.00	-9999.00	-0.08	0.23
39	e	'18-Jul-2008 08:00:00'	72	4.13	14.60	6.19	0.94	55.50	227.00	-9999.00	-9999.00	0.21	0.72
40	e	'19-Jun-1988 11:00:00'	72	4.02	15.04	5.67	0.94	51.21	226.24	-9999.00	-9999.00	0.10	0.42
41	e	'05-Jun-1998 20:00:00'	72	3.90	15.62	5.52	0.94	50.91	223.95	-9999.00	-9999.00	0.27	0.57
42	e	'02-Oct-1991 14:00:00'	72	3.85	16.26	5.49	0.94	45.94	229.24	-9999.00	-9999.00	-0.22	0.07
43	e	'13-Jul-1990 17:00:00'	72	4.04	14.21	5.79	0.93	53.48	227.68	-9999.00	-9999.00	0.16	0.57
44	e	'12-Aug-1990 08:00:00'	72	3.91	15.64	5.55	0.93	48.87	222.10	-9999.00	-9999.00	-0.11	0.17
45	e	'17-Aug-2005 23:00:00'	72	4.08	14.14	5.86	0.92	54.02	224.24	-9999.00	-9999.00	0.09	0.59
46	e	'09-Jun-1990 23:00:00'	72	3.97	14.66	5.54	0.91	50.23	224.74	-9999.00	-9999.00	0.09	0.59
47	e	'23-Jul-2007 17:00:00'	72	4.06	14.17	5.45	0.89	50.97	230.36	-9999.00	-9999.00	0.29	0.66
48	e	'22-May-2009 20:00:00'	72	4.24	13.27	5.38	0.89	56.75	224.31	-9999.00	-9999.00	0.37	0.89
49	e	'09-Sep-2003 17:00:00'	72	3.92	15.67	4.70	0.89	46.44	223.27	-9999.00	-9999.00	-0.02	0.34
50	e	'29-Jul-1996 14:00:00'	72	4.00	14.83	4.85	0.88	48.48	230.79	-9999.00	-9999.00	0.31	0.91
51	e	'27-Jun-1991 05:00:00'	72	3.92	14.97	5.41	0.87	47.88	219.05	-9999.00	-9999.00	0.16	0.62
52	e	'30-Sep-1998 08:00:00'	72	3.78	15.80	5.08	0.86	44.44	223.93	-9999.00	-9999.00	0.04	0.37
53	e	'21-Jun-1994 14:00:00'	72	3.64	16.44	5.45	0.85	43.07	229.30	-9999.00	-9999.00	0.11	0.66
54	e	'18-Aug-1989 23:00:00'	72	3.74	15.35	5.65	0.85	46.30	226.19	-9999.00	-9999.00	0.07	0.54
55	e	'28-Jun-1996 02:00:00'	72	3.78	15.31	5.47	0.84	46.81	229.50	-9999.00	-9999.00	0.26	0.71
56	e	'05-Aug-2002 14:00:00'	72	3.77	15.93	4.98	0.84	45.09	223.68	-9999.00	-9999.00	0.01	0.55
57	e	'24-Sep-1990 05:00:00'	72	3.73	16.67	4.36	0.84	42.39	222.67	-9999.00	-9999.00	-0.01	0.53
58	e	'12-May-2002 05:00:00'	72	3.77	14.72	5.57	0.84	46.98	227.47	-9999.00	-9999.00	0.19	0.59
59	e	'28-Jul-1989 20:00:00'	72	3.66	16.19	5.04	0.83	42.29	223.57	-9999.00	-9999.00	0.13	0.59
60	e	'13-May-1988 14:00:00'	72	3.82	15.00	5.26	0.83	46.51	223.97	-9999.00	-9999.00	0.34	0.65
61	e	'28-Aug-1990 20:00:00'	72	3.61	15.91	5.53	0.83	43.42	224.04	-9999.00	-9999.00	-0.04	0.25
62	e	'10-Apr-1991 14:00:00'	72	3.72	15.62	4.93	0.83	43.92	223.91	-9999.00	-9999.00	0.24	0.53
63	e	'01-Jul-2002 20:00:00'	72	3.72	15.50	5.47	0.82	44.67	224.54	-9999.00	-9999.00	0.11	0.44
64	e	'20-Jun-1987 14:00:00'	72	3.78	15.76	4.57	0.82	43.66	222.52	-9999.00	-9999.00	0.05	0.39
65	e	'11-Aug-1999 20:00:00'	72	3.75	14.32	5.68	0.81	47.03	224.65	-9999.00	-9999.00	-0.03	0.53
66	e	'25-Jun-2000 14:00:00'	72	3.69	16.04	4.74	0.81	42.19	223.82	-9999.00	-9999.00	0.17	0.47
67	e	'14-Jul-1987 14:00:00'	72	3.71	15.84	4.36	0.81	42.57	217.99	-9999.00	-9999.00	-0.09	0.38
68	e	'10-Jun-1998 08:00:00'	72	3.97	13.07	5.40	0.80	48.62	229.10	-9999.00	-9999.00	0.24	0.80
69	e	'20-Jun-1996 08:00:00'	72	4.04	13.34	4.68	0.79	49.28	230.47	-9999.00	-9999.00	0.31	0.73
70	e	'18-Sep-2007 02:00:00'	72	3.60	16.67	4.27	0.79	39.25	223.77	-9999.00	-9999.00	0.02	0.36
71	e	'24-Jul-1988 05:00:00'	72	3.87	14.82	5.14	0.79	46.56	232.50	-9999.00	-9999.00	0.21	0.73
72	e	'14-Jul-1989 11:00:00'	72	3.75	14.73	5.49	0.79	44.69	220.38	-9999.00	-9999.00	0.05	0.42
73	e	'16-Aug-2002 14:00:00'	72	3.50	16.04	5.17	0.78	40.34	224.51	-9999.00	-9999.00	-0.21	0.35
74	e	'16-Jul-1999 05:00:00'	72	3.67	15.02	4.99	0.78	42.21	227.03	-9999.00	-9999.00	0.11	0.49
75	e	'31-Aug-2007 11:00:00'	72	3.63	15.62	4.81	0.78	40.18	227.14	-9999.00	-9999.00	-0.17	0.14
76	e	'08-Aug-2006 17:00:00'	72	3.77	13.45	5.66	0.77	47.83	232.56	-9999.00	-9999.00	-0.04	0.64
77	e	'07-Aug-1992 17:00:00'	72	3.62	15.39	4.85	0.77	41.69	223.84	-9999.00	-9999.00	0.08	0.58
78	e	'07-Aug-2007 05:00:00'	72	3.61	15.99	4.76	0.77	40.52	229.62	-9999.00	-9999.00	0.06	0.52
79	e	'23-May-1995 02:00:00'	72	3.70	14.55	5.66	0.77	43.87	226.72	-9999.00	-9999.00	0.10	0.48
80	e	'29-Jun-1992 05:00:00'	72	3.85	13.69	5.09	0.76	46.35	229.96	-9999.00	-9999.00	0.15	0.69
81	e	'20-Sep-2008 20:00:00'	72	3.58	15.55	4.70	0.76	40.05	221.04	-9999.00	-9999.00	-0.01	0.42
82	e	'27-Aug-1992 17:00:00'	72	3.68	14.47	4.95	0.76	42.19	223.69	-9999.00	-9999.00	0.04	0.49
83	e	'21-Jul-1995 02:00:00'	72	3.85	13.13	5.09	0.76	47.62	230.53	-9999.00	-9999.00	0.06	0.52
84	e	'30-Jun-1989 05:00:00'	72	3.73	14.53	4.87	0.75	43.2					

Location	Geraldton
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'29-Jul-1993 00:30:00'	105.00	5.11	16.25	5.92	2.24	118.25	224.35	-9999.00	-9999.00	0.04	0.62
2	f	'03-Aug-1991 02:00:00'	120.00	4.70	15.72	6.43	2.10	114.50	225.00	-9999.00	-9999.00	0.07	0.62
3	f	'18-Jul-1996 00:30:00'	87.00	5.39	14.41	6.52	1.89	110.07	230.40	-9999.00	-9999.00	0.29	0.87
4	f	'16-Jul-1990 18:30:00'	69.00	5.56	15.29	7.22	1.70	93.95	227.15	-9999.00	-9999.00	0.03	0.41
5	f	'12-Sep-2009 02:00:00'	78.00	4.91	16.33	6.11	1.57	82.33	224.80	-9999.00	-9999.00	0.07	0.52
6	f	'08-Jun-1995 05:00:00'	84.00	5.09	13.68	6.83	1.54	95.32	229.35	-9999.00	-9999.00	0.27	0.77
7	f	'05-Jun-1997 02:00:00'	60.00	5.13	16.25	6.45	1.31	69.22	221.79	-9999.00	-9999.00	0.07	0.54
8	f	'25-Aug-2004 08:00:00'	60.00	5.17	15.19	6.34	1.25	70.06	227.05	-9999.00	-9999.00	0.08	0.60
9	f	'31-Jul-2007 15:30:00'	69.00	4.71	15.77	5.54	1.22	66.08	225.44	-9999.00	-9999.00	0.16	0.78
10	f	'12-Jul-2002 03:30:00'	63.00	4.99	14.84	6.58	1.20	68.30	223.09	-9999.00	-9999.00	0.11	0.60
11	f	'24-Jul-1990 00:30:00'	57.00	5.07	14.24	6.34	1.12	64.90	222.10	-9999.00	-9999.00	-0.02	0.50
12	f	'21-Jul-2009 02:00:00'	42.00	5.83	14.17	7.00	1.08	63.42	226.84	-9999.00	-9999.00	0.12	0.84
13	f	'24-May-1994 12:30:00'	45.00	5.59	14.03	7.71	1.08	64.52	227.26	-9999.00	-9999.00	0.18	0.55
14	f	'07-Sep-1991 21:30:00'	63.00	4.38	16.90	5.23	1.01	51.89	224.72	-9999.00	-9999.00	-0.04	0.39
15	f	'29-Jun-2009 11:00:00'	66.00	4.59	13.93	6.04	1.00	60.77	221.87	-9999.00	-9999.00	0.30	0.65
16	f	'21-Jul-1989 06:30:00'	45.00	5.03	16.88	5.93	0.98	50.15	224.82	-9999.00	-9999.00	0.19	0.71
17	f	'04-Jul-1991 03:30:00'	39.00	5.44	16.38	6.52	0.97	51.35	224.91	-9999.00	-9999.00	0.01	0.42
18	f	'22-Sep-2003 17:00:00'	66.00	4.39	15.15	5.02	0.96	54.04	225.79	-9999.00	-9999.00	-0.04	0.37
19	f	'02-Jul-1992 05:00:00'	66.00	4.39	14.96	5.35	0.96	54.26	225.76	-9999.00	-9999.00	0.01	0.48
20	f	'06-Aug-1998 17:00:00'	48.00	4.93	15.79	5.94	0.95	51.22	227.76	-9999.00	-9999.00	0.07	0.41
21	f	'10-Oct-1997 11:00:00'	60.00	4.48	14.97	4.82	0.90	51.23	225.42	-9999.00	-9999.00	-0.15	0.19
22	f	'21-Sep-1989 05:00:00'	54.00	4.40	16.64	5.43	0.87	45.19	222.33	-9999.00	-9999.00	-0.01	0.39
23	f	'20-Nov-1992 02:00:00'	36.00	5.49	14.70	6.84	0.86	48.85	218.13	-9999.00	-9999.00	-0.11	0.14
24	f	'07-Sep-2005 08:00:00'	60.00	4.42	14.40	4.77	0.84	49.53	227.26	-9999.00	-9999.00	0.13	0.36
25	f	'15-Jul-1988 11:00:00'	42.00	4.84	16.83	5.60	0.83	42.63	221.45	-9999.00	-9999.00	0.02	0.46
26	f	'22-Sep-1998 02:00:00'	42.00	5.07	14.74	5.85	0.81	47.28	224.47	-9999.00	-9999.00	0.01	0.40
27	f	'28-Jul-2006 11:00:00'	36.00	5.04	16.96	6.08	0.79	40.53	223.61	-9999.00	-9999.00	-0.03	0.28
28	f	'26-Aug-1987 08:00:00'	36.00	5.08	16.58	5.82	0.78	40.62	221.72	-9999.00	-9999.00	-0.24	0.12
29	f	'15-Aug-2009 02:00:00'	54.00	4.35	14.83	5.59	0.77	44.25	226.69	-9999.00	-9999.00	0.20	0.69
30	f	'18-Jul-2000 03:30:00'	51.00	4.43	14.91	5.41	0.76	43.26	225.19	-9999.00	-9999.00	0.19	0.76
31	f	'02-Sep-2002 09:30:00'	39.00	4.98	15.20	5.61	0.75	42.12	223.64	-9999.00	-9999.00	-0.02	0.28
32	f	'14-Jul-1986 20:00:00'	42.00	4.80	15.02	6.17	0.75	42.69	219.75	-9999.00	-9999.00	0.15	0.39
33	f	'22-May-2009 17:00:00'	54.00	4.57	13.25	5.38	0.74	48.33	226.75	-9999.00	-9999.00	0.36	0.83
34	f	'16-Aug-1988 08:00:00'	42.00	4.74	15.27	5.65	0.74	41.21	228.40	-9999.00	-9999.00	0.10	0.49
35	f	'17-Aug-2005 17:00:00'	48.00	4.55	14.33	5.86	0.73	43.44	224.84	-9999.00	-9999.00	0.18	0.59
36	f	'30-Aug-1989 17:00:00'	36.00	4.95	15.77	5.95	0.73	39.00	222.76	-9999.00	-9999.00	-0.03	0.21
37	f	'03-Jul-2007 03:30:00'	45.00	4.58	14.21	6.05	0.71	41.80	227.42	-9999.00	-9999.00	0.27	0.80
38	f	'25-Jul-1996 02:00:00'	36.00	5.09	14.48	5.75	0.69	40.96	228.85	-9999.00	-9999.00	0.05	0.47
39	f	'16-Sep-1996 03:30:00'	33.00	4.97	15.84	6.08	0.68	36.42	229.78	-9999.00	-9999.00	0.16	0.47
40	f	'05-Jun-1998 17:00:00'	36.00	4.87	15.61	5.52	0.68	37.32	224.92	-9999.00	-9999.00	0.23	0.46
41	f	'10-Sep-2001 09:30:00'	33.00	4.84	16.98	5.55	0.66	33.84	222.30	-9999.00	-9999.00	-0.10	0.20
42	f	'13-Jul-1990 15:30:00'	33.00	4.98	15.33	5.79	0.66	36.09	226.60	-9999.00	-9999.00	0.08	0.25
43	f	'11-Aug-1990 21:30:00'	39.00	4.50	16.27	5.55	0.66	34.43	222.57	-9999.00	-9999.00	-0.10	0.15
44	f	'09-Jun-1990 05:00:00'	36.00	4.71	15.20	5.54	0.63	35.05	226.04	-9999.00	-9999.00	0.05	0.52
45	f	'19-Jun-1996 03:30:00'	51.00	4.10	13.39	4.68	0.56	35.98	233.23	-9999.00	-9999.00	0.32	0.65
46	f	'20-Jul-1995 14:00:00'	42.00	4.45	13.25	5.09	0.56	35.69	234.40	-9999.00	-9999.00	0.12	0.48
47	f	'13-May-1988 21:30:00'	39.00	4.38	14.75	5.26	0.56	32.21	222.95	-9999.00	-9999.00	0.32	0.65
48	f	'03-Aug-1990 11:00:00'	48.00	3.98	14.57	4.31	0.55	31.99	229.86	-9999.00	-9999.00	0.09	0.52
49	f	'10-Apr-1991 14:00:00'	36.00	4.33	16.12	4.93	0.54	28.88	224.31	-9999.00	-9999.00	0.23	0.45
50	f	'18-Aug-1989 23:00:00'	30.00	4.73	15.62	5.65	0.54	29.46	229.21	-9999.00	-9999.00	0.05	0.48
51	f	'19-Jul-2008 03:30:00'	27.00	5.30	13.59	6.19	0.54	34.02	229.83	-9999.00	-9999.00	0.09	0.57
52	f	'28-Aug-1990 17:00:00'	30.00	4.62	16.49	5.53	0.54	28.11	224.76	-9999.00	-9999.00	-0.03	0.25
53	f	'22-Jul-2007 17:00:00'	30.00	4.71	15.70	5.45	0.54	29.25	229.86	-9999.00	-9999.00	0.31	0.60
54	f	'05-Aug-2002 11:00:00'	36.00	4.37	15.54	4.98	0.53	29.55	223.79	-9999.00	-9999.00	-0.02	0.36
55	f	'11-May-2002 20:00:00'	30.00	4.76	15.17	5.57	0.53	29.67	229.70	-9999.00	-9999.00	0.20	0.59
56	f	'11-Aug-1999 11:00:00'	30.00	4.83	14.73	5.68	0.53	30.74	225.62	-9999.00	-9999.00	0.00	0.38
57	f	'02-Jul-2002 00:30:00'	33.00	4.52	15.16	5.47	0.53	29.49	225.74	-9999.00	-9999.00	0.09	0.38
58	f	'18-Jun-1988 12:30:00'	27.00	4.85	15.82	5.67	0.52	28.18	228.01	-9999.00	-9999.00	0.08	0.41
59	f	'28-Jun-1996 02:00:00'	30.00	4.71	15.14	5.47	0.52	29.36	231.03	-9999.00	-9999.00	0.21	0.47
60	f	'14-Jul-1987 09:30:00'	39.00	4.07	16.28	4.36	0.52	27.27	218.57	-9999.00	-9999.00	-0.16	0.23
61	f	'08-Aug-2006 11:00:00'	30.00	4.88	13.72	5.66	0.51	31.43	234.96	-9999.00	-9999.00	-0.09	0.39
62	f	'15-Aug-2002 20:00:00'	30.00	4.44	16.68	5.17	0.50	25.69	225.35	-9999.00	-9999.00	-0.21	0.09
63	f	'28-Jun-1992 14:00:00'	36.00	4.42	13.59	5.09	0.49	30.26	231.27	-9999.00	-9999.00	0.19	0.61
64	f	'17-Jul-1999 06:30:00'	33.00	4.34	15.14	4.99	0.48	26.72	230.19	-9999.00	-9999.00	0.02	0.28
65	f	'30-Jul-1996 23:00:00'	36.00	4.18	14.68	4.85	0.46	26.90	230.47	-9999.00	-9999.00	0.33	0.91
66	f	'10-Aug-1997 08:00:00'	30.00	4.42	15.60	4.95	0.46	25.34	223.32	-9999.00	-9999.00	-0.03	0.30
67	f	'12-Jul-1995 15:30:00'	27.00	4.73	14.48	5.63	0.46	26.91	239.05	-9999.00	-9999.00	0.35	0.97
68	f	'01-Jun-1988 21:30:00'	45.00	3.99	13.29	4.76	0.46	30.26	229.87	-9999.00	-9999.00	0.40	0.89
69	f	'28-Jul-1989 03:30:00'	27.00	4.47	16.98	5.04	0.46	23.45	224.47	-9999.00	-9999.00	0.14	0.57
70	f	'07-Aug-1992 14:00:00'	30.00	4.39	15.68	4.85	0.46	24.98	222.84	-9999.00	-9999.00	0.01	0.31
71	f	'22-Aug-2003 15:30:00'	33.00	4.87	11.54	5.61	0.45	34.34	222.63	-9999.00	-9999.00	-0.01	0.57
72	f	'28-Jul-1996 08:00:00'	36.00	4.23	14.08	4.65	0.45	27.44	229.39	-9999.00	-9999.00	0.15	0.56
73	f	'13-Oct-1986 12:30:00'	33.00	4.39	13.86	5.15	0.45	27.38	222.50	-9999.00	-9999.00	-9999.00	-9999.00
74	f	'29-Sep-1998 15:30:00'	27.00	4.44	16.97	5.08	0.45	23.05	222.02	-9999.00	-9999.00	0.09	0.37
75	f	'11-Jun-1998 11:00:00'	30.00	4.55	13.99	5.40	0.45	27.23	221.63	-9999.00	-9999.00	0.03	0.40
76	f	'18-Jun-1999 21:30:00'	27.00	4.61	14.56	5.51	0.44	25.34	227.75	-9999.00	-9999.00	0.25	0.62
77	f	'14-Jun-2002 18:30:00'	27.00	4.67	14.30	5.42	0.44	25.74	223.72	-9999.00	-9999.00	0.16	0.62
78	f	'28-Jun-1991 03:30:00'	27.00	4.63	14.39	5.41	0.43	25.20	219.75	-9999.00	-9999.00	0.02	0.40
79	f	'08-Oct-1999 08:00:00'	30.00	4.65	12.63	5.44	0.42	28.36	229.84	-9999.00	-9999.00	0.10	0.34
80	f	'19-Sep-2007 03:30:00'	33.00	3.92	17.23	4.22	0.42	21.31	226.16	-9999.00	-9999.00	-0.03	0.30
81	f	'26-Aug-1992 15:30:00'	27.00	4.43	14.94	4.95	0.41	22.97	225.13	-9999.00	-9999.00	0.02	0.49
82	f	'10-May-1987 17:00:00'	30.00	4.39	13.86	5.33	0.41	24.85	223.69	-9999.0			

Location	Geraldton
Method	72 Hour Comparison
Title	Geraldton 72 Hour Comparison



Location	Jurien
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'17-Jul-1996 23:00:00'	72	5.97	14.65	6.76	1.87	109.33	250.96	-9999.00	-9999.00	0.29	0.82
2	a	'25-Aug-2004 07:45:00'	72	5.56	15.46	7.60	1.66	94.03	-9999.00	-9999.00	-9999.00	0.05	0.52
3	a	'28-Jul-1993 20:00:00'	72	5.56	16.60	6.05	1.73	92.85	246.03	-9999.00	-9999.00	0.05	0.55
4	a	'02-Aug-1991 20:00:00'	72	5.41	15.70	6.58	1.60	89.38	247.20	-9999.00	-9999.00	0.12	0.71
5	a	'07-Sep-2005 06:15:00'	72	5.35	14.94	6.31	1.47	86.07	-9999.00	-9999.00	-9999.00	0.13	0.41
6	a	'08-Jun-1995 02:00:00'	72	5.26	13.64	6.61	1.37	84.81	249.94	-9999.00	-9999.00	0.29	0.67
7	a	'05-Jun-1997 02:00:00'	72	5.20	16.22	6.67	1.56	84.49	243.37	-9999.00	-9999.00	0.08	0.53
8	a	'29-Jun-2009 08:15:00'	72	5.13	13.50	6.78	1.26	80.60	-9999.00	-9999.00	-9999.00	0.23	0.58
9	a	'22-Sep-2003 16:00:00'	72	4.96	15.19	5.78	1.30	74.60	-9999.00	-9999.00	-9999.00	-0.05	0.28
10	a	'23-Sep-2013 18:42:00'	72	4.94	13.90	6.34	1.18	73.72	-9999.00	247.95	260.79	0.16	0.57
11	a	'11-Sep-2009 20:15:00'	72	4.93	16.37	5.62	1.36	73.88	-9999.00	-9999.00	-9999.00	0.07	0.49
12	a	'24-May-1994 08:00:00'	72	4.87	13.78	6.98	1.28	77.49	244.83	-9999.00	-9999.00	0.13	0.61
13	a	'12-Jul-2002 01:30:00'	72	4.86	13.79	6.53	1.18	72.55	-9999.00	-9999.00	-9999.00	0.08	0.57
14	a	'02-Jul-1992 02:00:00'	72	4.84	14.86	5.49	1.24	71.34	246.16	-9999.00	-9999.00	-0.06	0.39
15	a	'03-Jul-1991 23:00:00'	72	4.79	15.62	6.65	1.35	74.54	245.15	-9999.00	-9999.00	0.03	0.42
16	a	'15-Sep-1996 23:00:00'	72	4.74	15.18	6.37	1.25	70.46	250.72	-9999.00	-9999.00	0.15	0.41
17	a	'10-Oct-1997 14:00:00'	72	4.72	15.02	5.28	1.20	68.57	245.20	-9999.00	-9999.00	-0.16	0.32
18	a	'07-Sep-1991 20:00:00'	72	4.71	16.92	5.35	1.28	67.89	246.70	-9999.00	-9999.00	-0.07	0.36
19	a	'24-Jul-1996 05:00:00'	72	4.66	14.98	5.67	1.14	66.14	249.56	-9999.00	-9999.00	0.09	0.47
20	a	'21-Jul-2009 05:15:00'	72	4.63	13.79	7.26	1.18	71.06	-9999.00	-9999.00	-9999.00	0.08	0.78
21	a	'15-Sep-1982 20:00:00'	72	4.63	14.76	5.70	1.15	66.79	246.47	-9999.00	-9999.00	0.00	0.60
22	a	'19-Nov-1992 23:00:00'	72	4.62	14.13	6.74	1.18	69.64	238.34	-9999.00	-9999.00	-0.20	0.13
23	a	'14-Aug-2017 03:50:00'	72	4.61	14.49	5.96	1.09	64.74	-9999.00	243.42	267.33	0.19	0.50
24	a	'20-Jun-1996 08:00:00'	72	4.58	13.27	5.06	0.98	63.33	249.81	-9999.00	-9999.00	0.30	0.67
25	a	'29-Jul-1996 05:00:00'	72	4.54	14.75	5.22	1.06	62.28	250.99	-9999.00	-9999.00	0.23	0.83
26	a	'22-May-2009 15:15:00'	72	4.52	12.89	5.46	0.93	62.60	-9999.00	-9999.00	-9999.00	0.32	0.80
27	a	'02-Sep-2002 05:30:00'	72	4.51	14.80	5.66	1.08	63.11	-9999.00	-9999.00	-9999.00	0.01	0.45
28	a	'03-Jul-2007 01:30:00'	72	4.51	13.56	5.65	0.97	61.98	-9999.00	-9999.00	-9999.00	0.22	0.72
29	a	'29-Jul-2017 08:50:00'	72	4.51	14.26	5.77	1.04	62.74	-9999.00	239.47	253.73	0.08	0.40
30	a	'28-Apr-2000 08:45:00'	72	4.50	14.83	5.65	1.08	62.82	-9999.00	-9999.00	-9999.00	0.26	0.61
31	a	'27-Jun-1991 02:00:00'	72	4.44	14.93	5.52	1.04	60.44	240.43	-9999.00	-9999.00	0.14	0.64
32	a	'01-Aug-2011 13:03:00'	72	4.43	14.61	5.62	1.01	59.90	-9999.00	250.76	258.54	0.29	0.70
33	a	'17-Jul-1999 08:45:00'	72	4.41	14.91	5.88	1.05	61.04	-9999.00	-9999.00	-9999.00	0.06	0.46
34	a	'03-Apr-2012 19:28:00'	72	4.40	16.56	6.36	1.12	59.67	-9999.00	228.27	236.22	0.25	0.48
35	a	'14-Aug-2009 12:15:00'	72	4.39	14.77	5.49	1.00	58.62	-9999.00	-9999.00	-9999.00	0.12	0.58
36	a	'31-Jul-2007 11:30:00'	72	4.38	15.57	5.30	1.03	58.51	-9999.00	-9999.00	-9999.00	0.13	0.69
37	a	'08-Aug-2006 11:45:00'	72	4.38	13.69	6.42	0.96	60.80	-9999.00	-9999.00	-9999.00	-0.08	0.54
38	a	'05-Jul-1982 08:00:00'	72	4.35	15.94	5.58	1.08	58.97	242.86	-9999.00	-9999.00	-0.13	0.27
39	a	'02-Oct-1991 11:00:00'	72	4.32	16.33	5.44	1.06	57.24	250.26	-9999.00	-9999.00	-0.29	0.09
40	a	'01-Aug-1996 08:00:00'	72	4.31	14.26	4.58	0.94	56.09	244.71	-9999.00	-9999.00	0.06	0.49
41	a	'20-Jul-2017 19:50:00'	72	4.30	14.52	6.91	1.02	59.22	-9999.00	240.62	249.80	0.17	0.59
42	a	'28-Jun-1992 23:00:00'	72	4.29	13.71	5.29	0.92	57.54	250.60	-9999.00	-9999.00	0.09	0.62
43	a	'12-Jun-2012 03:28:00'	72	4.27	11.89	6.65	0.77	56.19	-9999.00	249.12	256.86	0.43	0.72
44	a	'11-Aug-1992 14:00:00'	72	4.26	14.98	5.02	0.96	55.15	245.65	-9999.00	-9999.00	-0.12	0.26
45	a	'18-Jun-1999 06:45:00'	72	4.25	14.77	5.84	0.96	56.45	-9999.00	-9999.00	-9999.00	0.24	0.58
46	a	'01-Oct-2005 20:45:00'	72	4.25	15.64	5.90	0.99	55.16	-9999.00	-9999.00	-9999.00	-0.15	0.05
47	a	'17-Aug-2005 18:45:00'	72	4.25	13.59	6.72	NaN	56.99	-9999.00	-9999.00	-9999.00	0.04	0.58
48	a	'27-Jun-2003 03:30:00'	72	4.25	11.44	5.10	0.72	55.04	-9999.00	-9999.00	-9999.00	0.35	0.82
49	a	'08-Oct-1999 18:30:00'	72	4.24	13.07	6.54	0.90	59.21	-9999.00	-9999.00	-9999.00	-0.10	0.09
50	a	'17-Jul-2000 01:30:00'	72	4.23	14.96	4.81	0.91	53.26	-9999.00	-9999.00	-9999.00	0.21	0.63
51	a	'28-Jun-1996 02:00:00'	72	4.22	15.20	5.65	0.99	57.03	249.80	-9999.00	-9999.00	0.22	0.61
52	a	'10-Jun-1998 07:45:00'	72	4.22	13.29	4.96	0.85	53.78	-9999.00	-9999.00	-9999.00	0.21	0.63
53	a	'23-Aug-1995 17:00:00'	72	4.21	15.05	4.74	0.93	53.36	241.70	-9999.00	-9999.00	-0.11	0.30
54	a	'01-Sep-2013 03:43:00'	72	4.19	15.32	5.47	0.96	54.50	-9999.00	236.94	258.58	0.12	0.47
55	a	'03-Sep-1999 08:45:00'	72	4.18	13.27	5.78	0.83	54.71	-9999.00	-9999.00	-9999.00	-0.07	0.40
56	a	'04-Sep-2012 05:58:00'	72	4.17	13.22	5.92	0.81	54.42	-9999.00	246.02	255.78	0.09	0.67
57	a	'13-Jan-2005 14:45:00'	72	4.17	14.88	5.26	0.90	52.86	-9999.00	-9999.00	-9999.00	-0.44	0.07
58	a	'11-Jun-2005 05:15:00'	72	4.15	12.05	5.40	0.75	52.56	-9999.00	-9999.00	-9999.00	0.03	0.35
59	a	'07-Jul-2014 22:34:00'	72	4.14	14.29	5.85	0.86	52.84	-9999.00	239.25	241.15	0.08	0.36
60	a	'20-Jun-2009 06:15:00'	72	4.13	13.42	5.37	0.81	52.09	-9999.00	-9999.00	-9999.00	0.14	0.74
61	a	'02-Aug-2003 23:30:00'	72	4.12	14.61	5.87	0.86	52.19	-9999.00	-9999.00	-9999.00	-0.01	0.33
62	a	'12-Jun-1982 14:00:00'	72	4.11	16.51	5.20	0.98	52.18	245.96	-9999.00	-9999.00	0.07	0.37
63	a	'07-Aug-1992 23:00:00'	72	4.11	15.38	5.17	0.94	53.13	244.04	-9999.00	-9999.00	-0.03	0.49
64	a	'20-Jul-1995 23:00:00'	72	4.10	13.53	5.25	0.86	53.53	248.82	-9999.00	-9999.00	0.02	0.36
65	a	'22-May-1995 23:00:00'	72	4.09	14.68	5.34	0.87	51.42	247.03	-9999.00	-9999.00	0.04	0.38
66	a	'22-May-2016 20:21:00'	72	4.09	13.63	6.53	0.85	54.24	-9999.00	244.38	256.69	0.14	0.75
67	a	'08-Oct-2013 17:43:00'	72	4.06	16.34	5.08	0.92	50.08	-9999.00	246.01	240.14	0.01	0.39
68	a	'27-Aug-1992 11:00:00'	72	4.06	14.43	5.08	0.87	50.85	244.46	-9999.00	-9999.00	0.01	0.40
69	a	'18-Sep-2013 10:12:00'	72	4.06	13.95	5.32	0.80	50.17	-9999.00	243.76	241.73	-0.02	0.26
70	a	'02-Sep-1998 22:45:00'	72	4.06	12.77	6.09	0.79	52.01	-9999.00	-9999.00	-9999.00	0.03	0.55
71	a	'18-Jul-2008 22:30:00'	72	4.05	13.56	6.79	0.81	53.16	-9999.00	-9999.00	-9999.00	0.10	0.86
72	a	'09-Sep-2003 16:00:00'	72	4.05	16.12	4.92	0.91	49.69	-9999.00	-9999.00	-9999.00	-0.09	0.26
73	a	'27-Jul-2013 04:42:00'	72	4.05	12.40	6.18	0.76	52.76	-9999.00	247.48	253.78	0.22	0.60
74	a	'22-Sep-1998 04:45:00'	72	4.04	13.97	5.40	0.85	53.43	-9999.00	-9999.00	-9999.00	-0.05	0.32
75	a	'29-Jul-2011 12:33:00'	72	4.04	11.64	5.75	0.69	50.30	-9999.00	252.35	267.42	0.28	0.76
76	a	'28-Jul-2006 12:45:00'	72	4.04	16.06	5.57	0.94	51.20	-9999.00	-9999.00	-9999.00	-0.04	0.40
77	a	'06-Aug-1998 22:45:00'	72	4.04	15.07	4.98	0.87	50.14	-9999.00	-9999.00	-9999.00	0.01	0.40
78	a	'24-May-1997 23:00:00'	72	4.02	14.51	4.56	0.85	49.62	247.15	-9999.00	-9999.00	0.02	0.54
79	a	'05-Jul-2003 21:30:00'	72	4.01	13.77	5.07	0.79	49.42	-9999.00	-9999.00	-9999.00	0.02	0.35
80	a	'07-Aug-2007 10:30:00'	72	4.01	15.72	5.17	0.88	48.95	-9999.00	-9999.00	-9999.00	-0.03	0.39
81	a	'08-Aug-1993 23:00:00'	72	4.01	14.61	4.36	0.82	48.41	244.29	-9999.00	-9999.00	-0.16	0.03
82	a	'11-May-2002 19:30:00'	72	4.01	13.87	5.85	0.83	51.33	-9999.00	-9999.00	-9999.00	0.15	0.62
83	a	'01-Jul-2004 12:45:00'	72	3.99	14.73	5.15	0.81	48.89	-9999.00	-9999.00	-9999.00	-0.01	0.71
84	a	'21-Jun-1994 11:00:00'	72	3.99									

Location	Jurien
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'16-Jul-1996 15:30:00'	72	4.64	13.12	6.76	1.06	69.66	256.19	-9999.00	-9999.00	0.47	0.86
2	c	'11-Jun-2012 19:43:00'	72	4.06	11.14	6.65	0.67	51.30	-9999.00	250.88	265.11	0.47	0.86
3	c	'02-Feb-2012 08:43:00'	72	2.12	11.33	4.52	0.22	17.19	-9999.00	244.47	238.44	0.45	0.89
4	c	'16-May-2011 03:48:00'	72	1.55	14.10	2.00	0.12	7.27	-9999.00	239.54	358.27	0.44	0.83
5	c	'14-May-1999 02:15:00'	72	1.39	10.51	1.99	0.07	5.86	-9999.00	-9999.00	-9999.00	0.43	0.75
6	c	'19-Feb-2011 02:18:00'	72	1.40	9.24	1.83	0.06	5.99	-9999.00	222.39	194.25	0.42	0.78
7	c	'27-May-1999 13:15:00'	72	2.72	10.71	4.39	0.29	24.26	-9999.00	-9999.00	-9999.00	0.41	0.74
8	c	'08-May-2013 02:57:30'	72	2.35	14.38	4.80	0.21	12.35	-9999.00	242.69	234.42	0.40	0.89
9	c	'21-May-2009 01:45:00'	72	3.54	13.02	5.46	0.59	40.81	-9999.00	-9999.00	-9999.00	0.39	0.80
10	c	'26-Jun-2003 04:00:00'	72	3.90	10.56	5.06	0.59	46.56	-9999.00	-9999.00	-9999.00	0.39	0.82
11	c	'26-Apr-2000 10:15:00'	72	3.22	14.35	5.63	0.59	34.72	-9999.00	-9999.00	-9999.00	0.38	0.70
12	c	'24-Jun-2013 06:58:00'	72	2.90	14.18	4.36	0.45	26.78	-9999.00	245.63	273.96	0.38	0.80
13	c	'06-Jan-2011 02:18:00'	72	1.26	8.36	2.82	0.07	5.96	-9999.00	230.89	220.04	0.36	0.77
14	c	'11-Mar-2012 08:13:00'	72	1.75	12.11	2.40	0.13	9.30	-9999.00	228.68	205.65	0.36	0.68
15	c	'19-Jun-1996 06:30:00'	72	4.50	13.35	5.06	0.93	59.27	251.84	-9999.00	-9999.00	0.36	0.73
16	c	'06-May-2012 05:13:00'	72	2.44	14.09	3.52	0.30	18.53	-9999.00	230.47	244.01	0.35	0.78
17	c	'18-Mar-2012 15:43:00'	72	1.66	12.04	2.71	0.11	8.71	-9999.00	225.14	201.55	0.35	0.62
18	c	'23-Apr-2011 17:48:00'	72	1.64	11.55	2.12	0.11	8.14	-9999.00	232.84	254.80	0.35	0.65
19	c	'22-Feb-2011 04:48:00'	72	1.08	10.50	1.51	0.04	3.59	-9999.00	267.35	199.98	0.34	0.58
20	c	'09-Jun-1998 03:15:00'	72	4.05	11.81	4.96	0.68	49.00	-9999.00	-9999.00	-9999.00	0.34	0.78
21	c	'13-Jun-2017 08:05:00'	72	2.53	15.59	3.82	0.36	20.04	-9999.00	237.56	301.28	0.34	0.71
22	c	'07-Jun-1995 12:30:00'	72	5.00	13.22	6.61	1.13	72.66	252.14	-9999.00	-9999.00	0.34	0.67
23	c	'26-Apr-2011 20:48:00'	72	2.92	14.26	3.72	0.43	26.32	-9999.00	232.65	246.38	0.34	0.48
24	c	'01-Jul-2007 10:00:00'	72	3.85	12.33	5.65	0.64	45.56	-9999.00	-9999.00	-9999.00	0.34	0.82
25	c	'30-May-2000 01:15:00'	72	1.41	10.11	2.19	0.08	6.19	-9999.00	-9999.00	-9999.00	0.34	0.69
26	c	'06-Apr-2008 03:00:00'	72	1.52	14.01	2.02	0.11	6.97	-9999.00	-9999.00	-9999.00	0.34	0.61
27	c	'17-May-2015 02:21:00'	72	3.10	12.53	4.58	0.44	31.42	-9999.00	242.90	285.86	0.33	0.76
28	c	'29-Jan-2011 23:18:00'	72	1.99	11.42	2.84	0.15	12.07	-9999.00	241.86	247.99	0.33	0.86
29	c	'30-Mar-2008 16:00:00'	72	1.75	9.05	3.26	0.09	9.72	-9999.00	-9999.00	-9999.00	0.33	0.76
30	c	'13-Jun-2000 23:22:30'	72	3.01	13.29	3.85	0.43	27.94	-9999.00	-9999.00	-9999.00	0.33	0.80
31	c	'07-Jun-2012 10:43:00'	72	2.09	13.78	2.82	0.20	13.19	-9999.00	240.54	294.45	0.33	0.77
32	c	'10-May-1995 21:30:00'	72	2.93	13.49	4.95	0.44	28.88	248.79	-9999.00	-9999.00	0.33	0.58
33	c	'13-Feb-2011 12:18:00'	72	1.28	11.70	1.65	0.07	5.06	-9999.00	224.04	186.55	0.32	0.70
34	c	'27-May-2013 07:27:30'	72	1.77	13.19	2.32	0.15	9.47	-9999.00	242.49	268.02	0.32	0.73
35	c	'14-Jan-2012 06:43:00'	72	1.58	13.44	2.45	0.12	7.70	-9999.00	237.89	194.27	0.32	0.50
36	c	'10-Jun-2000 21:15:00'	72	2.14	10.17	3.09	0.17	14.30	-9999.00	-9999.00	-9999.00	0.31	0.65
37	c	'12-Jan-2011 08:48:00'	72	1.54	12.60	2.58	0.11	7.34	-9999.00	231.05	198.28	0.31	0.55
38	c	'16-May-2003 03:00:00'	72	3.67	11.81	6.67	0.68	48.12	-9999.00	-9999.00	-9999.00	0.31	1.04
39	c	'04-Jul-1999 18:45:00'	72	2.57	13.46	3.89	0.36	21.90	-9999.00	-9999.00	-9999.00	0.31	0.56
40	c	'19-May-1999 10:15:00'	72	2.24	12.14	3.38	0.20	16.10	-9999.00	-9999.00	-9999.00	0.31	0.78
41	c	'10-Apr-1999 13:15:00'	72	1.54	12.34	1.97	0.10	7.15	-9999.00	-9999.00	-9999.00	0.31	0.56
42	c	'27-Jan-2012 07:43:00'	72	1.85	14.29	2.75	0.18	10.56	-9999.00	236.23	192.16	0.30	0.51
43	c	'03-Jun-2005 01:15:00'	72	1.84	12.46	2.59	0.14	10.44	-9999.00	-9999.00	-9999.00	0.30	0.62
44	c	'19-May-2013 11:28:00'	72	2.16	12.23	4.72	0.22	16.03	-9999.00	241.66	237.63	0.30	0.68
45	c	'06-Apr-2011 04:18:00'	72	1.63	12.75	3.55	0.14	9.06	-9999.00	245.27	225.44	0.30	0.60
46	c	'13-Apr-1999 23:45:00'	72	1.37	12.92	1.99	0.09	5.81	-9999.00	-9999.00	-9999.00	0.29	0.51
47	c	'29-Apr-2015 20:51:00'	72	1.26	14.28	2.49	0.10	5.71	-9999.00	237.23	311.48	0.29	0.53
48	c	'07-May-2014 10:19:00'	72	2.33	12.27	5.32	0.30	21.45	-9999.00	238.96	275.62	0.29	0.52
49	c	'06-Jun-2005 05:15:00'	72	2.95	12.55	4.93	0.38	28.47	-9999.00	-9999.00	-9999.00	0.29	0.89
50	c	'31-Jul-2011 15:18:00'	72	4.33	13.71	5.62	0.93	57.46	-9999.00	249.12	261.36	0.29	0.70
51	c	'13-Jun-2013 18:27:00'	72	1.84	14.11	2.27	0.17	10.19	-9999.00	250.46	325.59	0.29	0.60
52	c	'09-May-2004 11:52:30'	72	3.55	13.15	6.48	0.78	47.67	-9999.00	-9999.00	-9999.00	0.29	0.90
53	c	'02-Jul-1998 21:15:00'	72	2.29	15.80	3.61	0.29	15.86	-9999.00	-9999.00	-9999.00	0.29	0.58
54	c	'05-May-1999 07:15:00'	72	2.88	15.83	3.91	0.45	25.09	-9999.00	-9999.00	-9999.00	0.29	0.61
55	c	'17-Apr-2012 23:43:00'	72	2.82	14.20	5.26	0.47	26.89	-9999.00	230.58	230.41	0.29	0.48
56	c	'17-Jun-2014 16:49:00'	72	3.26	14.25	5.17	0.55	36.90	-9999.00	254.45	289.61	0.28	0.85
57	c	'28-Jun-2009 18:45:00'	72	5.03	12.73	6.78	1.15	76.77	-9999.00	-9999.00	-9999.00	0.28	0.58
58	c	'31-May-2011 02:48:00'	72	2.61	11.23	3.81	0.27	20.74	-9999.00	248.34	267.00	0.28	0.69
59	c	'22-Jun-2003 21:30:00'	72	1.88	14.65	2.20	0.18	10.70	-9999.00	-9999.00	-9999.00	0.28	0.49
60	c	'16-May-2013 11:28:00'	72	1.50	14.07	1.98	0.11	6.85	-9999.00	234.34	304.08	0.28	0.55
61	c	'23-Feb-2012 02:43:00'	72	2.03	11.84	2.64	0.17	12.43	-9999.00	234.64	208.38	0.28	0.50
62	c	'11-Apr-2011 19:48:00'	72	2.05	12.28	2.80	0.19	13.28	-9999.00	241.21	250.56	0.28	0.56
63	c	'30-May-2012 22:13:00'	72	1.88	14.17	3.20	0.19	11.56	-9999.00	231.29	315.91	0.28	0.50
64	c	'19-May-2011 07:18:00'	72	1.81	10.99	4.27	0.13	11.19	-9999.00	240.05	274.68	0.28	0.84
65	c	'30-May-2001 17:00:00'	72	2.53	13.44	3.92	0.32	20.07	-9999.00	-9999.00	-9999.00	0.28	0.55
66	c	'26-Jun-2012 19:13:00'	72	2.16	11.05	2.84	0.17	14.29	-9999.00	236.38	294.07	0.28	0.53
67	c	'28-Apr-2012 19:43:00'	72	1.95	13.54	2.33	0.18	11.46	-9999.00	229.47	281.58	0.28	0.56
68	c	'21-Jun-1995 21:30:00'	72	2.17	13.72	2.54	0.22	13.50	248.78	-9999.00	-9999.00	0.28	0.55
69	c	'09-Jun-2014 00:19:00'	72	2.09	14.37	3.27	0.22	13.14	-9999.00	249.44	305.56	0.28	0.64
70	c	'22-Jul-2007 19:00:00'	72	3.28	13.05	4.22	0.51	32.86	-9999.00	-9999.00	-9999.00	0.27	0.57
71	c	'26-Feb-2011 15:48:00'	72	1.20	11.41	1.60	0.06	4.35	-9999.00	267.63	250.54	0.27	0.56
72	c	'02-May-1999 04:45:00'	72	2.28	13.48	4.47	0.33	19.64	-9999.00	-9999.00	-9999.00	0.27	0.56
73	c	'09-May-2000 18:45:00'	72	1.76	12.92	4.23	0.14	9.78	-9999.00	-9999.00	-9999.00	0.27	0.62
74	c	'23-Apr-2000 10:15:00'	72	1.23	13.46	1.80	0.07	4.54	-9999.00	-9999.00	-9999.00	0.27	0.60
75	c	'08-Jun-2008 18:30:00'	72	2.11	11.26	3.64	0.18	15.59	-9999.00	-9999.00	-9999.00	0.27	0.76
76	c	'24-Mar-1999 00:15:00'	72	1.65	11.24	4.13	0.14	9.41	-9999.00	-9999.00	-9999.00	0.27	0.59
77	c	'07-Sep-2014 10:49:00'	72	2.68	9.68	4.87	0.46	33.01	-9999.00	248.60	288.67	0.27	0.56
78	c	'03-Jun-1998 21:15:00'	72	3.06	11.92	4.75	0.35	27.66	-9999.00	-9999.00	-9999.00	0.26	0.46
79	c	'12-Jun-1992 00:30:00'	72	3.12	14.14	3.85	0.49	29.99	251.47	-9999.00	-9999.00	0.26	0.63
80	c	'03-Jul-2000 08:37:30'	72	2.85	10.69	4.53	0.31	24.94	-9999.00	-9999.00	-9999.00	0.26	0.75
81	c	'23-Jun-2008 18:00:00'	72	1.79	14.14	2.95	0.17	10.24	-9999.00	-9999.00	-9999.00	0.26	0.55
82	c	'31-May-2008'	72	1.60	11.75	2.57	0.11	7.75	-9999.00	-9999.00	-9999.00	0.26	0.64
83	c	'05-Mar-2012 16:43:00'	72	1.49	12.70	1.86	0.10	6.69	-9999.00	232.74	203.44	0.26	0.56
84	c	'17-Jun-1999 12:15:00'	72	3.98	14.93	5.84	0.83	49.05	-9999.00	-9999.00	-99		

Location	Jurien
Method	72 Hour Rolling Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'25-Apr-1991 23:00:00'	72	2.93	15.54	3.42	0.47	26.10	243.48	-9999.00	-9999.00	0.00	0.31
2	e	'18-Jul-1996 05:00:00'	72	5.94	14.94	6.76	1.92	108.49	249.13	-9999.00	-9999.00	0.25	0.82
3	e	'28-Jul-1993 20:00:00'	72	5.56	16.60	6.05	1.80	92.85	246.03	-9999.00	-9999.00	0.05	0.55
4	e	'25-Aug-2004 09:45:00'	72	5.55	15.52	7.60	1.68	93.85	-9999.00	-9999.00	-9999.00	0.04	0.52
5	e	'02-Aug-1991 20:00:00'	72	5.41	15.70	6.58	1.66	89.38	247.20	-9999.00	-9999.00	0.12	0.71
6	e	'05-Jun-1997 05:00:00'	72	5.19	16.18	6.67	1.59	84.18	242.92	-9999.00	-9999.00	0.08	0.53
7	e	'07-Sep-2005 04:15:00'	72	5.37	15.03	6.31	1.51	86.08	-9999.00	-9999.00	-9999.00	0.13	0.41
8	e	'08-Jun-1995 05:00:00'	72	5.26	13.69	6.61	1.42	84.92	249.28	-9999.00	-9999.00	0.27	0.67
9	e	'04-Jul-1991 02:00:00'	72	4.79	15.64	6.65	1.37	74.57	245.11	-9999.00	-9999.00	0.01	0.42
10	e	'11-Sep-2009 20:15:00'	72	4.93	16.37	5.62	1.37	73.88	-9999.00	-9999.00	-9999.00	0.07	0.49
11	e	'07-Sep-1991 20:00:00'	72	4.71	16.92	5.35	1.32	67.89	246.70	-9999.00	-9999.00	-0.07	0.36
12	e	'22-Sep-2003 20:00:00'	72	4.96	15.31	5.78	1.32	74.50	-9999.00	-9999.00	-9999.00	-0.06	0.24
13	e	'24-May-1994 08:00:00'	72	4.87	13.78	6.98	1.30	77.49	244.83	-9999.00	-9999.00	0.13	0.61
14	e	'15-Sep-1996 23:00:00'	72	4.74	15.18	6.37	1.28	70.46	250.72	-9999.00	-9999.00	0.15	0.41
15	e	'02-Jul-1992 08:00:00'	72	4.82	15.05	5.49	1.28	70.83	246.30	-9999.00	-9999.00	-0.06	0.39
16	e	'29-Jun-2009 10:15:00'	72	5.12	13.60	6.78	1.27	80.17	-9999.00	-9999.00	-9999.00	0.22	0.58
17	e	'10-Oct-1997 17:00:00'	72	4.71	15.06	5.28	1.22	68.16	245.04	-9999.00	-9999.00	-0.18	0.17
18	e	'24-Sep-2013 09:12:00'	72	4.88	14.62	6.34	1.22	72.16	-9999.00	246.99	254.83	0.09	0.57
19	e	'19-Nov-1992 23:00:00'	72	4.62	14.13	6.74	1.20	69.64	238.34	-9999.00	-9999.00	-0.20	0.13
20	e	'12-Jul-2002 06:30:00'	72	4.80	14.21	6.53	1.19	71.44	-9999.00	-9999.00	-9999.00	0.07	0.57
21	e	'24-Jul-1996 05:00:00'	72	4.66	14.98	5.67	1.19	66.14	249.56	-9999.00	-9999.00	0.09	0.47
22	e	'21-Jul-2009 08:15:00'	72	4.62	13.93	7.26	1.18	70.84	-9999.00	-9999.00	-9999.00	0.07	0.78
23	e	'15-Sep-1982 20:00:00'	72	4.63	14.76	5.70	1.17	66.79	246.47	-9999.00	-9999.00	0.00	0.60
24	e	'02-Oct-1991 14:00:00'	72	4.31	16.40	5.44	1.13	56.97	250.09	-9999.00	-9999.00	-0.30	0.06
25	e	'03-Apr-2012 19:28:00'	72	4.40	16.56	6.36	1.12	59.67	-9999.00	228.27	236.22	0.25	0.48
26	e	'05-Jul-1982 08:00:00'	72	4.35	15.94	5.58	1.11	58.97	242.86	-9999.00	-9999.00	-0.13	0.27
27	e	'29-Jul-1996 08:00:00'	72	4.53	14.84	5.22	1.11	61.71	250.90	-9999.00	-9999.00	0.23	0.83
28	e	'14-Aug-2017 07:20:00'	72	4.61	14.54	5.96	1.10	64.61	-9999.00	242.91	265.59	0.18	0.50
29	e	'28-Apr-2000 07:45:00'	72	4.50	14.85	5.65	1.09	62.78	-9999.00	-9999.00	-9999.00	0.27	0.61
30	e	'02-Sep-2002 22:30:00'	72	4.44	15.40	5.66	1.09	61.02	-9999.00	-9999.00	-9999.00	-0.07	0.32
31	e	'27-Jun-1991 02:00:00'	72	4.44	14.93	5.52	1.08	60.44	240.43	-9999.00	-9999.00	0.14	0.64
32	e	'17-Jul-1999 07:45:00'	72	4.41	14.93	5.88	1.05	61.01	-9999.00	-9999.00	-9999.00	0.06	0.46
33	e	'29-Jul-2017 08:50:00'	72	4.51	14.26	5.77	1.05	62.74	-9999.00	239.47	253.73	0.08	0.40
34	e	'31-Jul-2007 10:30:00'	72	4.38	15.63	5.30	1.04	58.52	-9999.00	-9999.00	-9999.00	0.13	0.69
35	e	'20-Jun-1996 05:00:00'	72	4.58	13.46	5.06	1.03	63.22	250.28	-9999.00	-9999.00	0.31	0.67
36	e	'12-Jun-1982 17:00:00'	72	4.11	16.37	5.20	1.02	51.82	246.11	-9999.00	-9999.00	0.08	0.37
37	e	'20-Jul-2017 19:50:00'	72	4.30	14.52	6.91	1.02	59.22	-9999.00	240.62	249.80	0.17	0.59
38	e	'01-Aug-2011 15:33:00'	72	4.42	14.69	5.62	1.02	59.81	-9999.00	251.01	257.01	0.28	0.70
39	e	'14-Aug-2009 12:15:00'	72	4.39	14.77	5.49	1.01	58.62	-9999.00	-9999.00	-9999.00	0.12	0.58
40	e	'01-Oct-2005 21:45:00'	72	4.26	15.64	5.90	1.01	55.06	-9999.00	-9999.00	-9999.00	-0.15	0.05
41	e	'28-Jun-1996 02:00:00'	72	4.22	15.20	5.65	1.01	57.03	249.80	-9999.00	-9999.00	0.22	0.61
42	e	'11-Aug-1992 20:00:00'	72	4.24	15.27	5.02	1.00	55.08	245.67	-9999.00	-9999.00	-0.15	0.26
43	e	'03-Jul-2007 05:30:00'	72	4.47	13.84	5.65	0.99	60.82	-9999.00	-9999.00	-9999.00	0.20	0.72
44	e	'01-Sep-2013 12:13:00'	72	4.14	15.93	5.47	0.97	53.37	-9999.00	237.19	255.26	0.11	0.47
45	e	'08-Aug-2006 11:45:00'	72	4.38	13.69	6.42	0.97	60.80	-9999.00	-9999.00	-9999.00	-0.08	0.54
46	e	'07-Aug-1992 20:00:00'	72	4.11	15.47	5.17	0.97	53.12	244.13	-9999.00	-9999.00	-0.04	0.49
47	e	'18-Jun-1999 07:45:00'	72	4.24	14.79	5.84	0.97	56.36	-9999.00	-9999.00	-9999.00	0.25	0.58
48	e	'29-Jun-1992 05:00:00'	72	4.37	13.68	5.29	0.96	58.68	250.22	-9999.00	-9999.00	0.09	0.62
49	e	'23-Aug-1995 17:00:00'	72	4.21	15.05	4.74	0.96	53.36	241.70	-9999.00	-9999.00	-0.11	0.30
50	e	'01-Aug-1996 11:00:00'	72	4.27	14.20	4.58	0.96	55.09	244.10	-9999.00	-9999.00	0.05	0.49
51	e	'21-Jun-1994 11:00:00'	72	3.99	16.68	5.22	0.96	50.14	250.80	-9999.00	-9999.00	0.08	0.58
52	e	'28-Jul-2006 13:45:00'	72	4.03	16.06	5.57	0.95	51.15	-9999.00	-9999.00	-9999.00	-0.04	0.40
53	e	'17-Jul-2000 01:30:00'	72	4.23	14.96	4.81	0.95	53.26	-9999.00	-9999.00	-9999.00	0.21	0.63
54	e	'22-May-2009 14:15:00'	72	4.52	12.91	5.46	0.94	62.59	-9999.00	-9999.00	-9999.00	0.32	0.80
55	e	'04-Oct-1992 05:00:00'	72	3.99	16.44	4.83	0.93	48.53	248.65	-9999.00	-9999.00	-0.31	0.02
56	e	'08-Oct-2013 20:13:00'	72	4.06	16.42	5.08	0.93	49.87	-9999.00	245.96	239.89	0.01	0.39
57	e	'16-Jul-1982 08:00:00'	72	3.87	17.50	4.75	0.92	47.59	248.28	-9999.00	-9999.00	-0.04	0.28
58	e	'09-Sep-2003 17:00:00'	72	4.05	16.07	4.92	0.92	49.64	-9999.00	-9999.00	-9999.00	-0.10	0.26
59	e	'13-Jan-2005 14:45:00'	72	4.17	14.88	5.26	0.91	52.86	-9999.00	-9999.00	-9999.00	-0.44	0.07
60	e	'08-Oct-1999 22:30:00'	72	4.23	13.42	6.54	0.91	58.96	-9999.00	-9999.00	-9999.00	-0.10	0.09
61	e	'22-May-1995 23:00:00'	72	4.09	14.68	5.34	0.90	51.42	247.03	-9999.00	-9999.00	0.04	0.38
62	e	'04-Aug-2006 12:45:00'	72	3.96	16.63	5.29	0.90	47.74	-9999.00	-9999.00	-9999.00	-0.09	0.23
63	e	'12-Jun-1994 20:00:00'	72	3.96	14.97	4.96	0.90	49.61	242.28	-9999.00	-9999.00	-0.18	0.29
64	e	'07-Aug-1998 04:45:00'	72	3.98	15.67	4.98	0.90	48.56	-9999.00	-9999.00	-9999.00	-0.01	0.40
65	e	'27-Aug-1992 14:00:00'	72	4.04	14.52	5.08	0.89	50.23	244.14	-9999.00	-9999.00	0.00	0.40
66	e	'07-Aug-2007 10:30:00'	72	4.01	15.72	5.17	0.89	48.95	-9999.00	-9999.00	-9999.00	-0.03	0.39
67	e	'05-Jul-1992 11:00:00'	72	3.90	14.81	5.50	0.89	48.63	244.72	-9999.00	-9999.00	-0.17	0.13
68	e	'16-May-2005 20:45:00'	72	3.90	16.30	5.18	0.88	47.96	-9999.00	-9999.00	-9999.00	0.15	0.56
69	e	'30-Jul-1991 17:00:00'	72	3.95	15.26	4.92	0.88	48.99	249.11	-9999.00	-9999.00	0.07	0.42
70	e	'27-Jun-2015 07:06:00'	72	3.83	17.92	5.02	0.88	44.89	-9999.00	238.83	214.15	-0.09	0.22
71	e	'10-Jun-1998 10:45:00'	72	4.19	13.40	4.96	0.88	53.31	-9999.00	-9999.00	-9999.00	0.19	0.63
72	e	'01-Aug-1982 17:00:00'	72	3.92	16.01	4.42	0.88	45.81	246.22	-9999.00	-9999.00	-0.12	0.21
73	e	'25-May-1997 02:00:00'	72	4.02	14.69	4.56	0.87	49.39	245.67	-9999.00	-9999.00	0.01	0.43
74	e	'20-Jul-1995 23:00:00'	72	4.10	13.53	5.25	0.87	53.53	248.82	-9999.00	-9999.00	0.02	0.36
75	e	'02-Aug-2003 23:30:00'	72	4.12	14.61	5.87	0.87	52.19	-9999.00	-9999.00	-9999.00	-0.01	0.33
76	e	'19-Aug-1995 14:00:00'	72	3.99	14.95	4.48	0.87	48.20	247.42	-9999.00	-9999.00	-0.10	0.19
77	e	'08-Jul-2014 00:04:00'	72	4.14	14.30	5.85	0.87	52.80	-9999.00	239.21	240.11	0.07	0.36
78	e	'25-Jun-2000 18:00:00'	72	3.85	16.55	5.31	0.87	45.38	-9999.00	-9999.00	-9999.00	0.09	0.43
79	e	'22-Sep-1998 07:45:00'	72	4.04	14.02	5.40	0.86	53.20	-9999.00	-9999.00	-9999.00	-0.06	0.32
80	e	'21-Jun-1992 08:00:00'	72	3.86	14.86	5.81	0.86	48.66	248.06	-9999.00	-9999.00	0.05	0.39
81	e	'16-Aug-1997 11:00:00'	72	3.91	14.79	4.97	0.86	48.53	249.73	-9999.00	-9999.00	-0.18	0.35
82	e	'08-Aug-1993 23:00:00'	72	4.01	14.61	4.36	0.86	48.41	244.29	-9999.00	-9999.00	-0.16	0.03
83	e	'22-May-2016 13:51:00'	72	4.08	13.78	6.53	0.85	54.26	-9999.00	243.55	257.23	0.14	0.75
84	e	'26-Jul-1982 08:00:00'	72	3.85	16.06	4.							

K1509 - South West Storm Selection
Extreme Event Comparison

Location	Jurien
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'29-Jul-1993 05:00:00'	126.00	5.13	15.97	6.05	2.60	141.87	245.36	-9999.00	-9999.00	-0.02	0.55
2	f	'03-Aug-1991 00:30:00'	129.00	5.05	15.71	6.58	2.53	140.64	246.00	-9999.00	-9999.00	0.05	0.71
3	f	'18-Jul-1996 02:00:00'	90.00	5.67	14.39	6.76	2.11	124.88	250.75	-9999.00	-9999.00	0.27	0.86
4	f	'07-Sep-2005 07:07:30'	111.25	5.04	15.30	6.31	2.05	118.64	-9999.00	-9999.00	-9999.00	0.08	0.41
5	f	'25-Aug-2004 12:00:00'	80.50	5.41	15.46	7.60	1.77	100.59	-9999.00	-9999.00	-9999.00	0.05	0.52
6	f	'08-Jun-1995 02:00:00'	96.00	5.03	13.68	6.61	1.69	104.43	249.08	-9999.00	-9999.00	0.23	0.67
7	f	'05-Jun-1997 02:00:00'	72.00	5.20	16.22	6.67	1.56	84.49	243.37	-9999.00	-9999.00	0.08	0.53
8	f	'23-Sep-2013 23:42:00'	87.00	4.88	14.02	6.34	1.41	87.14	-9999.00	248.93	257.47	0.11	0.57
9	f	'11-Sep-2009 16:45:00'	71.00	4.94	16.38	5.62	1.34	73.19	-9999.00	-9999.00	-9999.00	0.07	0.49
10	f	'29-Jun-2009 04:15:00'	82.00	5.00	13.13	6.78	1.34	87.36	-9999.00	-9999.00	-9999.00	0.22	0.58
11	f	'07-Sep-1991 21:30:00'	75.00	4.68	16.82	5.35	1.31	69.84	246.75	-9999.00	-9999.00	-0.08	0.36
12	f	'02-Jul-1992 05:00:00'	78.00	4.78	14.83	5.49	1.31	75.55	246.08	-9999.00	-9999.00	-0.08	0.39
13	f	'20-Jun-1996 03:30:00'	99.00	4.51	12.92	5.06	1.29	84.63	250.22	-9999.00	-9999.00	0.30	0.73
14	f	'31-Jul-1996 18:30:00'	87.00	4.40	14.50	4.90	1.20	70.86	246.48	-9999.00	-9999.00	0.16	0.83
15	f	'15-Sep-1996 18:30:00'	63.00	4.88	15.29	6.37	1.16	65.07	250.64	-9999.00	-9999.00	0.17	0.41
16	f	'24-May-1994 11:00:00'	54.00	5.33	14.02	6.98	1.14	68.30	246.22	-9999.00	-9999.00	0.15	0.57
17	f	'10-Oct-1997 14:00:00'	66.00	4.81	15.11	5.28	1.13	64.75	245.44	-9999.00	-9999.00	-0.17	0.17
18	f	'04-Jul-1991 02:00:00'	48.00	5.40	16.15	6.65	1.13	61.62	246.35	-9999.00	-9999.00	0.02	0.42
19	f	'15-Sep-1982 17:00:00'	60.00	4.85	14.94	5.70	1.04	59.97	248.07	-9999.00	-9999.00	0.02	0.60
20	f	'21-Jul-2009 00:15:00'	46.00	5.49	14.51	7.26	1.02	60.12	-9999.00	-9999.00	-9999.00	0.13	0.78
21	f	'19-Nov-1992 18:30:00'	51.00	5.11	14.65	6.74	1.01	58.88	239.55	-9999.00	-9999.00	-0.14	0.13
22	f	'28-Apr-2000 06:15:00'	51.00	4.89	15.16	5.65	0.90	51.63	-9999.00	-9999.00	-9999.00	0.29	0.61
23	f	'12-Jul-2002 12:00:00'	45.00	5.20	14.83	6.53	0.89	51.85	-9999.00	-9999.00	-9999.00	0.03	0.57
24	f	'14-Aug-2009 14:15:00'	60.00	4.50	14.87	5.49	0.88	51.34	-9999.00	-9999.00	-9999.00	0.12	0.58
25	f	'02-Sep-2002 04:00:00'	49.00	4.92	15.24	5.66	0.88	50.24	-9999.00	-9999.00	-9999.00	0.04	0.45
26	f	'22-May-2009 14:45:00'	59.00	4.74	12.59	5.46	0.82	55.77	-9999.00	-9999.00	-9999.00	0.33	0.78
27	f	'22-Sep-2003 01:00:00'	44.00	5.02	15.18	5.78	0.81	46.51	-9999.00	-9999.00	-9999.00	0.00	0.28
28	f	'04-Oct-1991 03:30:00'	45.00	4.66	17.76	5.30	0.81	41.68	244.89	-9999.00	-9999.00	-0.18	0.09
29	f	'17-Jul-1999 01:15:00'	45.00	4.97	15.01	5.88	0.81	47.14	-9999.00	-9999.00	-9999.00	0.11	0.46
30	f	'01-Aug-2011 06:48:00'	49.50	4.70	14.80	5.62	0.79	46.22	-9999.00	249.76	259.39	0.30	0.70
31	f	'25-Jul-1996 03:30:00'	45.00	4.86	14.83	5.67	0.79	45.95	248.89	-9999.00	-9999.00	0.03	0.47
32	f	'08-Aug-2006 07:15:00'	47.00	4.96	13.49	6.42	0.77	49.26	-9999.00	-9999.00	-9999.00	-0.08	0.52
33	f	'27-Jun-1996 21:30:00'	45.00	4.75	15.50	5.65	0.77	43.82	250.82	-9999.00	-9999.00	0.25	0.61
34	f	'28-Jul-1996 12:30:00'	51.00	4.61	14.39	5.22	0.77	46.26	251.06	-9999.00	-9999.00	0.17	0.63
35	f	'20-Jul-2017 07:05:00'	36.50	5.20	15.47	6.91	0.75	42.21	-9999.00	242.11	255.67	-5466.35	0.59
36	f	'31-Jul-2007 18:00:00'	49.00	4.59	15.01	5.30	0.75	43.12	-9999.00	-9999.00	-9999.00	0.08	0.45
37	f	'02-Jul-2007 14:30:00'	50.00	4.73	13.18	5.65	0.72	47.15	-9999.00	-9999.00	-9999.00	0.32	0.72
38	f	'08-Oct-1999 09:37:30'	39.75	5.26	13.25	6.54	0.72	46.87	-9999.00	-9999.00	-9999.00	-3767.28	0.09
39	f	'04-Jul-1982 14:00:00'	36.00	4.94	16.87	5.58	0.72	37.93	243.77	-9999.00	-9999.00	-0.11	0.27
40	f	'14-Aug-2017 14:05:00'	45.50	4.70	14.50	5.56	0.71	42.28	-9999.00	244.04	270.36	0.22	0.50
41	f	'12-Aug-1992 06:30:00'	45.00	4.52	15.67	5.02	0.70	38.96	243.52	-9999.00	-9999.00	-0.19	0.23
42	f	'28-Jun-1992 15:30:00'	45.00	4.72	13.46	5.29	0.68	43.02	251.96	-9999.00	-9999.00	0.13	0.57
43	f	'20-Jul-1995 15:30:00'	45.00	4.61	13.86	5.25	0.67	40.79	251.93	-9999.00	-9999.00	0.08	0.36
44	f	'25-Jun-1991 11:00:00'	48.00	4.28	15.77	4.54	0.67	36.95	241.09	-9999.00	-9999.00	0.09	0.50
45	f	'22-Sep-1998 00:15:00'	45.00	4.70	13.76	5.40	0.66	42.43	-9999.00	-9999.00	-9999.00	0.00	0.32
46	f	'28-Jul-2006 07:15:00'	35.00	4.78	17.06	5.57	0.64	33.87	-9999.00	-9999.00	-9999.00	-0.09	0.20
47	f	'01-Oct-2005 04:37:30'	36.25	4.68	16.98	5.90	0.64	33.72	-9999.00	-9999.00	-9999.00	-0.14	0.05
48	f	'16-Jul-1982 03:30:00'	39.00	4.46	17.71	4.75	0.63	32.92	249.62	-9999.00	-9999.00	-0.04	0.28
49	f	'07-Aug-1992 14:00:00'	36.00	4.75	15.75	5.17	0.62	34.72	244.46	-9999.00	-9999.00	-0.09	0.16
50	f	'18-Jun-1999 19:15:00'	35.00	4.95	14.90	5.84	0.62	36.46	-9999.00	-9999.00	-9999.00	0.29	0.58
51	f	'22-May-2016 01:06:00'	35.50	5.10	13.57	6.53	0.61	39.38	-9999.00	248.77	251.88	0.19	0.75
52	f	'27-Jul-2013 01:57:30'	42.48	4.83	12.22	6.18	0.60	42.07	-9999.00	252.41	253.12	0.31	0.60
53	f	'12-Jun-1994 05:00:00'	36.00	4.63	16.02	4.96	0.60	32.86	245.63	-9999.00	-9999.00	-0.18	0.20
54	f	'28-Jun-1991 02:00:00'	36.00	4.83	14.06	5.52	0.60	36.15	240.39	-9999.00	-9999.00	0.07	0.64
55	f	'11-Aug-2003 14:00:00'	45.00	4.50	13.44	5.27	0.60	38.42	-9999.00	-9999.00	-9999.00	0.17	0.68
56	f	'11-May-2002 15:30:00'	36.00	4.88	13.95	5.85	0.59	36.39	-9999.00	-9999.00	-9999.00	0.22	0.62
57	f	'24-May-1997 14:00:00'	42.00	4.34	15.32	4.56	0.59	33.30	248.55	-9999.00	-9999.00	0.06	0.43
58	f	'05-Jul-1992 21:30:00'	33.00	4.70	15.98	5.50	0.58	31.69	244.61	-9999.00	-9999.00	-0.17	0.01
59	f	'04-Apr-2012 22:43:00'	29.50	4.88	17.41	6.36	0.58	30.04	-9999.00	231.33	232.32	0.28	0.48
60	f	'21-Jun-1994 18:30:00'	33.00	4.62	17.18	5.22	0.58	30.23	250.70	-9999.00	-9999.00	0.13	0.58
61	f	'03-Sep-1999 08:45:00'	42.00	4.74	12.39	5.78	0.57	39.76	-9999.00	-9999.00	-9999.00	0.02	0.40
62	f	'06-Oct-2002 06:00:00'	33.00	5.10	12.75	6.60	0.56	37.02	-9999.00	-9999.00	-9999.00	-0.04	0.21
63	f	'04-Sep-2012 12:28:00'	41.00	4.80	12.22	5.92	0.56	39.85	-9999.00	250.81	251.64	0.16	0.67
64	f	'28-Jul-2017 21:05:00'	33.50	4.96	13.82	5.77	0.56	34.63	-9999.00	237.13	256.08	0.20	0.40
65	f	'11-May-2004 04:37:30'	32.25	4.90	14.47	6.48	0.56	32.97	-9999.00	-9999.00	-9999.00	0.21	0.72
66	f	'01-Oct-1991 09:30:00'	33.00	4.66	15.78	5.44	0.56	30.73	252.41	-9999.00	-9999.00	-0.26	0.09
67	f	'09-Jul-1995 03:30:00'	39.00	4.55	13.93	5.14	0.55	34.59	251.32	-9999.00	-9999.00	0.08	0.42
68	f	'03-Oct-1992 14:00:00'	36.00	4.36	17.35	4.83	0.55	28.91	251.34	-9999.00	-9999.00	-0.28	0.02
69	f	'22-Jul-1996 23:00:00'	36.00	4.45	15.73	4.76	0.54	30.21	250.64	-9999.00	-9999.00	0.10	0.24
70	f	'10-Aug-1997 08:00:00'	36.00	4.46	15.57	4.82	0.54	30.38	244.21	-9999.00	-9999.00	-0.09	0.20
71	f	'08-Jun-2004 12:37:30'	34.25	4.57	15.39	5.34	0.53	30.06	-9999.00	-9999.00	-9999.00	0.10	0.46
72	f	'13-Jun-1982 23:00:00'	36.00	4.35	16.06	4.56	0.53	28.83	248.47	-9999.00	-9999.00	0.11	0.37
73	f	'12-Dec-1982 11:00:00'	36.00	4.43	15.36	4.67	0.53	29.78	244.94	-9999.00	-9999.00	-0.25	0.05
74	f	'15-Aug-2002 15:00:00'	33.00	4.73	15.14	5.38	0.53	31.33	-9999.00	-9999.00	-9999.00	-0.19	0.15
75	f	'16-May-2005 06:15:00'	31.00	4.63	16.96	5.18	0.53	28.00	-9999.00	-9999.00	-9999.00	0.23	0.56
76	f	'11-Jun-1982 11:00:00'	30.00	4.62	16.91	5.20	0.52	27.65	244.39	-9999.00	-9999.00	-0.03	0.34
77	f	'15-Aug-1997 21:30:00'	33.00	4.57	15.51	4.97	0.52	29.34	253.16	-9999.00	-9999.00	-0.06	0.35
78	f	'22-Aug-1995 21:30:00'	39.00	4.20	15.72	4.38	0.52	28.97	241.40	-9999.00	-9999.00	-0.08	0.24
79	f	'26-Aug-1992 15:30:00'	33.00	4.58	14.89	5.08	0.52	29.80	246.18	-9999.00	-9999.00	0.00	0.34
80	f	'09-Jun-1982 00:30:00'	33.00	4.54	15.52	5.18	0.52	29.07	249.96	-9999.00	-9999.00	0.10	0.60
81	f	'19-Jun-1993 00:30:00'	39.00	4.16	16.16	4.28	0.52	28.29	240.26	-9999.00	-9999.00	-0.11	0.33
82	f	'21-Jun-1992 18:30:00'	27.00	4.96	15.07	5.81	0.51	28.98</					

Location	Metropolitan (Rottnest/Fremantle)
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'17-Jul-1996 16:00:00'	72	6.48	14.01	8.31	2.06	125.52	-9999.00	-9999.00	-9999.00	0.46	0.96
2	a	'16-Jul-1990 11:00:00'	72	6.39	14.25	8.11	2.16	128.12	252.58	-9999.00	-9999.00	0.13	0.64
3	a	'25-Aug-2004 10:30:00'	72	5.99	14.76	7.61	1.88	110.24	-9999.00	-9999.00	-9999.00	0.16	0.88
4	a	'02-Aug-1991 17:00:00'	72	5.95	15.01	7.49	1.88	108.58	250.33	-9999.00	-9999.00	0.27	0.88
5	a	'11-Sep-2009 17:10:00'	72	5.72	15.51	6.98	1.78	99.96	-9999.00	257.00	270.23	0.22	0.68
6	a	'24-Aug-1983 02:00:00'	72	5.69	13.49	6.89	1.64	102.44	260.07	-9999.00	-9999.00	0.18	0.66
7	a	'28-Jul-1993 14:00:00'	72	5.60	16.12	6.40	1.76	94.60	248.44	-9999.00	-9999.00	0.12	0.60
8	a	'31-Jul-2007 09:42:00'	72	5.58	15.08	7.02	1.65	94.41	-9999.00	257.88	266.75	0.27	0.89
9	a	'22-Jul-1990 20:00:00'	72	5.53	12.98	6.51	1.42	93.46	250.40	-9999.00	-9999.00	0.09	0.77
10	a	'29-Jun-2009 02:40:00'	72	5.47	13.16	6.88	1.40	91.07	-9999.00	254.71	273.88	0.43	0.91
11	a	'23-Sep-2013 19:58:00'	72	5.44	13.23	7.43	1.39	90.00	-9999.00	265.81	272.04	0.32	0.87
12	a	'28-Aug-1983 23:00:00'	72	5.43	15.94	7.11	1.74	93.23	250.59	-9999.00	-9999.00	0.04	0.24
13	a	'11-Jul-2002 18:30:00'	72	5.37	14.15	8.37	1.49	90.36	-9999.00	-9999.00	-9999.00	0.18	0.84
14	a	'29-Jun-1983 05:00:00'	72	5.37	12.38	6.92	1.32	91.09	253.82	-9999.00	-9999.00	0.25	0.82
15	a	'01-Jul-1992 20:00:00'	72	5.36	14.09	5.84	1.45	87.68	249.66	-9999.00	-9999.00	0.04	0.83
16	a	'28-Jul-1996 19:00:00'	72	5.29	14.57	7.09	1.42	84.33	-9999.00	-9999.00	-9999.00	0.28	0.89
17	a	'01-Aug-2011 17:37:00'	72	5.17	14.43	6.58	1.37	81.24	-9999.00	260.61	266.35	0.33	0.90
18	a	'03-Jul-2007 00:12:00'	72	5.15	13.24	6.71	1.24	81.34	-9999.00	259.03	265.75	0.36	1.03
19	a	'06-Sep-2005 23:00:00'	72	5.12	13.63	6.00	1.26	79.90	-9999.00	257.36	234.56	0.25	0.54
20	a	'20-Jul-2009 11:32:00'	72	5.11	13.03	8.94	1.47	87.79	-9999.00	257.49	263.92	0.23	0.77
21	a	'11-Aug-1981 08:00:00'	72	5.09	13.46	6.74	1.35	83.25	252.31	-9999.00	-9999.00	0.14	0.57
22	a	'14-Aug-2017 03:59:00'	72	5.09	13.77	6.24	1.25	78.42	-9999.00	261.04	278.01	0.32	0.65
23	a	'04-Jun-1997 16:00:00'	72	5.08	15.70	7.88	1.49	81.43	-9999.00	-9999.00	-9999.00	0.18	0.73
24	a	'08-Jun-1995 00:29:00'	72	5.08	12.82	6.25	1.15	78.43	-9999.00	264.26	265.59	0.37	0.78
25	a	'08-Sep-2014 13:11:00'	72	5.07	13.53	7.14	1.22	78.42	-9999.00	257.94	262.42	0.29	0.81
26	a	'21-Sep-2003 17:45:00'	72	5.07	13.36	6.18	1.20	76.84	-9999.00	-9999.00	-9999.00	0.09	0.44
27	a	'03-Jul-1991 14:00:00'	72	5.06	13.86	7.32	1.39	83.66	249.86	-9999.00	-9999.00	0.16	0.57
28	a	'10-Oct-1997 04:00:00'	72	5.05	13.17	6.19	1.18	78.01	-9999.00	-9999.00	-9999.00	0.02	0.53
29	a	'20-Jun-1996 01:00:00'	72	5.04	12.92	6.11	1.14	75.63	-9999.00	-9999.00	-9999.00	0.44	0.88
30	a	'02-Sep-1983 23:00:00'	72	5.01	12.49	6.58	1.10	77.12	250.08	-9999.00	-9999.00	0.20	0.65
31	a	'15-Sep-1996 13:00:00'	72	5.01	13.65	6.95	1.24	76.87	-9999.00	-9999.00	-9999.00	0.25	0.58
32	a	'08-Jun-1981 08:00:00'	72	5.00	13.67	7.27	1.30	81.33	245.01	-9999.00	-9999.00	0.20	0.54
33	a	'07-Jul-2014 15:11:00'	72	5.00	13.77	7.35	1.23	77.55	-9999.00	258.28	263.38	0.22	0.66
34	a	'01-Jul-1985 05:00:00'	72	4.99	16.14	5.90	1.41	75.68	252.26	-9999.00	-9999.00	0.19	0.68
35	a	'28-Jul-2017 22:59:00'	72	4.98	13.32	6.70	1.20	76.96	-9999.00	260.78	273.35	0.24	0.60
36	a	'28-Jun-1992 17:00:00'	72	4.95	12.78	6.64	1.18	79.21	256.60	-9999.00	-9999.00	0.20	0.72
37	a	'11-Jun-1988 17:00:00'	72	4.94	14.25	5.39	1.24	73.82	254.33	-9999.00	-9999.00	0.27	0.70
38	a	'15-Aug-1981 23:00:00'	72	4.92	14.27	6.02	1.28	75.26	248.16	-9999.00	-9999.00	0.00	0.47
39	a	'29-Nov-2012 11:46:00'	72	4.91	12.20	8.00	1.19	80.60	-9999.00	262.99	270.16	0.32	1.17
40	a	'01-Jun-1988 23:00:00'	72	4.91	12.77	5.38	1.09	73.21	249.96	-9999.00	-9999.00	0.38	1.02
41	a	'27-May-1981 05:00:00'	72	4.89	12.57	5.47	1.07	72.74	242.08	-9999.00	-9999.00	0.26	0.66
42	a	'09-Jun-1990 14:00:00'	72	4.88	13.93	6.32	1.21	74.37	248.24	-9999.00	-9999.00	0.18	0.73
43	a	'12-Jul-2010 12:25:00'	72	4.87	13.66	7.26	1.24	76.34	-9999.00	252.19	255.63	0.21	0.90
44	a	'19-Jun-1988 02:00:00'	72	4.87	14.30	5.97	1.24	73.13	248.99	-9999.00	-9999.00	0.06	0.47
45	a	'25-Jul-1996 19:00:00'	72	4.86	14.39	6.61	1.20	71.04	-9999.00	-9999.00	-9999.00	0.13	0.80
46	a	'17-Jul-2000 05:30:00'	72	4.85	14.03	5.70	1.17	71.61	-9999.00	-9999.00	-9999.00	0.30	0.78
47	a	'26-Aug-1985 02:00:00'	72	4.84	14.28	5.62	1.18	71.12	246.42	-9999.00	-9999.00	0.14	0.47
48	a	'23-May-1994 18:59:59'	72	4.82	12.01	7.68	1.06	75.51	-9999.00	-9999.00	-9999.00	0.31	0.84
49	a	'23-Jul-1981 02:00:00'	72	4.81	12.45	6.53	1.13	75.56	252.79	-9999.00	-9999.00	0.25	0.78
50	a	'25-Jul-1983 08:00:00'	72	4.81	14.14	6.06	1.17	72.94	246.62	-9999.00	-9999.00	0.21	0.63
51	a	'03-Aug-1990 08:00:00'	72	4.81	13.49	5.50	1.11	72.47	253.67	-9999.00	-9999.00	0.13	0.63
52	a	'01-Aug-1996 00:00:00'	72	4.79	13.70	5.81	1.10	68.57	-9999.00	-9999.00	-9999.00	0.20	0.66
53	a	'17-Jul-1999 08:39:00'	72	4.79	13.95	6.06	1.14	71.01	-9999.00	-9999.00	-9999.00	0.15	0.62
54	a	'21-Sep-1988 08:00:00'	72	4.77	13.50	6.65	1.08	69.98	250.58	-9999.00	-9999.00	0.26	1.08
55	a	'22-May-2016 16:11:00'	72	4.71	13.29	7.20	1.11	71.72	-9999.00	261.38	271.67	0.23	1.12
56	a	'27-Jun-2003 02:30:00'	72	4.71	11.42	6.26	0.89	68.06	-9999.00	-9999.00	-9999.00	0.52	0.97
57	a	'08-Aug-2006 07:05:00'	72	4.70	13.01	7.61	1.11	72.27	-9999.00	270.80	274.73	0.06	0.77
58	a	'15-Aug-1997 23:00:00'	72	4.68	14.33	6.81	1.19	70.02	-9999.00	-9999.00	-9999.00	-0.03	0.49
59	a	'16-Aug-1988 05:00:00'	72	4.68	13.65	5.93	1.13	70.19	256.35	-9999.00	-9999.00	0.19	0.66
60	a	'22-May-2009 10:51:00'	72	4.67	12.56	6.27	0.97	67.55	-9999.00	257.89	263.47	0.48	1.03
61	a	'14-Jul-2000 04:30:00'	72	4.65	13.77	5.74	1.07	66.77	-9999.00	-9999.00	-9999.00	0.28	0.86
62	a	'13-May-1988 17:00:00'	72	4.65	13.89	6.53	1.12	69.68	245.90	-9999.00	-9999.00	0.36	0.66
63	a	'23-Aug-1995 12:59:59'	72	4.64	14.38	5.53	1.08	64.95	-9999.00	-9999.00	-9999.00	0.05	0.44
64	a	'11-Jun-2012 23:24:00'	72	4.63	11.63	6.48	0.90	66.57	-9999.00	268.14	270.36	0.63	1.35
65	a	'13-Jul-1990 08:00:00'	72	4.62	13.30	5.73	1.07	67.53	251.95	-9999.00	-9999.00	0.19	0.57
66	a	'20-Jul-2017 14:59:00'	72	4.60	13.25	7.35	1.08	67.10	-9999.00	259.77	266.11	0.27	0.80
67	a	'28-Jun-1981 23:00:00'	72	4.59	13.62	4.99	1.02	63.43	241.23	-9999.00	-9999.00	0.20	0.51
68	a	'07-Sep-1991 20:00:00'	72	4.58	16.47	5.11	1.22	64.42	248.11	-9999.00	-9999.00	0.01	0.41
69	a	'29-Jul-2011 17:07:00'	72	4.57	11.76	5.88	0.86	63.41	-9999.00	267.72	275.61	0.41	0.98
70	a	'20-Jun-2009 04:10:00'	72	4.57	13.55	6.24	1.01	64.27	-9999.00	255.38	257.59	0.30	0.90
71	a	'31-Jul-1981 14:00:00'	72	4.56	15.13	5.62	1.13	63.61	247.66	-9999.00	-9999.00	0.16	0.55
72	a	'19-Jun-1983 11:00:00'	72	4.56	14.54	5.22	1.05	63.47	254.68	-9999.00	-9999.00	0.35	0.67
73	a	'27-Jun-1991 02:00:00'	72	4.55	13.69	6.02	1.01	65.38	243.76	-9999.00	-9999.00	0.26	0.80
74	a	'01-Sep-2013 02:29:00'	72	4.54	14.59	5.84	1.08	63.26	-9999.00	256.55	268.39	0.25	0.64
75	a	'02-Sep-2002 03:30:00'	72	4.54	13.92	6.14	1.02	63.18	-9999.00	-9999.00	-9999.00	0.14	0.69
76	a	'19-Nov-1992 17:00:00'	72	4.54	13.12	6.85	1.08	67.64	238.80	-9999.00	-9999.00	-0.12	0.31
77	a	'14-Aug-2009 18:10:00'	72	4.53	13.28	5.96	0.96	62.58	-9999.00	263.74	268.65	0.27	0.68
78	a	'09-Jun-1998 22:40:00'	72	4.53	12.58	6.19	0.94	63.44	-9999.00	-9999.00	-9999.00	0.34	0.75
79	a	'06-Sep-1980 20:00:00'	72	4.52	15.85	5.35	1.16	62.66	251.78	-9999.00	-9999.00	-0.02	0.24
80	a	'18-Jul-2008 11:37:00'	72	4.51	13.72	7.05	1.02	65.68	-9999.00	260.54	251.44	0.28	1.07
81	a	'03-Aug-2003 20:00:00'	72	4.51	12.81	6.21	0.91	62.96	-9999.00	-9999.00	-9999.00	0.10	0.63
82	a	'07-Aug-1984 17:00:00'	72	4.51	13.51	6.13	1.03	65.12	245.03	-9999.00	-9999.00	0.18	0.52
83	a	'20-Jul-1989 14:00:00'	72	4.48	16.66	5.79	1.20	63.26	248.21	-9999.00	-9999.00	0.23	0.73
84	a	'15-Sep-1982 17:00:00'	72	4.48	14.68	5.49	1.1						

Location	Metropolitan (Rottnest/Fremantle)
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'11-Jun-2012 18:39:00'	72	4.53	11.44	6.48	0.86	64.02	-9999.00	270.15	276.98	0.64	1.35
2	c	'26-Jun-2003 06:00:00'	72	4.32	10.90	5.64	0.72	57.03	-9999.00	-9999.00	-9999.00	0.57	0.97
3	c	'16-Jul-1996 15:30:00'	72	5.27	12.49	8.31	1.43	94.54	-9999.00	-9999.00	-9999.00	0.54	0.96
4	c	'21-May-2009 23:36:00'	72	4.50	12.64	6.27	0.91	63.60	-9999.00	257.83	276.64	0.54	1.03
5	c	'16-May-2011 03:33:00'	72	1.34	13.96	1.68	0.09	5.42	-9999.00	254.16	8.98	0.52	0.95
6	c	'08-May-2013 12:31:00'	72	3.74	14.17	6.94	0.78	48.90	-9999.00	255.99	282.72	0.51	1.03
7	c	'01-Jul-2007 07:04:30'	72	4.36	12.12	6.71	0.84	60.44	-9999.00	261.60	276.56	0.49	1.03
8	c	'27-May-1999 21:10:00'	72	2.99	9.82	5.09	0.33	29.82	-9999.00	-9999.00	-9999.00	0.47	0.85
9	c	'15-Jan-2013 08:31:00'	72	1.86	12.45	3.21	0.18	11.76	-9999.00	247.14	245.29	0.47	0.80
10	c	'26-Apr-2000 11:15:00'	72	3.61	13.33	5.16	0.64	40.44	-9999.00	-9999.00	-9999.00	0.47	0.86
11	c	'02-Feb-2012 11:52:00'	72	1.63	11.30	2.88	0.12	9.76	-9999.00	258.57	230.76	0.47	0.93
12	c	'19-Jun-1996 04:30:00'	72	4.87	12.62	6.11	1.08	71.74	-9999.00	-9999.00	-9999.00	0.46	0.88
13	c	'28-Jun-2009 18:55:00'	72	5.40	12.79	6.88	1.32	88.34	-9999.00	256.27	276.87	0.46	0.91
14	c	'19-Feb-2011 02:26:00'	72	1.27	10.34	1.90	0.06	4.99	-9999.00	237.70	201.95	0.46	0.83
15	c	'06-Jan-2011 02:53:00'	72	1.41	9.40	2.89	0.10	7.54	-9999.00	236.37	228.24	0.46	0.97
16	c	'01-Jun-1988 04:30:00'	72	4.83	13.14	5.38	1.04	68.20	-9999.00	249.86	-9999.00	0.46	1.02
17	c	'24-Apr-2011 16:01:00'	72	1.96	12.14	3.74	0.18	12.37	-9999.00	246.24	268.51	0.46	0.78
18	c	'17-May-2015 02:26:00'	72	3.35	11.51	5.47	0.47	36.27	-9999.00	264.78	296.37	0.45	1.03
19	c	'15-May-1999 02:09:00'	72	1.48	9.02	2.22	0.06	7.27	-9999.00	-9999.00	-9999.00	0.45	0.82
20	c	'16-May-2003 04:00:00'	72	3.91	10.91	7.89	0.75	56.75	-9999.00	-9999.00	-9999.00	0.45	1.21
21	c	'24-Jun-2013 08:13:00'	72	3.36	13.92	4.68	0.58	34.98	-9999.00	261.40	278.08	0.45	0.90
22	c	'06-May-2012 05:52:00'	72	2.25	12.46	4.60	0.23	16.63	-9999.00	247.28	268.62	0.44	0.92
23	c	'22-Feb-2011 06:26:30'	72	1.19	10.87	1.99	0.06	4.53	-9999.00	290.67	273.47	0.44	0.72
24	c	'06-Apr-2008 03:57:00'	72	1.44	13.49	2.43	0.10	6.71	-9999.00	251.46	247.78	0.43	0.76
25	c	'09-Jun-1998 02:10:00'	72	4.34	11.83	6.19	0.83	58.87	-9999.00	-9999.00	-9999.00	0.43	0.93
26	c	'07-Jun-2012 10:45:30'	72	2.13	12.22	3.13	0.18	14.07	-9999.00	270.00	311.31	0.43	0.92
27	c	'10-May-1995 22:30:00'	72	3.60	10.94	6.74	0.69	48.90	-9999.00	252.60	281.42	0.42	0.79
28	c	'09-May-2004 12:07:30'	72	3.88	11.44	6.90	0.73	50.46	-9999.00	-9999.00	-9999.00	0.42	1.13
29	c	'27-Apr-2011 18:31:00'	72	2.88	13.39	3.92	0.38	25.22	-9999.00	250.12	252.89	0.42	0.65
30	c	'31-May-2011 01:52:00'	72	2.87	10.86	3.43	0.31	25.06	-9999.00	265.90	281.13	0.42	0.87
31	c	'06-Jun-1995 22:44:30'	72	4.37	11.72	6.25	0.81	60.69	-9999.00	267.82	276.33	0.42	0.78
32	c	'29-Jul-2011 12:52:00'	72	4.52	11.62	5.88	0.83	62.02	-9999.00	269.55	275.73	0.42	0.98
33	c	'17-Jun-2014 17:43:30'	72	3.46	13.08	5.32	0.56	40.94	-9999.00	273.06	301.00	0.42	1.04
34	c	'27-May-2013 08:01:00'	72	1.81	12.73	2.18	0.15	9.81	-9999.00	256.99	250.42	0.41	0.88
35	c	'18-Mar-2012 19:22:00'	72	1.54	11.78	3.08	0.10	8.21	-9999.00	246.13	198.01	0.41	0.72
36	c	'05-Jul-1984 16:30:00'	72	3.90	11.67	5.14	0.60	45.31	-9999.00	248.76	-9999.00	0.41	0.70
37	c	'06-Apr-2011 04:29:30'	72	1.87	12.76	4.44	0.19	12.44	-9999.00	254.03	248.34	0.41	0.79
38	c	'12-Mar-2012 06:52:00'	72	1.72	11.50	2.97	0.12	9.56	-9999.00	248.04	222.14	0.41	0.77
39	c	'13-Jun-2017 09:14:00'	72	1.94	14.92	2.57	0.20	11.33	-9999.00	259.21	289.87	0.40	0.85
40	c	'30-Jan-2011 18:10:00'	72	2.19	10.62	3.66	0.18	15.53	-9999.00	263.33	235.44	0.40	1.00
41	c	'08-Jun-2005 03:15:00'	72	3.32	9.64	4.49	0.35	33.37	-9999.00	265.41	272.23	0.40	1.00
42	c	'19-May-1999 12:09:30'	72	2.23	10.09	3.63	0.16	16.12	-9999.00	-9999.00	-9999.00	0.40	0.99
43	c	'14-Feb-2011 13:56:00'	72	1.15	9.67	1.61	0.04	4.08	-9999.00	239.76	201.12	0.40	0.80
44	c	'19-May-2011 07:03:00'	72	1.91	10.25	4.72	0.13	13.20	-9999.00	254.32	265.67	0.40	1.12
45	c	'12-Jan-2011 10:23:30'	72	1.30	12.75	2.55	0.08	5.42	-9999.00	246.97	217.17	0.39	0.70
46	c	'07-May-2014 20:45:30'	72	2.92	12.18	5.57	0.45	32.25	-9999.00	254.48	277.65	0.39	0.81
47	c	'30-May-2000 23:22:30'	72	2.18	11.31	3.48	0.22	15.29	-9999.00	-9999.00	-9999.00	0.39	0.75
48	c	'09-Jun-2008 18:27:00'	72	2.82	11.19	4.38	0.30	25.37	-9999.00	256.73	273.92	0.39	0.99
49	c	'04-Jul-1999 18:09:30'	72	2.72	12.09	3.79	0.34	23.01	-9999.00	-9999.00	-9999.00	0.39	0.69
50	c	'28-Jun-1986 04:30:00'	72	3.45	10.84	4.38	0.42	35.00	272.57	-9999.00	-9999.00	0.38	0.74
51	c	'14-Jan-2012 07:22:00'	72	1.39	14.01	2.00	0.10	5.92	-9999.00	252.02	225.11	0.38	0.59
52	c	'26-Jun-2012 20:01:00'	72	2.80	10.57	3.98	0.28	24.51	-9999.00	272.78	300.18	0.38	0.62
53	c	'23-May-2014 23:13:30'	72	3.67	12.18	5.87	0.71	45.67	-9999.00	249.71	264.06	0.38	0.78
54	c	'30-May-2012 22:22:00'	72	1.69	12.57	2.99	0.13	9.16	-9999.00	256.59	316.30	0.38	0.61
55	c	'12-Jun-1992 01:30:00'	72	3.21	11.46	4.25	0.36	31.75	282.35	-9999.00	-9999.00	0.38	0.82
56	c	'28-Nov-2012 17:01:00'	72	4.52	11.57	8.00	1.06	73.42	-9999.00	263.99	277.45	0.38	1.17
57	c	'30-Apr-2007 01:35:00'	72	3.91	13.20	5.52	0.75	49.15	-9999.00	250.31	258.12	0.38	0.61
58	c	'07-Sep-2014 11:56:00'	72	4.16	11.54	7.14	0.82	58.27	-9999.00	257.18	280.06	0.38	0.81
59	c	'01-Apr-1989 22:30:00'	72	3.59	13.56	5.25	0.64	41.13	242.88	-9999.00	-9999.00	0.38	0.77
60	c	'14-Jun-2011 05:22:00'	72	2.82	10.82	4.55	0.30	25.38	-9999.00	280.93	313.68	0.38	0.94
61	c	'27-Feb-2011 14:57:00'	72	1.12	12.36	1.51	0.05	3.79	-9999.00	273.64	293.52	0.38	0.72
62	c	'07-Jun-1985 13:30:00'	72	3.81	12.55	4.60	0.68	44.65	261.62	-9999.00	-9999.00	0.37	0.82
63	c	'19-Jun-1983 04:30:00'	72	4.57	14.79	5.22	1.02	60.70	253.22	-9999.00	-9999.00	0.37	0.67
64	c	'23-Jun-2008 19:22:00'	72	1.93	12.79	3.46	0.16	12.24	-9999.00	265.62	306.43	0.37	0.71
65	c	'27-Jun-2008 22:52:00'	72	2.92	12.66	4.15	0.38	27.00	-9999.00	250.43	272.66	0.37	0.77
66	c	'27-Jan-2012 08:22:00'	72	1.49	14.07	2.15	0.11	6.81	-9999.00	248.45	225.70	0.37	0.62
67	c	'29-Apr-2015 21:26:00'	72	1.58	14.02	3.11	0.15	8.98	-9999.00	251.71	320.21	0.37	0.57
68	c	'26-Jul-2013 18:13:30'	72	4.05	12.23	6.16	0.72	51.30	-9999.00	262.21	262.48	0.37	0.85
69	c	'22-Jun-2003 22:15:00'	72	2.04	11.77	2.65	0.15	12.59	-9999.00	-9999.00	-9999.00	0.37	0.63
70	c	'28-Apr-2012 19:22:00'	72	1.64	11.79	2.50	0.10	8.57	-9999.00	246.87	275.27	0.37	0.67
71	c	'14-Jun-2000 00:30:00'	72	3.41	12.53	4.48	0.51	35.78	-9999.00	-9999.00	-9999.00	0.37	0.80
72	c	'13-May-1988 22:30:00'	72	4.51	12.78	6.53	0.99	64.05	243.14	-9999.00	-9999.00	0.37	0.66
73	c	'17-Apr-2012 22:52:00'	72	2.50	13.89	4.46	0.36	20.87	-9999.00	246.39	245.55	0.37	0.61
74	c	'16-Apr-1999 03:09:30'	72	1.00	13.00	1.40	0.05	3.01	-9999.00	-9999.00	-9999.00	0.36	0.63
75	c	'17-Jul-2008 06:52:00'	72	3.95	13.72	7.05	0.73	48.68	-9999.00	258.56	261.13	0.36	1.07
76	c	'22-Sep-2013 23:43:00'	72	4.89	11.99	7.43	1.10	76.42	-9999.00	268.52	283.34	0.36	0.87
77	c	'19-May-2013 20:01:00'	72	2.17	12.97	3.93	0.24	15.68	-9999.00	258.17	261.56	0.36	0.61
78	c	'12-Apr-2011 12:00:00'	72	2.26	11.97	3.09	0.21	15.97	-9999.00	251.11	251.09	0.36	0.66
79	c	'24-Jun-2009 13:25:00'	72	2.97	11.37	4.27	0.41	28.73	-9999.00	268.25	306.86	0.36	1.02
80	c	'27-May-1984 13:30:00'	72	3.18	11.42	4.70	0.40	33.46	255.53	-9999.00	-9999.00	0.36	0.71
81	c	'13-Aug-2017 18:44:00'	72	4.99	13.63	6.24	1.20	75.47	-9999.00	261.58	283.37	0.36	0.65
82	c	'22-Jul-2007 20:27:00'	72	4.31	12.71	6.02	0.82	56.57	-9999.00	271.35	275.61	0.36	0.80
83	c	'21-May-2010 20:55:00'	72	1.90	12.65	4.92	0.17	14.77	-9999.00	250.68	273.39	0.36	0.70
84	c	'12-Aug-2010 15:42:00'	72	2.94	13.09	4.30	0.39	26.64	-9999.00	268.31	285.56	0.36	0.76

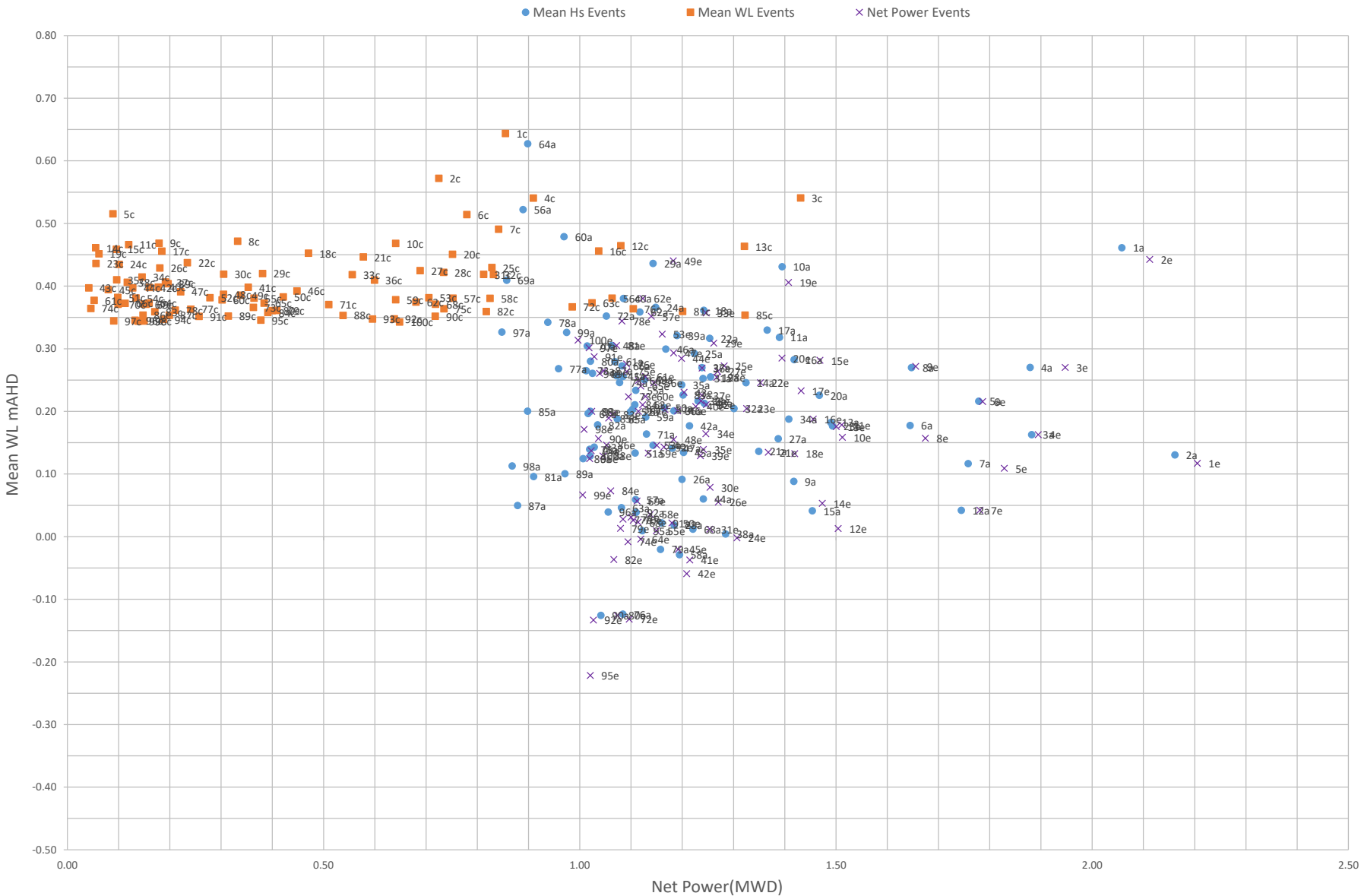
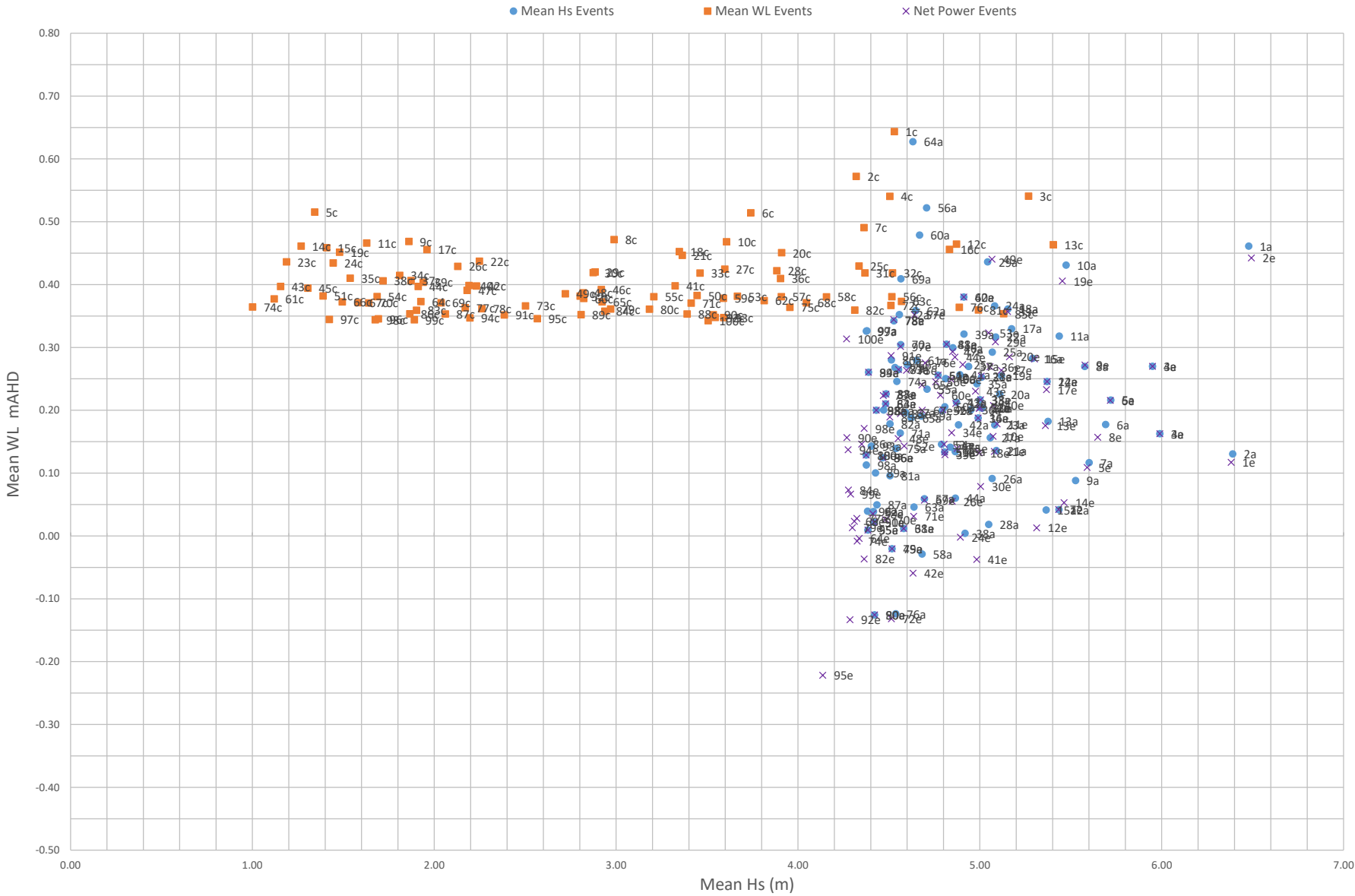
Location	Metropolitan (Rottnest/Fremantle)
Method	72 Hour Net Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'16-Jul-1990 14:00:00'	72	6.38	14.26	8.11	2.21	127.62	252.68	-9999.00	-9999.00	0.12	0.64
2	e	'17-Jul-1996 18:00:00'	72	6.49	14.19	8.31	2.11	125.10	-9999.00	-9999.00	-9999.00	0.44	0.96
3	e	'02-Aug-1991 17:00:00'	72	5.95	15.01	7.49	1.95	108.58	250.33	-9999.00	-9999.00	0.27	0.88
4	e	'25-Aug-2004 10:30:00'	72	5.99	14.76	7.61	1.89	110.24	-9999.00	-9999.00	-9999.00	0.16	0.88
5	e	'28-Jul-1993 17:00:00'	72	5.59	16.13	6.40	1.83	93.91	248.41	-9999.00	-9999.00	0.11	0.60
6	e	'11-Sep-2009 17:40:00'	72	5.72	15.51	6.98	1.79	99.99	-9999.00	256.95	270.07	0.22	0.68
7	e	'29-Aug-1983 02:00:00'	72	5.43	16.07	7.11	1.78	93.10	250.78	-9999.00	-9999.00	0.04	0.24
8	e	'24-Aug-1983 08:00:00'	72	5.65	13.74	6.89	1.67	101.39	257.17	-9999.00	-9999.00	0.16	0.66
9	e	'31-Jul-2007 08:42:00'	72	5.58	15.09	7.02	1.66	94.49	-9999.00	257.87	266.66	0.27	0.89
10	e	'04-Jun-1997 21:00:00'	72	5.07	16.02	7.88	1.51	81.24	-9999.00	-9999.00	-9999.00	0.16	0.73
11	e	'21-Jul-2009 06:10:00'	72	5.09	13.91	8.94	1.51	87.91	-9999.00	257.40	262.09	0.18	0.77
12	e	'02-Jul-1992 02:00:00'	72	5.31	14.49	5.84	1.50	85.92	248.54	-9999.00	-9999.00	0.01	0.52
13	e	'11-Jul-2002 19:30:00'	72	5.36	14.14	8.37	1.50	90.37	-9999.00	-9999.00	-9999.00	0.18	0.84
14	e	'23-Jul-1990 02:00:00'	72	5.46	13.26	6.51	1.47	91.23	249.40	-9999.00	-9999.00	0.05	0.75
15	e	'28-Jul-1996 20:00:00'	72	5.30	14.60	7.09	1.47	84.10	-9999.00	-9999.00	-9999.00	0.28	0.89
16	e	'01-Jul-1985 05:00:00'	72	4.99	16.14	5.90	1.46	75.68	252.26	-9999.00	-9999.00	0.19	0.68
17	e	'24-Sep-2013 10:58:00'	72	5.37	14.02	7.43	1.43	88.22	-9999.00	262.79	267.38	0.23	0.87
18	e	'03-Jul-1991 23:00:00'	72	5.00	14.39	7.32	1.42	82.60	247.55	-9999.00	-9999.00	0.13	0.57
19	e	'29-Jun-2009 06:40:00'	72	5.45	13.36	6.88	1.41	90.35	-9999.00	254.25	271.62	0.41	0.91
20	e	'01-Aug-2011 23:07:00'	72	5.16	14.68	6.58	1.39	80.89	-9999.00	260.23	264.51	0.29	0.78
21	e	'11-Aug-1981 11:00:00'	72	5.08	13.62	6.74	1.37	82.88	251.04	-9999.00	-9999.00	0.13	0.57
22	e	'29-Jun-1983 05:00:00'	72	5.37	12.38	6.92	1.35	91.09	253.82	-9999.00	-9999.00	0.25	0.82
23	e	'08-Jun-1981 08:00:00'	72	5.00	13.67	7.27	1.33	81.33	245.01	-9999.00	-9999.00	0.20	0.54
24	e	'16-Aug-1981 02:00:00'	72	4.89	14.42	6.02	1.31	74.21	246.41	-9999.00	-9999.00	0.00	0.47
25	e	'11-Jun-1988 23:00:00'	72	4.91	14.48	5.39	1.28	73.02	253.51	-9999.00	-9999.00	0.27	0.70
26	e	'19-Jun-1988 05:00:00'	72	4.85	14.45	5.97	1.27	72.45	248.52	-9999.00	-9999.00	0.06	0.47
27	e	'06-Sep-2005 21:00:00'	72	5.12	13.67	6.00	1.27	79.89	-9999.00	257.35	234.36	0.26	0.54
28	e	'15-Sep-1996 18:00:00'	72	5.01	13.95	6.95	1.27	75.72	-9999.00	-9999.00	-9999.00	0.25	0.58
29	e	'14-Aug-2017 05:29:00'	72	5.09	13.80	6.24	1.26	78.35	-9999.00	261.08	277.33	0.31	0.65
30	e	'22-Sep-2003 11:45:00'	72	5.00	14.08	6.18	1.25	75.64	-9999.00	-9999.00	-9999.00	0.08	0.44
31	e	'07-Sep-1991 20:00:00'	72	4.58	16.47	5.11	1.25	64.42	248.11	-9999.00	-9999.00	0.01	0.41
32	e	'12-Jul-2010 13:25:00'	72	4.87	13.70	7.26	1.25	76.28	-9999.00	252.18	255.13	0.21	0.90
33	e	'03-Jul-2007 00:42:00'	72	5.15	13.25	6.71	1.25	81.27	-9999.00	258.94	265.38	0.36	1.03
34	e	'09-Jun-1990 17:00:00'	72	4.84	14.02	6.32	1.25	72.93	247.87	-9999.00	-9999.00	0.16	0.73
35	e	'25-Jul-1996 20:00:00'	72	4.87	14.45	6.61	1.24	70.93	-9999.00	-9999.00	-9999.00	0.14	0.80
36	e	'08-Sep-2014 17:11:00'	72	5.06	13.76	7.14	1.24	78.18	-9999.00	258.36	261.29	0.27	0.81
37	e	'20-Jul-1989 11:00:00'	72	4.48	16.80	5.79	1.24	63.17	248.40	-9999.00	-9999.00	0.23	0.73
38	e	'07-Jul-2014 15:11:00'	72	5.00	13.77	7.35	1.24	77.55	-9999.00	258.28	263.38	0.22	0.66
39	e	'26-Aug-1985 08:00:00'	72	4.81	14.58	5.62	1.24	69.94	246.25	-9999.00	-9999.00	0.13	0.47
40	e	'28-Jun-1992 23:00:00'	72	5.07	12.71	6.64	1.23	80.96	256.43	-9999.00	-9999.00	0.21	0.83
41	e	'10-Oct-1997 12:00:00'	72	4.98	13.82	6.19	1.21	76.52	-9999.00	-9999.00	-9999.00	-0.04	0.48
42	e	'16-Aug-1997 05:00:00'	72	4.63	14.87	6.81	1.21	68.95	-9999.00	-9999.00	-9999.00	-0.06	0.49
43	e	'29-Jul-2017 00:59:00'	72	4.98	13.33	6.70	1.20	76.97	-9999.00	260.55	271.31	0.23	0.60
44	e	'29-Nov-2012 20:16:00'	72	4.86	12.79	8.00	1.20	79.82	-9999.00	258.20	261.81	0.28	1.17
45	e	'06-Sep-1980 20:00:00'	72	4.52	15.85	5.35	1.19	62.66	251.78	-9999.00	-9999.00	-0.02	0.24
46	e	'25-Jul-1983 05:00:00'	72	4.80	14.41	6.06	1.19	72.71	247.27	-9999.00	-9999.00	0.20	0.63
47	e	'17-Jul-2000 08:30:00'	72	4.85	14.11	5.70	1.18	71.54	-9999.00	-9999.00	-9999.00	0.29	0.78
48	e	'01-Aug-1981 05:00:00'	72	4.55	15.42	5.62	1.18	64.04	248.43	-9999.00	-9999.00	0.16	0.55
49	e	'19-Jun-1996 23:00:00'	72	5.07	13.01	6.11	1.18	75.86	-9999.00	-9999.00	-9999.00	0.44	0.88
50	e	'01-Aug-1980 05:00:00'	72	4.42	16.24	5.46	1.18	61.76	250.08	-9999.00	-9999.00	0.02	0.32
51	e	'03-Sep-1983 02:00:00'	72	5.00	12.55	6.58	1.17	76.58	250.23	-9999.00	-9999.00	0.20	0.65
52	e	'16-Aug-1988 17:00:00'	72	4.58	14.83	5.93	1.16	67.72	251.72	-9999.00	-9999.00	0.14	0.66
53	e	'08-Jun-1995 04:30:00'	72	5.05	13.00	6.25	1.16	77.50	-9999.00	263.25	264.55	0.32	0.78
54	e	'17-Jul-1999 08:39:00'	72	4.80	13.95	6.06	1.15	71.01	-9999.00	-9999.00	-9999.00	0.15	0.62
55	e	'27-Aug-1980 20:00:00'	72	4.38	15.88	5.47	1.15	59.93	251.52	-9999.00	-9999.00	0.01	0.40
56	e	'23-Jul-1981 08:00:00'	72	4.76	12.80	6.53	1.14	73.87	249.56	-9999.00	-9999.00	0.25	0.78
57	e	'13-May-1988 14:00:00'	72	4.64	14.07	6.53	1.14	69.53	246.29	-9999.00	-9999.00	0.35	0.66
58	e	'20-Sep-1989 23:00:00'	72	4.41	15.78	5.27	1.14	60.37	245.19	-9999.00	-9999.00	0.04	0.43
59	e	'03-Aug-1990 08:00:00'	72	4.81	13.49	5.50	1.13	72.47	253.67	-9999.00	-9999.00	0.13	0.63
60	e	'31-Jul-1996 20:00:00'	72	4.78	13.77	5.81	1.13	68.21	-9999.00	-9999.00	-9999.00	0.22	0.84
61	e	'21-Sep-1988 08:00:00'	72	4.77	13.50	6.65	1.13	69.98	250.58	-9999.00	-9999.00	0.26	1.08
62	e	'01-Jun-1988 23:00:00'	72	4.91	12.77	5.38	1.12	73.21	249.96	-9999.00	-9999.00	0.38	1.02
63	e	'15-Sep-1982 17:00:00'	72	4.48	14.68	5.49	1.12	64.30	247.89	-9999.00	-9999.00	0.21	0.62
64	e	'17-Sep-1981 20:00:00'	72	4.34	15.38	5.70	1.12	60.49	249.04	-9999.00	-9999.00	0.00	0.24
65	e	'22-May-2016 10:11:00'	72	4.68	13.57	7.20	1.12	71.37	-9999.00	259.01	270.39	0.24	1.12
66	e	'27-May-1981 11:00:00'	72	4.84	12.83	5.47	1.11	71.77	241.42	-9999.00	-9999.00	0.25	0.66
67	e	'13-Jul-1990 11:00:00'	72	4.68	13.41	5.73	1.11	68.86	251.72	-9999.00	-9999.00	0.20	0.57
68	e	'31-Aug-1989 20:00:00'	72	4.31	15.49	5.78	1.11	57.09	246.79	-9999.00	-9999.00	0.02	0.33
69	e	'08-Aug-2006 07:35:00'	72	4.69	13.02	7.61	1.11	72.28	-9999.00	270.89	274.45	0.06	0.77
70	e	'02-Sep-2002 21:30:00'	72	4.48	15.24	6.14	1.10	61.18	-9999.00	-9999.00	-9999.00	0.03	0.44
71	e	'23-Aug-1995 15:59:59'	72	4.64	14.42	5.53	1.10	64.94	-9999.00	-9999.00	-9999.00	0.03	0.44
72	e	'19-Nov-1992 20:00:00'	72	4.51	13.29	6.85	1.10	66.94	238.89	-9999.00	-9999.00	-0.13	0.31
73	e	'01-Sep-2013 11:29:00'	72	4.47	15.29	5.84	1.09	61.69	-9999.00	256.05	266.19	0.22	0.64
74	e	'09-Sep-1981 20:00:00'	72	4.32	15.65	5.26	1.09	56.82	248.40	-9999.00	-9999.00	-0.01	0.23
75	e	'20-Jul-2017 18:29:00'	72	4.60	13.41	7.35	1.09	67.01	-9999.00	258.92	265.30	0.26	0.80
76	e	'14-Jul-2000 07:30:00'	72	4.70	13.76	5.74	1.09	67.77	-9999.00	-9999.00	-9999.00	0.28	0.86
77	e	'09-Sep-2003 13:30:00'	72	4.32	16.15	6.34	1.08	57.20	-9999.00	-9999.00	-9999.00	0.03	0.47
78	e	'19-Jun-1983 14:00:00'	72	4.53	14.85	5.22	1.08	62.30	252.85	-9999.00	-9999.00	0.34	0.67
79	e	'10-Aug-1980 02:00:00'	72	4.30	15.64	5.29	1.08	58.27	250.43	-9999.00	-9999.00	0.01	0.46
80	e	'30-Sep-1980 17:00:00'	72	4.42	14.87	5.01	1.07	59.56	246.46	-9999.00	-9999.00	-0.13	0.23
81	e	'23-May-1994 18:59:59'	72	4.82	12.01	7.68	1.07	75.51	-9999.00	-9999.00	-9999.00	0.31	0.84
82	e	'06-Sep-1989 17:00:00'	72	4.36	15.32	4.92	1.07	57.70	254.22	-9999.00	-9999.00	-0.04	0.32
83	e	'29-Jun-1981 05:00:00'	72	4.56	13.81	4.99	1.06	62.78	241.16	-9999.00	-9999.00	0.19	0.51
84	e	'15-Jul-1988 08:00:00'	72	4.28	15.25	5.29							

Location	Metropolitan (Rottnest/Fremantle)
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'15-Jul-1990 09:30:00'	135.00	5.73	14.23	8.11	3.26	193.86	251.24	-9999.00	-9999.00	0.14	0.64
2	f	'02-Aug-1991 20:00:00'	120.00	5.49	15.13	7.49	2.73	155.90	248.73	-9999.00	-9999.00	0.22	0.88
3	f	'29-Jul-1993 00:30:00'	123.00	5.27	15.47	6.40	2.63	145.22	247.02	-9999.00	-9999.00	0.07	0.60
4	f	'17-Jul-1996 17:00:00'	80.00	6.27	13.84	8.31	2.19	134.81	-9999.00	-9999.00	-9999.00	0.44	0.96
5	f	'25-Aug-2004 09:00:00'	79.00	5.84	14.67	7.61	1.97	115.70	-9999.00	-9999.00	-9999.00	0.16	0.88
6	f	'11-Sep-2009 16:25:00'	73.50	5.69	15.48	6.98	1.80	101.09	-9999.00	-9999.00	-9999.00	0.22	0.68
7	f	'29-Aug-1983 00:30:00'	75.00	5.38	15.89	7.11	1.78	95.34	250.41	-9999.00	-9999.00	0.04	0.24
8	f	'01-Aug-2011 21:22:00'	99.50	5.04	14.14	6.58	1.77	106.97	-9999.00	-9999.00	-9999.00	0.30	0.90
9	f	'23-Jul-1990 00:30:00'	93.00	5.29	13.05	6.51	1.70	112.23	249.26	-9999.00	-9999.00	0.08	0.77
10	f	'31-Jul-2007 09:27:00'	73.50	5.55	15.07	7.02	1.67	95.61	-9999.00	-9999.00	-9999.00	0.26	0.89
11	f	'24-Aug-1983 02:00:00'	66.00	5.85	13.54	6.89	1.59	98.32	260.64	-9999.00	-9999.00	0.19	0.66
12	f	'01-Jul-1985 08:00:00'	84.00	4.89	15.97	5.90	1.58	85.36	251.95	-9999.00	-9999.00	0.23	0.76
13	f	'01-Jul-1992 23:00:00'	78.00	5.28	14.13	5.84	1.53	92.35	249.34	-9999.00	-9999.00	0.05	0.83
14	f	'22-Sep-2003 01:37:30'	91.75	4.97	13.56	6.18	1.51	95.33	-9999.00	-9999.00	-9999.00	0.07	0.71
15	f	'29-Jun-2009 01:55:00'	79.50	5.37	13.05	6.88	1.48	97.03	-9999.00	-9999.00	-9999.00	0.42	0.91
16	f	'11-Jun-1988 21:30:00'	87.00	4.82	13.93	5.39	1.41	85.46	254.86	-9999.00	-9999.00	0.28	0.70
17	f	'24-Sep-2013 02:28:00'	71.00	5.45	13.54	7.43	1.41	89.24	-9999.00	-9999.00	-9999.00	0.29	0.87
18	f	'11-Jul-2002 18:15:00'	64.50	5.52	14.10	8.37	1.40	85.19	-9999.00	-9999.00	-9999.00	0.17	0.80
19	f	'04-Jun-1997 15:00:00'	56.00	5.50	16.14	7.88	1.34	72.49	-9999.00	-9999.00	-9999.00	0.18	0.73
20	f	'20-Jul-2009 22:25:00'	43.50	6.26	14.56	8.94	1.31	74.51	-9999.00	-9999.00	-9999.00	0.25	0.77
21	f	'19-Jun-1996 19:00:00'	84.00	4.94	12.59	6.11	1.28	86.56	-9999.00	-9999.00	-9999.00	0.46	0.88
22	f	'29-Jun-1983 05:00:00'	66.00	5.49	12.37	6.92	1.27	86.86	254.55	-9999.00	-9999.00	0.23	0.82
23	f	'06-Sep-2005 23:00:00'	72.00	5.12	13.63	6.00	1.26	79.90	-9999.00	-9999.00	-9999.00	0.25	0.54
24	f	'28-Jul-1996 05:00:00'	58.00	5.50	14.21	7.09	1.24	75.12	-9999.00	-9999.00	-9999.00	0.30	0.89
25	f	'19-Jun-1988 00:30:00'	69.00	4.90	14.33	5.97	1.21	71.06	249.18	-9999.00	-9999.00	0.06	0.47
26	f	'15-Aug-1981 18:30:00'	63.00	5.08	14.49	6.02	1.20	69.76	249.41	-9999.00	-9999.00	0.04	0.47
27	f	'15-Sep-1996 12:30:00'	65.00	5.16	13.80	6.95	1.20	73.91	-9999.00	-9999.00	-9999.00	0.25	0.58
28	f	'11-Aug-1981 05:00:00'	54.00	5.56	13.97	6.74	1.20	72.43	252.96	-9999.00	-9999.00	0.20	0.57
29	f	'08-Sep-2014 14:56:00'	68.50	5.13	13.67	7.14	1.20	76.17	-9999.00	-9999.00	-9999.00	0.29	0.81
30	f	'31-Jul-1996 08:00:00'	76.00	4.78	14.03	5.81	1.19	72.85	-9999.00	-9999.00	-9999.00	0.27	0.87
31	f	'28-Jun-1981 21:30:00'	87.00	4.54	13.43	4.99	1.19	75.36	241.65	-9999.00	-9999.00	0.19	0.51
32	f	'01-Jun-1988 23:00:00'	78.00	4.85	12.81	5.38	1.15	77.64	249.63	-9999.00	-9999.00	0.40	1.02
33	f	'03-Jul-1991 21:30:00'	45.00	5.82	14.77	7.32	1.15	67.52	249.53	-9999.00	-9999.00	0.14	0.57
34	f	'02-Jul-2007 20:49:30'	63.75	5.30	13.12	6.71	1.15	76.02	-9999.00	-9999.00	-9999.00	0.37	1.03
35	f	'10-Oct-1997 04:00:00'	66.00	5.15	13.20	6.19	1.13	74.20	-9999.00	-9999.00	-9999.00	0.04	0.53
36	f	'07-Jun-1995 23:44:00'	70.50	5.10	12.79	6.25	1.13	77.31	-9999.00	-9999.00	-9999.00	0.37	0.78
37	f	'08-Jun-1981 03:30:00'	51.00	5.49	13.63	7.27	1.09	68.46	246.95	-9999.00	-9999.00	0.22	0.54
38	f	'07-Sep-1991 17:00:00'	60.00	4.73	16.68	5.11	1.09	56.79	248.18	-9999.00	-9999.00	0.03	0.41
39	f	'17-Jul-2000 13:30:00'	62.00	4.99	14.04	5.70	1.06	65.05	-9999.00	-9999.00	-9999.00	0.30	0.78
40	f	'14-Jul-2000 13:00:00'	63.00	4.89	13.97	5.74	1.03	63.33	-9999.00	-9999.00	-9999.00	0.26	0.86
41	f	'12-Jul-2010 12:40:00'	44.50	5.68	13.86	7.26	1.01	61.64	-9999.00	-9999.00	-9999.00	0.24	0.90
42	f	'17-Jul-1999 04:39:30'	58.02	5.07	13.98	6.06	1.01	63.02	-9999.00	-9999.00	-9999.00	0.18	0.62
43	f	'29-Nov-2012 09:01:00'	41.50	6.10	13.04	8.00	1.00	66.34	-9999.00	-9999.00	-9999.00	0.45	1.17
44	f	'22-Jul-1981 20:00:00'	54.00	5.30	12.54	6.53	1.00	66.68	253.76	-9999.00	-9999.00	0.29	0.78
45	f	'01-Aug-1981 03:30:00'	57.00	4.73	15.48	5.62	0.98	54.50	248.48	-9999.00	-9999.00	0.17	0.55
46	f	'19-Jun-1983 08:00:00'	66.00	4.63	14.35	5.22	0.98	59.78	255.55	-9999.00	-9999.00	0.37	0.67
47	f	'28-Jun-1992 11:00:00'	48.00	5.58	12.74	6.64	0.98	65.21	259.06	-9999.00	-9999.00	0.25	0.72
48	f	'25-Jul-1983 08:00:00'	54.00	5.19	13.55	6.06	0.97	62.07	247.73	-9999.00	-9999.00	0.25	0.63
49	f	'25-Jul-1996 02:00:00'	52.00	5.12	14.15	6.61	0.97	58.33	-9999.00	-9999.00	-9999.00	0.13	0.65
50	f	'15-Sep-1982 14:00:00'	54.00	4.93	14.81	5.49	0.97	55.90	249.94	-9999.00	-9999.00	0.26	0.62
51	f	'03-Aug-1990 06:30:00'	57.00	5.12	13.15	5.50	0.96	63.63	255.33	-9999.00	-9999.00	0.19	0.63
52	f	'27-May-1981 14:00:00'	60.00	4.97	12.96	5.47	0.96	63.15	241.47	-9999.00	-9999.00	0.26	0.66
53	f	'16-Aug-1988 05:00:00'	48.00	5.25	14.53	5.93	0.95	57.05	253.50	-9999.00	-9999.00	0.21	0.66
54	f	'07-Sep-1980 02:00:00'	54.00	4.72	15.96	5.35	0.95	51.12	252.74	-9999.00	-9999.00	-0.01	0.23
55	f	'13-May-1988 15:30:00'	51.00	5.13	13.83	6.53	0.94	58.64	246.40	-9999.00	-9999.00	0.40	0.66
56	f	'20-Sep-1989 23:00:00'	54.00	4.65	16.07	5.27	0.93	49.71	245.61	-9999.00	-9999.00	0.04	0.43
57	f	'20-Jul-1989 21:30:00'	45.00	5.01	16.42	5.79	0.92	48.63	248.58	-9999.00	-9999.00	0.24	0.73
58	f	'01-Aug-1980 02:00:00'	48.00	4.87	16.40	5.46	0.92	48.64	250.70	-9999.00	-9999.00	0.03	0.32
59	f	'08-Jul-2014 02:56:00'	45.50	5.45	13.77	7.35	0.92	57.78	-9999.00	-9999.00	-9999.00	0.18	0.57
60	f	'08-Aug-2006 04:20:00'	43.50	5.61	13.16	7.61	0.91	58.92	-9999.00	-9999.00	-9999.00	0.27	0.77
61	f	'15-Aug-1997 13:30:00'	41.00	5.47	14.79	6.81	0.90	52.08	-9999.00	-9999.00	-9999.00	0.07	0.49
62	f	'08-Jun-1990 20:00:00'	42.00	5.47	13.86	6.32	0.89	54.81	252.70	-9999.00	-9999.00	0.21	0.73
63	f	'30-Sep-1980 21:30:00'	57.00	4.55	15.04	5.01	0.88	49.86	246.85	-9999.00	-9999.00	-0.16	0.11
64	f	'20-Jun-2009 07:40:00'	53.00	4.91	13.48	6.24	0.85	53.87	-9999.00	-9999.00	-9999.00	0.32	0.90
65	f	'01-Sep-2013 01:44:00'	46.50	4.93	15.43	5.84	0.85	47.45	-9999.00	-9999.00	-9999.00	0.24	0.64
66	f	'27-Aug-1980 08:00:00'	42.00	4.91	17.25	5.47	0.84	43.16	254.27	-9999.00	-9999.00	-0.01	0.40
67	f	'17-Sep-1981 17:00:00'	42.00	5.01	15.90	5.70	0.84	45.29	250.99	-9999.00	-9999.00	0.04	0.24
68	f	'25-Aug-1985 02:00:00'	54.00	4.87	13.02	5.62	0.83	54.84	247.71	-9999.00	-9999.00	0.15	0.44
69	f	'14-Jun-2002 13:30:00'	37.00	5.62	14.11	6.60	0.83	50.00	-9999.00	-9999.00	-9999.00	0.18	0.78
70	f	'29-Jun-1989 20:00:00'	54.00	4.64	14.50	5.61	0.83	49.62	246.47	-9999.00	-9999.00	0.17	0.61
71	f	'04-Jul-2005 14:30:00'	43.00	5.08	14.84	6.08	0.83	47.28	-9999.00	-9999.00	-9999.00	0.23	0.62
72	f	'07-Jul-1979 12:30:00'	45.00	5.21	13.29	5.91	0.82	52.53	254.64	-9999.00	-9999.00	0.17	0.54
73	f	'14-Aug-2009 14:55:00'	57.50	4.69	13.36	5.96	0.82	53.22	-9999.00	-9999.00	-9999.00	0.26	0.68
74	f	'07-Aug-1984 12:30:00'	45.00	5.08	13.60	6.13	0.81	50.49	246.83	-9999.00	-9999.00	0.21	0.52
75	f	'15-Jul-1988 06:30:00'	45.00	4.72	16.15	5.29	0.81	42.92	245.31	-9999.00	-9999.00	0.06	0.50
76	f	'30-Apr-1984 11:00:00'	42.00	5.12	14.25	5.72	0.81	47.72	252.16	-9999.00	-9999.00	0.30	0.53
77	f	'09-Aug-1980 21:30:00'	45.00	4.77	15.72	5.29	0.80	43.72	251.69	-9999.00	-9999.00	0.07	0.46
78	f	'19-Nov-1992 17:00:00'	36.00	5.47	14.22	6.85	0.80	47.50	242.26	-9999.00	-9999.00	-0.06	0.31
79	f	'04-Oct-1988 02:00:00'	48.00	4.65	15.27	5.03	0.79	44.06	249.50	-9999.00	-9999.00	0.08	0.43
80	f	'19-Jul-2008 00:22:00'	42.50	5.34	13.01	7.05	0.79	51.97	-9999.00	-9999.00	-9999.00	0.27	1.07
81	f	'22-May-2009 13:21:00'	50.00	5.12	12.28	6.27	0.79	55.21	-9999.00	-9999.00	-9999.00	0.53	1.03
82	f	'05-Jun-1998 08:10:00'	47.00	5.00	13.53	6							

Location	Metropolitan (Rottnest/Fremantle)
Method	72 Hour Comparison
Title	Metropolitan (Rottnest/Fremantle) 72 Hour Comparison



Location	Cape Naturaliste
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'17-Jul-1996 20:00:00'	72	7.59	14.19	8.91	2.99	177.99	254.88	-9999.00	-9999.00	0.47	1.09
2	a	'16-Jul-1990 08:00:00'	72	6.92	14.41	8.30	2.53	148.22	249.06	-9999.00	-9999.00	0.20	0.80
3	a	'03-Aug-1991 11:00:00'	72	6.75	14.85	8.37	2.42	138.86	242.78	-9999.00	-9999.00	0.30	1.06
4	a	'24-Sep-2013 06:47:00'	72	6.70	14.60	8.16	2.32	136.61	-9999.00	254.28	272.71	0.35	1.31
5	a	'28-Jul-1993 08:00:00'	72	6.66	16.22	7.62	2.52	134.01	241.07	-9999.00	-9999.00	0.22	0.59
6	a	'31-Aug-2013 22:47:00'	72	6.47	15.57	9.47	2.42	131.80	-9999.00	242.46	277.48	0.34	0.74
7	a	'04-Jun-1997 20:00:00'	72	6.46	15.81	8.77	2.44	131.78	236.86	-9999.00	-9999.00	0.21	0.88
8	a	'01-Jul-1992 20:00:00'	72	6.44	14.27	7.30	2.14	127.03	244.13	-9999.00	-9999.00	0.10	0.89
9	a	'11-Sep-2009 15:30:00'	72	6.43	15.81	7.64	2.26	124.36	-9999.00	-9999.00	-9999.00	0.23	0.82
10	a	'02-Sep-2002 04:15:00'	72	6.27	15.14	8.46	2.18	122.04	-9999.00	-9999.00	-9999.00	0.21	0.81
11	a	'15-Sep-1996 14:00:00'	72	6.18	14.39	7.95	2.06	119.50	250.45	-9999.00	-9999.00	0.34	0.71
12	a	'28-Jun-2009 23:30:00'	72	6.15	13.11	7.08	1.75	114.41	-9999.00	-9999.00	-9999.00	0.48	0.91
13	a	'31-Jul-2007 06:15:00'	72	6.14	15.19	7.18	2.04	114.72	-9999.00	-9999.00	-9999.00	0.32	1.04
14	a	'22-Jul-1990 23:00:00'	72	6.06	13.28	7.39	1.79	113.49	246.24	-9999.00	-9999.00	0.07	0.85
15	a	'11-Jul-2002 14:30:00'	72	5.98	14.09	8.40	1.80	110.42	-9999.00	-9999.00	-9999.00	0.26	1.04
16	a	'25-Aug-2004 12:45:00'	72	5.95	14.87	7.68	1.88	107.97	-9999.00	-9999.00	-9999.00	0.22	0.94
17	a	'01-Aug-2011 20:00:00'	72	5.91	14.21	7.98	1.77	106.23	-9999.00	251.19	263.93	0.35	0.98
18	a	'16-Jul-2000 05:15:00'	72	5.91	14.55	6.65	1.75	103.49	-9999.00	-9999.00	-9999.00	0.41	1.05
19	a	'08-Jun-1995 02:00:00'	72	5.80	12.96	6.70	1.55	101.89	252.02	-9999.00	-9999.00	0.41	0.99
20	a	'18-Jun-1988 23:00:00'	72	5.80	14.41	7.13	1.79	104.37	244.38	-9999.00	-9999.00	0.17	0.66
21	a	'01-Jul-1985 05:00:00'	72	5.77	16.08	7.12	1.90	101.86	246.19	-9999.00	-9999.00	0.26	0.83
22	a	'03-Jul-1991 11:00:00'	72	5.76	14.38	7.63	1.83	105.89	244.60	-9999.00	-9999.00	0.25	0.65
23	a	'03-Apr-2012 03:19:00'	72	5.74	16.06	7.64	1.87	100.30	-9999.00	234.65	259.79	0.34	0.60
24	a	'28-Jul-1996 17:00:00'	72	5.71	14.16	7.53	1.63	100.18	252.10	-9999.00	-9999.00	0.40	1.18
25	a	'22-Sep-2003 07:15:00'	72	5.69	14.27	6.70	1.63	98.12	-9999.00	-9999.00	-9999.00	0.16	0.63
26	a	'26-Aug-1985 02:00:00'	72	5.69	14.65	6.85	1.68	98.27	240.15	-9999.00	-9999.00	0.14	0.58
27	a	'10-Oct-1997 08:00:00'	72	5.66	14.63	7.17	1.75	100.35	238.87	-9999.00	-9999.00	0.06	0.59
28	a	'31-Jul-2016 06:57:00'	72	5.66	14.41	8.22	1.74	100.34	-9999.00	253.25	249.57	0.10	0.71
29	a	'06-Aug-1998 20:00:00'	72	5.65	15.21	6.73	1.77	98.95	244.24	-9999.00	-9999.00	0.13	0.72
30	a	'09-Jun-1990 11:00:00'	72	5.65	14.00	7.60	1.66	100.23	244.83	-9999.00	-9999.00	0.24	0.89
31	a	'12-Jun-2012 17:19:00'	72	5.65	13.09	7.31	1.48	97.26	-9999.00	245.86	251.81	0.51	1.16
32	a	'11-Aug-1990 20:00:00'	72	5.56	15.03	6.80	1.71	95.86	236.94	-9999.00	-9999.00	-0.05	0.21
33	a	'19-Nov-1992 14:00:00'	72	5.56	13.42	8.02	1.65	100.72	229.83	-9999.00	-9999.00	-0.15	0.20
34	a	'28-Jul-2017 23:54:00'	72	5.56	13.57	7.02	1.52	94.89	-9999.00	250.51	262.03	0.29	0.75
35	a	'29-Nov-2012 20:19:00'	72	5.53	13.23	7.67	1.52	96.76	-9999.00	244.34	252.80	0.31	1.20
36	a	'17-Jul-1999 07:45:00'	72	5.52	13.34	7.11	1.47	94.59	-9999.00	-9999.00	-9999.00	0.20	0.62
37	a	'26-Jun-1991 20:00:00'	72	5.51	14.04	6.73	1.50	92.54	236.30	-9999.00	-9999.00	0.33	0.86
38	a	'08-May-2002 02:30:00'	72	5.51	13.88	7.64	1.60	95.84	-9999.00	-9999.00	-9999.00	0.44	0.76
39	a	'11-Jun-1988 14:00:00'	72	5.47	14.22	6.15	1.53	91.18	252.45	-9999.00	-9999.00	0.39	0.88
40	a	'15-Jul-1988 08:00:00'	72	5.46	15.38	7.28	1.76	95.36	237.44	-9999.00	-9999.00	0.16	0.61
41	a	'24-May-1994 08:00:00'	72	5.46	13.70	7.11	1.56	95.11	238.72	-9999.00	-9999.00	0.27	0.76
42	a	'29-Aug-1989 14:00:00'	72	5.46	15.99	7.03	1.70	92.15	237.34	-9999.00	-9999.00	0.14	0.68
43	a	'15-Aug-2011 19:30:00'	72	5.44	14.42	6.89	1.52	90.06	-9999.00	248.19	260.07	0.17	0.72
44	a	'13-Sep-2008 22:45:00'	72	5.43	14.72	6.31	1.54	89.52	-9999.00	-9999.00	-9999.00	0.09	0.44
45	a	'20-Sep-1989 20:00:00'	72	5.42	15.97	6.33	1.70	91.28	237.36	-9999.00	-9999.00	0.14	0.53
46	a	'10-May-2013 04:47:00'	72	5.42	13.66	7.57	1.44	90.01	-9999.00	235.81	245.89	0.36	0.78
47	a	'31-Jul-1991 08:00:00'	72	5.41	15.51	6.29	1.61	88.66	242.37	-9999.00	-9999.00	0.30	0.80
48	a	'20-Jun-1996 02:00:00'	72	5.40	12.35	6.41	1.31	89.68	252.97	-9999.00	-9999.00	0.49	0.98
49	a	'14-Jul-1986 02:00:00'	72	5.37	14.94	6.23	1.56	89.08	234.55	-9999.00	-9999.00	0.17	0.43
50	a	'31-Jul-1996 20:00:00'	72	5.36	13.50	6.10	1.37	86.92	240.10	-9999.00	-9999.00	0.25	0.93
51	a	'07-Jul-2014 22:43:00'	72	5.35	14.02	7.06	1.43	88.02	-9999.00	242.98	242.01	0.21	0.85
52	a	'20-Jul-1989 08:00:00'	72	5.35	16.97	6.54	1.71	88.30	241.03	-9999.00	-9999.00	0.31	0.88
53	a	'07-Sep-1991 14:00:00'	72	5.34	16.60	6.09	1.69	88.02	240.93	-9999.00	-9999.00	0.12	0.44
54	a	'23-Jul-1996 23:00:00'	72	5.32	14.61	6.51	1.47	85.76	246.22	-9999.00	-9999.00	0.24	0.63
55	a	'28-Sep-1998 11:00:00'	72	5.31	14.39	6.23	1.47	86.14	239.97	-9999.00	-9999.00	0.21	0.58
56	a	'18-Sep-2013 13:47:00'	72	5.30	14.30	7.11	1.45	86.00	-9999.00	246.96	262.36	0.18	0.58
57	a	'01-Oct-2005 14:00:00'	72	5.27	14.66	7.05	1.49	85.73	-9999.00	-9999.00	-9999.00	0.04	0.48
58	a	'02-Oct-2016 04:27:00'	72	5.27	13.80	8.42	1.49	89.70	-9999.00	243.74	242.17	0.06	0.60
59	a	'28-Jun-1992 17:00:00'	72	5.27	12.56	6.82	1.29	86.95	258.42	-9999.00	-9999.00	0.30	1.00
60	a	'13-May-1988 14:00:00'	72	5.26	14.20	8.10	1.50	90.88	235.67	-9999.00	-9999.00	0.40	0.87
61	a	'21-Sep-1988 05:00:00'	72	5.25	13.47	6.69	1.30	83.68	247.24	-9999.00	-9999.00	0.35	1.23
62	a	'16-Aug-2017 01:24:00'	72	5.25	13.65	7.05	1.34	84.44	-9999.00	236.89	243.11	0.17	0.64
63	a	'10-Jun-1998 02:00:00'	72	5.24	12.15	6.94	1.19	83.85	248.80	-9999.00	-9999.00	0.37	0.90
64	a	'12-Jul-2010 04:09:00'	72	5.23	13.37	7.21	1.39	86.39	-9999.00	247.51	255.61	0.22	0.81
65	a	'13-Jul-1990 05:00:00'	72	5.23	13.52	6.60	1.42	86.62	248.36	-9999.00	-9999.00	0.27	0.69
66	a	'11-Aug-1992 05:00:00'	72	5.22	13.64	6.16	1.34	83.76	242.11	-9999.00	-9999.00	0.11	0.48
67	a	'22-May-2016 19:57:00'	72	5.22	12.58	7.67	1.25	84.16	-9999.00	256.93	268.75	0.28	1.01
68	a	'15-Aug-2009 01:30:00'	72	5.22	13.48	6.62	1.28	82.30	-9999.00	-9999.00	-9999.00	0.28	0.83
69	a	'03-Aug-1990 02:00:00'	72	5.21	13.18	5.90	1.26	83.82	254.97	-9999.00	-9999.00	0.25	0.78
70	a	'28-Apr-2000 03:45:00'	72	5.20	13.73	6.24	1.34	83.04	-9999.00	-9999.00	-9999.00	0.44	0.82
71	a	'29-Jun-1989 20:00:00'	72	5.19	14.23	6.42	1.38	83.45	235.79	-9999.00	-9999.00	0.24	0.66
72	a	'03-Aug-2003 01:15:00'	72	5.19	13.63	6.69	1.27	81.94	-9999.00	-9999.00	-9999.00	0.17	0.80
73	a	'11-Jun-2005 02:30:00'	72	5.16	12.11	7.00	1.20	82.75	-9999.00	-9999.00	-9999.00	0.08	0.50
74	a	'14-Jul-1987 05:00:00'	72	5.16	15.59	5.94	1.51	82.33	229.32	-9999.00	-9999.00	0.00	0.49
75	a	'20-Jun-2009 05:30:00'	72	5.15	13.33	6.81	1.25	81.45	-9999.00	-9999.00	-9999.00	0.30	1.00
76	a	'10-May-2004 19:45:00'	72	5.13	12.33	8.00	1.25	84.48	-9999.00	-9999.00	-9999.00	0.41	1.27
77	a	'04-Sep-2013 23:18:00'	72	5.13	14.60	6.46	1.37	80.00	-9999.00	240.47	253.13	0.11	0.66
78	a	'08-May-2012 23:49:00'	72	5.13	14.00	8.12	1.41	85.60	-9999.00	232.44	248.90	0.32	1.02
79	a	'23-Aug-1995 11:00:00'	72	5.12	14.38	6.19	1.33	79.47	233.36	-9999.00	-9999.00	0.17	0.51
80	a	'13-Jul-1989 23:00:00'	72	5.12	14.42	6.98	1.39	82.17	233.20	-9999.00	-9999.00	0.16	0.56
81	a	'11-May-2002 06:30:00'	72	5.10	13.93	7.30	1.37	82.20	-9999.00	-9999.00	-9999.00	0.36	0.92
82	a	'08-Aug-2016 12:27:00'	72	5.10	12.38	6.73	1.13	79.79	-9999.00	248.24	252.30	0.15	0.62
83	a	'01-Jun-1988 17:00:00'	72	5.08	13.13	5.96	1.21	78.32	244.24	-9999.00	-9999.00	0.46	1.08
84	a	'13-Oct-1986 14:00:00'	72	5.07	12								

Location	Cape Naturaliste
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'11-Jun-2012 17:04:00'	72	5.01	11.44	7.31	1.10	78.98	-9999.00	265.93	270.17	0.66	1.44
2	c	'26-Jun-2003 01:45:00'	72	4.30	10.42	5.76	0.75	58.00	-9999.00	-9999.00	-9999.00	0.65	1.02
3	c	'16-Jul-1996 13:30:00'	72	6.02	12.89	8.32	1.78	117.96	261.57	-9999.00	-9999.00	0.63	1.09
4	c	'08-May-2013 13:02:00'	72	4.50	14.46	7.57	1.11	66.82	-9999.00	237.88	290.42	0.56	1.05
5	c	'01-Jul-2007 04:45:00'	72	4.40	12.22	6.51	0.84	59.32	-9999.00	-9999.00	-9999.00	0.56	1.29
6	c	'26-Apr-2000 11:15:00'	72	4.29	13.18	5.93	0.87	56.82	-9999.00	-9999.00	-9999.00	0.55	0.92
7	c	'21-May-2009 01:15:00'	72	3.94	12.65	5.73	0.68	50.70	-9999.00	-9999.00	-9999.00	0.55	1.23
8	c	'28-May-1999 01:52:30'	72	3.06	10.41	5.05	0.34	30.23	256.88	-9999.00	-9999.00	0.54	0.97
9	c	'01-Jun-1988 04:30:00'	72	5.01	13.81	5.96	1.21	73.79	243.40	-9999.00	-9999.00	0.54	1.08
10	c	'17-May-2015 01:37:00'	72	3.73	11.22	4.90	0.53	42.28	-9999.00	268.21	313.26	0.53	1.03
11	c	'06-Jun-1995 19:30:00'	72	5.08	12.19	6.05	1.05	76.99	260.79	-9999.00	-9999.00	0.53	0.99
12	c	'19-Jun-1996 01:30:00'	72	5.38	11.83	6.41	1.22	85.90	262.81	-9999.00	-9999.00	0.53	0.98
13	c	'09-Jun-1998 01:30:00'	72	4.74	10.74	5.66	0.82	66.85	274.31	-9999.00	-9999.00	0.52	1.15
14	c	'10-May-1995 22:30:00'	72	4.36	11.20	7.19	0.90	65.57	268.45	-9999.00	-9999.00	0.52	0.88
15	c	'15-May-1999 01:30:00'	72	2.10	11.52	2.97	0.16	13.51	234.15	-9999.00	-9999.00	0.52	0.88
16	c	'27-Jun-2009 22:30:00'	72	5.53	11.84	7.08	1.37	95.35	-9999.00	-9999.00	-9999.00	0.52	0.91
17	c	'16-May-2011 03:45:00'	72	1.91	13.82	2.54	0.18	11.07	-9999.00	237.72	20.34	0.51	0.94
18	c	'16-May-2003 01:45:00'	72	4.03	11.03	7.44	0.70	54.89	-9999.00	-9999.00	-9999.00	0.51	1.53
19	c	'15-Jan-2013 20:04:00'	72	2.55	12.41	3.81	0.30	20.53	-9999.00	230.26	238.85	0.51	0.87
20	c	'24-Jun-2013 06:32:00'	72	4.20	13.84	6.96	0.91	55.27	-9999.00	249.42	287.20	0.50	1.02
21	c	'09-May-2004 10:15:00'	72	4.77	11.26	8.00	1.03	73.90	-9999.00	-9999.00	-9999.00	0.50	1.27
22	c	'03-Jul-1999 17:45:00'	72	3.13	11.46	4.26	0.42	30.33	-9999.00	-9999.00	-9999.00	0.50	0.84
23	c	'06-Jun-1985 09:00:00'	72	3.43	10.90	4.86	0.42	35.69	288.63	-9999.00	-9999.00	0.49	0.95
24	c	'30-May-2000 23:15:00'	72	3.31	10.58	4.20	0.39	32.89	-9999.00	-9999.00	-9999.00	0.49	0.92
25	c	'07-Jun-2012 11:04:00'	72	2.78	11.89	4.90	0.31	25.53	-9999.00	265.02	337.21	0.48	1.07
26	c	'01-Apr-1989 19:30:00'	72	4.00	13.80	5.97	0.80	50.91	237.23	-9999.00	-9999.00	0.48	0.84
27	c	'07-May-2002 13:00:00'	72	5.30	12.81	7.64	1.50	91.14	-9999.00	-9999.00	-9999.00	0.47	0.92
28	c	'17-Jun-2014 18:27:30'	72	4.26	12.45	6.83	0.82	60.39	-9999.00	259.76	304.06	0.47	1.16
29	c	'24-Apr-2011 18:15:00'	72	2.88	11.37	5.70	0.38	25.26	-9999.00	246.73	263.33	0.47	0.77
30	c	'06-May-2012 05:34:00'	72	3.14	13.53	6.28	0.53	36.00	-9999.00	236.45	303.44	0.47	1.09
31	c	'13-Aug-2017 00:07:30'	72	4.69	13.30	6.81	1.17	72.24	-9999.00	262.86	300.83	0.47	0.93
32	c	'29-Jul-2011 13:15:00'	72	4.67	11.67	5.92	0.89	65.90	-9999.00	259.30	282.72	0.47	1.11
33	c	'19-May-1999 10:30:00'	72	2.81	11.61	3.71	0.27	23.96	252.34	-9999.00	-9999.00	0.46	0.98
34	c	'31-May-2011 02:15:00'	72	3.86	11.41	5.27	0.62	46.16	-9999.00	255.44	275.70	0.46	0.95
35	c	'22-Sep-2013 23:02:00'	72	5.82	13.83	8.16	1.75	107.18	-9999.00	252.02	285.98	0.46	1.31
36	c	'06-Jan-2011 03:24:00'	72	2.10	9.88	4.28	0.24	17.67	-9999.00	236.35	226.42	0.46	0.99
37	c	'14-Jun-2000 00:15:00'	72	4.05	12.85	5.14	0.74	50.01	-9999.00	-9999.00	-9999.00	0.46	0.85
38	c	'07-Apr-2008 02:30:00'	72	2.40	13.27	3.38	0.28	18.01	-9999.00	-9999.00	-9999.00	0.46	0.83
39	c	'12-Jun-1992 04:30:00'	72	3.29	13.75	3.99	0.51	34.43	261.91	-9999.00	-9999.00	0.46	0.89
40	c	'14-Jun-2011 04:00:00'	72	3.97	11.18	5.59	0.62	48.73	-9999.00	280.82	333.56	0.45	1.13
41	c	'22-Feb-2011 07:45:00'	72	1.34	10.99	2.07	0.07	5.71	-9999.00	278.97	84.28	0.45	0.71
42	c	'22-Jun-2003 23:45:00'	72	2.47	12.05	3.95	0.23	18.66	-9999.00	-9999.00	-9999.00	0.45	0.71
43	c	'10-Jun-2000 20:15:00'	72	3.47	10.55	4.51	0.43	36.38	-9999.00	-9999.00	-9999.00	0.45	0.82
44	c	'13-Jun-2017 09:09:00'	72	2.95	15.15	3.86	0.47	26.48	-9999.00	250.25	283.17	0.45	0.88
45	c	'19-Feb-2011 03:15:00'	72	1.59	10.80	2.21	0.09	7.79	-9999.00	219.83	154.33	0.45	0.80
46	c	'26-Jun-1986 19:30:00'	72	2.60	10.32	3.58	0.22	19.73	273.21	-9999.00	-9999.00	0.45	0.83
47	c	'01-Aug-1991 22:30:00'	72	6.52	15.54	8.37	2.24	124.84	244.85	-9999.00	-9999.00	0.45	1.06
48	c	'27-Feb-1989 10:30:00'	72	2.51	12.53	4.34	0.26	19.85	233.10	-9999.00	-9999.00	0.44	0.87
49	c	'02-Feb-2012 14:44:00'	72	2.12	12.74	3.17	0.23	14.69	-9999.00	252.12	181.82	0.44	0.79
50	c	'07-Sep-2014 10:57:30'	72	4.11	11.55	6.65	0.57	38.77	-9999.00	248.29	305.09	0.44	0.92
51	c	'27-Jun-1996 01:30:00'	72	4.50	15.59	6.94	1.11	66.47	251.79	-9999.00	-9999.00	0.44	1.00
52	c	'26-Jun-2012 20:34:00'	72	3.66	11.28	5.32	0.53	41.83	-9999.00	260.80	298.05	0.43	0.82
53	c	'11-Jun-1988 01:30:00'	72	5.19	13.74	6.15	1.31	80.53	255.57	-9999.00	-9999.00	0.43	0.88
54	c	'02-May-1999 04:30:00'	72	3.23	12.37	4.78	0.51	33.97	236.41	-9999.00	-9999.00	0.43	0.74
55	c	'27-Apr-2011 18:15:00'	72	4.03	13.62	4.94	0.76	49.02	-9999.00	237.52	248.85	0.43	0.67
56	c	'07-Jun-2005 14:15:00'	72	2.74	11.26	4.11	0.28	22.85	-9999.00	-9999.00	-9999.00	0.43	1.00
57	c	'09-Jun-2008 17:15:00'	72	3.52	11.06	4.44	0.46	37.90	-9999.00	-9999.00	-9999.00	0.43	0.98
58	c	'27-May-2013 08:02:00'	72	2.34	12.22	2.98	0.23	16.47	-9999.00	244.39	253.84	0.43	0.87
59	c	'16-Aug-1999 23:15:00'	72	3.60	14.28	6.62	0.67	45.40	-9999.00	-9999.00	-9999.00	0.43	0.74
60	c	'22-Jul-2007 19:45:00'	72	4.29	14.08	5.66	0.92	55.77	-9999.00	-9999.00	-9999.00	0.43	0.80
61	c	'29-Apr-2015 19:07:00'	72	2.21	13.18	3.49	0.25	15.78	-9999.00	241.18	321.75	0.43	0.68
62	c	'23-May-2014 22:57:30'	72	4.10	11.40	6.11	0.80	54.85	-9999.00	255.24	277.70	0.43	0.79
63	c	'26-Jun-1999 23:45:00'	72	3.94	13.16	6.34	0.74	48.62	-9999.00	-9999.00	-9999.00	0.42	0.90
64	c	'13-May-1988 01:30:00'	72	5.21	14.93	8.10	1.45	85.51	239.38	-9999.00	-9999.00	0.42	0.87
65	c	'16-Apr-1999 01:30:00'	72	1.47	12.94	1.66	0.09	6.20	233.48	-9999.00	-9999.00	0.42	0.76
66	c	'30-Apr-2007 02:30:00'	72	4.35	12.44	5.62	0.82	58.53	-9999.00	-9999.00	-9999.00	0.42	0.67
67	c	'16-Jul-2000 12:52:30'	72	5.89	14.50	6.55	1.74	103.52	-9999.00	-9999.00	-9999.00	0.42	1.05
68	c	'07-May-2014 21:27:30'	72	3.47	12.46	5.96	0.66	44.52	-9999.00	243.33	294.30	0.42	0.75
69	c	'28-Nov-2012 16:34:00'	72	4.72	12.57	7.67	1.19	77.95	-9999.00	247.27	279.59	0.42	1.20
70	c	'02-Jul-2000 07:07:30'	72	3.29	10.06	3.62	0.13	11.71	-9999.00	-9999.00	-9999.00	0.42	0.97
71	c	'28-Jul-1996 10:30:00'	72	5.71	14.11	7.53	1.57	96.62	252.35	-9999.00	-9999.00	0.41	1.18
72	c	'17-Jun-1987 19:30:00'	72	4.31	13.18	5.98	0.88	57.62	241.38	-9999.00	-9999.00	0.41	0.71
73	c	'12-Jan-2011 09:54:30'	72	1.77	12.68	3.00	0.14	9.70	-9999.00	232.00	137.34	0.41	0.73
74	c	'01-Aug-2011 13:15:00'	72	5.83	14.03	7.98	1.70	102.96	-9999.00	251.99	271.01	0.41	1.01
75	c	'08-May-1996 19:30:00'	72	3.94	10.75	5.91	0.57	48.59	273.36	-9999.00	-9999.00	0.41	0.98
76	c	'24-Jun-2009 10:00:00'	72	3.07	10.88	4.30	0.38	29.22	-9999.00	-9999.00	-9999.00	0.41	1.06
77	c	'12-Jul-1995 07:30:00'	72	4.35	11.50	7.63	0.88	62.04	269.09	-9999.00	-9999.00	0.40	1.13
78	c	'19-May-2011 04:15:00'	72	2.33	11.62	5.40	0.23	17.41	-9999.00	232.31	243.94	0.40	1.07
79	c	'06-Apr-2011 04:15:00'	72	2.27	12.94	4.89	0.29	18.25	-9999.00	241.96	284.25	0.40	0.79
80	c	'02-Jul-1998 22:30:00'	72	3.25	15.55	5.50	0.61	32.57	242.07	-9999.00	-9999.00	0.40	0.66
81	c	'08-Jun-2014 22:28:00'	72	3.09	14.37	5.18	0.48	29.08	-9999.00	248.40	312.91	0.40	0.75
82	c	'18-Jun-1999 13:15:00'	72	4.85	14.58	6.76	1.26	73.28	-9999.00	-9999.00	-9999.00	0.40	0.84
83	c	'21-Apr-1991 13:30:00'	72	2.32	13.96	3.00	0.27	16.02	238.82	-9999.00	-9999.00	0.40	1.16
84	c	'30-May-2012 21:34:00'	72	2.55	12.81	3.81	0.31						

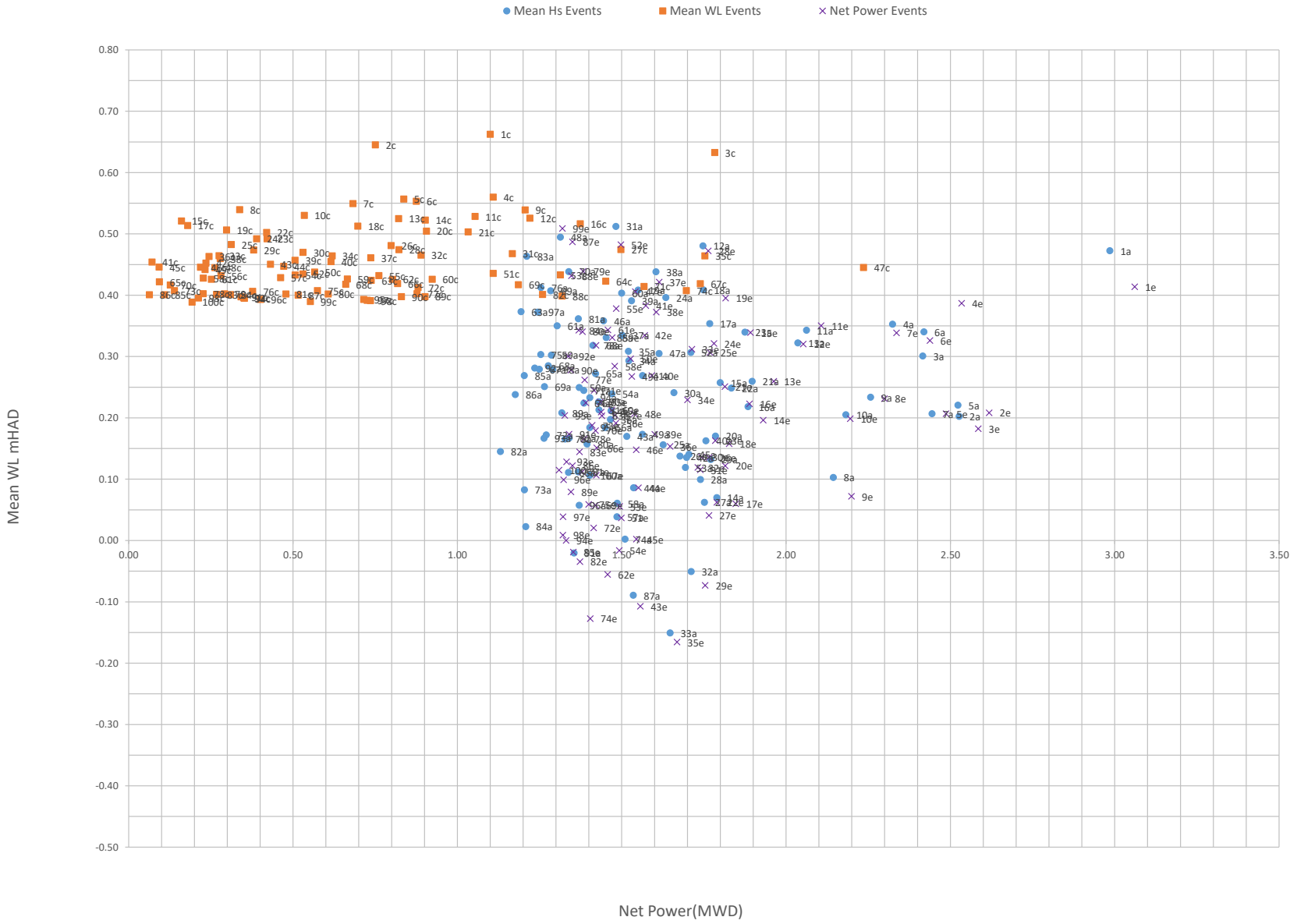
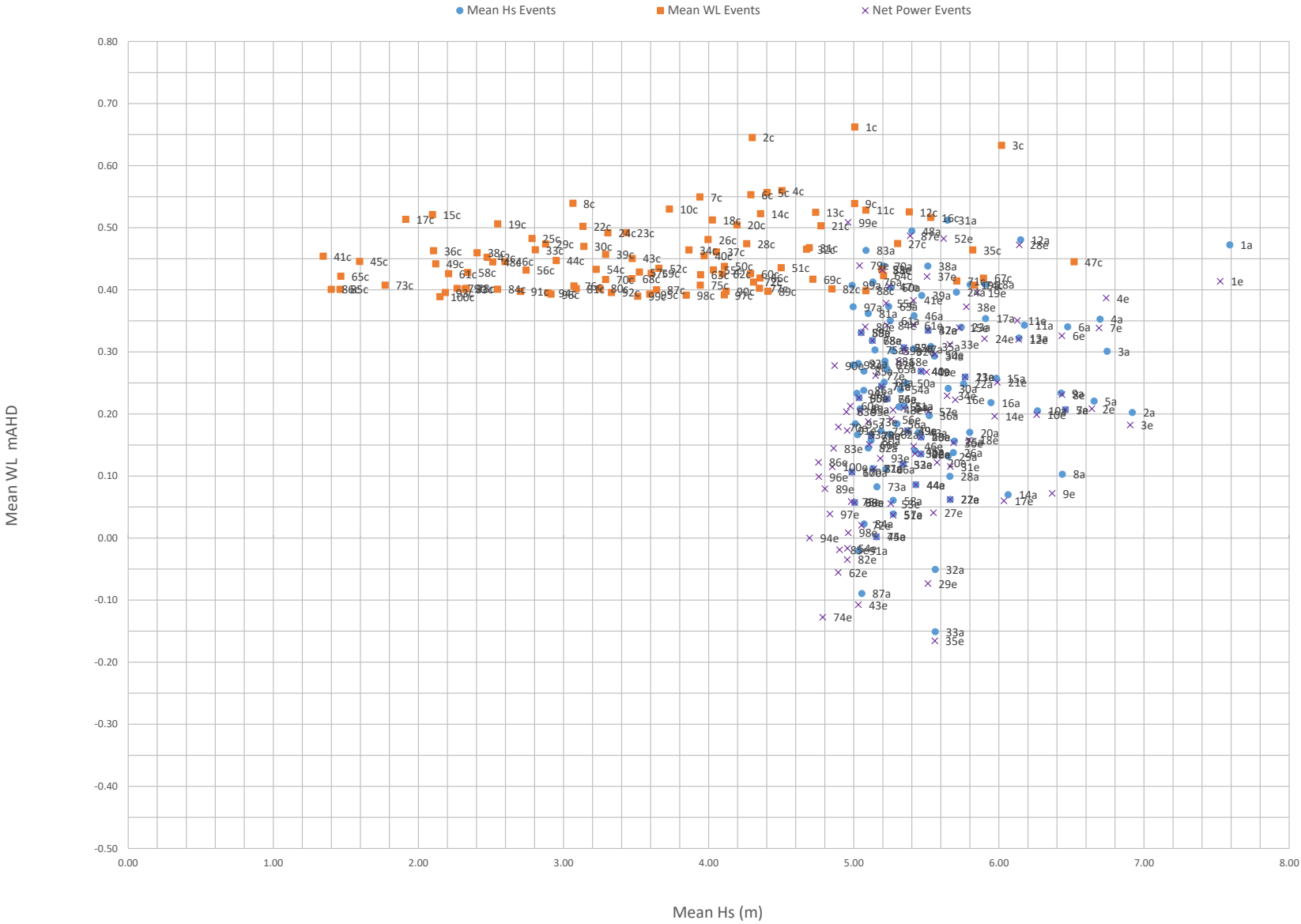
Location	Cape Naturaliste
Method	72 Hour Net Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'18-Jul-1996 02:00:00'	72	7.53	14.51	8.91	3.06	175.52	250.94	-9999.00	-9999.00	0.41	1.01
2	e	'28-Jul-1993 11:00:00'	72	6.64	16.26	7.62	2.62	133.03	240.95	-9999.00	-9999.00	0.21	0.59
3	e	'16-Jul-1990 11:00:00'	72	6.90	14.41	8.30	2.59	147.62	249.18	-9999.00	-9999.00	0.18	0.80
4	e	'02-Aug-1991 17:00:00'	72	6.74	15.18	8.37	2.53	138.48	243.65	-9999.00	-9999.00	0.39	1.06
5	e	'04-Jun-1997 20:00:00'	72	6.46	15.81	8.77	2.49	131.78	236.86	-9999.00	-9999.00	0.21	0.88
6	e	'01-Sep-2013 04:17:00'	72	6.43	15.91	9.47	2.44	130.68	-9999.00	241.77	276.58	0.33	0.74
7	e	'24-Sep-2013 08:47:00'	72	6.69	14.68	8.16	2.34	136.35	-9999.00	253.80	271.60	0.34	1.31
8	e	'11-Sep-2009 16:30:00'	72	6.43	15.81	7.64	2.30	124.32	-9999.00	-9999.00	-9999.00	0.23	0.82
9	e	'02-Jul-1992 02:00:00'	72	6.37	14.58	7.30	2.20	124.73	243.12	-9999.00	-9999.00	0.07	0.68
10	e	'02-Sep-2002 05:15:00'	72	6.26	15.16	8.46	2.20	121.80	-9999.00	-9999.00	-9999.00	0.20	0.81
11	e	'15-Sep-1996 20:00:00'	72	6.13	14.62	7.95	2.11	117.25	249.91	-9999.00	-9999.00	0.35	0.71
12	e	'31-Jul-2007 07:15:00'	72	6.14	15.22	7.18	2.05	114.46	-9999.00	-9999.00	-9999.00	0.32	1.04
13	e	'01-Jul-1985 05:00:00'	72	5.77	16.08	7.12	1.96	101.86	246.19	-9999.00	-9999.00	0.26	0.83
14	e	'25-Aug-2004 16:45:00'	72	5.97	15.01	7.68	1.93	107.78	-9999.00	-9999.00	-9999.00	0.20	0.94
15	e	'03-Apr-2012 09:19:00'	72	5.73	16.20	7.64	1.89	99.80	-9999.00	235.22	257.92	0.34	0.60
16	e	'03-Jul-1991 23:00:00'	72	5.70	14.94	7.63	1.89	104.76	239.43	-9999.00	-9999.00	0.22	0.65
17	e	'23-Jul-1990 02:00:00'	72	6.03	13.37	7.39	1.85	112.80	245.23	-9999.00	-9999.00	0.06	0.85
18	e	'19-Jun-1988 02:00:00'	72	5.80	14.53	7.13	1.83	103.74	243.65	-9999.00	-9999.00	0.16	0.66
19	e	'15-Jul-2000 20:15:00'	72	5.85	14.92	6.65	1.82	101.75	-9999.00	-9999.00	-9999.00	0.40	0.93
20	e	'07-Aug-1998 02:00:00'	72	5.57	15.60	6.73	1.81	96.03	242.75	-9999.00	-9999.00	0.12	0.61
21	e	'11-Jul-2002 15:30:00'	72	5.99	14.09	8.40	1.81	110.36	-9999.00	-9999.00	-9999.00	0.25	1.04
22	e	'10-Oct-1997 08:00:00'	72	5.66	14.63	7.17	1.79	100.35	238.87	-9999.00	-9999.00	0.06	0.59
23	e	'15-Jul-1988 11:00:00'	72	5.46	15.39	7.28	1.78	95.07	237.22	-9999.00	-9999.00	0.16	0.61
24	e	'01-Aug-2011 23:30:00'	72	5.90	14.24	7.98	1.78	106.04	-9999.00	250.24	260.46	0.32	0.96
25	e	'20-Jul-1989 08:00:00'	72	5.35	16.97	6.54	1.77	88.30	241.03	-9999.00	-9999.00	0.31	0.88
26	e	'29-Aug-1989 14:00:00'	72	5.46	15.99	7.03	1.77	92.15	237.34	-9999.00	-9999.00	0.14	0.68
27	e	'31-Jul-2016 18:27:00'	72	5.55	15.24	8.22	1.77	97.53	-9999.00	247.47	241.82	0.04	0.71
28	e	'29-Jun-2009 00:30:00'	72	6.14	13.14	7.08	1.76	114.20	-9999.00	-9999.00	-9999.00	0.47	0.91
29	e	'12-Aug-1990 02:00:00'	72	5.51	15.25	6.80	1.75	94.21	235.67	-9999.00	-9999.00	-0.07	0.21
30	e	'20-Sep-1989 23:00:00'	72	5.42	16.02	6.33	1.74	91.24	237.16	-9999.00	-9999.00	0.14	0.53
31	e	'26-Aug-1985 05:00:00'	72	5.67	14.77	6.85	1.74	97.13	239.88	-9999.00	-9999.00	0.12	0.58
32	e	'07-Sep-1991 14:00:00'	72	5.34	16.60	6.09	1.73	88.02	240.93	-9999.00	-9999.00	0.12	0.44
33	e	'26-Jul-1996 14:00:00'	72	5.66	14.38	7.53	1.71	97.46	248.83	-9999.00	-9999.00	0.31	1.18
34	e	'09-Jun-1990 14:00:00'	72	5.64	14.08	7.60	1.70	99.48	244.02	-9999.00	-9999.00	0.23	0.89
35	e	'19-Nov-1992 17:00:00'	72	5.56	13.46	8.02	1.67	100.37	229.54	-9999.00	-9999.00	-0.17	0.20
36	e	'22-Sep-2003 09:15:00'	72	5.69	14.35	6.70	1.65	98.01	-9999.00	-9999.00	-9999.00	0.15	0.63
37	e	'08-May-2002 06:30:00'	72	5.51	14.02	7.64	1.61	94.47	-9999.00	-9999.00	-9999.00	0.42	0.69
38	e	'08-Jun-1995 05:00:00'	72	5.78	13.02	6.70	1.61	100.97	250.29	-9999.00	-9999.00	0.37	0.99
39	e	'14-Jul-1986 02:00:00'	72	5.37	14.94	6.23	1.60	89.08	234.55	-9999.00	-9999.00	0.17	0.43
40	e	'24-May-1994 08:00:00'	72	5.46	13.70	7.11	1.59	95.11	238.72	-9999.00	-9999.00	0.27	0.76
41	e	'11-Jun-1988 20:00:00'	72	5.41	14.47	6.15	1.57	89.38	250.64	-9999.00	-9999.00	0.38	0.88
42	e	'26-Jun-1991 20:00:00'	72	5.51	14.04	6.73	1.57	92.54	236.30	-9999.00	-9999.00	0.33	0.86
43	e	'01-Sep-2007 03:15:00'	72	5.03	16.40	7.06	1.56	79.85	-9999.00	-9999.00	-9999.00	-0.11	0.11
44	e	'13-Sep-2008 22:45:00'	72	5.43	14.72	6.31	1.55	89.52	-9999.00	-9999.00	-9999.00	0.09	0.44
45	e	'14-Jul-1987 05:00:00'	72	5.16	15.59	5.94	1.54	82.33	229.32	-9999.00	-9999.00	0.00	0.49
46	e	'15-Aug-2011 23:03:00'	72	5.41	14.79	6.89	1.54	88.46	-9999.00	247.82	259.36	0.15	0.72
47	e	'13-May-1988 08:00:00'	72	5.24	14.57	8.10	1.54	90.31	237.44	-9999.00	-9999.00	0.41	0.87
48	e	'29-Sep-1998 02:00:00'	72	5.27	14.87	6.23	1.54	85.62	240.30	-9999.00	-9999.00	0.21	0.58
49	e	'30-Nov-2012 00:49:00'	72	5.50	13.52	7.67	1.53	96.10	-9999.00	240.71	247.72	0.27	1.20
50	e	'28-Jul-2017 23:24:00'	72	5.56	13.59	7.02	1.53	94.86	-9999.00	250.60	262.62	0.30	0.75
51	e	'01-Oct-2005 15:00:00'	72	5.27	14.66	7.05	1.50	85.67	-9999.00	-9999.00	-9999.00	0.04	0.48
52	e	'12-Jun-2012 22:19:00'	72	5.62	13.46	7.31	1.50	96.42	-9999.00	240.98	247.53	0.48	1.16
53	e	'02-Oct-2016 08:27:00'	72	5.26	13.98	8.42	1.49	89.37	-9999.00	243.66	241.74	0.06	0.60
54	e	'27-Jun-2015 00:52:00'	72	4.96	17.65	6.34	1.49	74.59	-9999.00	246.44	235.78	-0.02	0.27
55	e	'29-Jul-1996 17:00:00'	72	5.22	14.57	6.29	1.48	81.60	248.69	-9999.00	-9999.00	0.38	0.93
56	e	'19-Sep-2013 00:17:00'	72	5.26	14.79	7.11	1.48	84.94	-9999.00	244.51	268.91	0.19	0.58
57	e	'17-Jul-1999 05:45:00'	72	5.51	13.43	7.11	1.48	94.48	-9999.00	-9999.00	-9999.00	0.20	0.62
58	e	'13-Jul-1990 08:00:00'	72	5.31	13.62	6.60	1.48	88.66	248.02	-9999.00	-9999.00	0.28	0.69
59	e	'05-Jun-1998 14:00:00'	72	5.05	15.04	6.76	1.47	83.95	239.00	-9999.00	-9999.00	0.33	0.82
60	e	'25-Jun-2000 08:45:00'	72	4.98	16.71	6.44	1.47	74.35	-9999.00	-9999.00	-9999.00	0.21	0.55
61	e	'10-May-2013 06:17:00'	72	5.41	13.71	7.57	1.46	89.86	-9999.00	235.65	244.79	0.34	0.78
62	e	'28-Aug-1990 17:00:00'	72	4.89	15.41	7.00	1.46	78.02	238.12	-9999.00	-9999.00	-0.06	0.23
63	e	'16-Aug-1988 20:00:00'	72	4.95	15.58	6.66	1.44	78.79	245.70	-9999.00	-9999.00	0.20	0.82
64	e	'07-Jul-2014 23:13:00'	72	5.34	14.02	7.06	1.44	87.98	-9999.00	242.86	241.50	0.21	0.85
65	e	'15-May-2016 14:57:00'	72	5.04	15.53	7.78	1.43	78.75	-9999.00	245.45	248.49	0.23	0.47
66	e	'14-Jul-1989 02:00:00'	72	5.11	14.44	6.98	1.42	81.71	232.98	-9999.00	-9999.00	0.15	0.56
67	e	'17-Sep-2007 09:15:00'	72	4.99	16.24	6.50	1.42	75.64	-9999.00	-9999.00	-9999.00	0.11	0.41
68	e	'08-May-2012 23:49:00'	72	5.13	14.00	8.12	1.42	85.60	-9999.00	232.44	248.90	0.32	1.02
69	e	'21-Jun-1987 08:00:00'	72	5.01	15.53	6.05	1.42	76.56	235.04	-9999.00	-9999.00	0.06	0.40
70	e	'28-Jul-1989 23:00:00'	72	4.89	15.71	6.50	1.42	73.62	236.02	-9999.00	-9999.00	0.18	0.55
71	e	'29-Jun-1989 20:00:00'	72	5.19	14.23	6.42	1.42	83.45	235.79	-9999.00	-9999.00	0.24	0.66
72	e	'12-Aug-1992 14:00:00'	72	5.05	15.04	6.16	1.41	78.68	235.27	-9999.00	-9999.00	0.02	0.44
73	e	'21-Jul-2009 05:30:00'	72	5.10	13.78	8.20	1.41	83.31	-9999.00	-9999.00	-9999.00	0.19	0.90
74	e	'02-Oct-1991 08:00:00'	72	4.79	16.15	6.05	1.40	70.11	247.05	-9999.00	-9999.00	-0.13	0.12
75	e	'15-Sep-2000 01:30:00'	72	4.98	14.89	6.90	1.40	77.82	-9999.00	-9999.00	-9999.00	0.06	0.47
76	e	'12-Jul-2010 04:39:00'	72	5.23	13.38	7.21	1.39	86.37	-9999.00	247.51	255.49	0.22	0.81
77	e	'23-Jul-1996 11:00:00'	72	5.15	14.36	6.36	1.39	79.96	245.11	-9999.00	-9999.00	0.26	0.63
78	e	'23-Aug-1995 11:00:00'	72	5.12	14.38	6.19	1.39	79.47	233.36	-9999.00	-9999.00	0.17	0.51
79	e	'14-Aug-2017'	72	5.04	14.13	6.81	1.38	81.68	-9999.00	250.35	292.07	0.44	0.93
80	e	'11-May-2002 10:30:00'	72	5.08	14.06	7.30	1.38	81.72	-9999.00	-9999.00	-9999.00	0.34	0.92
81	e	'04-Sep-2013 23:18:00'	72	5.14	14.60	6.46	1.38	80.00	-9999.00	240.47	253.13	0.11	0.66
82	e	'05-Jul-1992 05:00:00'	72	4.96	14.19	7.05	1.37	78.87	239.41	-9999.00	-9999.00	-0.03	0.42
83	e	'01-Sep-1989 17:00:00'	72	4.86	15.21	5.93	1.37	73.22	242.46	-9999.00	-9999.00	0.14	0.52
84	e	'20-Sep-1988 23:00:00'	72	5.23	13.70	6.69							

Location	Cape Naturaliste
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'15-Jul-1990 06:30:00'	129.00	6.42	14.52	8.30	3.92	228.40	246.73	-9999.00	-9999.00	0.22	0.80
2	f	'28-Jul-1993 21:30:00'	129.00	6.20	15.46	7.62	3.86	211.37	239.84	-9999.00	-9999.00	0.16	0.59
3	f	'02-Aug-1991 20:00:00'	126.00	6.29	15.25	8.37	3.78	212.96	241.26	-9999.00	-9999.00	0.33	1.06
4	f	'30-Jul-1996 05:00:00'	156.00	5.50	13.83	7.53	3.22	200.29	245.58	-9999.00	-9999.00	0.34	1.18
5	f	'17-Jul-1996 21:30:00'	81.00	7.34	14.05	8.91	3.16	189.37	254.40	-9999.00	-9999.00	0.47	1.09
6	f	'16-Jul-2000 01:52:30'	123.25	5.75	14.46	6.65	2.87	170.92	-9999.00	-9999.00	-9999.00	0.38	1.05
7	f	'04-Jun-1997 18:30:00'	69.00	6.54	15.84	8.77	2.40	129.10	237.26	-9999.00	-9999.00	0.20	0.88
8	f	'11-Sep-2009 16:37:30'	77.75	6.33	15.73	7.64	2.39	132.21	-9999.00	-9999.00	-9999.00	0.24	0.82
9	f	'01-Jul-1992 21:30:00'	75.00	6.38	14.28	7.30	2.20	130.16	243.93	-9999.00	-9999.00	0.11	0.89
10	f	'01-Jul-1985 03:30:00'	81.00	5.68	16.06	7.12	2.08	111.49	246.10	-9999.00	-9999.00	0.23	0.83
11	f	'25-Aug-1985 23:00:00'	96.00	5.55	14.10	6.85	2.07	125.44	241.74	-9999.00	-9999.00	0.13	0.58
12	f	'15-Sep-1996 11:00:00'	66.00	6.31	14.40	7.95	1.97	114.06	250.65	-9999.00	-9999.00	0.34	0.71
13	f	'28-Jun-2009 23:00:00'	79.00	6.05	12.95	7.08	1.84	122.06	-9999.00	-9999.00	-9999.00	0.47	0.91
14	f	'07-Jun-1995 23:00:00'	84.00	5.70	12.90	6.70	1.75	115.50	252.71	-9999.00	-9999.00	0.41	0.99
15	f	'18-Jun-1988 23:00:00'	66.00	5.90	14.63	7.13	1.70	98.13	244.01	-9999.00	-9999.00	0.15	0.66
16	f	'10-Oct-1997 06:30:00'	63.00	5.82	14.73	7.17	1.62	92.33	239.54	-9999.00	-9999.00	0.07	0.59
17	f	'23-Jul-1990 12:30:00'	57.00	6.29	13.94	7.39	1.61	97.73	241.34	-9999.00	-9999.00	0.06	0.85
18	f	'06-Aug-1998 14:00:00'	60.00	5.85	15.18	6.73	1.57	88.09	245.58	-9999.00	-9999.00	0.14	0.72
19	f	'23-Sep-2013 17:17:00'	47.00	6.86	14.26	8.16	1.56	93.49	-9999.00	255.62	279.22	0.48	1.31
20	f	'03-Jul-1991 17:00:00'	48.00	6.42	15.23	7.63	1.54	86.33	242.10	-9999.00	-9999.00	0.24	0.65
21	f	'11-Jun-1988 14:00:00'	72.00	5.47	14.22	6.15	1.53	91.18	252.45	-9999.00	-9999.00	0.39	0.88
22	f	'15-Jul-1988 02:00:00'	48.00	6.12	16.11	7.28	1.47	77.53	237.13	-9999.00	-9999.00	0.17	0.61
23	f	'07-Sep-1991 12:30:00'	57.00	5.58	16.86	6.09	1.46	75.29	240.92	-9999.00	-9999.00	0.13	0.44
24	f	'19-Nov-1992 09:30:00'	51.00	6.15	14.06	8.02	1.43	84.76	232.25	-9999.00	-9999.00	-0.15	0.20
25	f	'20-Sep-1989 20:00:00'	54.00	5.75	16.22	6.33	1.42	75.71	237.76	-9999.00	-9999.00	0.14	0.53
26	f	'11-Aug-1990 09:30:00'	51.00	5.94	15.15	6.80	1.39	77.17	238.62	-9999.00	-9999.00	-0.06	0.21
27	f	'11-Jul-2002 11:45:00'	48.50	6.30	13.83	8.40	1.31	81.62	-9999.00	-9999.00	-9999.00	0.30	0.86
28	f	'13-Sep-2008 16:45:00'	58.00	5.58	14.58	6.31	1.29	76.00	-9999.00	-9999.00	-9999.00	0.10	0.44
29	f	'14-Jul-1986 08:00:00'	54.00	5.64	14.90	6.23	1.28	73.36	233.79	-9999.00	-9999.00	0.20	0.43
30	f	'24-May-1994 09:30:00'	45.00	6.13	14.47	7.11	1.25	73.51	242.44	-9999.00	-9999.00	0.26	0.66
31	f	'20-Jul-1989 18:30:00'	45.00	5.81	16.67	6.54	1.25	64.94	241.65	-9999.00	-9999.00	0.32	0.88
32	f	'17-Jul-1999 01:15:00'	53.00	5.95	13.37	7.11	1.24	79.58	-9999.00	-9999.00	-9999.00	0.23	0.62
33	f	'29-Jun-1989 21:30:00'	57.00	5.40	14.32	6.42	1.17	70.74	236.30	-9999.00	-9999.00	0.24	0.66
34	f	'08-Jun-1990 18:30:00'	39.00	6.40	14.26	7.60	1.17	69.61	249.32	-9999.00	-9999.00	0.26	0.87
35	f	'29-Sep-1998 02:00:00'	48.00	5.62	15.37	6.23	1.16	64.54	239.83	-9999.00	-9999.00	0.17	0.49
36	f	'14-Jul-1987 02:00:00'	48.00	5.54	15.88	5.94	1.16	62.41	230.56	-9999.00	-9999.00	0.03	0.49
37	f	'20-Jul-2009 22:07:30'	39.25	6.27	14.69	8.20	1.15	65.82	-9999.00	-9999.00	-9999.00	0.24	0.90
38	f	'01-Sep-2007 16:15:00'	38.00	5.89	17.59	7.06	1.12	55.88	-9999.00	-9999.00	-9999.00	-0.10	0.11
39	f	'05-Jun-1998 11:00:00'	42.00	5.98	14.81	6.76	1.11	64.89	241.79	-9999.00	-9999.00	0.29	0.64
40	f	'19-Jun-1996 15:30:00'	51.00	5.76	12.75	6.41	1.09	72.16	255.43	-9999.00	-9999.00	0.52	0.98
41	f	'25-Jun-1991 00:30:00'	51.00	5.29	15.18	5.56	1.07	60.23	233.04	-9999.00	-9999.00	0.26	0.65
42	f	'03-Aug-1990 00:30:00'	57.00	5.45	13.26	5.90	1.07	71.55	255.05	-9999.00	-9999.00	0.27	0.78
43	f	'04-Apr-2012 09:19:00'	43.00	5.56	16.17	6.83	1.05	56.15	-9999.00	237.60	253.40	0.37	0.60
44	f	'08-May-2012 06:19:00'	38.00	6.31	14.07	8.12	1.05	64.15	-9999.00	235.61	254.66	0.37	1.04
45	f	'30-Aug-1989 09:30:00'	39.00	5.90	15.19	7.03	1.05	59.05	238.72	-9999.00	-9999.00	0.05	0.37
46	f	'25-Jul-1996 03:30:00'	45.00	5.61	14.59	6.51	1.04	60.37	246.78	-9999.00	-9999.00	0.15	0.61
47	f	'16-Aug-1988 03:30:00'	39.00	5.93	15.04	6.66	1.04	58.80	248.17	-9999.00	-9999.00	0.28	0.82
48	f	'10-May-2004 12:07:30'	43.25	6.04	13.11	8.00	1.03	66.70	-9999.00	-9999.00	-9999.00	0.47	1.04
49	f	'28-Jul-2017 22:39:00'	39.50	6.08	14.18	7.02	1.03	61.46	-9999.00	249.76	256.39	0.32	0.75
50	f	'11-Aug-1992 18:30:00'	45.00	5.66	14.35	6.16	1.02	61.47	239.37	-9999.00	-9999.00	0.07	0.44
51	f	'28-Jun-1992 08:00:00'	48.00	5.74	12.66	6.82	1.01	68.29	261.05	-9999.00	-9999.00	0.34	0.94
52	f	'13-May-1988 21:30:00'	33.00	6.46	13.74	8.10	1.00	61.36	233.86	-9999.00	-9999.00	0.47	0.83
53	f	'04-Jul-2005 09:30:00'	42.00	5.70	14.54	6.65	1.00	57.76	-9999.00	-9999.00	-9999.00	0.18	0.62
54	f	'30-Sep-2005 23:00:00'	38.00	5.83	15.51	7.05	0.99	55.03	-9999.00	-9999.00	-9999.00	0.09	0.48
55	f	'19-Sep-2013 01:32:00'	38.50	5.86	15.18	7.11	0.98	55.70	-9999.00	243.35	265.68	0.21	0.58
56	f	'28-Aug-1990 09:30:00'	33.00	5.99	16.20	7.00	0.97	51.50	241.72	-9999.00	-9999.00	-0.05	0.23
57	f	'27-Jun-1991 17:00:00'	42.00	5.91	12.84	6.73	0.96	62.97	239.22	-9999.00	-9999.00	0.35	0.86
58	f	'29-Nov-2012 19:34:00'	33.50	6.39	14.13	7.67	0.96	57.98	-9999.00	239.62	247.44	0.21	0.72
59	f	'03-Oct-1988 23:00:00'	42.00	5.42	15.61	6.00	0.95	52.38	244.45	-9999.00	-9999.00	0.15	0.47
60	f	'12-Jun-2005 04:00:00'	41.00	5.77	13.42	6.72	0.92	57.90	-9999.00	-9999.00	-9999.00	0.01	0.50
61	f	'01-Aug-2007 02:15:00'	34.00	6.05	14.84	7.14	0.92	52.46	-9999.00	-9999.00	-9999.00	0.23	0.77
62	f	'26-Aug-1987 00:30:00'	39.00	5.34	16.58	5.86	0.90	47.18	235.72	-9999.00	-9999.00	-9999.00	-9999.00
63	f	'07-Aug-1992 05:00:00'	36.00	5.87	14.29	6.62	0.90	53.52	241.77	-9999.00	-9999.00	-0.05	0.25
64	f	'05-Jul-1992 09:30:00'	33.00	5.97	14.80	7.05	0.90	51.25	238.72	-9999.00	-9999.00	-0.08	0.09
65	f	'20-Sep-1988 08:00:00'	48.00	5.12	14.39	5.47	0.89	52.53	245.62	-9999.00	-9999.00	0.23	0.56
66	f	'26-Jul-2002 11:30:00'	42.00	5.26	15.52	5.92	0.88	48.53	-9999.00	-9999.00	-9999.00	0.10	0.59
67	f	'24-May-1997 06:30:00'	45.00	5.31	13.96	5.76	0.87	53.46	251.30	-9999.00	-9999.00	0.25	0.83
68	f	'11-Jun-1994 18:30:00'	33.00	5.82	15.52	6.18	0.87	47.65	240.31	-9999.00	-9999.00	0.03	0.39
69	f	'05-Jul-2003 19:22:30'	43.75	5.58	12.99	6.77	0.86	57.54	-9999.00	-9999.00	-9999.00	0.25	0.66
70	f	'14-Jul-1989 02:00:00'	36.00	5.73	14.43	6.98	0.86	51.12	233.07	-9999.00	-9999.00	0.11	0.46
71	f	'18-Jun-1999 21:45:00'	34.00	5.77	15.22	6.76	0.86	48.23	-9999.00	-9999.00	-9999.00	0.42	0.76
72	f	'13-Oct-1986 03:30:00'	39.00	5.87	12.72	6.54	0.85	57.42	246.71	-9999.00	-9999.00	0.01	0.47
73	f	'30-Jul-2007 07:15:00'	26.00	6.32	16.32	7.18	0.83	44.42	-9999.00	-9999.00	-9999.00	0.42	1.04
74	f	'03-Oct-1991 20:00:00'	36.00	5.22	17.80	5.64	0.83	41.33	238.98	-9999.00	-9999.00	0.00	0.30
75	f	'01-Jul-2002 16:30:00'	34.00	5.94	14.02	6.81	0.83	50.75	-9999.00	-9999.00	-9999.00	0.23	0.48
76	f	'26-Sep-2012 19:19:30'	35.02	5.62	15.01	6.23	0.82	46.37	-9999.00	239.06	250.44	0.23	0.56
77	f	'11-May-1995 18:30:00'	33.00	6.14	12.57	7.19	0.81	54.28	251.02	-9999.00	-9999.00	0.54	0.88
78	f	'02-Sep-1989 03:30:00'	33.00	5.58	15.75	5.93	0.80	43.69	245.89	-9999.00	-9999.00	0.09	0.50
79	f	'21-Jun-1992 09:30:00'	27.00	6.26	14.27	7.69	0.80	47.16	252.17	-9999.00	-9999.00	0.26	0.58
80	f	'12-Jul-2010 18:54:00'	26.50	6.23	15.55	7.21	0.79	43.41	-9999.00	248.69	238.96	0.17	0.80
81	f	'04-Sep-1986 06:30:00'	33.00	5.53	15.53	5.97	0.78	42.96	239.11	-9999.00	-9999.00	-0.06	0.25
82	f	'20-Oct-1988 05:00:00'	42.00	5.34	13.20	5.63	0.78	50					

Location	Cape Naturaliste
Method	72 Hour Comparison
Title	Cape Naturaliste 72 Hour Comparison



Location	Albany
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'14-Jul-1987 11:00:00'	72	6.66	16.02	7.83	2.64	138.17	204.96	-9999.00	-9999.00	0.06	0.59
2	a	'04-Jun-1997 23:00:00'	72	6.50	15.90	7.98	2.51	131.85	211.87	-9999.00	-9999.00	0.26	0.84
3	a	'29-Jun-1981 08:00:00'	72	6.47	14.56	7.86	2.21	128.27	211.16	-9999.00	-9999.00	0.24	0.71
4	a	'13-Sep-2008 22:50:00'	72	6.34	14.76	8.23	2.11	122.27	-9999.00	216.24	238.25	0.21	0.69
5	a	'15-Sep-1980 20:00:00'	72	6.27	14.64	8.88	2.19	124.40	213.16	-9999.00	-9999.00	-0.02	0.27
6	a	'08-Aug-1984 08:00:00'	72	6.23	14.36	7.00	2.00	118.00	208.82	-9999.00	-9999.00	0.12	0.54
7	a	'12-Aug-1990 17:00:00'	72	6.14	15.12	7.79	2.09	116.01	211.12	-9999.00	-9999.00	0.02	0.33
8	a	'03-Aug-1991 20:00:00'	72	6.13	15.04	7.60	2.03	114.58	216.48	-9999.00	-9999.00	0.26	0.51
9	a	'16-Aug-1981 02:00:00'	72	6.06	15.03	7.58	2.05	115.09	214.42	-9999.00	-9999.00	0.10	0.59
10	a	'01-Jul-1992 23:00:00'	72	6.04	14.28	7.09	1.90	112.54	219.74	-9999.00	-9999.00	0.19	0.83
11	a	'28-Jul-1993 05:00:00'	72	6.01	16.37	6.97	2.12	109.73	214.53	-9999.00	-9999.00	0.29	0.75
12	a	'12-Jun-2005 14:00:00'	72	5.96	12.62	7.67	1.64	110.93	208.39	-9999.00	-9999.00	0.11	0.65
13	a	'02-Sep-2002 23:00:00'	72	5.96	14.99	6.66	1.91	107.64	209.91	-9999.00	-9999.00	0.16	0.57
14	a	'18-Jul-1996 11:00:00'	72	5.95	14.23	8.16	2.00	113.86	220.19	-9999.00	-9999.00	0.37	0.93
15	a	'27-May-1981 17:00:00'	72	5.94	13.43	7.64	1.77	111.55	216.31	-9999.00	-9999.00	0.36	0.58
16	a	'11-Sep-2009 22:59:00'	72	5.94	15.69	7.23	1.96	106.85	-9999.00	224.78	250.19	0.21	0.68
17	a	'30-Aug-2005 10:30:00'	72	5.84	13.78	8.82	1.88	112.05	-9999.00	-9999.00	-9999.00	0.02	0.41
18	a	'17-Jun-1979 02:00:00'	72	5.81	16.13	8.58	2.21	112.40	209.11	-9999.00	-9999.00	0.06	0.39
19	a	'22-Aug-1980 14:00:00'	72	5.80	14.45	7.40	1.85	107.02	209.66	-9999.00	-9999.00	0.09	0.49
20	a	'23-Jul-2000 14:00:00'	72	5.78	14.65	7.90	1.90	108.19	207.98	-9999.00	-9999.00	0.24	0.58
21	a	'18-Aug-1984 23:00:00'	72	5.77	15.20	7.41	1.83	102.73	210.17	-9999.00	-9999.00	0.12	0.37
22	a	'24-Sep-2013 14:40:00'	72	5.77	14.48	7.83	1.71	102.06	-9999.00	230.75	250.99	0.29	0.74
23	a	'12-Aug-1992 14:00:00'	72	5.76	15.51	7.60	1.89	104.06	211.43	-9999.00	-9999.00	0.06	0.62
24	a	'01-Oct-1980 05:00:00'	72	5.75	15.33	7.12	1.90	104.03	214.08	-9999.00	-9999.00	0.00	0.32
25	a	'11-Jul-2002 23:00:00'	72	5.74	14.32	6.80	1.70	101.51	215.30	-9999.00	-9999.00	0.22	0.81
26	a	'01-Sep-2013 01:41:00'	72	5.74	15.77	8.35	1.94	103.87	-9999.00	223.69	250.69	0.24	0.61
27	a	'05-Jun-2003 05:00:00'	72	5.73	13.70	7.20	1.60	100.46	204.31	-9999.00	-9999.00	0.16	0.63
28	a	'15-Jul-1988 05:00:00'	72	5.72	15.12	8.32	1.98	107.27	215.89	-9999.00	-9999.00	0.18	0.73
29	a	'29-Jun-2009 22:59:00'	72	5.70	13.50	6.91	1.54	98.50	-9999.00	215.64	241.20	0.42	0.72
30	a	'07-Jun-2002 02:00:00'	72	5.66	13.34	7.70	1.65	103.70	209.24	-9999.00	-9999.00	0.16	0.52
31	a	'26-Sep-1986 02:00:00'	72	5.61	16.92	7.21	2.01	99.57	202.98	-9999.00	-9999.00	-0.11	0.31
32	a	'10-Oct-1997 14:00:00'	72	5.57	15.09	8.26	1.90	103.90	214.80	-9999.00	-9999.00	0.07	0.46
33	a	'18-Jun-1982 08:00:00'	72	5.56	14.69	7.88	1.71	97.85	207.26	-9999.00	-9999.00	0.00	0.47
34	a	'29-Aug-1983 20:00:00'	72	5.54	15.87	6.78	1.76	94.14	214.54	-9999.00	-9999.00	0.15	0.45
35	a	'25-Jun-1991 05:00:00'	72	5.52	15.43	6.82	1.76	95.95	212.23	-9999.00	-9999.00	0.26	0.71
36	a	'04-Aug-1981 14:00:00'	72	5.52	15.68	6.55	1.77	94.98	207.77	-9999.00	-9999.00	0.17	0.48
37	a	'02-Sep-2009 15:59:00'	72	5.51	14.67	9.01	1.69	97.03	-9999.00	208.22	226.40	0.02	0.48
38	a	'11-Sep-1981 02:00:00'	72	5.51	16.54	6.93	1.92	97.10	212.19	-9999.00	-9999.00	0.03	0.41
39	a	'02-Aug-1996 02:00:00'	72	5.51	13.47	6.55	1.46	93.49	211.96	-9999.00	-9999.00	0.21	0.67
40	a	'16-Jun-1980 23:00:00'	72	5.51	14.65	8.49	1.82	101.47	207.90	-9999.00	-9999.00	0.09	0.69
41	a	'12-Apr-1985 11:00:00'	72	5.50	14.22	7.40	1.65	95.97	210.21	-9999.00	-9999.00	0.20	0.73
42	a	'25-Aug-2004 17:00:00'	72	5.49	14.80	6.51	1.59	91.59	218.56	-9999.00	-9999.00	0.19	0.66
43	a	'21-Jun-2009 00:29:00'	72	5.49	13.47	7.24	1.43	91.90	-9999.00	215.45	231.55	0.30	0.88
44	a	'17-Jul-1999 20:00:00'	72	5.48	12.87	6.56	1.40	93.38	218.91	-9999.00	-9999.00	0.24	0.77
45	a	'01-Oct-2005 16:30:00'	72	5.48	14.97	6.77	1.60	90.77	-9999.00	-9999.00	-9999.00	0.08	0.45
46	a	'08-Sep-2005 01:30:00'	72	5.47	13.91	6.24	1.45	90.50	-9999.00	-9999.00	-9999.00	0.23	0.55
47	a	'11-May-1987 17:00:00'	72	5.45	12.34	6.61	1.27	93.38	190.42	-9999.00	-9999.00	-0.02	0.42
48	a	'28-Jul-1994 11:00:00'	72	5.45	15.37	6.52	1.64	91.38	206.40	-9999.00	-9999.00	-0.03	0.23
49	a	'16-Sep-1996 23:00:00'	72	5.45	14.76	7.34	1.66	93.47	219.95	-9999.00	-9999.00	0.26	0.63
50	a	'02-Sep-1983 23:00:00'	72	5.45	13.19	6.81	1.44	92.32	215.50	-9999.00	-9999.00	0.27	0.81
51	a	'28-Oct-2007 07:30:00'	72	5.44	12.96	7.43	1.44	92.89	-9999.00	-9999.00	-9999.00	0.03	0.66
52	a	'26-Jul-2002 17:00:00'	72	5.44	14.55	6.50	1.56	90.81	212.57	-9999.00	-9999.00	0.17	0.73
53	a	'04-Aug-2003 11:00:00'	72	5.42	13.75	6.81	1.46	91.36	213.02	-9999.00	-9999.00	0.14	0.43
54	a	'02-Oct-2016 03:55:00'	72	5.41	13.46	7.74	1.46	91.72	-9999.00	226.23	239.26	0.15	0.45
55	a	'20-Aug-1991 20:00:00'	72	5.40	14.38	6.22	1.46	87.90	210.99	-9999.00	-9999.00	0.07	0.45
56	a	'23-Jul-1990 23:00:00'	72	5.37	13.50	6.79	1.47	90.78	217.09	-9999.00	-9999.00	0.09	0.86
57	a	'09-Oct-1979 17:00:00'	72	5.36	14.41	6.92	1.51	88.77	214.30	-9999.00	-9999.00	0.02	0.43
58	a	'19-Nov-1993 20:00:00'	72	5.35	13.83	6.29	1.44	88.52	207.85	-9999.00	-9999.00	-0.01	0.38
59	a	'05-Jul-2005 05:00:00'	72	5.35	13.45	6.15	1.39	88.07	212.35	-9999.00	-9999.00	0.22	0.84
60	a	'29-Aug-1989 08:00:00'	72	5.35	16.50	7.26	1.77	89.43	210.90	-9999.00	-9999.00	0.15	0.64
61	a	'03-Sep-1979 11:00:00'	72	5.34	17.22	6.85	1.77	88.91	205.08	-9999.00	-9999.00	-0.08	0.39
62	a	'04-Jun-1992 17:00:00'	72	5.33	15.20	6.26	1.63	88.85	203.33	-9999.00	-9999.00	0.03	0.63
63	a	'16-Jul-1979 14:00:00'	72	5.31	16.25	6.54	1.67	87.00	210.42	-9999.00	-9999.00	0.03	0.25
64	a	'24-Sep-2003 02:00:00'	72	5.31	14.01	6.46	1.42	86.54	212.16	-9999.00	-9999.00	0.07	0.51
65	a	'13-Jul-1981 11:00:00'	72	5.30	15.69	6.65	1.60	85.80	206.74	-9999.00	-9999.00	0.17	0.63
66	a	'28-Jul-1985 23:00:00'	72	5.28	14.66	6.81	1.56	88.22	207.25	-9999.00	-9999.00	0.02	0.47
67	a	'26-Jul-1981 11:00:00'	72	5.28	15.35	6.60	1.56	85.92	209.31	-9999.00	-9999.00	0.08	0.47
68	a	'21-Jun-1987 14:00:00'	72	5.28	16.19	6.35	1.64	85.98	209.98	-9999.00	-9999.00	0.12	0.55
69	a	'14-Oct-1989 05:00:00'	72	5.28	15.14	6.48	1.52	85.77	212.33	-9999.00	-9999.00	0.05	0.47
70	a	'04-Aug-1984 08:00:00'	72	5.28	12.78	8.24	1.28	91.27	166.06	-9999.00	-9999.00	0.03	0.34
71	a	'31-Jul-2007 13:30:00'	72	5.28	15.13	6.48	1.50	85.30	-9999.00	-9999.00	-9999.00	0.34	0.94
72	a	'29-Sep-1998 08:00:00'	72	5.28	15.22	6.89	1.62	88.57	216.82	-9999.00	-9999.00	0.19	0.59
73	a	'26-Aug-1985 02:00:00'	72	5.26	14.86	6.50	1.45	84.11	215.51	-9999.00	-9999.00	0.19	0.55
74	a	'21-Sep-1989 02:00:00'	72	5.25	16.36	5.99	1.65	85.67	212.10	-9999.00	-9999.00	0.17	0.61
75	a	'10-May-2013 16:11:00'	72	5.25	13.07	7.45	1.34	85.47	-9999.00	222.54	237.48	0.41	0.93
76	a	'09-Sep-1989 17:00:00'	72	5.25	13.32	6.44	1.32	84.57	212.50	-9999.00	-9999.00	0.02	0.34
77	a	'14-Apr-1980 05:00:00'	72	5.24	15.72	5.76	1.56	84.09	207.10	-9999.00	-9999.00	0.10	0.42
78	a	'14-Jul-1986 05:00:00'	72	5.23	15.22	5.99	1.49	83.54	211.40	-9999.00	-9999.00	0.15	0.37
79	a	'19-Jun-1993 08:00:00'	72	5.22	15.53	6.16	1.55	83.99	206.67	-9999.00	-9999.00	0.10	0.63
80	a	'31-Jul-2014 07:14:00'	72	5.22	14.87	6.73	1.46	83.27	-9999.00	212.16	212.25	0.10	0.50
81	a	'19-Jun-1988 05:00:00'	72	5.21	14.74	7.14	1.46	84.08	217.18	-9999.00	-9999.00	0.16	0.60
82	a	'30-Jun-2004 14:00:00'	72	5.20	14.73	6.62	1.48	84.65	208.44	-9999.00	-9999.00	0.10	0.66
83	a	'04-Jul-1982 23:00:00'	72	5.20	15.42	7.31	1.59	86.22	213.47	-9999.00	-9999.00	0.05	0.46
84	a	'09-Sep-2014 17:14:00'	72	5.20	14.4								

Location	Albany
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'22-May-2009 03:30:00'	72.00	4.79	13.72	7.96	1.16	73.82	215.07	279.00	279.00	0.52	1.01
2	c	'27-Jun-2003 02:00:00'	72.00	2.92	11.75	3.72	0.35	26.50	225.43	-9999.00	-9999.00	0.51	1.01
3	c	'27-Apr-2000 12:30:00'	72.00	4.12	13.60	6.48	0.83	53.07	218.75	-9999.00	-9999.00	0.51	0.80
4	c	'28-Jun-2009 21:13:30'	72.00	5.05	13.01	6.91	1.23	80.11	-9999.00	225.16	249.34	0.50	0.72
5	c	'17-Jul-1996 06:30:00'	72.00	4.66	12.95	8.16	1.12	70.31	227.83	-9999.00	-9999.00	0.49	1.01
6	c	'02-Jul-2007 10:07:30'	72.00	4.01	12.11	7.12	0.66	50.51	-9999.00	-9999.00	-9999.00	0.49	1.13
7	c	'19-May-1999 12:30:00'	72.00	2.23	14.33	3.03	0.24	15.06	210.62	-9999.00	-9999.00	0.47	0.91
8	c	'16-May-1999 06:30:00'	72.00	2.66	12.59	3.33	0.30	20.83	200.84	-9999.00	-9999.00	0.47	0.98
9	c	'12-Jun-2012 00:09:00'	72.00	3.96	12.11	6.47	0.72	50.84	-9999.00	226.92	245.83	0.47	0.75
10	c	'07-May-2012 06:39:00'	72.00	4.37	13.60	6.72	0.79	54.92	-9999.00	220.54	233.91	0.46	0.95
11	c	'01-Jun-2011 02:48:00'	72.00	3.94	12.88	5.50	0.74	48.11	-9999.00	224.63	244.04	0.46	0.94
12	c	'01-Jun-1988 06:30:00'	72.00	3.80	13.75	4.86	0.70	42.90	219.02	-9999.00	-9999.00	0.45	1.02
13	c	'29-May-1984 00:30:00'	72.00	3.74	12.03	5.51	0.56	42.95	223.84	-9999.00	-9999.00	0.44	0.93
14	c	'27-Apr-2011 21:47:30'	72.00	3.44	13.33	4.29	0.54	35.87	-9999.00	220.49	236.91	0.44	0.64
15	c	'17-May-2011 05:48:00'	72.00	1.78	12.62	2.29	0.13	9.58	-9999.00	214.30	130.41	0.44	0.96
16	c	'09-May-2013 03:26:00'	72.00	3.85	13.71	5.67	0.65	46.41	-9999.00	223.48	226.21	0.43	0.93
17	c	'19-Jun-1996 18:30:00'	72.00	3.32	13.16	4.25	0.51	33.15	224.60	-9999.00	-9999.00	0.42	0.86
18	c	'12-May-1995 00:30:00'	72.00	3.57	12.51	5.00	0.57	40.98	220.82	-9999.00	-9999.00	0.42	0.75
19	c	'08-May-2002 00:30:00'	72.00	3.72	13.68	4.44	0.67	41.26	225.12	-9999.00	-9999.00	0.42	0.63
20	c	'17-Jun-1983 23:00:00'	72.00	2.36	14.81	4.79	0.34	19.43	216.26	-9999.00	-9999.00	0.41	0.64
21	c	'15-Jun-2011 06:18:00'	72.00	2.47	9.18	3.90	0.12	11.57	-9999.00	234.38	238.23	0.41	0.97
22	c	'19-Jun-2000 18:30:00'	72.00	4.26	12.22	6.68	0.79	58.68	219.34	-9999.00	-9999.00	0.41	0.91
23	c	'09-May-2004 18:30:00'	72.00	2.69	16.58	4.54	0.41	22.34	217.90	-9999.00	-9999.00	0.41	0.86
24	c	'07-Jun-1995 21:30:00'	72.00	4.05	12.75	6.86	0.82	51.91	226.68	-9999.00	-9999.00	0.40	0.68
25	c	'01-May-2007 01:52:30'	72.00	4.85	13.35	5.85	1.06	70.10	-9999.00	-9999.00	-9999.00	0.40	0.77
26	c	'09-Jun-1998 06:30:00'	72.00	3.07	12.41	4.10	0.40	29.08	222.68	-9999.00	-9999.00	0.40	0.97
27	c	'14-Jul-2000 12:30:00'	72.00	3.96	13.88	4.87	0.76	47.90	220.41	-9999.00	-9999.00	0.39	0.82
28	c	'11-Jun-1988 03:30:00'	72.00	3.82	15.37	5.28	0.80	45.13	219.17	-9999.00	-9999.00	0.39	0.87
29	c	'29-May-1999 03:30:00'	72.00	2.67	10.54	3.88	0.24	23.40	197.58	-9999.00	-9999.00	0.39	0.90
30	c	'18-May-1984 14:00:00'	72.00	4.19	13.64	6.02	0.98	59.23	218.97	-9999.00	-9999.00	0.39	0.93
31	c	'28-Jun-1983 20:00:00'	72.00	3.68	13.33	6.59	0.68	43.24	217.44	-9999.00	-9999.00	0.39	0.87
32	c	'20-Jun-2009 02:14:00'	72.00	5.08	13.50	7.24	1.24	79.99	-9999.00	222.73	241.01	0.39	0.88
33	c	'02-Apr-1989 15:30:00'	72.00	3.65	13.61	4.83	0.63	40.53	215.93	-9999.00	-9999.00	0.39	0.87
34	c	'16-May-2003 06:30:00'	72.00	2.67	12.69	4.90	0.30	24.07	213.26	-9999.00	-9999.00	0.39	1.04
35	c	'01-Aug-2011 17:18:00'	72.00	4.82	13.64	6.58	1.11	71.13	-9999.00	233.47	251.05	0.39	0.95
36	c	'04-Jul-1999 21:30:00'	72.00	2.36	13.06	2.92	0.25	16.73	215.84	-9999.00	-9999.00	0.38	0.74
37	c	'26-May-1981 21:30:00'	72.00	5.42	13.48	7.64	1.43	91.22	214.91	-9999.00	-9999.00	0.38	0.70
38	c	'27-Jun-1999 05:00:00'	72.00	3.41	13.11	6.11	0.59	38.55	222.53	-9999.00	-9999.00	0.38	0.93
39	c	'05-Jul-1984 21:30:00'	72.00	3.77	12.35	5.97	0.62	44.63	216.69	-9999.00	-9999.00	0.38	0.67
40	c	'17-Jul-2000 12:30:00'	72.00	4.90	14.54	5.92	1.20	70.36	216.65	-9999.00	-9999.00	0.38	0.86
41	c	'14-May-1988 03:30:00'	72.00	3.74	13.16	4.62	0.62	41.37	215.78	-9999.00	-9999.00	0.38	0.76
42	c	'07-Apr-2008 06:00:00'	72.00	2.48	13.46	3.55	0.29	18.78	-9999.00	-9999.00	-9999.00	0.38	0.83
43	c	'06-Apr-2011 19:33:00'	72.00	2.93	12.98	5.24	0.46	29.08	-9999.00	227.45	206.48	0.38	0.83
44	c	'22-May-2010 22:32:00'	72.00	3.50	13.40	7.52	0.67	48.30	-9999.00	217.43	160.83	0.38	0.67
45	c	'29-Jun-2007 07:00:00'	72.00	2.57	11.89	3.80	0.26	19.92	-9999.00	-9999.00	-9999.00	0.38	1.00
46	c	'08-Jun-2005 12:30:00'	72.00	2.33	13.00	5.30	0.23	16.34	214.10	-9999.00	-9999.00	0.37	0.89
47	c	'08-May-2014 21:29:00'	72.00	3.24	12.59	5.12	0.50	35.14	-9999.00	226.65	235.32	0.37	0.67
48	c	'03-Jul-2000 15:30:00'	72.00	2.83	11.53	5.34	0.30	24.11	221.92	-9999.00	-9999.00	0.37	0.92
49	c	'20-May-2011 08:48:00'	72.00	2.55	11.08	4.52	0.27	23.37	-9999.00	216.28	197.53	0.37	1.01
50	c	'23-Jul-2007 23:00:00'	72.00	3.71	13.43	5.19	0.64	43.35	-9999.00	-9999.00	-9999.00	0.37	0.67
51	c	'08-May-1984 21:30:00'	72.00	3.84	14.40	6.51	0.79	48.90	209.47	-9999.00	-9999.00	0.37	0.68
52	c	'11-May-2002 00:30:00'	72.00	3.77	14.14	5.26	0.74	43.77	219.22	-9999.00	-9999.00	0.37	0.84
53	c	'24-Apr-2011 20:47:30'	72.00	2.39	12.13	3.72	0.25	17.91	-9999.00	211.91	191.55	0.36	0.67
54	c	'01-Jun-2000 03:30:00'	72.00	2.73	15.26	3.56	0.40	23.22	217.68	-9999.00	-9999.00	0.36	0.84
55	c	'28-Jun-2008 01:22:30'	72.00	4.22	14.15	6.77	0.97	56.58	-9999.00	-9999.00	-9999.00	0.36	0.71
56	c	'16-May-1989 00:30:00'	72.00	2.06	12.79	2.57	0.18	12.16	209.42	-9999.00	-9999.00	0.36	0.61
57	c	'04-Jul-1998 00:30:00'	72.00	3.50	14.31	4.77	0.59	38.06	220.53	-9999.00	-9999.00	0.36	0.77
58	c	'18-Apr-2012 00:09:00'	72.00	3.75	14.17	5.98	0.84	47.08	-9999.00	217.96	219.53	0.36	0.62
59	c	'25-May-2014 00:29:00'	72.00	3.76	12.70	5.85	0.69	45.00	-9999.00	232.57	246.52	0.36	0.67
60	c	'18-Jun-2014 20:59:00'	72.00	3.61	13.42	6.52	0.65	44.56	-9999.00	221.74	228.80	0.36	0.73
61	c	'17-May-2015 05:28:00'	72.00	2.27	11.35	3.61	0.11	9.41	-9999.00	217.81	141.75	0.36	0.85
62	c	'30-Jul-2007 16:00:00'	72.00	4.77	14.44	6.48	1.22	71.34	-9999.00	-9999.00	-9999.00	0.35	0.94
63	c	'03-Apr-2012 00:47:00'	72.00	6.35	15.08	7.11	0.21	11.97	-9999.00	218.33	257.18	0.35	0.64
64	c	'13-Aug-2017 21:25:00'	72.00	-9999.00	NaN	-9999.00	-9999.00	-9999.00	-9999.00	-9999.00	-9999.00	0.35	0.58
65	c	'27-Jun-2012 22:39:00'	72.00	4.16	12.98	7.00	0.94	59.83	-9999.00	219.19	223.26	0.35	0.60
66	c	'07-Nov-2011 13:46:30'	72.00	2.79	10.69	4.94	0.33	26.83	-9999.00	234.69	242.51	0.35	0.78
67	c	'19-Jun-2011 12:47:00'	72.00	4.58	13.19	5.61	0.98	64.68	-9999.00	224.67	243.35	0.35	0.77
68	c	'12-Apr-2011 21:03:00'	72.00	2.50	11.38	3.39	0.23	19.50	-9999.00	213.58	228.85	0.35	0.66
69	c	'13-Jan-2011 12:03:00'	72.00	2.51	9.80	3.90	0.20	19.60	-9999.00	153.98	138.84	0.35	0.63
70	c	'23-Sep-2013 19:25:00'	72.00	5.41	14.15	7.83	1.52	91.93	-9999.00	230.82	255.53	0.34	0.74
71	c	'29-Jul-2011 14:48:00'	72.00	3.30	10.84	4.56	0.40	34.05	-9999.00	241.78	254.54	0.34	0.90
72	c	'07-Jul-2014 00:59:00'	72.00	5.93	13.00	7.22	0.59	39.92	-9999.00	217.24	233.27	0.34	0.72
73	c	'14-Jun-2000 03:30:00'	72.00	3.16	14.28	4.43	0.51	30.62	217.60	-9999.00	-9999.00	0.34	0.76
74	c	'20-Apr-1980 14:00:00'	72.00	3.19	12.13	4.50	0.42	30.29	216.30	-9999.00	-9999.00	0.34	0.70
75	c	'09-Jun-2008 22:15:00'	72.00	3.47	12.23	5.06	0.54	40.73	-9999.00	-9999.00	-9999.00	0.34	0.77
76	c	'25-Feb-2012 05:48:00'	72.00	3.03	11.91	4.07	0.37	28.00	-9999.00	226.72	225.67	0.34	0.61
77	c	'03-May-1999 06:30:00'	72.00	3.82	13.86	4.82	0.71	43.48	215.60	-9999.00	-9999.00	0.34	0.79
78	c	'23-May-2008 10:15:00'	72.00	3.20	12.56	5.15	0.45	32.50	-9999.00	-9999.00	-9999.00	0.34	0.89
79	c	'21-Jul-2017 02:40:00'	72.00	4.16	12.88	5.08	0.75	52.26	-9999.00	231.69	246.53	0.34	0.85
80	c	'25-Jun-2009 20:13:00'	72.00	2.26	13.85	3.34	0.25	15.65	-9999.00	220.16	161.88	0.34	0.89
81	c	'29-May-2011 02:47:30'	72.00	1.62	12.35	3.07	0.11	8.12	-9999.00	217.71	109.60	0.34	0.81
82	c	'10-Jul-2000 21:30:00'	72.00	3.45	14.84	5.39	0.67	37.67	214.63	-9999.00	-9999.00	0.34	0.65

Location	Albany
Method	72 Hour Net Power

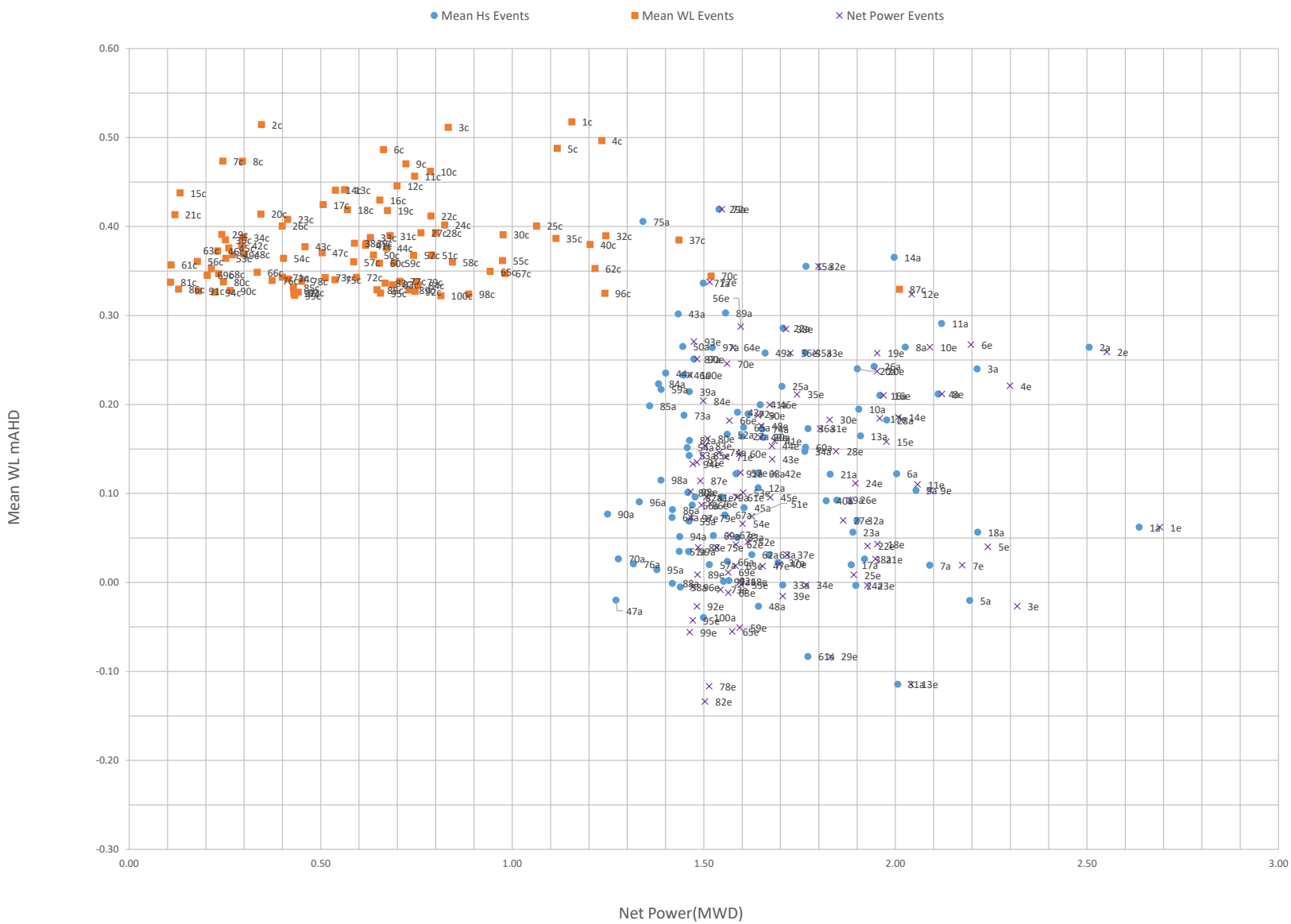
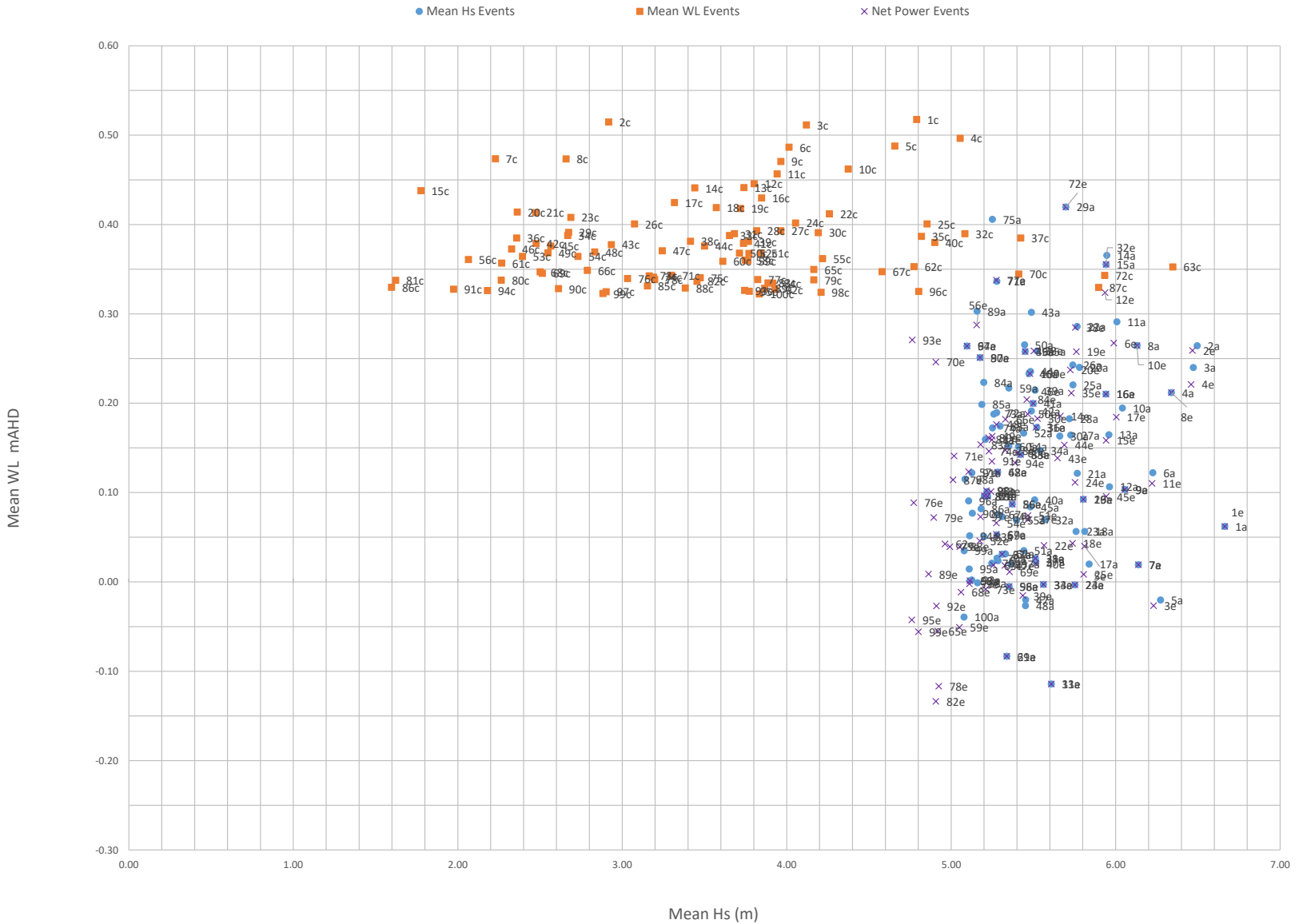
Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'14-Jul-1987 11:00:00'	72	6.66	16.02	7.83	2.69	138.17	204.96	-9999.00	-9999.00	0.06	0.59
2	e	'05-Jun-1997 02:00:00'	72	6.47	16.02	7.98	2.55	131.04	211.09	-9999.00	-9999.00	0.26	0.84
3	e	'15-Sep-1980 23:00:00'	72	6.23	14.74	8.88	2.32	122.81	213.14	-9999.00	-9999.00	-0.03	0.27
4	e	'29-Jun-1981 11:00:00'	72	6.46	14.56	7.86	2.30	128.09	210.70	-9999.00	-9999.00	0.22	0.71
5	e	'17-Jun-1979 05:00:00'	72	5.81	16.14	8.58	2.24	112.46	209.26	-9999.00	-9999.00	0.04	0.39
6	e	'28-Jul-1993 11:00:00'	72	5.99	16.49	6.97	2.20	108.56	214.13	-9999.00	-9999.00	0.27	0.75
7	e	'12-Aug-1990 17:00:00'	72	6.14	15.12	7.79	2.17	116.01	211.12	-9999.00	-9999.00	0.02	0.33
8	e	'13-Sep-2008 22:50:00'	72	6.34	14.76	8.23	2.12	122.27	-9999.00	216.24	238.25	0.21	0.69
9	e	'16-Aug-1981 02:00:00'	72	6.06	15.03	7.58	2.09	115.09	214.42	-9999.00	-9999.00	0.10	0.59
10	e	'03-Aug-1991 20:00:00'	72	6.13	15.04	7.60	2.09	114.58	216.48	-9999.00	-9999.00	0.26	0.51
11	e	'08-Aug-1984 11:00:00'	72	6.22	14.39	7.00	2.06	117.72	207.55	-9999.00	-9999.00	0.11	0.54
12	e	'18-Jul-1996 17:00:00'	72	5.94	14.40	8.16	2.04	114.17	217.73	-9999.00	-9999.00	0.32	0.93
13	e	'26-Sep-1986 02:00:00'	72	5.61	16.92	7.21	2.04	99.57	202.98	-9999.00	-9999.00	-0.11	0.31
14	e	'15-Jul-1988 14:00:00'	72	5.66	15.51	8.32	2.01	104.75	214.24	-9999.00	-9999.00	0.19	0.73
15	e	'03-Sep-2002 02:00:00'	72	5.94	15.06	6.66	1.98	107.32	209.04	-9999.00	-9999.00	0.16	0.57
16	e	'11-Sep-2009 22:59:00'	72	5.94	15.69	7.23	1.97	106.85	-9999.00	224.78	250.19	0.21	0.68
17	e	'02-Jul-1992 05:00:00'	72	6.00	14.58	7.09	1.96	111.38	218.45	-9999.00	-9999.00	0.18	0.77
18	e	'12-Aug-1992 17:00:00'	72	5.74	15.67	7.60	1.95	103.27	210.71	-9999.00	-9999.00	0.04	0.62
19	e	'23-Jul-2000 08:00:00'	72	5.76	15.11	7.90	1.95	107.62	207.93	-9999.00	-9999.00	0.26	0.58
20	e	'01-Sep-2013 04:11:00'	72	5.72	15.90	8.35	1.95	103.46	-9999.00	223.58	249.99	0.24	0.61
21	e	'11-Sep-1981 02:00:00'	72	5.51	16.54	6.93	1.95	97.10	212.19	-9999.00	-9999.00	0.03	0.41
22	e	'10-Oct-1997 20:00:00'	72	5.56	15.16	8.26	1.93	103.88	214.16	-9999.00	-9999.00	0.04	0.46
23	e	'01-Oct-1980 05:00:00'	72	5.75	15.33	7.12	1.93	104.03	214.08	-9999.00	-9999.00	0.00	0.32
24	e	'19-Aug-1984 02:00:00'	72	5.75	15.23	7.41	1.90	102.62	210.35	-9999.00	-9999.00	0.11	0.37
25	e	'30-Aug-2005 13:30:00'	72	5.81	13.94	8.82	1.89	111.48	-9999.00	-9999.00	-9999.00	0.01	0.41
26	e	'22-Aug-1980 14:00:00'	72	5.80	14.45	7.40	1.88	107.02	209.66	-9999.00	-9999.00	0.09	0.49
27	e	'17-Jun-1980 05:00:00'	72	5.47	15.23	8.49	1.86	99.39	205.70	-9999.00	-9999.00	0.07	0.49
28	e	'29-Aug-1989 11:00:00'	72	5.33	16.64	7.26	1.85	88.47	211.04	-9999.00	-9999.00	0.15	0.64
29	e	'03-Sep-1979 11:00:00'	72	5.34	17.22	6.85	1.83	88.91	205.08	-9999.00	-9999.00	-0.08	0.39
30	e	'29-Aug-1983 02:00:00'	72	5.52	15.93	6.78	1.83	94.15	215.44	-9999.00	-9999.00	0.18	0.45
31	e	'04-Aug-1981 17:00:00'	72	5.51	15.67	6.55	1.80	94.78	207.64	-9999.00	-9999.00	0.17	0.48
32	e	'27-May-1981 17:00:00'	72	5.94	13.43	7.64	1.80	111.55	216.31	-9999.00	-9999.00	0.36	0.58
33	e	'25-Jun-1991 08:00:00'	72	5.50	15.57	6.82	1.79	95.17	211.60	-9999.00	-9999.00	0.26	0.71
34	e	'18-Jun-1982 08:00:00'	72	5.56	14.69	7.88	1.77	97.85	207.26	-9999.00	-9999.00	0.00	0.47
35	e	'12-Jul-2002 02:00:00'	72	5.73	14.30	6.80	1.74	100.96	215.36	-9999.00	-9999.00	0.21	0.81
36	e	'16-Sep-1996 23:00:00'	72	5.45	14.76	7.34	1.73	93.47	219.95	-9999.00	-9999.00	0.26	0.63
37	e	'16-Jul-1979 14:00:00'	72	5.31	16.25	6.54	1.72	87.00	210.42	-9999.00	-9999.00	0.03	0.25
38	e	'24-Sep-2013 15:40:00'	72	5.75	14.54	7.83	1.71	101.65	-9999.00	230.54	250.64	0.28	0.74
39	e	'28-Jul-1994 05:00:00'	72	5.43	15.72	6.52	1.71	90.79	206.42	-9999.00	-9999.00	-0.02	0.23
40	e	'02-Sep-2009 16:29:00'	72	5.51	14.68	9.01	1.70	97.05	-9999.00	208.20	226.13	0.02	0.48
41	e	'21-Sep-1989 05:00:00'	72	5.25	16.38	5.99	1.68	85.37	211.98	-9999.00	-9999.00	0.16	0.61
42	e	'21-Jun-1987 14:00:00'	72	5.28	16.19	6.35	1.68	85.98	209.98	-9999.00	-9999.00	0.12	0.55
43	e	'07-Jun-2002 05:00:00'	72	5.65	13.43	7.70	1.68	103.13	208.08	-9999.00	-9999.00	0.14	0.52
44	e	'05-Jun-2003 11:00:00'	72	5.69	14.07	7.20	1.68	98.98	204.31	-9999.00	-9999.00	0.15	0.63
45	e	'12-Jun-2005 17:00:00'	72	5.94	12.69	7.67	1.67	110.24	207.18	-9999.00	-9999.00	0.10	0.65
46	e	'12-Apr-1985 11:00:00'	72	5.50	14.22	7.40	1.67	95.97	210.21	-9999.00	-9999.00	0.20	0.73
47	e	'04-Jun-1992 20:00:00'	72	5.33	15.31	6.26	1.65	88.53	203.19	-9999.00	-9999.00	0.02	0.63
48	e	'13-Jul-1981 14:00:00'	72	5.27	15.73	6.65	1.65	84.76	206.81	-9999.00	-9999.00	0.18	0.63
49	e	'29-Sep-1998 14:00:00'	72	5.25	15.47	6.89	1.65	87.49	215.41	-9999.00	-9999.00	0.16	0.55
50	e	'25-Aug-2004 20:00:00'	72	5.46	14.86	6.51	1.64	90.63	218.28	-9999.00	-9999.00	0.19	0.66
51	e	'01-Oct-2005 18:30:00'	72	5.47	14.99	6.77	1.63	91.00	-9999.00	-9999.00	-9999.00	0.07	0.45
52	e	'05-Jul-1982 02:00:00'	72	5.17	15.55	7.31	1.61	84.82	212.74	-9999.00	-9999.00	0.05	0.46
53	e	'14-Apr-1980 05:00:00'	72	5.24	15.72	5.76	1.60	84.09	207.10	-9999.00	-9999.00	0.10	0.42
54	e	'26-Jul-1981 14:00:00'	72	5.27	15.32	6.60	1.60	85.60	209.65	-9999.00	-9999.00	0.07	0.47
55	e	'23-Sep-2009 14:29:00'	72	5.11	15.06	8.30	1.60	83.52	-9999.00	215.20	238.10	0.00	0.39
56	e	'25-Jun-2000 02:00:00'	72	5.15	16.05	6.31	1.60	81.96	212.81	-9999.00	-9999.00	0.29	0.55
57	e	'28-Jul-2006 10:00:00'	72	5.11	16.00	7.14	1.60	82.24	-9999.00	-9999.00	-9999.00	0.12	0.72
58	e	'25-Sep-1990 08:00:00'	72	5.11	16.32	6.52	1.60	80.77	209.18	-9999.00	-9999.00	0.00	0.55
59	e	'25-Jun-1990 02:00:00'	72	5.05	15.27	7.17	1.59	79.80	209.54	-9999.00	-9999.00	-0.05	0.50
60	e	'26-Jul-2002 20:00:00'	72	5.40	14.66	6.50	1.59	89.55	211.68	-9999.00	-9999.00	0.14	0.73
61	e	'19-Jun-1993 08:00:00'	72	5.22	15.53	6.16	1.59	83.99	206.67	-9999.00	-9999.00	0.10	0.63
62	e	'10-Sep-2001 23:00:00'	72	4.96	16.14	6.61	1.58	77.74	211.10	-9999.00	-9999.00	0.04	0.41
63	e	'29-Jul-1985 02:00:00'	72	5.26	14.83	6.81	1.58	87.41	205.92	-9999.00	-9999.00	0.02	0.47
64	e	'01-Jul-1985 08:00:00'	72	5.10	16.29	6.53	1.58	79.90	216.28	-9999.00	-9999.00	0.26	0.91
65	e	'08-Mar-1991 11:00:00'	72	4.92	16.23	7.17	1.57	77.19	204.97	-9999.00	-9999.00	-0.06	0.32
66	e	'01-Sep-1983 14:00:00'	72	5.33	14.61	6.81	1.57	89.81	213.55	-9999.00	-9999.00	0.18	0.51
67	e	'14-Oct-1989 08:00:00'	72	5.27	15.13	6.48	1.57	85.75	212.33	-9999.00	-9999.00	0.05	0.47
68	e	'28-May-2015 08:43:00'	72	5.06	15.37	8.51	1.56	82.41	-9999.00	210.10	205.34	-0.01	0.17
69	e	'09-Oct-1979 11:00:00'	72	5.35	14.47	6.92	1.56	88.67	214.37	-9999.00	-9999.00	0.01	0.43
70	e	'20-Jul-1989 11:00:00'	72	4.91	17.23	6.12	1.56	74.13	213.29	-9999.00	-9999.00	0.25	0.82
71	e	'29-Jul-1989 14:00:00'	72	5.02	15.97	6.41	1.56	78.02	210.26	-9999.00	-9999.00	0.14	0.67
72	e	'29-Jun-2009 22:59:00'	72	5.70	13.50	6.91	1.55	98.50	-9999.00	215.64	241.20	0.42	0.72
73	e	'21-Aug-1991 20:00:00'	72	5.21	15.48	5.77	1.54	81.22	207.70	-9999.00	-9999.00	-0.01	0.39
74	e	'14-Jul-1986 05:00:00'	72	5.23	15.22	5.99	1.54	83.54	211.40	-9999.00	-9999.00	0.15	0.37
75	e	'03-Apr-1979 14:00:00'	72	4.99	15.63	6.80	1.53	79.34	202.14	-9999.00	-9999.00	0.04	0.37
76	e	'28-May-1983 14:00:00'	72	4.77	15.44	7.13	1.52	77.82	215.05	-9999.00	-9999.00	0.09	0.68
77	e	'31-Jul-2007 12:30:00'	72	5.27	15.23	6.48	1.52	85.23	-9999.00	-9999.00	-9999.00	0.34	0.94
78	e	'27-Aug-1987 11:00:00'	72	4.92	16.41	6.17	1.51	74.44	209.30	-9999.00	-9999.00	-0.12	0.23
79	e	'07-Sep-1991 14:00:00'	72	4.89	16.87	5.83	1.51	74.27	214.07	-9999.00	-9999.00	0.07	0.53
80	e	'26-Aug-1985 08:00:00'	72	5.23	15.02	6.50	1.51	82.91	214.93	-9999.00	-9999.00	0.16	0.55
81	e	'30-Jun-2004 14:00:00'	72	5.20	14.73	6.62	1.51	84.65	208.44	-9999.00	-9999.00	0.10	0.66
82	e	'09-Oct-2005 21:30:00'	72	4.91	15.98	7.20	1.50	77.45	-9999.00	-9999.00	-9999.00	-0.13	0.37
83	e	'19-Jun-1988 08:00:00'	72	5.18	14.83	7.14	1.50	82.60	216.43	-9999.00	-9999.00	0.15	0.60
84	e	'02-Aug-1996 08:00:00'	72	5.46	13.68								

K1509 - South West Storm Selection
Extreme Event Comparison

Location	Albany
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'28-Jul-1993 11:00:00'	102.00	5.86	16.04	6.97	2.82	148.39	214.99	-9999.00	-9999.00	0.26	0.75
2	f	'14-Jul-1987 11:00:00'	72.00	6.66	16.02	7.83	2.64	138.17	204.96	-9999.00	-9999.00	0.06	0.59
3	f	'29-Jun-1981 08:00:00'	90.00	6.29	14.41	7.86	2.62	153.32	211.26	-9999.00	-9999.00	0.21	0.71
4	f	'04-Jun-1997 21:30:00'	69.00	6.57	15.93	7.98	2.45	128.79	212.16	-9999.00	-9999.00	0.26	0.84
5	f	'03-Aug-1991 21:30:00'	81.00	6.02	15.00	7.60	2.21	125.12	216.04	-9999.00	-9999.00	0.25	0.51
6	f	'08-Aug-1984 11:00:00'	84.00	6.06	14.10	7.00	2.19	131.33	207.91	-9999.00	-9999.00	0.08	0.54
7	f	'03-Sep-2002 00:30:00'	81.00	5.86	14.96	6.66	2.09	118.14	209.59	-9999.00	-9999.00	0.15	0.57
8	f	'11-Sep-2009 22:44:00'	72.50	5.93	15.68	7.23	1.97	107.36	-9999.00	224.76	250.20	0.21	0.68
9	f	'17-Jun-1979 05:00:00'	48.00	6.70	16.90	8.58	1.92	95.53	208.68	-9999.00	-9999.00	0.06	0.39
10	f	'02-Jul-1992 00:30:00'	69.00	6.10	14.43	7.09	1.87	109.68	219.14	-9999.00	-9999.00	0.17	0.77
11	f	'16-Aug-1981 05:00:00'	60.00	6.36	15.03	7.58	1.86	104.30	214.23	-9999.00	-9999.00	0.11	0.59
12	f	'18-Jul-1996 18:30:00'	51.00	6.59	15.19	8.16	1.77	97.18	215.57	-9999.00	-9999.00	0.32	0.87
13	f	'25-Sep-1986 20:00:00'	54.00	6.05	17.57	7.21	1.75	85.15	202.75	-9999.00	-9999.00	-0.09	0.31
14	f	'15-Jul-1988 02:00:00'	48.00	6.57	16.08	8.32	1.71	89.72	213.89	-9999.00	-9999.00	0.22	0.73
15	f	'01-Oct-1980 00:30:00'	57.00	6.14	15.57	7.12	1.69	91.74	213.82	-9999.00	-9999.00	0.04	0.32
16	f	'11-Aug-1990 12:30:00'	51.00	6.28	15.46	7.79	1.64	88.42	215.05	-9999.00	-9999.00	0.05	0.35
17	f	'16-Sep-1980 23:00:00'	42.00	6.91	15.32	8.88	1.64	89.19	212.60	-9999.00	-9999.00	-0.05	0.27
18	f	'30-Aug-2005 08:30:00'	46.00	6.86	14.65	8.82	1.64	94.36	-9999.00	-9999.00	-9999.00	0.02	0.41
19	f	'23-Jul-2000 12:30:00'	51.00	6.41	14.88	7.90	1.64	91.73	207.37	-9999.00	-9999.00	0.29	0.58
20	f	'22-Aug-1980 11:00:00'	54.00	6.28	14.70	7.40	1.61	91.93	210.82	-9999.00	-9999.00	0.13	0.49
21	f	'11-Jul-2002 23:00:00'	66.00	5.84	14.35	6.80	1.61	95.67	215.46	-9999.00	-9999.00	0.20	0.81
22	f	'27-May-1981 18:30:00'	57.00	6.35	13.62	7.64	1.59	99.08	217.08	-9999.00	-9999.00	0.39	0.58
23	f	'10-Sep-1981 23:00:00'	48.00	6.16	17.10	6.93	1.58	78.62	212.47	-9999.00	-9999.00	0.02	0.41
24	f	'12-Jun-2005 11:00:00'	66.00	6.09	12.66	7.67	1.57	105.44	209.71	-9999.00	-9999.00	0.14	0.65
25	f	'04-Aug-1981 12:30:00'	57.00	5.83	15.99	6.55	1.55	82.36	207.84	-9999.00	-9999.00	0.20	0.48
26	f	'25-Jun-1991 02:00:00'	54.00	5.95	15.79	6.82	1.51	81.34	211.60	-9999.00	-9999.00	0.25	0.71
27	f	'10-Oct-1997 21:30:00'	39.00	6.86	15.78	8.26	1.49	80.39	213.14	-9999.00	-9999.00	0.05	0.46
28	f	'12-Apr-1985 02:00:00'	54.00	5.96	14.41	7.40	1.43	82.64	211.78	-9999.00	-9999.00	0.23	0.73
29	f	'26-Jul-2002 12:30:00'	63.00	5.58	14.61	6.50	1.43	82.83	212.92	-9999.00	-9999.00	0.22	0.73
30	f	'06-Jun-2002 21:30:00'	51.00	6.27	13.59	7.70	1.42	87.60	209.00	-9999.00	-9999.00	0.17	0.52
31	f	'16-Jun-1980 11:00:00'	36.00	6.86	15.60	8.49	1.40	75.00	206.94	-9999.00	-9999.00	0.06	0.49
32	f	'02-Sep-2009 14:44:00'	46.50	6.33	14.76	9.01	1.39	79.31	-9999.00	211.05	231.02	0.05	0.48
33	f	'28-Jul-1994 12:30:00'	57.00	5.65	15.36	6.52	1.39	77.41	206.25	-9999.00	-9999.00	0.00	0.23
34	f	'14-Apr-1980 05:00:00'	60.00	5.40	15.93	5.76	1.38	73.59	207.02	-9999.00	-9999.00	0.09	0.42
35	f	'20-Sep-1989 23:00:00'	54.00	5.57	16.52	5.99	1.37	70.82	212.44	-9999.00	-9999.00	0.19	0.61
36	f	'11-Aug-1992 23:00:00'	42.00	6.48	15.09	7.60	1.37	76.63	213.78	-9999.00	-9999.00	0.10	0.62
37	f	'04-Jun-1992 12:30:00'	51.00	5.77	15.91	6.26	1.35	71.81	202.81	-9999.00	-9999.00	0.06	0.63
38	f	'02-Aug-1996 00:30:00'	63.00	5.64	13.58	6.55	1.34	85.23	211.19	-9999.00	-9999.00	0.21	0.67
39	f	'29-Aug-1983 08:00:00'	48.00	5.90	15.93	6.78	1.34	71.27	215.67	-9999.00	-9999.00	0.19	0.45
40	f	'28-Jul-1985 18:30:00'	51.00	5.77	15.37	6.81	1.33	72.41	205.28	-9999.00	-9999.00	0.00	0.47
41	f	'19-Jun-1982 02:00:00'	42.00	6.39	14.90	7.88	1.31	74.46	203.70	-9999.00	-9999.00	-0.03	0.47
42	f	'12-Sep-2008 16:50:00'	47.00	6.09	14.77	8.10	1.29	73.81	-9999.00	216.28	246.54	0.31	0.69
43	f	'04-Aug-2003 03:30:00'	57.00	5.71	13.71	6.81	1.27	79.43	214.43	-9999.00	-9999.00	0.19	0.43
44	f	'14-Jul-1986 09:30:00'	57.00	5.41	15.17	5.99	1.26	70.23	211.18	-9999.00	-9999.00	0.19	0.37
45	f	'23-Jul-1990 12:30:00'	51.00	5.86	13.88	6.79	1.24	75.24	219.24	-9999.00	-9999.00	0.19	0.86
46	f	'17-Jul-1999 18:30:00'	57.00	5.76	13.14	6.56	1.23	80.54	218.17	-9999.00	-9999.00	0.23	0.67
47	f	'23-Sep-2003 23:00:00'	60.00	5.44	14.03	6.46	1.23	74.95	212.88	-9999.00	-9999.00	0.08	0.51
48	f	'05-Jul-2005 05:00:00'	60.00	5.50	13.60	6.15	1.23	76.90	213.35	-9999.00	-9999.00	0.24	0.84
49	f	'29-Sep-1998 02:00:00'	42.00	6.03	15.86	6.89	1.22	65.10	214.79	-9999.00	-9999.00	0.17	0.44
50	f	'08-Jul-2014 09:29:00'	47.50	5.99	14.39	7.22	1.20	71.79	-9999.00	216.44	224.96	0.29	0.72
51	f	'18-Jun-1993 23:00:00'	48.00	5.59	15.99	6.16	1.20	63.51	206.56	-9999.00	-9999.00	0.10	0.63
52	f	'04-Sep-1979 00:30:00'	39.00	6.00	16.77	6.85	1.19	60.70	204.65	-9999.00	-9999.00	-0.12	0.39
53	f	'12-Jun-1994 03:30:00'	51.00	5.50	15.22	6.26	1.19	65.67	214.09	-9999.00	-9999.00	0.07	0.64
54	f	'10-Sep-2001 03:30:00'	39.00	5.92	17.01	6.61	1.17	58.76	211.40	-9999.00	-9999.00	0.06	0.41
55	f	'24-Sep-2009 14:29:30'	33.02	6.26	18.21	8.30	1.17	55.46	-9999.00	216.63	227.05	0.05	0.39
56	f	'30-Aug-1995 18:30:00'	57.00	5.23	14.98	5.86	1.17	65.60	207.74	-9999.00	-9999.00	-0.08	0.15
57	f	'19-Aug-1984 21:30:00'	39.00	6.23	14.75	7.41	1.16	66.38	213.63	-9999.00	-9999.00	0.13	0.37
58	f	'20-Nov-1992 00:30:00'	51.00	5.68	13.96	6.29	1.15	70.07	208.66	-9999.00	-9999.00	0.04	0.38
59	f	'28-May-1983 03:30:00'	33.00	6.22	17.72	7.13	1.14	55.50	213.51	-9999.00	-9999.00	0.09	0.65
60	f	'25-Jun-1982 17:00:00'	42.00	6.00	14.94	6.57	1.14	64.53	209.32	-9999.00	-9999.00	0.02	0.41
61	f	'29-Jun-2008 14:00:00'	42.00	5.98	15.58	6.88	1.14	63.41	-9999.00	-9999.00	-9999.00	0.31	0.71
62	f	'24-Sep-2013 01:10:00'	45.00	6.04	14.26	6.94	1.14	69.08	-9999.00	232.45	257.82	0.34	0.74
63	f	'02-Sep-1983 08:00:00'	42.00	6.15	14.00	6.81	1.12	68.19	213.00	-9999.00	-9999.00	0.18	0.51
64	f	'16-Sep-1979 14:00:00'	36.00	6.06	16.28	7.06	1.12	57.76	207.99	-9999.00	-9999.00	-0.05	0.18
65	f	'09-Oct-1979 00:30:00'	45.00	5.72	14.82	6.92	1.11	63.51	214.89	-9999.00	-9999.00	-0.01	0.35
66	f	'28-Oct-2007 01:15:00'	41.00	6.28	13.76	7.43	1.11	68.62	-9999.00	-9999.00	-9999.00	0.02	0.66
67	f	'22-Aug-1991 12:30:00'	51.00	5.19	16.17	5.55	1.10	57.78	206.49	-9999.00	-9999.00	-0.03	0.39
68	f	'15-Sep-1996 21:30:00'	33.00	6.25	15.99	7.34	1.09	56.65	218.99	-9999.00	-9999.00	0.31	0.56
69	f	'17-Jul-1979 03:30:00'	39.00	5.78	16.35	6.54	1.09	56.20	209.51	-9999.00	-9999.00	-0.03	0.22
70	f	'10-Oct-2005 02:30:00'	34.00	6.07	17.24	7.20	1.08	53.36	-9999.00	-9999.00	-9999.00	-0.23	0.25
71	f	'11-Dec-1981 18:30:00'	39.00	5.98	15.28	6.48	1.07	59.58	205.95	-9999.00	-9999.00	-0.12	0.54
72	f	'07-Sep-2005 13:30:00'	50.00	5.54	14.41	6.24	1.07	64.31	-9999.00	-9999.00	-9999.00	0.27	0.57
73	f	'04-Sep-1986 09:30:00'	39.00	5.94	15.20	6.80	1.07	58.89	214.41	-9999.00	-9999.00	-0.03	0.43
74	f	'09-Oct-1993 00:30:00'	39.00	6.14	14.17	6.84	1.06	63.20	209.41	-9999.00	-9999.00	-0.17	0.16
75	f	'19-Aug-1981 23:00:00'	36.00	6.39	13.99	7.97	1.06	64.49	215.81	-9999.00	-9999.00	0.08	0.39
76	f	'04-Jul-1982 06:30:00'	33.00	6.16	16.16	7.31	1.04	54.38	213.52	-9999.00	-9999.00	0.00	0.39
77	f	'28-Aug-1990 14:00:00'	36.00	5.90	16.22	6.86	1.03	54.11	214.65	-9999.00	-9999.00	0.05	0.34
78	f	'02-Sep-1984 14:00:00'	48.00	5.35	14.90	5.97	1.02	58.15	208.69	-9999.00	-9999.00	0.11	0.37
79	f	'02-Apr-1979 21:30:00'	33.00	5.91	17.56	6.80	1.02	50.12	201.72	-9999.00	-9999.00	0.05	0.37
80	f	'28-Jul-2006 02:30:00'	31.00	6.14	17.40	7.14	1.01	49.57	-9999.00	-9999.00	-9999.00	0.21	0.72
81	f	'28-May-2015 13:43:00'	26.00	6.62	17.70	8.51	1.00	48.56	-9999.00	205.77	200.19	-0.03	0.17
82	f	'09-Jun-1995 09:30:00'	39.00	5.86	14.71	6.86	1.00	58.02	206.89	-9999.00			

Location	Albany
Method	72 Hour Comparison
Title	Albany 72 Hour Comparison



Location	Bremer/Hopetoun
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'23-Aug-2009 20:00:00'	72	5.62	15.15	6.95	1.78	99.05	200.60	-9999.00	-9999.00	0.01	0.39
2	a	'05-Jun-2003 08:00:00'	72	5.46	13.77	6.92	1.48	91.40	200.16	-9999.00	-9999.00	0.07	0.59
3	a	'13-Sep-2008 23:00:00'	72	5.24	14.74	6.87	1.48	85.52	205.88	-9999.00	-9999.00	0.09	0.60
4	a	'12-Jun-2005 20:00:00'	72	5.17	12.74	6.37	1.27	83.14	201.87	-9999.00	-9999.00	0.00	0.52
5	a	'30-Aug-2005 20:00:00'	72	5.16	13.76	8.18	1.58	93.02	203.69	-9999.00	-9999.00	-0.14	0.46
6	a	'07-Jun-2002 11:00:00'	72	5.12	13.56	7.18	1.41	85.03	202.68	-9999.00	-9999.00	0.00	0.42
7	a	'04-Sep-2002 17:00:00'	72	5.00	14.72	6.32	1.36	77.50	199.97	-9999.00	-9999.00	-0.13	0.41
8	a	'24-Jul-2000 02:00:00'	72	4.96	14.19	6.59	1.35	78.23	203.98	-9999.00	-9999.00	0.08	0.46
9	a	'02-Sep-2009 17:00:00'	72	4.92	14.52	6.81	1.33	76.86	199.92	-9999.00	-9999.00	-0.12	0.43
10	a	'28-Oct-2007 17:00:00'	72	4.87	12.36	6.64	1.13	75.91	201.42	-9999.00	-9999.00	-0.08	0.67
11	a	'19-Apr-2006 20:00:00'	72	4.63	14.67	5.77	1.19	67.69	195.66	-9999.00	-9999.00	-0.19	0.40
12	a	'21-Jun-2009 08:00:00'	72	4.53	12.98	6.18	0.97	64.02	202.87	-9999.00	-9999.00	0.15	0.88
13	a	'06-Aug-2003 02:00:00'	72	4.50	14.92	5.81	1.07	61.06	201.97	-9999.00	-9999.00	-0.13	0.14
14	a	'23-Jul-2003 08:00:00'	72	4.46	13.02	6.75	1.07	67.00	202.74	-9999.00	-9999.00	-0.17	0.39
15	a	'12-Jun-2003 17:00:00'	72	4.45	13.35	5.44	0.96	61.00	199.80	-9999.00	-9999.00	-0.20	0.36
16	a	'30-Jun-2004 20:00:00'	72	4.43	14.75	5.93	1.09	62.09	204.89	-9999.00	-9999.00	-0.06	0.51
17	a	'22-Sep-2006 23:00:00'	72	4.42	14.31	5.89	1.06	62.29	206.76	-9999.00	-9999.00	-0.02	0.43
18	a	'21-Sep-2008 05:00:00'	72	4.35	15.18	5.19	1.04	57.89	207.66	-9999.00	-9999.00	-0.06	0.41
19	a	'05-Jul-2005 20:00:00'	72	4.32	13.17	4.92	0.89	57.56	200.35	-9999.00	-9999.00	0.00	0.68
20	a	'30-Aug-2003 14:00:00'	72	4.31	12.98	5.51	0.90	58.49	198.97	-9999.00	-9999.00	-0.27	0.30
21	a	'22-Aug-2000 02:00:00'	72	4.28	11.93	6.23	0.84	59.26	188.87	-9999.00	-9999.00	-0.16	0.23
22	a	'25-Sep-2009 14:00:00'	72	4.27	14.86	6.27	1.08	59.27	201.79	-9999.00	-9999.00	-0.27	0.20
23	a	'13-May-2000 08:00:00'	72	4.23	12.87	5.66	0.81	56.16	198.35	-9999.00	-9999.00	0.01	0.47
24	a	'30-Jun-2008 11:00:00'	72	4.18	14.29	5.99	0.96	56.66	205.89	-9999.00	-9999.00	0.06	0.62
25	a	'18-Jul-1999 05:00:00'	72	4.18	13.24	5.34	0.86	54.96	208.20	-9999.00	-9999.00	NaN	-9999.00
26	a	'28-Mar-2007 08:00:00'	72	4.16	12.11	4.89	0.75	53.43	196.84	-9999.00	-9999.00	NaN	-9999.00
27	a	'26-Mar-1999 17:00:00'	72	4.16	13.91	4.96	0.88	53.33	202.45	-9999.00	-9999.00	0.01	0.38
28	a	'26-May-2000 14:00:00'	72	4.16	13.27	5.41	0.87	54.74	191.64	-9999.00	-9999.00	0.03	0.42
29	a	'05-Jun-2001 20:00:00'	72	4.16	10.66	4.80	0.60	52.61	168.23	-9999.00	-9999.00	-0.18	0.44
30	a	'10-Oct-2005 02:00:00'	72	4.14	14.68	5.87	0.95	54.75	203.95	-9999.00	-9999.00	-0.26	0.23
31	a	'17-Aug-2001 08:00:00'	72	4.14	13.49	5.73	0.89	55.38	205.03	-9999.00	-9999.00	-0.24	0.39
32	a	'26-Jul-2002 23:00:00'	72	4.14	14.69	5.57	0.92	53.27	208.18	-9999.00	-9999.00	0.00	0.60
33	a	'30-Jun-2009 11:00:00'	72	4.13	13.69	5.04	0.83	52.22	207.47	-9999.00	-9999.00	0.20	0.56
34	a	'18-May-2003 17:00:00'	72	4.12	10.39	4.95	0.60	51.71	199.51	-9999.00	-9999.00	0.07	0.84
35	a	'12-Sep-2009 11:00:00'	72	4.11	15.69	5.33	0.95	51.99	210.74	-9999.00	-9999.00	0.03	0.53
36	a	'01-Oct-2005 14:00:00'	72	4.10	15.47	5.12	0.96	52.19	206.36	-9999.00	-9999.00	-0.06	0.35
37	a	'15-Jul-2002 14:00:00'	72	4.08	14.36	5.22	0.92	53.34	204.25	-9999.00	-9999.00	-0.14	0.33
38	a	'24-Sep-2003 11:00:00'	72	4.08	14.04	4.97	0.84	50.64	206.82	-9999.00	-9999.00	-0.08	0.49
39	a	'09-Sep-2005 17:00:00'	72	4.07	12.42	5.12	0.72	51.83	203.36	-9999.00	-9999.00	-0.10	0.46
40	a	'30-Sep-2003 14:00:00'	72	4.06	9.23	4.73	0.48	49.87	121.95	-9999.00	-9999.00	-0.35	0.16
41	a	'04-Jul-2007 11:00:00'	72	4.06	14.22	5.82	0.86	51.61	206.42	-9999.00	-9999.00	NaN	-9999.00
42	a	'05-Jan-2007 05:00:00'	72	4.05	10.30	6.34	0.61	54.86	160.03	-9999.00	-9999.00	-0.18	0.47
43	a	'12-Jul-2002 05:00:00'	72	4.04	14.57	4.97	0.87	50.73	209.11	-9999.00	-9999.00	0.07	0.71
44	a	'04-Sep-1999 11:00:00'	72	4.04	12.50	5.76	0.80	53.46	195.30	-9999.00	-9999.00	-0.11	0.31
45	a	'10-Sep-2004 05:00:00'	72	4.02	14.40	5.15	0.87	51.54	206.38	-9999.00	-9999.00	-0.37	0.09
46	a	'02-May-2007 14:00:00'	72	4.01	13.28	4.61	0.77	49.20	204.70	-9999.00	-9999.00	NaN	-9999.00
47	a	'27-Jun-2006 17:00:00'	72	4.00	15.20	4.80	0.86	48.94	208.59	-9999.00	-9999.00	-0.01	0.55
48	a	'15-Sep-2002 17:00:00'	72	3.98	12.83	5.41	0.73	51.13	202.53	-9999.00	-9999.00	-0.16	0.34
49	a	'13-Apr-2003 11:00:00'	72	3.97	12.27	5.76	0.73	52.52	198.74	-9999.00	-9999.00	0.06	0.56
50	a	'02-Aug-2004 23:00:00'	72	3.95	14.14	5.65	0.85	50.71	207.94	-9999.00	-9999.00	-0.16	0.56
51	a	'13-Oct-2006 23:00:00'	72	3.93	14.82	5.38	0.88	49.46	206.62	-9999.00	-9999.00	-0.25	0.23
52	a	'07-Sep-2002 20:00:00'	72	3.93	14.54	4.66	0.82	47.32	202.39	-9999.00	-9999.00	-0.27	0.34
53	a	'24-May-2009 02:00:00'	72	3.92	12.13	5.97	0.75	50.88	203.36	-9999.00	-9999.00	0.20	0.96
54	a	'28-Jul-2003 11:00:00'	72	3.91	14.76	5.11	0.85	48.89	207.33	-9999.00	-9999.00	-0.17	0.44
55	a	'26-Jun-2000 17:00:00'	72	3.89	15.05	4.72	0.83	46.90	208.39	-9999.00	-9999.00	0.05	0.33
56	a	'13-Jan-2005 05:00:00'	72	3.89	14.25	5.24	0.79	46.78	205.94	-9999.00	-9999.00	-0.25	0.35
57	a	'14-May-2007 20:00:00'	72	3.89	11.76	4.93	0.62	46.88	184.34	-9999.00	-9999.00	NaN	-9999.00
58	a	'19-Jul-2000 20:00:00'	72	3.88	13.74	4.46	0.73	45.64	205.25	-9999.00	-9999.00	0.15	0.72
59	a	'11-Jun-2008 14:00:00'	72	3.87	13.82	4.67	0.75	45.93	206.42	-9999.00	-9999.00	0.07	0.33
60	a	'25-Apr-2008 23:00:00'	72	3.87	13.83	4.21	0.74	45.51	197.36	-9999.00	-9999.00	-0.11	0.48
61	a	'15-Sep-1999 17:00:00'	72	3.87	12.64	4.75	0.68	47.52	206.79	-9999.00	-9999.00	-0.04	0.45
62	a	'02-Jun-2003 05:00:00'	72	3.86	12.69	4.89	0.67	45.73	199.37	-9999.00	-9999.00	0.11	0.67
63	a	'07-Oct-2002 17:00:00'	72	3.86	11.21	4.84	0.59	46.72	202.35	-9999.00	-9999.00	-0.18	0.33
64	a	'14-Aug-2003 05:00:00'	72	3.86	15.09	5.16	0.86	47.95	202.42	-9999.00	-9999.00	-0.25	0.21
65	a	'11-Jul-2006 08:00:00'	72	3.85	11.55	5.09	0.62	46.98	178.08	-9999.00	-9999.00	-0.14	0.71
66	a	'01-Sep-2000 20:00:00'	72	3.85	12.91	4.94	0.71	46.27	205.90	-9999.00	-9999.00	0.01	0.44
67	a	'01-Aug-2007 08:00:00'	72	3.84	14.78	4.70	0.79	45.51	209.67	-9999.00	-9999.00	NaN	-9999.00
68	a	'30-Aug-2008 08:00:00'	72	3.82	15.52	4.95	0.83	45.42	207.16	-9999.00	-9999.00	-0.03	0.51
69	a	'08-Sep-2001 20:00:00'	72	3.79	14.07	5.09	0.75	44.63	207.80	-9999.00	-9999.00	-0.07	0.29
70	a	'07-Jul-2000 23:00:00'	72	3.78	12.40	5.61	0.70	47.94	205.78	-9999.00	-9999.00	0.12	0.49
71	a	'21-Sep-2009 08:00:00'	72	3.78	13.09	5.23	0.68	45.47	205.37	-9999.00	-9999.00	-0.06	0.43
72	a	'20-Jun-2000 23:00:00'	72	3.78	12.46	5.39	0.64	44.76	207.47	-9999.00	-9999.00	0.22	0.84
73	a	'16-Apr-2009 05:00:00'	72	3.77	14.59	5.01	0.78	45.05	197.76	-9999.00	-9999.00	-0.06	0.31
74	a	'03-Aug-2002 23:00:00'	72	3.76	15.64	4.30	0.77	42.69	207.10	-9999.00	-9999.00	-0.06	0.39
75	a	'21-Mar-2009 20:00:00'	72	3.75	14.56	4.88	0.77	44.31	202.87	-9999.00	-9999.00	-0.04	0.33
76	a	'12-Apr-2006 20:00:00'	72	3.75	14.25	4.66	0.74	43.48	202.66	-9999.00	-9999.00	-0.01	0.38
77	a	'26-Aug-2009 23:00:00'	72	3.75	13.62	4.13	0.68	42.25	197.06	-9999.00	-9999.00	-0.18	0.13
78	a	'26-Jun-2002 05:00:00'	72	3.73	14.81	4.56	0.73	42.12	207.98	-9999.00	-9999.00	-0.13	0.46
79	a	'26-Jul-2009 20:00:00'	72	3.72	13.86	4.04	0.69	41.96	201.83	-9999.00	-9999.00	-0.21	0.19
80	a	'24-Mar-2001 08:00:00'	72	3.72	11.85	4.98	0.59	43.72	200.22	-9999.00	-9999.00	-0.19	0.26
81	a	'20-Jul-2008 14:00:00'	72	3.71	11.86	5.32	0.56	44.41	197.04	-9999.00	-9999.00	-0.09	0.67
82	a	'28-May-2007 14:00:00'	72	3.71	13.27	4.12	0.66	42.47	203.92	-9999.00	-9999.00	0.02	0.40
83	a	'26-Apr-2001 11:00:00'	72	3.70	12.90	4.77	0.65	42.96	203.36	-9999.00	-9999.00	-0.01	0.54
84	a	'02-Sep-2007 05:00:00'	72	3.69	15.92	4.92							

Location	Bremer/Hopetoun
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'22-May-2009 04:30:00'	72	3.15	14.25	5.97	0.55	33.59	210.41	-9999.00	-9999.00	0.35	0.96
2	c	'27-Apr-2000 22:30:00'	72	2.73	13.69	4.97	0.42	25.58	211.31	-9999.00	-9999.00	0.35	0.60
3	c	'28-Jun-2009 22:30:00'	72	3.41	14.59	4.52	0.59	34.84	210.58	-9999.00	-9999.00	0.33	0.56
4	c	'27-Jun-2003 04:30:00'	72	1.89	13.14	2.61	0.16	10.70	206.21	-9999.00	-9999.00	0.31	0.76
5	c	'20-May-1999 13:30:00'	72	2.36	13.64	4.89	0.28	18.75	206.81	-9999.00	-9999.00	0.28	0.72
6	c	'17-May-1999 07:30:00'	72	1.98	12.73	2.80	0.17	11.50	183.17	-9999.00	-9999.00	0.27	0.82
7	c	'20-Jun-2000 07:30:00'	72	3.50	12.70	5.39	0.56	38.75	208.08	-9999.00	-9999.00	0.26	0.84
8	c	'20-Jun-2009 01:30:00'	72	3.76	13.61	6.18	0.70	43.71	209.88	-9999.00	-9999.00	0.23	0.88
9	c	'17-May-2003 07:30:00'	72	3.00	11.08	4.95	0.33	30.27	209.56	-9999.00	-9999.00	0.22	0.84
10	c	'10-May-2004 16:30:00'	72	1.97	16.87	3.01	0.22	12.02	210.24	-9999.00	-9999.00	0.21	0.61
11	c	'08-May-2002 01:30:00'	72	1.73	14.56	2.19	0.15	8.95	212.62	-9999.00	-9999.00	0.21	0.44
12	c	'09-Apr-2008 10:30:00'	72	2.61	13.50	4.73	0.31	19.95	207.00	-9999.00	-9999.00	0.20	0.72
13	c	'29-Jun-2008 01:30:00'	72	3.82	14.45	5.99	0.83	48.25	208.46	-9999.00	-9999.00	0.20	0.62
14	c	'18-Jul-2000 16:30:00'	72	3.45	14.19	4.46	0.59	35.42	210.04	-9999.00	-9999.00	0.19	0.73
15	c	'15-Jul-2000 04:30:00'	72	2.51	14.11	3.01	0.30	18.45	212.73	-9999.00	-9999.00	0.19	0.68
16	c	'04-Jul-2000 10:30:00'	72	2.46	12.39	4.11	0.27	19.00	208.46	-9999.00	-9999.00	0.18	0.71
17	c	'11-May-2000 19:30:00'	72	3.56	12.23	5.66	0.61	43.76	201.98	-9999.00	-9999.00	0.18	0.50
18	c	'14-May-1999 04:30:00'	72	2.21	13.35	3.73	0.28	16.64	192.27	-9999.00	-9999.00	0.18	0.67
19	c	'11-May-2002 01:30:00'	72	2.13	14.46	2.96	0.23	13.89	211.46	-9999.00	-9999.00	0.18	0.65
20	c	'29-May-1999 04:30:00'	72	2.86	10.69	4.20	0.30	26.52	191.69	-9999.00	-9999.00	0.18	0.65
21	c	'23-May-2008 16:30:00'	72	2.26	14.20	3.47	0.26	15.77	208.82	-9999.00	-9999.00	0.18	0.73
22	c	'09-Jun-2005 07:30:00'	72	2.34	12.09	4.29	0.23	18.25	205.32	-9999.00	-9999.00	0.17	0.68
23	c	'14-Jun-2002 07:30:00'	72	3.00	11.16	3.98	0.33	27.82	207.63	-9999.00	-9999.00	0.17	0.84
24	c	'11-Jun-1999 01:30:00'	72	3.11	14.01	4.26	0.47	29.09	209.38	-9999.00	-9999.00	0.16	0.60
25	c	'16-Jun-2008 04:30:00'	72	3.24	14.95	4.64	0.56	33.40	206.68	-9999.00	-9999.00	0.16	0.72
26	c	'11-Jul-2000 01:30:00'	72	2.57	14.45	4.21	0.34	20.51	211.09	-9999.00	-9999.00	0.16	0.52
27	c	'01-Jun-2000 04:30:00'	72	1.76	14.14	2.19	0.15	9.08	207.82	-9999.00	-9999.00	0.16	0.74
28	c	'03-Jun-1999 09:00:00'	72	3.08	13.16	4.20	0.43	28.99	211.27	-9999.00	-9999.00	0.15	0.65
29	c	'25-Jun-2008 22:30:00'	72	3.00	14.43	4.61	0.50	29.80	208.44	-9999.00	-9999.00	0.15	0.49
30	c	'04-Jul-2005 04:30:00'	72	3.25	13.51	4.91	0.53	33.28	210.29	-9999.00	-9999.00	0.15	0.68
31	c	'07-Jun-2004 16:30:00'	72	2.46	13.53	3.65	0.31	18.83	209.92	-9999.00	-9999.00	0.15	0.62
32	c	'22-Jul-2000 19:30:00'	72	4.63	14.37	6.59	1.18	67.32	204.44	-9999.00	-9999.00	0.15	0.46
33	c	'03-May-1999 07:30:00'	72	2.67	14.04	3.57	0.37	21.83	208.51	-9999.00	-9999.00	0.15	0.67
34	c	'05-Jun-2002 22:30:00'	72	3.86	12.95	7.18	0.87	55.08	210.60	-9999.00	-9999.00	0.15	0.42
35	c	'10-Jun-2008 19:30:00'	72	3.54	13.76	4.67	0.60	37.80	207.44	-9999.00	-9999.00	0.15	0.44
36	c	'17-Jul-2008 13:30:00'	72	2.47	14.71	3.29	0.31	17.72	211.56	-9999.00	-9999.00	0.15	0.72
37	c	'25-Jun-2009 19:30:00'	72	1.75	14.33	2.46	0.15	8.84	209.05	-9999.00	-9999.00	0.14	0.70
38	c	'30-Jul-2008 04:30:00'	72	2.70	13.91	3.10	0.35	21.43	209.62	-9999.00	-9999.00	0.14	0.73
39	c	'15-Aug-2009 01:30:00'	72	3.20	14.57	4.79	0.52	31.11	212.07	-9999.00	-9999.00	0.14	0.53
40	c	'24-May-2000 19:30:00'	72	3.17	13.29	5.41	0.51	31.48	196.44	-9999.00	-9999.00	0.14	0.55
41	c	'29-Apr-2008 22:30:00'	72	2.55	14.67	4.38	0.37	21.34	208.24	-9999.00	-9999.00	0.13	0.36
42	c	'13-Sep-2008 13:30:00'	72	5.05	14.65	6.87	1.29	75.17	205.99	-9999.00	-9999.00	0.13	0.60
43	c	'02-Jun-2003 19:30:00'	72	4.32	12.47	6.51	0.79	55.16	198.02	-9999.00	-9999.00	0.13	0.67
44	c	'04-Jun-2009 01:30:00'	72	3.08	12.82	4.61	0.41	30.30	210.86	-9999.00	-9999.00	0.13	0.65
45	c	'11-Jun-2009 18:00:00'	72	2.35	11.51	4.07	0.25	19.06	206.44	-9999.00	-9999.00	0.13	0.64
46	c	'12-Jun-2004 01:30:00'	72	2.47	12.88	3.17	0.27	18.13	210.16	-9999.00	-9999.00	0.13	0.40
47	c	'20-Jul-2009 04:30:00'	72	2.24	12.49	3.34	0.21	14.46	214.17	-9999.00	-9999.00	0.13	0.74
48	c	'09-Jul-2009 16:30:00'	72	1.99	12.17	3.32	0.16	12.43	203.51	-9999.00	-9999.00	0.12	0.67
49	c	'15-Jun-2000 04:30:00'	72	2.17	14.21	3.05	0.23	14.13	210.44	-9999.00	-9999.00	0.12	0.61
50	c	'12-May-2008 22:30:00'	72	1.96	13.03	2.96	0.17	11.54	212.23	-9999.00	-9999.00	0.12	0.35
51	c	'24-Apr-2000 22:30:00'	72	1.58	13.43	1.80	0.11	7.22	210.81	-9999.00	-9999.00	0.12	0.52
52	c	'07-Jul-2000 22:30:00'	72	3.83	12.36	5.61	0.69	46.93	205.66	-9999.00	-9999.00	0.12	0.49
53	c	'06-Apr-2008 07:30:00'	72	1.86	12.82	2.21	0.16	10.22	205.15	-9999.00	-9999.00	0.12	0.66
54	c	'07-Sep-2005 19:30:00'	72	3.31	14.15	4.91	0.52	31.54	211.69	-9999.00	-9999.00	0.12	0.46
55	c	'03-Jul-2001 01:30:00'	72	3.46	14.78	5.32	0.66	37.54	210.58	-9999.00	-9999.00	0.11	0.56
56	c	'13-Apr-2000 22:30:00'	72	2.56	13.79	3.07	0.31	19.37	205.73	-9999.00	-9999.00	0.11	0.42
57	c	'17-Aug-1999 22:30:00'	72	2.29	14.02	2.92	0.25	15.71	212.14	-9999.00	-9999.00	0.11	0.33
58	c	'14-Mar-2008 16:30:00'	72	2.81	13.15	3.96	0.38	24.27	207.39	-9999.00	-9999.00	0.11	0.48
59	c	'29-Jul-2001 22:30:00'	72	1.79	12.15	2.88	0.12	9.88	212.87	-9999.00	-9999.00	0.11	0.48
60	c	'08-Apr-1999 10:30:00'	72	1.96	13.23	2.28	0.17	11.15	203.67	-9999.00	-9999.00	0.10	0.42
61	c	'27-May-2007 01:30:00'	72	3.28	13.63	3.99	0.51	31.47	205.84	-9999.00	-9999.00	0.10	0.40
62	c	'07-May-2004 10:30:00'	72	1.28	13.75	1.71	0.07	4.66	205.97	-9999.00	-9999.00	0.10	0.64
63	c	'16-Aug-2000 16:30:00'	72	1.73	11.83	2.17	0.12	8.75	205.65	-9999.00	-9999.00	0.10	0.65
64	c	'25-Jul-2002 16:30:00'	72	3.17	13.78	4.83	0.52	30.95	210.33	-9999.00	-9999.00	0.10	0.61
65	c	'03-Feb-2000 01:30:00'	72	2.72	13.49	3.33	0.36	22.11	208.04	-9999.00	-9999.00	0.10	0.58
66	c	'24-Jun-2000 22:30:00'	72	3.68	15.75	4.72	0.75	40.42	210.32	-9999.00	-9999.00	0.10	0.37
67	c	'28-May-2008 22:30:00'	72	2.26	13.67	2.85	0.24	15.29	203.43	-9999.00	-9999.00	0.10	0.36
68	c	'12-Apr-2003 13:30:00'	72	3.82	13.36	5.76	0.70	49.10	202.69	-9999.00	-9999.00	0.10	0.56
69	c	'30-Jun-2003 04:30:00'	72	2.57	10.96	2.98	0.24	19.39	167.11	-9999.00	-9999.00	0.10	0.71
70	c	'07-Oct-1999 16:30:00'	72	2.40	11.91	4.74	0.28	21.56	210.23	-9999.00	-9999.00	0.09	0.51
71	c	'11-May-1999 01:30:00'	72	2.69	14.05	3.15	0.36	21.42	201.34	-9999.00	-9999.00	0.09	0.35
72	c	'06-May-1999 07:30:00'	72	2.86	14.41	3.48	0.40	23.66	209.09	-9999.00	-9999.00	0.09	0.53
73	c	'24-Jun-2003 04:30:00'	72	1.19	14.49	1.43	0.07	4.10	209.51	-9999.00	-9999.00	0.09	0.52
74	c	'07-Jun-1999 22:30:00'	72	2.74	13.51	3.90	0.38	23.41	206.93	-9999.00	-9999.00	0.09	0.31
75	c	'02-Sep-2002 01:30:00'	72	3.39	14.39	4.87	0.63	36.11	210.88	-9999.00	-9999.00	0.09	0.45
76	c	'11-Jul-2002 13:30:00'	72	3.88	14.73	4.97	0.78	45.24	209.57	-9999.00	-9999.00	0.09	0.71
77	c	'24-Mar-1999 13:30:00'	72	2.67	13.12	4.96	0.40	24.94	207.61	-9999.00	-9999.00	0.09	0.37
78	c	'02-Jun-2008 04:30:00'	72	2.14	15.23	2.54	0.24	13.60	209.66	-9999.00	-9999.00	0.09	0.61
79	c	'06-Jun-2005 07:30:00'	72	2.33	13.29	3.35	0.27	16.61	203.95	-9999.00	-9999.00	0.08	0.68
80	c	'01-Mar-2007 22:30:00'	72	1.88	11.46	2.55	0.13	10.17	215.00	-9999.00	-9999.00	0.08	0.62
81	c	'07-May-2001 04:30:00'	72	1.86	12.56	3.12	0.17	11.12	207.98	-9999.00	-9999.00	0.08	0.50
82	c	'18-Apr-2008 01:30:00'	72	2.08	12.18	3.64	0.18	13.73	208.29	-9999.00	-9999.00	0.08	0.37
83	c	'27-Jul-1999 01:30:00'	72	1.84	14.59	2.45	0.18	10.34	214.33	-9999.00	-9999.00	0.08	0.61
84	c	'11-Sep-2009 01:30:00'	72	3.16	15.53	4.14	0.56	30.60</					

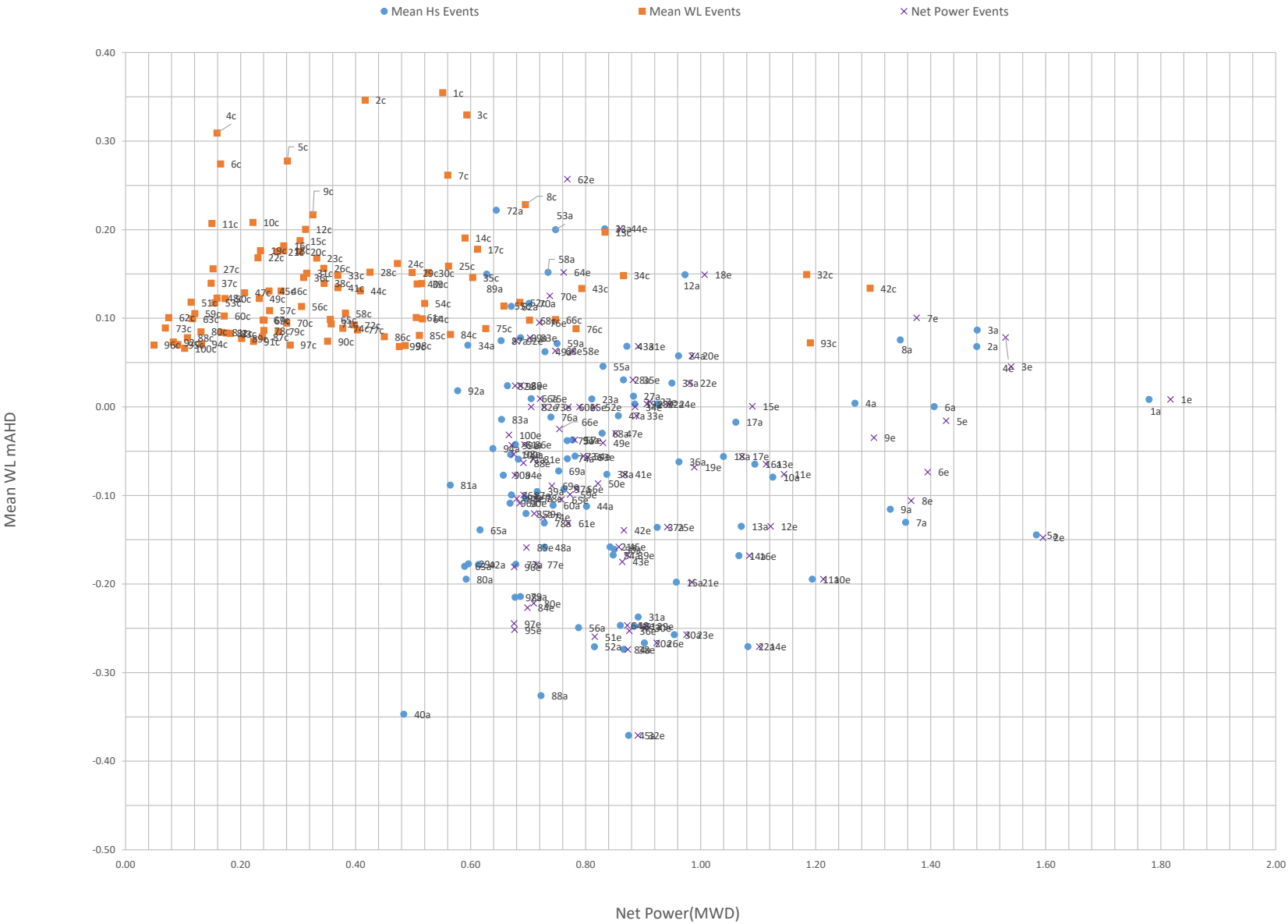
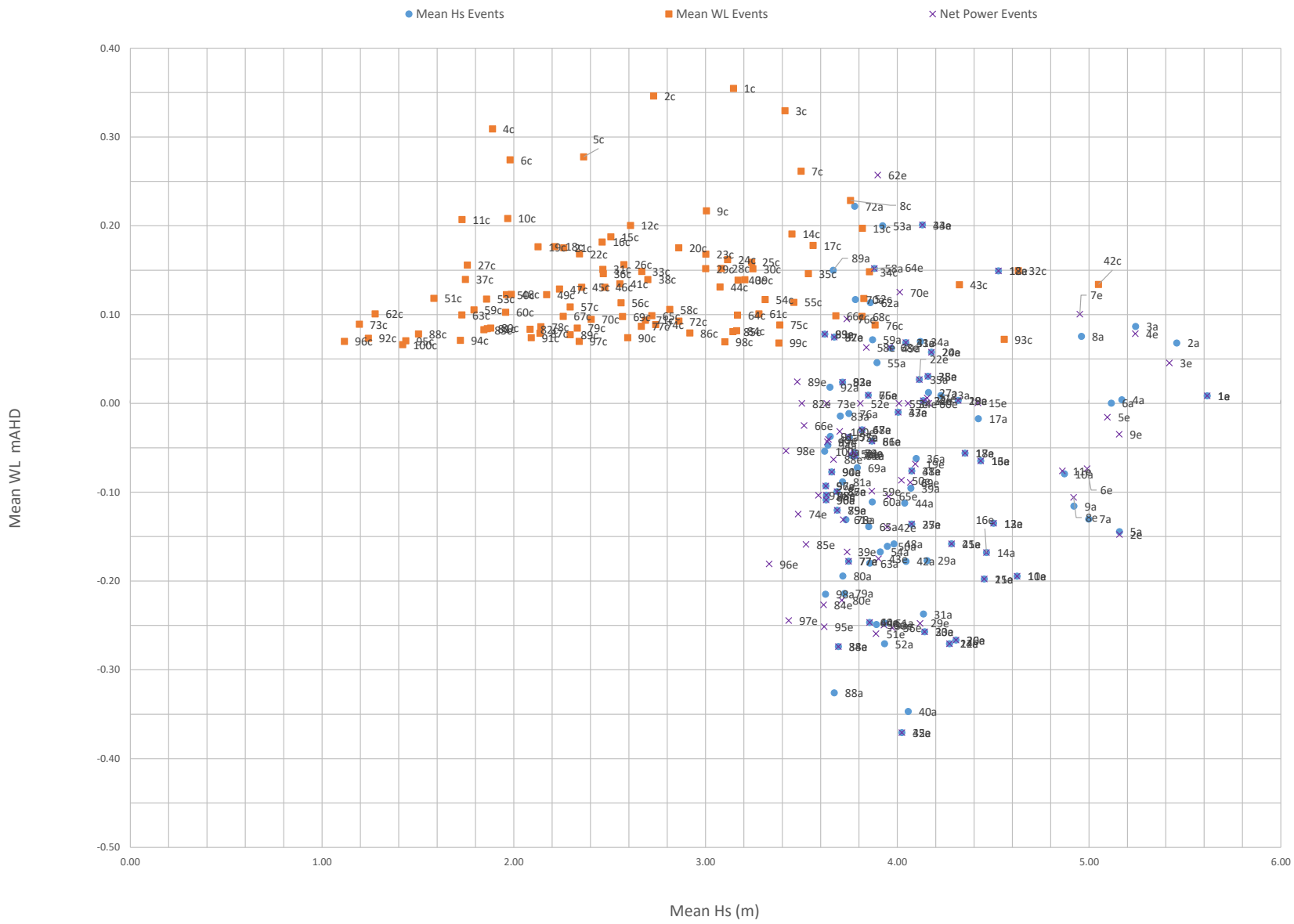
Location	Bremer/Hopetoun
Method	72 Hour Net Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'23-Aug-2009 20:00:00'	72	5.62	15.15	6.95	1.82	99.05	200.60	-9999.00	-9999.00	0.01	0.39
2	e	'30-Aug-2005 23:00:00'	72	5.16	13.83	8.18	1.60	93.02	203.30	-9999.00	-9999.00	-0.15	0.46
3	e	'05-Jun-2003 14:00:00'	72	5.42	14.05	6.92	1.54	89.98	200.69	-9999.00	-9999.00	0.05	0.59
4	e	'14-Sep-2008 02:00:00'	72	5.24	14.72	6.87	1.53	85.67	205.96	-9999.00	-9999.00	0.08	0.60
5	e	'07-Jun-2002 14:00:00'	72	5.10	13.67	7.18	1.43	84.63	201.79	-9999.00	-9999.00	-0.02	0.42
6	e	'04-Sep-2002 05:00:00'	72	4.99	14.85	6.32	1.39	76.53	201.49	-9999.00	-9999.00	-0.07	0.41
7	e	'23-Jul-2000 23:00:00'	72	4.95	14.35	6.59	1.38	78.19	204.39	-9999.00	-9999.00	0.10	0.46
8	e	'02-Sep-2009 14:00:00'	72	4.92	14.63	6.81	1.37	76.71	199.87	-9999.00	-9999.00	-0.11	0.43
9	e	'13-Jun-2005 02:00:00'	72	5.16	12.83	6.37	1.30	83.05	200.07	-9999.00	-9999.00	-0.03	0.52
10	e	'19-Apr-2006 20:00:00'	72	4.63	14.67	5.77	1.21	67.69	195.66	-9999.00	-9999.00	-0.19	0.40
11	e	'28-Oct-2007 20:00:00'	72	4.86	12.45	6.64	1.14	75.27	200.43	-9999.00	-9999.00	-0.08	0.67
12	e	'06-Aug-2003 02:00:00'	72	4.50	14.92	5.81	1.12	61.06	201.97	-9999.00	-9999.00	-0.13	0.14
13	e	'30-Jun-2004 20:00:00'	72	4.43	14.75	5.93	1.11	62.09	204.89	-9999.00	-9999.00	-0.06	0.51
14	e	'25-Sep-2009 14:00:00'	72	4.27	14.86	6.27	1.10	59.27	201.79	-9999.00	-9999.00	-0.27	0.20
15	e	'22-Sep-2006 20:00:00'	72	4.42	14.58	5.89	1.09	62.36	206.96	-9999.00	-9999.00	0.00	0.45
16	e	'23-Jul-2003 08:00:00'	72	4.46	13.02	6.75	1.08	67.00	202.74	-9999.00	-9999.00	-0.17	0.39
17	e	'21-Sep-2008 05:00:00'	72	4.35	15.18	5.19	1.07	57.89	207.66	-9999.00	-9999.00	-0.06	0.41
18	e	'21-Jun-2009 08:00:00'	72	4.53	12.98	6.18	1.01	64.02	202.87	-9999.00	-9999.00	0.15	0.88
19	e	'01-Oct-2005 17:00:00'	72	4.09	15.48	5.12	0.99	52.13	206.52	-9999.00	-9999.00	-0.07	0.35
20	e	'30-Jun-2008 11:00:00'	72	4.18	14.29	5.99	0.98	56.66	205.89	-9999.00	-9999.00	0.06	0.62
21	e	'12-Jun-2003 17:00:00'	72	4.45	13.35	5.44	0.98	61.00	199.80	-9999.00	-9999.00	-0.20	0.36
22	e	'12-Sep-2009 11:00:00'	72	4.11	15.69	5.33	0.98	51.99	210.74	-9999.00	-9999.00	0.03	0.53
23	e	'10-Oct-2005 02:00:00'	72	4.14	14.68	5.87	0.98	54.75	203.95	-9999.00	-9999.00	-0.26	0.23
24	e	'26-Jul-2002 23:00:00'	72	4.14	14.69	5.57	0.94	53.27	208.18	-9999.00	-9999.00	0.00	0.60
25	e	'15-Jul-2002 17:00:00'	72	4.07	14.36	5.22	0.94	53.47	204.01	-9999.00	-9999.00	-0.14	0.33
26	e	'30-Aug-2003 14:00:00'	72	4.31	12.98	5.51	0.92	58.49	198.97	-9999.00	-9999.00	-0.27	0.30
27	e	'26-Mar-1999 20:00:00'	72	4.16	13.90	4.96	0.91	52.89	202.43	-9999.00	-9999.00	0.01	0.38
28	e	'05-Jul-2005 20:00:00'	72	4.32	13.17	4.92	0.91	57.56	200.35	-9999.00	-9999.00	0.00	0.68
29	e	'17-Aug-2001 11:00:00'	72	4.12	13.71	5.73	0.91	54.47	204.28	-9999.00	-9999.00	-0.25	0.39
30	e	'14-Oct-2006 02:00:00'	72	3.93	14.83	5.38	0.90	49.44	206.52	-9999.00	-9999.00	-0.25	0.23
31	e	'12-Jul-2002 05:00:00'	72	4.04	14.57	4.97	0.89	50.73	209.11	-9999.00	-9999.00	0.07	0.71
32	e	'10-Sep-2004 05:00:00'	72	4.02	14.40	5.15	0.89	51.54	206.38	-9999.00	-9999.00	-0.37	0.09
33	e	'27-Jun-2006 17:00:00'	72	4.00	15.20	4.80	0.89	48.94	208.59	-9999.00	-9999.00	-0.01	0.55
34	e	'04-Jul-2007 11:00:00'	72	4.06	14.22	5.82	0.89	51.61	206.42	-9999.00	-9999.00	NaN	-9999.00
35	e	'26-May-2000 14:00:00'	72	4.16	13.27	5.41	0.88	54.74	191.64	-9999.00	-9999.00	0.03	0.42
36	e	'07-Sep-2002 08:00:00'	72	3.97	14.50	4.68	0.88	48.35	202.67	-9999.00	-9999.00	-0.25	0.34
37	e	'18-Jul-1999 05:00:00'	72	4.18	13.24	5.34	0.87	54.96	208.20	-9999.00	-9999.00	NaN	-9999.00
38	e	'02-Sep-2007 05:00:00'	72	3.69	15.92	4.92	0.87	45.25	208.82	-9999.00	-9999.00	-0.27	0.16
39	e	'11-Sep-2001 02:00:00'	72	3.74	16.06	5.09	0.87	44.09	210.53	-9999.00	-9999.00	-0.17	0.29
40	e	'14-Aug-2003 05:00:00'	72	3.86	15.09	5.16	0.87	47.95	202.42	-9999.00	-9999.00	-0.25	0.21
41	e	'24-Sep-2003 11:00:00'	72	4.08	14.04	4.97	0.87	50.64	206.82	-9999.00	-9999.00	-0.08	0.49
42	e	'02-Aug-2004 20:00:00'	72	3.95	14.25	5.65	0.87	50.77	207.97	-9999.00	-9999.00	-0.14	0.56
43	e	'28-Jul-2003 14:00:00'	72	3.90	14.81	5.11	0.86	48.72	207.43	-9999.00	-9999.00	-0.17	0.44
44	e	'30-Jun-2009 11:00:00'	72	4.13	13.69	5.04	0.86	52.22	207.47	-9999.00	-9999.00	0.20	0.56
45	e	'22-Aug-2000 02:00:00'	72	4.28	11.93	6.23	0.86	59.26	188.87	-9999.00	-9999.00	-0.16	0.23
46	e	'26-Jun-2000 17:00:00'	72	3.89	15.05	4.72	0.86	46.90	208.39	-9999.00	-9999.00	0.05	0.33
47	e	'30-Aug-2008 08:00:00'	72	3.82	15.52	4.95	0.85	45.42	207.16	-9999.00	-9999.00	-0.03	0.51
48	e	'13-May-2000 08:00:00'	72	4.23	12.87	5.66	0.84	56.16	198.35	-9999.00	-9999.00	0.01	0.47
49	e	'17-Sep-2007 14:00:00'	72	3.64	16.10	5.05	0.83	41.38	211.66	-9999.00	-9999.00	-0.04	0.31
50	e	'04-Sep-1999 05:00:00'	72	4.02	12.90	5.76	0.82	53.39	197.37	-9999.00	-9999.00	-0.09	0.31
51	e	'13-Jan-2005 08:00:00'	72	3.89	14.27	5.24	0.82	46.81	206.07	-9999.00	-9999.00	-0.26	0.35
52	e	'01-Aug-2007 02:00:00'	72	3.81	15.18	4.70	0.82	45.11	210.51	-9999.00	-9999.00	NaN	-9999.00
53	e	'04-Aug-2002 02:00:00'	72	3.75	15.67	4.30	0.80	42.56	207.02	-9999.00	-9999.00	-0.06	0.39
54	e	'16-Apr-2009 05:00:00'	72	3.77	14.59	5.01	0.80	45.05	197.76	-9999.00	-9999.00	-0.06	0.31
55	e	'02-May-2007 14:00:00'	72	4.01	13.28	4.61	0.79	49.20	204.70	-9999.00	-9999.00	NaN	-9999.00
56	e	'29-Jul-2006 05:00:00'	72	3.63	15.32	4.81	0.78	41.45	209.91	-9999.00	-9999.00	-0.09	0.42
57	e	'21-Mar-2009 23:00:00'	72	3.75	14.48	4.88	0.78	44.20	202.62	-9999.00	-9999.00	-0.04	0.33
58	e	'11-Jun-2008 20:00:00'	72	3.84	14.16	4.67	0.78	45.25	205.39	-9999.00	-9999.00	0.06	0.33
59	e	'25-Apr-2008 20:00:00'	72	3.87	13.97	4.21	0.77	45.66	198.22	-9999.00	-9999.00	-0.10	0.48
60	e	'28-Mar-2007 11:00:00'	72	4.16	12.11	4.89	0.77	53.25	195.62	-9999.00	-9999.00	NaN	-9999.00
61	e	'26-Jun-2002 08:00:00'	72	3.72	14.85	4.56	0.77	41.90	208.02	-9999.00	-9999.00	-0.13	0.46
62	e	'23-May-2009 14:00:00'	72	3.90	12.68	5.97	0.77	50.37	205.49	-9999.00	-9999.00	0.26	0.96
63	e	'12-Apr-2006 23:00:00'	72	3.73	14.20	4.66	0.77	42.93	202.83	-9999.00	-9999.00	-0.02	0.38
64	e	'19-Jul-2000 20:00:00'	72	3.88	13.74	4.46	0.76	45.64	205.25	-9999.00	-9999.00	0.15	0.72
65	e	'15-Sep-2002 08:00:00'	72	3.95	13.28	5.41	0.76	50.38	204.32	-9999.00	-9999.00	-0.10	0.34
66	e	'29-Sep-1998 20:00:00'	72	3.51	15.86	4.75	0.75	39.20	211.65	-9999.00	-9999.00	-0.02	0.27
67	e	'19-May-2006 02:00:00'	72	3.53	15.99	4.53	0.75	39.18	205.01	-9999.00	-9999.00	-0.18	0.36
68	e	'13-Apr-2003 08:00:00'	72	3.96	12.57	5.76	0.75	52.52	199.10	-9999.00	-9999.00	0.06	0.56
69	e	'09-Sep-2005 14:00:00'	72	4.07	12.52	5.12	0.74	51.64	204.26	-9999.00	-9999.00	-0.09	0.46
70	e	'02-Jun-2003 11:00:00'	72	4.01	12.57	5.32	0.74	49.64	198.77	-9999.00	-9999.00	0.13	0.67
71	e	'13-Oct-2005 23:00:00'	72	3.66	13.67	5.39	0.74	43.26	203.62	-9999.00	-9999.00	-0.32	0.09
72	e	'03-Jul-2001 11:00:00'	72	3.52	14.78	5.32	0.73	40.21	210.73	-9999.00	-9999.00	0.09	0.56
73	e	'06-May-2007 23:00:00'	72	3.63	14.74	4.65	0.73	40.73	207.52	-9999.00	-9999.00	NaN	-9999.00
74	e	'02-Jun-2004 20:00:00'	72	3.48	14.73	4.99	0.73	39.20	200.19	-9999.00	-9999.00	-0.12	0.51
75	e	'01-Sep-2000 20:00:00'	72	3.85	12.91	4.94	0.72	46.27	205.90	-9999.00	-9999.00	0.01	0.44
76	e	'08-Jul-2000 14:00:00'	72	3.74	13.10	5.61	0.72	47.67	205.89	-9999.00	-9999.00	0.10	0.49
77	e	'26-Aug-2009 23:00:00'	72	3.75	13.62	4.13	0.71	42.25	197.06	-9999.00	-9999.00	-0.18	0.13
78	e	'04-May-2006 05:00:00'	72	3.63	14.29	4.46	0.71	40.89	201.85	-9999.00	-9999.00	-0.10	0.26
79	e	'24-Sep-2002 11:00:00'	72	3.69	13.77	4.56	0.71	42.89	208.56	-9999.00	-9999.00	-0.12	0.22
80	e	'26-Jul-2009 23:00:00'	72	3.71	13.91	4.04	0.71	41.63	201.75	-9999.00	-9999.00	-0.22	0.19
81	e	'21-Sep-2009 08:00:00'	72	3.78	13.09	5.23	0.71	45.47	205.37	-9999.00	-9999.00	-0.06	0.43
82	e	'16-Jul-2007 20:00:00'	72	3.50	14.99	4.84	0.71	39.46	205.28	-9999.00	-9999.00	NaN	-9999.00
83	e	'15-Aug-2009 20:00:00'	72	3.62	14.21	4.88	0.70	41.79	210.33	-9999.00	-9999.00	0.08	0.53
84	e	'03-Sep-2001 02:00:00'	72	3.62	13.80	4.68	0.70						

Location	Bremer/Hopetoun
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'23-Aug-2009 20:00:00'	78.00	5.51	15.03	6.95	1.85	103.61	200.58	-9999.00	-9999.00	-0.01	0.39
2	f	'30-Aug-2005 17:00:00'	48.00	6.14	14.45	8.18	1.42	81.98	203.26	-9999.00	-9999.00	-0.10	0.46
3	f	'04-Sep-2002 18:30:00'	69.00	5.04	14.75	6.32	1.32	75.42	199.60	-9999.00	-9999.00	-0.15	0.41
4	f	'07-Jun-2002 08:00:00'	48.00	5.74	14.23	7.18	1.19	70.14	202.15	-9999.00	-9999.00	0.03	0.42
5	f	'13-Jun-2005 03:30:00'	63.00	5.31	13.05	6.37	1.19	76.72	199.92	-9999.00	-9999.00	-0.05	0.52
6	f	'23-Jul-2000 20:00:00'	54.00	5.35	14.82	6.59	1.19	67.27	204.98	-9999.00	-9999.00	0.11	0.37
7	f	'03-Sep-2009 00:30:00'	51.00	5.39	14.52	6.81	1.12	64.36	200.55	-9999.00	-9999.00	-0.12	0.43
8	f	'19-Apr-2006 20:00:00'	48.00	5.10	15.33	5.77	0.97	53.64	195.13	-9999.00	-9999.00	-0.21	0.26
9	f	'28-Oct-2007 08:00:00'	48.00	5.41	12.81	6.64	0.93	61.24	203.39	-9999.00	-9999.00	-0.03	0.67
10	f	'06-Jun-2003 06:30:00'	45.00	5.16	14.28	5.79	0.86	51.57	200.85	-9999.00	-9999.00	0.02	0.49
11	f	'22-Jul-2003 17:00:00'	36.00	5.61	13.80	6.75	0.82	50.10	205.42	-9999.00	-9999.00	-0.05	0.39
12	f	'04-Jun-2003 06:30:00'	39.00	5.54	13.19	6.92	0.82	52.53	198.39	-9999.00	-9999.00	0.11	0.62
13	f	'13-Sep-2008 00:30:00'	45.00	4.90	14.88	5.83	0.82	46.37	205.67	-9999.00	-9999.00	0.15	0.60
14	f	'24-Sep-2009 21:30:00'	33.00	5.24	17.80	6.27	0.79	39.58	212.33	-9999.00	-9999.00	-0.15	0.20
15	f	'07-Aug-2003 14:00:00'	48.00	4.49	15.76	4.75	0.75	40.70	199.04	-9999.00	-9999.00	-0.21	0.17
16	f	'15-Sep-2008 02:00:00'	30.00	5.75	14.35	6.87	0.74	43.85	204.92	-9999.00	-9999.00	-0.01	0.52
17	f	'15-Jul-2002 20:00:00'	42.00	4.77	15.11	5.22	0.72	40.35	203.36	-9999.00	-9999.00	-0.14	0.20
18	f	'21-Jun-2009 21:30:00'	39.00	5.16	12.82	6.18	0.67	44.39	199.14	-9999.00	-9999.00	0.17	0.88
19	f	'29-Aug-2003 21:30:00'	39.00	4.93	13.29	5.51	0.64	40.88	199.64	-9999.00	-9999.00	-0.21	0.30
20	f	'30-Jun-2004 05:00:00'	30.00	5.18	15.36	5.93	0.63	34.85	205.14	-9999.00	-9999.00	-0.08	0.45
21	f	'22-Sep-2006 05:00:00'	30.00	5.14	15.79	5.89	0.63	34.34	206.47	-9999.00	-9999.00	-0.01	0.32
22	f	'06-Jul-2005 00:30:00'	45.00	4.65	13.08	4.92	0.63	40.95	198.73	-9999.00	-9999.00	-0.01	0.61
23	f	'18-Jun-1999 08:00:00'	42.00	4.71	13.42	5.34	0.62	39.42	207.49	-9999.00	-9999.00	-9999.00	-9999.00
24	f	'29-Jun-2008 20:00:00'	30.00	5.23	14.78	5.99	0.62	35.79	206.19	-9999.00	-9999.00	0.21	0.62
25	f	'10-Oct-2005 09:30:00'	33.00	4.94	15.05	5.87	0.61	34.31	205.10	-9999.00	-9999.00	-0.26	0.23
26	f	'26-May-2000 12:30:00'	39.00	4.75	13.80	5.41	0.61	37.63	190.76	-9999.00	-9999.00	0.01	0.28
27	f	'01-Oct-2005 00:30:00'	33.00	4.71	16.86	5.12	0.60	30.99	206.61	-9999.00	-9999.00	-0.05	0.35
28	f	'20-Sep-2008 08:00:00'	30.00	4.82	16.94	5.19	0.59	29.93	209.22	-9999.00	-9999.00	-0.03	0.41
29	f	'10-Sep-2004 05:00:00'	36.00	4.72	14.44	5.15	0.58	34.26	205.66	-9999.00	-9999.00	-0.43	-0.07
30	f	'21-Aug-2000 09:30:00'	33.00	5.14	12.60	6.23	0.57	37.97	203.54	-9999.00	-9999.00	-0.09	0.23
31	f	'16-Aug-2001 14:00:00'	30.00	5.17	14.02	5.73	0.57	34.77	205.09	-9999.00	-9999.00	-0.23	0.36
32	f	'01-Sep-2007 23:00:00'	30.00	4.66	17.43	4.92	0.55	27.49	209.60	-9999.00	-9999.00	-0.22	0.16
33	f	'04-Sep-1999 08:00:00'	30.00	5.10	13.16	5.76	0.53	33.84	194.58	-9999.00	-9999.00	-0.14	0.24
34	f	'14-Oct-2006 06:30:00'	27.00	4.87	16.29	5.38	0.52	27.55	206.13	-9999.00	-9999.00	-0.32	0.06
35	f	'12-May-2000 12:30:00'	33.00	5.04	12.20	5.66	0.50	35.99	199.74	-9999.00	-9999.00	0.11	0.47
36	f	'28-Mar-2007 00:30:00'	39.00	4.49	12.69	4.89	0.50	33.15	200.54	-9999.00	-9999.00	-9999.00	-9999.00
37	f	'12-Apr-2003 21:30:00'	33.00	5.06	12.08	5.76	0.50	36.34	202.03	-9999.00	-9999.00	0.14	0.56
38	f	'09-Sep-2005 23:00:00'	42.00	4.58	11.57	5.12	0.49	37.19	200.92	-9999.00	-9999.00	-0.15	0.36
39	f	'23-May-2009 12:30:00'	27.00	5.07	13.20	5.97	0.47	29.71	205.84	-9999.00	-9999.00	0.33	0.96
40	f	'14-Aug-2003 03:30:00'	27.00	4.69	15.54	5.16	0.47	25.56	199.66	-9999.00	-9999.00	-0.28	0.15
41	f	'28-Jul-2003 12:30:00'	27.00	4.79	15.12	5.11	0.46	26.31	207.07	-9999.00	-9999.00	-0.21	0.35
42	f	'07-Jul-2000 21:30:00'	27.00	5.02	12.63	5.61	0.43	29.31	203.77	-9999.00	-9999.00	0.19	0.49
43	f	'05-Jan-2007 05:00:00'	30.00	5.25	10.03	6.34	0.41	36.20	149.36	-9999.00	-9999.00	-0.18	0.44
44	f	'15-Sep-1999 18:30:00'	33.00	4.60	11.96	4.75	0.41	29.50	206.44	-9999.00	-9999.00	-0.03	0.35
45	f	'15-Sep-2002 18:30:00'	27.00	5.05	12.06	5.41	0.40	29.26	201.64	-9999.00	-9999.00	-0.09	0.34
46	f	'07-Aug-1999 15:30:00'	27.00	4.82	12.11	5.38	0.38	27.00	197.84	-9999.00	-9999.00	-0.02	0.45
47	f	'07-Oct-2002 09:30:00'	27.00	4.41	11.55	4.84	0.29	22.23	205.04	-9999.00	-9999.00	-0.11	0.30
48	f	'19-May-2003 09:30:00'	27.00	4.32	10.96	4.41	0.26	21.12	199.59	-9999.00	-9999.00	-0.02	0.46
49	f	'05-Jun-2001 14:00:00'	30.00	4.49	9.26	4.80	0.25	25.58	167.37	-9999.00	-9999.00	-0.23	0.28

Location	Bremer/Hopetoun
Method	72 Hour Comparison
Title	Bremer/Hopetoun 72 Hour Comparison



Location	Esperance
Method	72 Hour Moving Average Wave

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	a	'12-May-1987 05:00:00'	72	6.25	12.53	7.88	1.84	125.66	190.80	-9999.00	-9999.00	0.14	0.71
2	a	'14-Jul-1987 20:00:00'	72	6.23	16.05	7.51	2.28	120.62	208.52	-9999.00	-9999.00	0.12	0.65
3	a	'23-Aug-2009 20:00:00'	72	5.97	15.28	7.40	2.04	112.34	206.12	-9999.00	-9999.00	0.19	0.53
4	a	'05-Jun-2003 11:00:00'	72	5.78	14.02	7.16	1.69	102.46	207.11	-9999.00	-9999.00	0.27	0.82
5	a	'14-Sep-2008 02:00:00'	72	5.68	14.96	7.50	1.77	100.71	212.50	-9999.00	-9999.00	0.28	0.85
6	a	'29-Jul-1994 02:00:00'	72	5.52	14.79	6.77	1.62	94.04	208.62	-9999.00	-9999.00	0.00	0.30
7	a	'12-Aug-1990 23:00:00'	72	5.46	15.34	6.83	1.65	92.05	215.04	-9999.00	-9999.00	0.08	0.62
8	a	'07-Jun-2002 11:00:00'	72	5.42	13.58	7.63	1.58	95.24	209.87	-9999.00	-9999.00	0.20	0.59
9	a	'30-Aug-2005 23:00:00'	72	5.41	13.92	8.73	1.77	103.15	210.68	-9999.00	-9999.00	0.01	0.67
10	a	'03-Sep-2002 23:00:00'	72	5.41	15.23	6.70	1.60	89.20	208.72	-9999.00	-9999.00	0.12	0.63
11	a	'05-Jun-1997 08:00:00'	72	5.38	16.22	6.64	1.73	91.33	214.43	-9999.00	-9999.00	0.29	0.89
12	a	'12-Jun-2005 23:00:00'	72	5.37	12.84	6.64	1.38	89.78	210.10	-9999.00	-9999.00	0.18	0.75
13	a	'24-Jul-2000 05:00:00'	72	5.32	14.36	7.13	1.58	90.55	210.46	-9999.00	-9999.00	0.23	0.62
14	a	'10-Sep-1989 02:00:00'	72	5.30	13.82	6.73	1.44	87.41	211.33	-9999.00	-9999.00	0.08	0.41
15	a	'12-Aug-1992 23:00:00'	72	5.28	15.80	7.19	1.62	88.29	213.36	-9999.00	-9999.00	0.02	0.63
16	a	'04-Jun-1992 23:00:00'	72	5.17	15.32	6.23	1.52	83.31	206.30	-9999.00	-9999.00	-0.01	0.68
17	a	'02-Sep-2009 17:00:00'	72	5.16	14.76	7.40	1.50	85.24	205.80	-9999.00	-9999.00	0.03	0.57
18	a	'15-Jun-1989 20:00:00'	72	5.15	10.65	5.72	0.94	79.91	165.23	-9999.00	-9999.00	0.08	0.63
19	a	'28-Oct-2007 17:00:00'	72	5.12	12.41	7.14	1.26	84.40	210.03	-9999.00	-9999.00	0.12	1.01
20	a	'27-Jun-1995 02:00:00'	72	5.04	12.51	7.26	1.19	82.20	215.31	-9999.00	-9999.00	0.21	0.72
21	a	'21-Aug-1991 23:00:00'	72	5.00	15.39	5.82	1.35	74.77	210.89	-9999.00	-9999.00	-0.03	0.39
22	a	'20-Nov-1992 11:00:00'	72	4.99	13.84	7.02	1.29	80.26	209.02	-9999.00	-9999.00	0.09	0.48
23	a	'25-Jun-1990 05:00:00'	72	4.99	14.93	7.05	1.43	78.44	207.43	-9999.00	-9999.00	-0.06	0.49
24	a	'02-Aug-1996 11:00:00'	72	4.94	13.84	6.25	1.24	76.35	214.25	-9999.00	-9999.00	0.32	0.93
25	a	'21-Jun-2009 08:00:00'	72	4.90	13.25	6.72	1.17	75.01	212.31	-9999.00	-9999.00	0.34	1.08
26	a	'22-Sep-2006 23:00:00'	72	4.89	14.85	6.53	1.34	76.67	213.39	-9999.00	-9999.00	0.16	0.60
27	a	'12-Sep-2009 11:00:00'	72	4.89	16.16	6.09	1.37	73.23	217.12	-9999.00	-9999.00	0.16	0.63
28	a	'31-Aug-1995 05:00:00'	72	4.87	15.11	5.60	1.30	72.82	208.90	-9999.00	-9999.00	-0.12	0.24
29	a	'25-Sep-2009 14:00:00'	72	4.84	16.06	7.27	1.49	77.72	210.14	-9999.00	-9999.00	-0.13	0.41
30	a	'30-Jun-2004 23:00:00'	72	4.84	14.97	6.49	1.33	74.30	210.87	-9999.00	-9999.00	0.07	0.66
31	a	'18-Jul-1999 05:00:00'	72	4.83	13.81	6.25	1.21	73.56	216.27	-9999.00	-9999.00	0.26	0.79
32	a	'05-Aug-1991 02:00:00'	72	4.81	14.93	6.88	1.28	72.58	216.80	-9999.00	-9999.00	0.14	0.51
33	a	'19-Jul-1996 08:00:00'	72	4.81	15.17	6.92	1.43	77.99	216.47	-9999.00	-9999.00	0.32	0.92
34	a	'19-Jun-1993 17:00:00'	72	4.80	15.48	5.73	1.29	71.06	210.39	-9999.00	-9999.00	0.04	0.72
35	a	'28-May-1997 08:00:00'	72	4.79	14.87	6.12	1.29	72.44	206.74	-9999.00	-9999.00	0.00	0.48
36	a	'19-Apr-2006 20:00:00'	72	4.79	14.68	5.97	1.28	72.75	200.65	-9999.00	-9999.00	-0.07	0.57
37	a	'06-Aug-2003 02:00:00'	72	4.78	14.89	6.34	1.21	69.33	208.39	-9999.00	-9999.00	0.00	0.38
38	a	'23-Jul-2003 08:00:00'	72	4.77	13.34	7.05	1.24	76.80	211.46	-9999.00	-9999.00	0.03	0.66
39	a	'21-Jun-1987 23:00:00'	72	4.77	16.07	5.82	1.32	70.40	213.55	-9999.00	-9999.00	0.13	0.53
40	a	'21-Sep-2008 05:00:00'	72	4.76	15.53	5.92	1.29	70.11	213.89	-9999.00	-9999.00	0.09	0.57
41	a	'22-Aug-2000 05:00:00'	72	4.76	12.10	6.96	1.08	72.98	195.32	-9999.00	-9999.00	-0.01	0.52
42	a	'09-Oct-1993 17:00:00'	72	4.74	13.85	6.43	1.24	74.34	210.65	-9999.00	-9999.00	-0.20	0.22
43	a	'30-Jun-1990 17:00:00'	72	4.72	13.44	6.20	1.13	70.56	201.02	-9999.00	-9999.00	0.04	0.46
44	a	'31-Jul-1995 08:00:00'	72	4.72	12.87	6.09	1.03	68.64	210.82	-9999.00	-9999.00	0.05	0.63
45	a	'27-Jul-1998 20:00:00'	72	4.71	11.38	6.36	0.93	70.78	202.05	-9999.00	-9999.00	0.00	0.57
46	a	'15-Jul-1988 14:00:00'	72	4.69	15.48	6.60	1.31	70.82	217.40	-9999.00	-9999.00	0.14	0.67
47	a	'11-Oct-1997 11:00:00'	72	4.68	15.51	7.02	1.37	74.32	217.01	-9999.00	-9999.00	0.01	0.47
48	a	'29-Aug-1989 08:00:00'	72	4.68	16.11	6.57	1.31	69.81	214.33	-9999.00	-9999.00	0.08	0.58
49	a	'17-Sep-1991 02:00:00'	72	4.66	13.02	6.64	1.04	70.11	212.83	-9999.00	-9999.00	-0.05	0.50
50	a	'31-Jul-1989 17:00:00'	72	4.65	16.12	6.07	1.27	67.24	210.96	-9999.00	-9999.00	-0.02	0.54
51	a	'25-May-1987 14:00:00'	72	4.64	14.51	5.69	1.13	65.97	206.69	-9999.00	-9999.00	-0.07	0.38
52	a	'14-Oct-1989 08:00:00'	72	4.64	15.36	5.49	1.20	66.37	214.26	-9999.00	-9999.00	0.03	0.56
53	a	'08-Mar-1991 14:00:00'	72	4.63	15.98	6.72	1.31	68.56	208.90	-9999.00	-9999.00	-0.07	0.33
54	a	'25-Jun-1991 11:00:00'	72	4.63	15.82	6.26	1.27	68.02	215.47	-9999.00	-9999.00	0.22	0.80
55	a	'12-Jun-2003 20:00:00'	72	4.63	13.49	5.69	1.05	65.88	206.75	-9999.00	-9999.00	-0.04	0.51
56	a	'05-Jul-2005 20:00:00'	72	4.62	13.72	5.52	1.06	65.79	209.68	-9999.00	-9999.00	0.13	0.78
57	a	'08-Jul-1989 23:00:00'	72	4.61	13.16	6.69	1.08	69.14	206.43	-9999.00	-9999.00	-0.04	0.42
58	a	'05-Jul-1990 08:00:00'	72	4.60	15.12	4.98	1.14	64.96	201.54	-9999.00	-9999.00	-0.15	0.34
59	a	'25-Sep-1990 20:00:00'	72	4.59	16.31	6.26	1.26	66.52	212.36	-9999.00	-9999.00	-0.08	0.36
60	a	'29-Jul-1993 02:00:00'	72	4.58	16.70	5.13	1.22	63.37	217.15	-9999.00	-9999.00	0.21	0.68
61	a	'09-Sep-2005 08:00:00'	72	4.58	12.99	5.82	0.94	64.91	211.72	-9999.00	-9999.00	0.14	0.75
62	a	'02-Jul-1992 08:00:00'	72	4.57	14.86	5.50	1.14	64.78	219.66	-9999.00	-9999.00	0.24	0.85
63	a	'30-Aug-2003 14:00:00'	72	4.55	13.11	5.98	1.03	66.26	205.92	-9999.00	-9999.00	-0.13	0.52
64	a	'30-Jun-2009 11:00:00'	72	4.55	14.01	5.59	1.04	63.59	215.86	-9999.00	-9999.00	0.38	0.73
65	a	'12-Jul-2002 08:00:00'	72	4.55	14.75	5.67	1.12	64.42	216.73	-9999.00	-9999.00	0.23	0.88
66	a	'30-Jun-2008 11:00:00'	72	4.53	14.62	6.67	1.16	67.14	212.80	-9999.00	-9999.00	0.20	0.81
67	a	'26-Jul-2002 23:00:00'	72	4.53	14.90	5.95	1.12	63.82	215.26	-9999.00	-9999.00	0.16	0.71
68	a	'10-Aug-1993 11:00:00'	72	4.52	15.11	6.24	1.12	63.70	214.97	-9999.00	-9999.00	0.05	0.38
69	a	'04-Jul-2007 11:00:00'	72	4.51	14.49	6.41	1.09	63.77	214.83	-9999.00	-9999.00	0.35	1.02
70	a	'13-May-2000 11:00:00'	72	4.51	13.10	6.04	0.95	64.05	204.54	-9999.00	-9999.00	0.16	0.64
71	a	'01-May-1995 17:00:00'	72	4.50	14.58	5.36	1.08	62.56	197.82	-9999.00	-9999.00	-0.07	0.49
72	a	'24-Sep-2003 11:00:00'	72	4.50	14.26	5.41	1.03	61.69	214.63	-9999.00	-9999.00	NaN	-9999.00
73	a	'22-Aug-1987 20:00:00'	72	4.49	15.24	5.90	1.06	64.64	212.05	-9999.00	-9999.00	-0.07	0.53
74	a	'24-Jul-1990 08:00:00'	72	4.47	13.50	5.98	1.05	63.74	217.02	-9999.00	-9999.00	0.14	0.96
75	a	'01-Oct-2005 17:00:00'	72	4.47	15.64	5.60	1.16	62.31	211.46	-9999.00	-9999.00	-0.01	0.38
76	a	'10-Oct-2005 05:00:00'	72	4.45	14.88	6.39	1.13	63.74	210.12	-9999.00	-9999.00	-0.14	0.36
77	a	'27-Jun-2006 20:00:00'	72	4.45	15.18	5.23	1.06	60.52	214.59	-9999.00	-9999.00	0.07	0.73
78	a	'28-Aug-1991 23:00:00'	72	4.44	13.38	5.75	1.00	62.77	212.71	-9999.00	-9999.00	-0.01	0.42
79	a	'17-Aug-2001 11:00:00'	72	4.43	13.75	6.05	1.03	63.09	211.04	-9999.00	-9999.00	-0.07	0.58
80	a	'15-Jul-1997 11:00:00'	72	4.42	15.00	6.18	1.11	62.76	212.58	-9999.00	-9999.00	-0.20	0.16
81	a	'28-Mar-2007 11:00:00'	72	4.42	12.18	5.11	0.85	60.37	201.30	-9999.00	-9999.00	-0.06	0.35
82	a	'02-Aug-2004 23:00:00'	72	4.41	14.48	6.49	1.10	64.06	214.76	-9999.00	-9999.00	0.01	0.65
83	a	'26-Mar-1999 20:00:00'	72	4.41	14.13	5.33	1.01	59.80	209.51	-9999.00	-9999.00	0.11	0.43
84	a	'07-Sep-2002 02:00:00'	72	4.39	14.95	5.18	1.03</						

Location	Esperance
Method	72 Hour Moving Average Water Level

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	c	'29-Jun-2009 01:30:00'	72	3.82	14.77	5.18	0.75	43.81	217.51	-9999.00	-9999.00	0.45	0.73
2	c	'23-May-2009 01:30:00'	72	3.82	13.45	6.25	0.74	46.78	217.16	-9999.00	-9999.00	0.44	1.10
3	c	'27-Apr-2000 22:30:00'	72	3.03	14.11	5.35	0.52	30.98	220.42	-9999.00	-9999.00	0.44	0.76
4	c	'18-Jul-1996 07:30:00'	72	4.33	14.58	6.92	1.16	63.16	219.45	-9999.00	-9999.00	0.44	0.97
5	c	'03-Jul-2007 07:30:00'	72	4.06	14.63	6.41	0.91	52.45	217.42	-9999.00	-9999.00	0.43	1.02
6	c	'02-May-2007 04:30:00'	72	4.28	13.72	5.05	0.86	53.74	213.55	-9999.00	-9999.00	0.40	0.86
7	c	'27-Jun-2003 04:30:00'	72	1.98	13.30	2.86	0.18	11.74	215.06	-9999.00	-9999.00	0.40	0.92
8	c	'12-May-1995 01:30:00'	72	2.57	13.07	3.41	0.29	20.26	214.50	-9999.00	-9999.00	0.39	0.94
9	c	'21-Jun-2009 01:30:00'	72	4.81	13.46	6.72	1.11	70.18	215.17	-9999.00	-9999.00	0.38	1.08
10	c	'20-May-1999 19:30:00'	72	2.57	13.58	5.08	0.32	21.27	213.71	-9999.00	-9999.00	0.37	0.72
11	c	'01-Aug-1996 19:30:00'	72	4.67	13.47	6.25	1.07	67.14	216.21	-9999.00	-9999.00	0.36	0.93
12	c	'02-Jun-1988 10:30:00'	72	2.76	11.96	3.29	0.29	22.16	220.51	-9999.00	-9999.00	0.35	0.96
13	c	'17-May-2003 10:30:00'	72	3.22	11.77	4.61	0.38	33.93	216.63	-9999.00	-9999.00	0.34	1.09
14	c	'17-May-1999 07:30:00'	72	2.05	12.82	2.87	0.18	12.21	189.91	-9999.00	-9999.00	0.33	0.92
15	c	'08-Jun-1995 01:30:00'	72	2.65	15.35	5.89	0.44	23.87	211.96	-9999.00	-9999.00	0.33	0.76
16	c	'18-Jul-2000 16:30:00'	72	3.96	14.57	5.34	0.81	47.13	217.86	-9999.00	-9999.00	0.33	0.99
17	c	'13-Sep-2008 13:30:00'	72	5.50	14.90	7.50	1.57	89.83	212.58	-9999.00	-9999.00	0.33	0.85
18	c	'04-Jun-1997 10:30:00'	72	4.62	15.37	6.64	1.29	68.61	215.85	-9999.00	-9999.00	0.32	0.89
19	c	'05-Jul-1999 22:30:00'	72	2.04	12.68	4.00	0.18	13.33	204.46	-9999.00	-9999.00	0.32	0.62
20	c	'29-Jun-2008 01:30:00'	72	4.14	14.68	6.67	1.00	57.04	215.35	-9999.00	-9999.00	0.32	0.81
21	c	'15-May-1988 06:00:00'	72	2.79	11.51	3.17	0.29	22.60	216.25	-9999.00	-9999.00	0.32	0.87
22	c	'31-Jul-2007 16:30:00'	72	4.35	16.31	5.31	1.06	56.78	217.32	-9999.00	-9999.00	0.31	0.93
23	c	'11-Jun-2005 10:30:00'	72	4.49	11.81	6.53	0.83	60.00	216.65	-9999.00	-9999.00	0.31	0.82
24	c	'14-Jun-2002 10:30:00'	72	3.32	11.50	4.82	0.44	34.92	216.08	-9999.00	-9999.00	0.31	1.03
25	c	'10-Jun-1998 07:30:00'	72	2.85	12.88	5.59	0.38	26.23	218.21	-9999.00	-9999.00	0.31	1.06
26	c	'20-Jun-2000 18:00:00'	72	4.14	12.88	6.20	0.78	52.69	216.89	-9999.00	-9999.00	0.31	0.82
27	c	'17-Jul-1999 16:30:00'	72	4.70	14.08	6.25	1.14	68.16	216.91	-9999.00	-9999.00	0.31	0.79
28	c	'22-Jul-2000 21:00:00'	72	4.92	15.27	7.13	1.40	76.94	210.63	-9999.00	-9999.00	0.31	0.62
29	c	'04-Jun-2003 19:30:00'	72	5.54	13.38	7.16	1.44	91.22	205.13	-9999.00	-9999.00	0.31	0.84
30	c	'28-Jun-1999 04:30:00'	72	2.98	14.09	5.36	0.53	31.73	220.58	-9999.00	-9999.00	0.30	0.86
31	c	'27-Jun-1991 15:00:00'	72	4.25	14.74	5.57	0.92	53.29	214.32	-9999.00	-9999.00	0.30	1.03
32	c	'03-Apr-1989 01:30:00'	72	2.73	14.16	3.38	0.37	22.32	217.81	-9999.00	-9999.00	0.30	0.86
33	c	'20-Jun-1996 19:30:00'	72	2.30	14.28	3.39	0.25	15.25	220.70	-9999.00	-9999.00	0.29	0.74
34	c	'11-May-2000 22:30:00'	72	3.76	12.44	6.04	0.72	49.52	210.35	-9999.00	-9999.00	0.29	0.64
35	c	'22-Jul-1990 16:30:00'	72	3.86	11.84	5.98	0.70	46.88	221.15	-9999.00	-9999.00	0.29	0.96
36	c	'06-Jun-2002 01:30:00'	72	4.04	13.22	7.63	0.94	59.56	219.37	-9999.00	-9999.00	0.28	0.59
37	c	'18-Jun-1999 13:30:00'	72	2.81	15.06	4.75	0.44	24.71	219.75	-9999.00	-9999.00	0.28	0.65
38	c	'05-Jul-1998 01:30:00'	72	3.01	14.03	3.79	0.40	27.20	219.83	-9999.00	-9999.00	0.28	0.65
39	c	'15-Jul-2000 04:30:00'	72	2.87	14.76	3.46	0.42	24.42	221.06	-9999.00	-9999.00	0.28	0.79
40	c	'11-May-2004 19:30:00'	72	3.08	14.49	4.30	0.47	29.89	214.05	-9999.00	-9999.00	0.28	0.59
41	c	'04-Jul-2000 16:30:00'	72	2.71	12.55	4.69	0.35	24.13	217.78	-9999.00	-9999.00	0.28	0.82
42	c	'12-Jun-1988 03:00:00'	72	2.82	15.77	3.55	0.43	23.61	219.64	-9999.00	-9999.00	0.27	0.79
43	c	'26-Jun-1995 03:00:00'	72	4.70	13.26	7.26	1.05	71.60	218.66	-9999.00	-9999.00	0.27	0.72
44	c	'15-Aug-2009 01:30:00'	72	3.69	15.01	5.33	0.70	40.87	219.33	-9999.00	-9999.00	0.27	0.65
45	c	'12-Jun-1999 04:30:00'	72	3.41	13.26	4.64	0.56	36.63	216.09	-9999.00	-9999.00	0.27	0.97
46	c	'08-May-2002 01:30:00'	72	1.97	15.06	2.66	0.21	12.15	220.53	-9999.00	-9999.00	0.27	0.53
47	c	'11-May-2002 04:30:00'	72	2.56	14.74	3.62	0.35	20.19	219.14	-9999.00	-9999.00	0.27	0.73
48	c	'16-Jul-1990 22:30:00'	72	3.49	15.46	4.28	0.65	35.79	220.91	-9999.00	-9999.00	0.26	0.76
49	c	'09-Apr-2008 10:30:00'	72	2.64	13.71	4.40	0.32	20.24	214.73	-9999.00	-9999.00	0.26	0.83
50	c	'07-Sep-2005 22:30:00'	72	3.84	14.59	5.80	0.73	42.72	220.25	-9999.00	-9999.00	0.26	0.75
51	c	'24-Jul-2007 01:30:00'	72	2.77	16.19	4.43	0.45	23.61	217.84	-9999.00	-9999.00	0.25	0.63
52	c	'17-Jul-1991 22:30:00'	72	3.75	14.86	5.26	0.74	43.74	215.99	-9999.00	-9999.00	0.25	0.47
53	c	'01-Jun-1996 04:30:00'	72	3.24	14.11	5.51	0.55	33.46	219.31	-9999.00	-9999.00	0.25	0.84
54	c	'17-Jun-1996 16:30:00'	72	2.51	13.39	4.22	0.29	20.65	221.09	-9999.00	-9999.00	0.25	1.04
55	c	'04-Jun-2009 01:30:00'	72	3.08	14.03	3.95	0.47	29.04	218.73	-9999.00	-9999.00	0.25	0.75
56	c	'10-Jun-2008 22:30:00'	72	3.61	14.45	4.91	0.67	40.12	213.53	-9999.00	-9999.00	0.25	0.50
57	c	'18-Jul-2008 07:30:00'	72	3.28	13.83	6.03	0.49	33.08	216.66	-9999.00	-9999.00	0.25	0.91
58	c	'02-Jun-2000 04:30:00'	72	2.12	14.43	2.50	0.22	13.42	221.03	-9999.00	-9999.00	0.25	0.82
59	c	'01-Jul-1992 16:30:00'	72	4.31	14.55	5.50	0.97	55.62	219.48	-9999.00	-9999.00	0.25	0.85
60	c	'12-Apr-2003 22:30:00'	72	4.23	13.65	6.34	0.90	59.40	207.62	-9999.00	-9999.00	0.25	0.76
61	c	'29-May-1999 13:30:00'	72	2.94	10.43	4.33	0.32	27.87	196.35	-9999.00	-9999.00	0.25	0.77
62	c	'04-Jun-1999 10:30:00'	72	3.39	12.40	4.57	0.47	35.35	218.14	-9999.00	-9999.00	0.25	0.74
63	c	'08-Oct-1999 13:30:00'	72	3.37	11.97	5.39	0.52	39.49	218.30	-9999.00	-9999.00	0.24	0.72
64	c	'16-Jun-2008 13:30:00'	72	3.70	15.11	4.90	0.71	42.01	213.20	-9999.00	-9999.00	0.24	0.79
65	c	'30-Jul-2008 04:30:00'	72	3.05	14.36	3.57	0.45	27.16	217.84	-9999.00	-9999.00	0.24	0.89
66	c	'30-Jun-2007 07:30:00'	72	1.97	13.30	2.57	0.18	11.38	221.03	-9999.00	-9999.00	0.24	0.85
67	c	'15-Jun-2000 01:30:00'	72	2.44	14.51	3.64	0.30	18.01	218.30	-9999.00	-9999.00	0.24	0.76
68	c	'07-Jun-2004 16:30:00'	72	2.80	13.77	4.50	0.43	25.00	218.26	-9999.00	-9999.00	0.24	0.70
69	c	'12-Jun-2004 01:30:00'	72	2.78	13.61	3.74	0.37	23.25	219.26	-9999.00	-9999.00	0.24	0.53
70	c	'25-Jun-2008 22:30:00'	72	3.33	14.54	5.13	0.62	37.17	215.36	-9999.00	-9999.00	0.24	0.55
71	c	'02-Sep-2002 01:30:00'	72	3.97	14.85	5.79	0.91	50.55	218.15	-9999.00	-9999.00	0.24	0.63
72	c	'10-Jul-2009 16:30:00'	72	2.62	12.21	3.92	0.29	22.34	220.21	-9999.00	-9999.00	0.24	0.76
73	c	'04-Jul-2005 13:30:00'	72	3.73	13.98	5.52	0.74	44.51	219.12	-9999.00	-9999.00	0.24	0.78
74	c	'11-Jul-2000 01:30:00'	72	2.90	15.16	5.03	0.49	26.92	217.66	-9999.00	-9999.00	0.23	0.59
75	c	'24-Apr-1990 04:30:00'	72	2.72	16.18	3.63	0.41	22.16	210.88	-9999.00	-9999.00	0.23	0.68
76	c	'24-Jun-1991 13:30:00'	72	4.10	14.95	6.26	1.00	54.54	216.02	-9999.00	-9999.00	0.23	0.80
77	c	'15-Sep-1996 19:30:00'	72	3.81	15.87	5.60	0.88	46.50	220.15	-9999.00	-9999.00	0.23	0.65
78	c	'24-May-2008 07:30:00'	72	2.72	15.35	3.92	0.41	22.79	214.90	-9999.00	-9999.00	0.23	0.77
79	c	'30-Jun-2003 04:30:00'	72	2.50	11.02	3.03	0.23	18.25	170.23	-9999.00	-9999.00	0.23	0.80
80	c	'12-Jul-2002 07:30:00'	72	4.59	14.79	5.67	1.09	62.76	216.70	-9999.00	-9999.00	0.23	0.88
81	c	'22-Aug-2009 19:30:00'	72	4.76	14.33	7.35	1.31	73.63	212.12	-9999.00	-9999.00	0.23	0.62
82	c	'03-Jul-2001 04:30:00'	72	3.88	15.08	6.12	0.84	47.13	217.35	-9999.00	-9999.00	0.23	0.72
83	c	'14-Sep-1999 19:30:00'	72	3.63	13.21	5.22	0.63	43.18	219.41	-9999.00	-9999.00	0.23	0.66
84	c	'12-Jun-2009 16:30:00'	72	3.02	10.76	4.34							

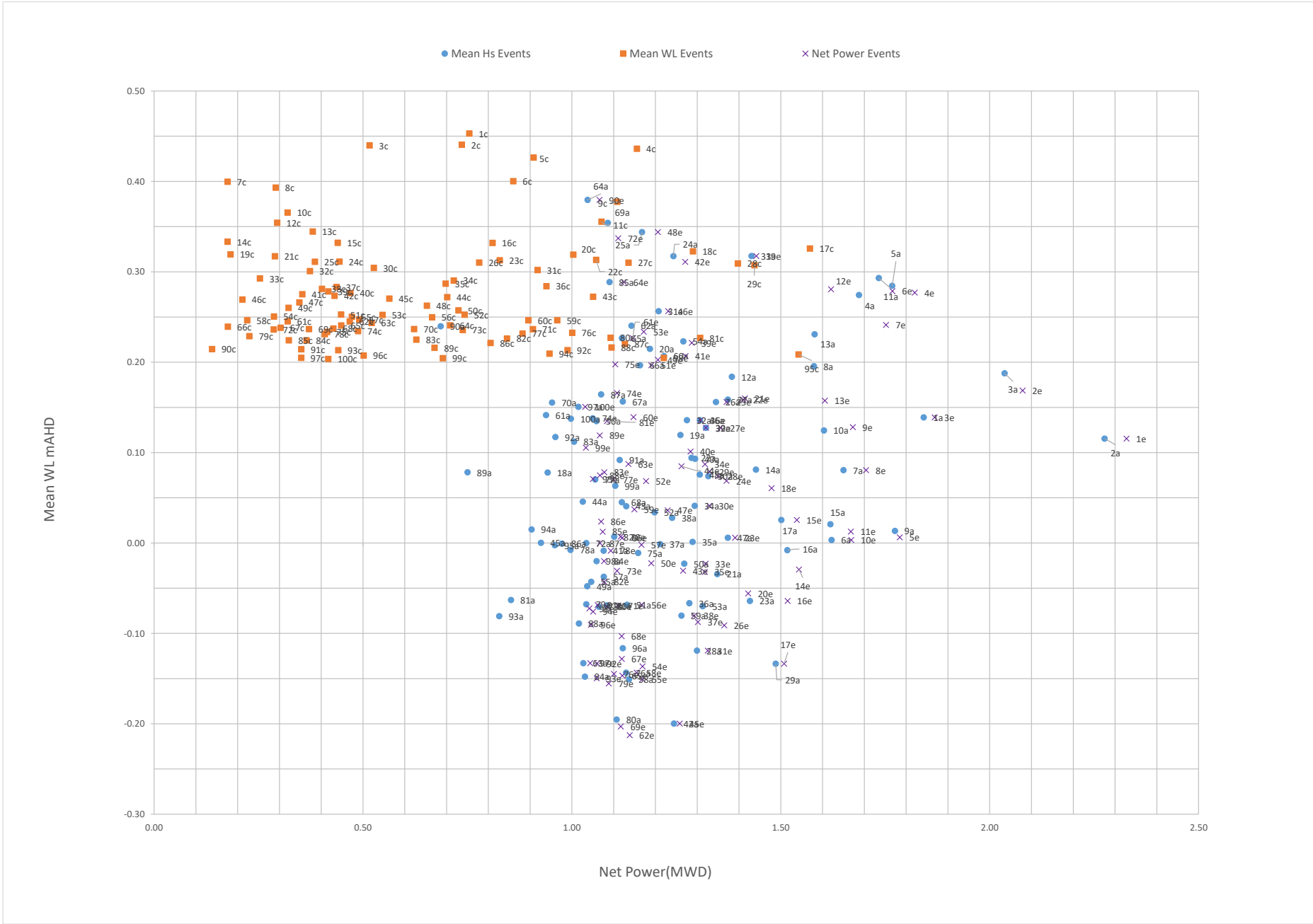
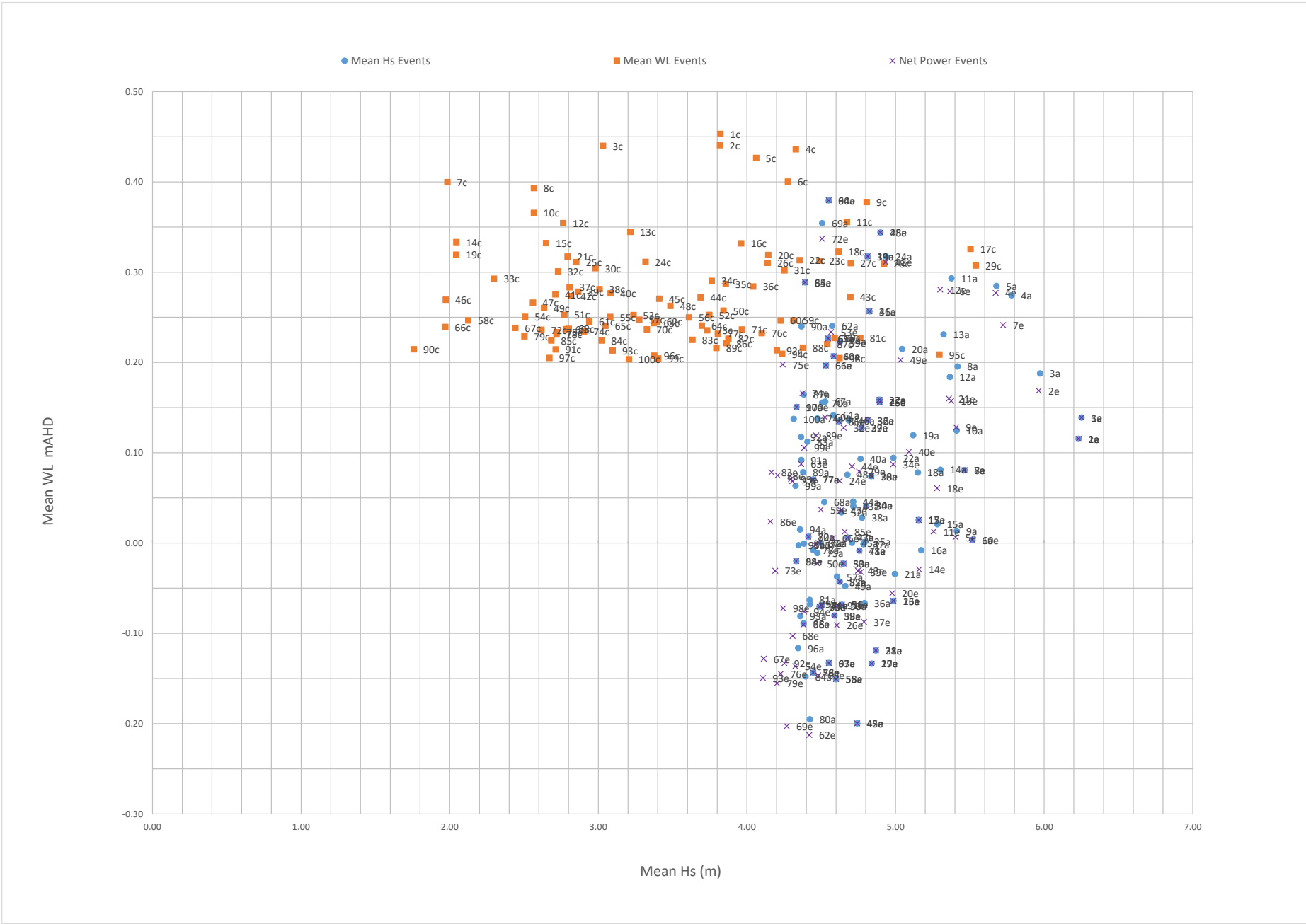
Location	Esperance
Method	72 Hour Net Power

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	e	'14-Jul-1987 20:00:00'	72	6.23	16.05	7.51	2.33	120.62	208.52	-9999.00	-9999.00	0.12	0.65
2	e	'23-Aug-2009 23:00:00'	72	5.96	15.26	7.40	2.08	112.28	205.85	-9999.00	-9999.00	0.17	0.53
3	e	'12-May-1987 05:00:00'	72	6.25	12.53	7.88	1.87	125.66	190.80	-9999.00	-9999.00	0.14	0.71
4	e	'14-Sep-2008 05:00:00'	72	5.67	14.93	7.50	1.82	100.75	212.61	-9999.00	-9999.00	0.28	0.85
5	e	'31-Aug-2005 02:00:00'	72	5.40	13.99	8.73	1.78	102.99	210.40	-9999.00	-9999.00	0.01	0.67
6	e	'05-Jun-1997 11:00:00'	72	5.37	16.23	6.64	1.77	91.23	214.30	-9999.00	-9999.00	0.28	0.89
7	e	'05-Jun-2003 17:00:00'	72	5.72	14.34	7.16	1.75	100.12	207.21	-9999.00	-9999.00	0.24	0.82
8	e	'12-Aug-1990 23:00:00'	72	5.46	15.34	6.83	1.70	92.05	215.04	-9999.00	-9999.00	0.08	0.62
9	e	'03-Sep-2002 20:00:00'	72	5.41	15.31	6.70	1.67	89.38	209.28	-9999.00	-9999.00	0.13	0.63
10	e	'29-Jul-1994 02:00:00'	72	5.52	14.79	6.77	1.67	94.04	208.62	-9999.00	-9999.00	0.00	0.30
11	e	'13-Aug-1992 02:00:00'	72	5.26	15.92	7.19	1.67	87.40	213.01	-9999.00	-9999.00	0.01	0.50
12	e	'23-Jul-2000 23:00:00'	72	5.30	14.74	7.13	1.62	90.27	210.94	-9999.00	-9999.00	0.28	0.62
13	e	'07-Jun-2002 17:00:00'	72	5.37	13.81	7.63	1.61	94.25	208.02	-9999.00	-9999.00	0.16	0.59
14	e	'05-Jun-1992 02:00:00'	72	5.16	15.38	6.23	1.54	82.72	206.41	-9999.00	-9999.00	-0.03	0.60
15	e	'02-Sep-2009 17:00:00'	72	5.16	14.76	7.40	1.54	85.24	205.80	-9999.00	-9999.00	0.03	0.57
16	e	'25-Jun-1990 05:00:00'	72	4.99	14.93	7.05	1.52	78.44	207.43	-9999.00	-9999.00	-0.06	0.49
17	e	'25-Sep-2009 14:00:00'	72	4.84	16.06	7.27	1.51	77.72	210.14	-9999.00	-9999.00	-0.13	0.41
18	e	'10-Sep-1989 05:00:00'	72	5.28	13.83	6.73	1.48	86.60	210.12	-9999.00	-9999.00	0.06	0.41
19	e	'19-Jul-1996 08:00:00'	72	4.81	15.17	6.92	1.44	77.99	216.47	-9999.00	-9999.00	0.32	0.92
20	e	'22-Aug-1991 05:00:00'	72	4.98	15.53	5.82	1.42	74.64	210.42	-9999.00	-9999.00	-0.06	0.39
21	e	'13-Jun-2005 02:00:00'	72	5.36	12.89	6.64	1.41	89.67	209.14	-9999.00	-9999.00	0.16	0.75
22	e	'12-Sep-2009 11:00:00'	72	4.89	16.16	6.09	1.41	73.23	217.12	-9999.00	-9999.00	0.16	0.63
23	e	'11-Oct-1997 11:00:00'	72	4.68	15.51	7.02	1.39	74.32	217.01	-9999.00	-9999.00	0.01	0.47
24	e	'29-Aug-1989 14:00:00'	72	4.62	16.55	6.57	1.37	67.41	214.69	-9999.00	-9999.00	0.07	0.58
25	e	'22-Sep-2006 23:00:00'	72	4.89	14.85	6.53	1.37	76.67	213.39	-9999.00	-9999.00	0.16	0.60
26	e	'08-Mar-1991 20:00:00'	72	4.61	16.25	6.72	1.36	68.04	208.94	-9999.00	-9999.00	-0.09	0.33
27	e	'21-Jun-1987 23:00:00'	72	4.77	16.07	5.82	1.36	70.40	213.55	-9999.00	-9999.00	0.13	0.53
28	e	'30-Jun-2004 23:00:00'	72	4.84	14.97	6.49	1.35	74.30	210.87	-9999.00	-9999.00	0.07	0.66
29	e	'21-Sep-2008 08:00:00'	72	4.75	15.55	5.92	1.33	69.41	213.51	-9999.00	-9999.00	0.08	0.57
30	e	'19-Jun-1993 17:00:00'	72	4.80	15.48	5.73	1.33	71.06	210.39	-9999.00	-9999.00	0.04	0.72
31	e	'31-Aug-1995 05:00:00'	72	4.87	15.11	5.60	1.33	72.82	208.90	-9999.00	-9999.00	-0.12	0.24
32	e	'15-Jul-1988 17:00:00'	72	4.65	15.66	6.60	1.32	69.85	217.34	-9999.00	-9999.00	0.13	0.67
33	e	'31-Jul-1989 17:00:00'	72	4.65	16.12	6.07	1.32	67.24	210.96	-9999.00	-9999.00	-0.02	0.54
34	e	'20-Nov-1992 08:00:00'	72	4.98	13.96	7.02	1.32	79.98	209.74	-9999.00	-9999.00	0.09	0.48
35	e	'28-May-1997 17:00:00'	72	4.77	15.14	6.12	1.32	72.18	206.23	-9999.00	-9999.00	-0.03	0.48
36	e	'05-Aug-1991 02:00:00'	72	4.81	14.93	6.88	1.31	72.58	216.80	-9999.00	-9999.00	0.14	0.51
37	e	'19-Apr-2006 23:00:00'	72	4.79	14.66	5.97	1.30	72.66	200.06	-9999.00	-9999.00	-0.09	0.57
38	e	'25-Sep-1990 20:00:00'	72	4.59	16.31	6.26	1.29	66.52	212.36	-9999.00	-9999.00	-0.08	0.36
39	e	'25-Jun-1991 14:00:00'	72	4.62	15.91	6.26	1.29	67.80	215.33	-9999.00	-9999.00	0.22	0.80
40	e	'28-Oct-2007 23:00:00'	72	5.09	12.61	7.14	1.28	83.03	208.07	-9999.00	-9999.00	0.10	1.01
41	e	'29-Jul-1993 02:00:00'	72	4.58	16.70	5.13	1.27	63.37	217.15	-9999.00	-9999.00	0.21	0.68
42	e	'02-Aug-1996 14:00:00'	72	4.93	13.93	6.25	1.27	76.47	213.98	-9999.00	-9999.00	0.31	0.93
43	e	'06-Aug-2003 05:00:00'	72	4.75	15.00	6.34	1.27	67.69	207.78	-9999.00	-9999.00	-0.03	0.27
44	e	'22-Jul-2003 11:00:00'	72	4.71	13.99	7.05	1.26	74.96	215.65	-9999.00	-9999.00	0.08	0.66
45	e	'09-Oct-1993 17:00:00'	72	4.74	13.85	6.43	1.26	74.34	210.65	-9999.00	-9999.00	-0.20	0.22
46	e	'18-Jul-1999 05:00:00'	72	4.83	13.81	6.25	1.23	73.56	216.27	-9999.00	-9999.00	0.26	0.79
47	e	'14-Oct-1989 11:00:00'	72	4.63	15.37	5.49	1.23	66.43	214.33	-9999.00	-9999.00	0.04	0.56
48	e	'21-Jun-2009 08:00:00'	72	4.90	13.25	6.72	1.21	75.01	212.31	-9999.00	-9999.00	0.34	1.08
49	e	'27-Jun-1995 05:00:00'	72	5.03	12.47	7.26	1.21	81.56	214.99	-9999.00	-9999.00	0.20	0.72
50	e	'01-Oct-2005 20:00:00'	72	4.47	15.64	5.60	1.19	62.28	211.67	-9999.00	-9999.00	-0.02	0.38
51	e	'30-Jun-2008 11:00:00'	72	4.53	14.62	6.67	1.19	67.14	212.80	-9999.00	-9999.00	0.20	0.81
52	e	'17-Sep-2007 17:00:00'	72	4.31	16.58	5.88	1.18	57.58	216.75	-9999.00	-9999.00	0.07	0.53
53	e	'02-Jul-1992 11:00:00'	72	4.57	14.97	5.50	1.17	64.58	219.73	-9999.00	-9999.00	0.23	0.85
54	e	'09-Nov-1990 11:00:00'	72	4.33	16.15	6.00	1.17	58.82	211.17	-9999.00	-9999.00	-0.14	0.48
55	e	'05-Jul-1990 08:00:00'	72	4.60	15.12	4.98	1.17	64.96	201.54	-9999.00	-9999.00	-0.15	0.34
56	e	'25-May-1987 14:00:00'	72	4.64	14.51	5.69	1.17	65.97	206.69	-9999.00	-9999.00	-0.07	0.38
57	e	'28-Jun-1990 08:00:00'	72	4.46	14.71	6.20	1.17	60.97	206.31	-9999.00	-9999.00	0.00	0.46
58	e	'10-Oct-2005 05:00:00'	72	4.45	14.88	6.39	1.16	63.74	210.12	-9999.00	-9999.00	-0.14	0.36
59	e	'10-Aug-1993 14:00:00'	72	4.50	15.15	6.24	1.15	63.02	214.83	-9999.00	-9999.00	0.04	0.38
60	e	'27-Jul-2002 02:00:00'	72	4.53	14.94	5.95	1.15	63.53	215.25	-9999.00	-9999.00	0.14	0.71
61	e	'12-Jul-2002 08:00:00'	72	4.55	14.75	5.67	1.15	64.42	216.73	-9999.00	-9999.00	0.23	0.88
62	e	'15-Jul-1997 14:00:00'	72	4.42	14.99	6.18	1.14	62.18	212.05	-9999.00	-9999.00	-0.21	0.16
63	e	'12-May-1989 17:00:00'	72	4.37	15.77	5.21	1.14	60.08	206.31	-9999.00	-9999.00	0.09	0.48
64	e	'31-Jul-2007 23:00:00'	72	4.39	15.76	5.31	1.12	59.60	217.24	-9999.00	-9999.00	0.29	0.93
65	e	'06-Sep-2002 23:00:00'	72	4.48	14.89	5.28	1.12	61.06	207.37	-9999.00	-9999.00	-0.15	0.52
66	e	'07-Jul-1989 20:00:00'	72	4.58	13.60	6.69	1.12	66.54	205.86	-9999.00	-9999.00	0.01	0.42
67	e	'01-Sep-2007 23:00:00'	72	4.11	16.39	5.58	1.12	56.78	214.44	-9999.00	-9999.00	-0.13	0.27
68	e	'30-Apr-1998 17:00:00'	72	4.31	15.30	5.91	1.12	60.10	206.26	-9999.00	-9999.00	-0.10	0.41
69	e	'27-Aug-1987 17:00:00'	72	4.27	16.44	5.23	1.12	55.79	213.15	-9999.00	-9999.00	-0.20	0.31
70	e	'02-Aug-2004 23:00:00'	72	4.41	14.48	6.49	1.12	64.06	214.76	-9999.00	-9999.00	0.01	0.65
71	e	'01-May-1995 17:00:00'	72	4.50	14.58	5.36	1.11	62.56	197.82	-9999.00	-9999.00	-0.07	0.49
72	e	'04-Jul-2007 14:00:00'	72	4.51	14.38	6.41	1.11	63.66	214.46	-9999.00	-9999.00	0.34	1.02
73	e	'11-Sep-2001 05:00:00'	72	4.19	16.25	5.66	1.11	55.42	215.09	-9999.00	-9999.00	-0.03	0.45
74	e	'26-Jun-2000 14:00:00'	72	4.37	15.53	5.35	1.11	59.04	215.01	-9999.00	-9999.00	0.17	0.41
75	e	'17-Sep-1996 11:00:00'	72	4.24	15.36	5.60	1.10	57.30	220.00	-9999.00	-9999.00	0.20	0.65
76	e	'17-Oct-1992 14:00:00'	72	4.23	15.49	5.77	1.10	58.03	211.15	-9999.00	-9999.00	-0.14	0.34
77	e	'27-Jun-2006 20:00:00'	72	4.45	15.18	5.23	1.10	60.52	214.59	-9999.00	-9999.00	0.07	0.73
78	e	'22-Aug-2000 05:00:00'	72	4.76	12.10	6.96	1.09	72.98	195.32	-9999.00	-9999.00	-0.01	0.52
79	e	'25-May-1993 14:00:00'	72	4.20	16.80	5.33	1.09	55.11	211.76	-9999.00	-9999.00	-0.16	0.47
80	e	'22-Aug-1987 20:00:00'	72	4.49	15.24	5.90	1.08	64.64	212.05	-9999.00	-9999.00	-0.07	0.53
81	e	'05-Jul-2005 20:00:00'	72	4.62	13.72	5.52	1.08	65.79	209.68	-9999.00	-9999.00	0.13	0.78
82	e	'12-Jun-2003 20:00:00'	72	4.63	13.49	5.69	1.08	65.88	206.75	-9999.00	-9999.00	-0.04	0.51
83	e	'29-Sep-1998 23:00:00'	72	4.17	16.07	5.71	1.08	55.35	217.40	-9999.00	-9999.00	0.08	0.40
84	e	'15-Jul-2002 17:00:00'	72	4.33	14.46	5.68	1.08						

Location	Esperance
Method	Wave Threshold Events

Rank		Mid Date	Event Duration (hours)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Power (MW Days)	Integral Hsq	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	f	'14-Jul-1987 20:00:00'	72.00	6.23	16.05	7.51	2.28	120.62	208.52	-9999.00	-9999.00	0.12	0.65
2	f	'24-Aug-2009 03:30:00'	57.00	6.32	15.51	7.40	1.81	99.36	205.03	-9999.00	-9999.00	0.17	0.49
3	f	'12-May-1987 03:30:00'	63.00	6.54	12.54	7.88	1.74	118.57	191.96	-9999.00	-9999.00	0.15	0.71
4	f	'29-Jul-1994 03:30:00'	69.00	5.56	14.72	6.77	1.57	91.33	208.61	-9999.00	-9999.00	0.01	0.30
5	f	'30-Aug-2005 17:00:00'	42.00	6.76	14.74	8.73	1.52	86.29	210.09	-9999.00	-9999.00	0.15	0.67
6	f	'05-Jun-1997 14:00:00'	48.00	5.96	16.53	6.64	1.40	73.34	214.28	-9999.00	-9999.00	0.32	0.89
7	f	'04-Jun-1992 18:30:00'	57.00	5.46	15.73	6.23	1.34	72.47	206.02	-9999.00	-9999.00	0.01	0.60
8	f	'23-Jul-2000 20:00:00'	48.00	5.92	15.26	7.13	1.33	73.26	211.09	-9999.00	-9999.00	0.32	0.62
9	f	'07-Jun-2002 11:00:00'	42.00	6.28	14.61	7.63	1.26	72.78	208.19	-9999.00	-9999.00	0.22	0.59
10	f	'03-Sep-2009 03:30:00'	45.00	5.85	14.87	7.40	1.20	67.27	207.12	-9999.00	-9999.00	0.06	0.57
11	f	'26-Jun-1990 20:00:00'	42.00	5.72	16.52	6.84	1.15	59.51	205.47	-9999.00	-9999.00	-0.04	0.35
12	f	'19-Jul-1996 06:30:00'	39.00	5.93	16.13	6.92	1.12	59.77	216.30	-9999.00	-9999.00	0.42	0.92
13	f	'13-Jun-2005 08:00:00'	48.00	5.82	13.46	6.64	1.12	69.83	207.84	-9999.00	-9999.00	0.17	0.75
14	f	'31-Aug-1995 00:30:00'	57.00	5.06	15.40	5.60	1.10	61.14	209.59	-9999.00	-9999.00	-0.09	0.24
15	f	'25-Sep-2009 00:30:00'	33.00	6.08	17.89	7.27	1.08	53.54	216.44	-9999.00	-9999.00	-0.01	0.41
16	f	'12-Aug-1992 05:00:00'	36.00	6.17	15.42	7.19	1.08	59.82	214.93	-9999.00	-9999.00	0.09	0.63
17	f	'11-Oct-1997 02:00:00'	36.00	5.97	16.20	7.02	1.05	55.99	216.01	-9999.00	-9999.00	0.06	0.38
18	f	'15-Jun-1989 20:00:00'	78.00	5.12	10.59	5.72	1.01	86.01	165.19	-9999.00	-9999.00	0.09	0.63
19	f	'10-Sep-1989 17:00:00'	42.00	5.67	14.27	6.73	1.00	58.83	208.95	-9999.00	-9999.00	0.08	0.41
20	f	'12-Sep-2009 18:30:00'	45.00	5.17	16.37	6.09	0.96	51.06	216.59	-9999.00	-9999.00	0.17	0.54
21	f	'06-Jun-2003 08:00:00'	42.00	5.59	14.57	6.13	0.96	56.27	206.31	-9999.00	-9999.00	0.20	0.71
22	f	'19-Apr-2006 20:00:00'	42.00	5.42	15.41	5.97	0.96	52.63	199.17	-9999.00	-9999.00	-0.07	0.41
23	f	'09-Oct-1993 06:30:00'	39.00	5.75	14.54	6.43	0.95	55.23	212.27	-9999.00	-9999.00	-0.13	0.22
24	f	'22-Jul-2003 20:00:00'	36.00	6.00	14.00	7.05	0.95	56.74	213.15	-9999.00	-9999.00	0.17	0.66
25	f	'28-Oct-2007 06:30:00'	39.00	5.98	13.05	7.14	0.94	60.72	213.38	-9999.00	-9999.00	0.24	1.01
26	f	'23-Aug-1991 02:00:00'	42.00	5.24	16.46	5.82	0.93	48.88	208.77	-9999.00	-9999.00	-0.12	0.39
27	f	'26-Jun-1995 18:30:00'	45.00	5.73	12.34	7.26	0.93	63.90	215.28	-9999.00	-9999.00	0.34	0.72
28	f	'20-Nov-1992 18:30:00'	39.00	5.86	13.78	7.02	0.92	57.92	207.01	-9999.00	-9999.00	0.08	0.48
29	f	'28-May-1997 09:30:00'	39.00	5.46	15.63	6.12	0.91	49.64	204.44	-9999.00	-9999.00	0.01	0.46
30	f	'18-Jul-1999 08:00:00'	42.00	5.48	14.25	6.25	0.90	53.69	215.30	-9999.00	-9999.00	0.32	0.79
31	f	'19-Jun-1993 05:00:00'	42.00	5.21	16.04	5.73	0.90	47.95	210.23	-9999.00	-9999.00	0.08	0.72
32	f	'04-Sep-2002 03:30:00'	33.00	5.84	15.44	6.70	0.88	48.50	205.20	-9999.00	-9999.00	0.01	0.52
33	f	'30-Jun-1990 09:30:00'	45.00	5.24	14.12	6.20	0.88	52.78	204.24	-9999.00	-9999.00	0.13	0.46
34	f	'05-Jul-1990 03:30:00'	51.00	4.82	15.08	4.98	0.87	49.62	201.89	-9999.00	-9999.00	-0.14	0.34
35	f	'04-Jun-2003 08:00:00'	36.00	5.90	13.30	7.16	0.86	54.89	206.09	-9999.00	-9999.00	0.29	0.82
36	f	'13-Sep-2008 03:30:00'	39.00	5.36	15.20	6.32	0.86	48.05	211.70	-9999.00	-9999.00	0.32	0.80
37	f	'15-Sep-2008 03:30:00'	27.00	6.43	14.65	7.50	0.84	48.67	211.72	-9999.00	-9999.00	0.18	0.50
38	f	'12-Aug-1990 00:30:00'	27.00	6.06	16.77	6.55	0.82	42.47	215.95	-9999.00	-9999.00	0.07	0.32
39	f	'28-Aug-1989 11:00:00'	30.00	5.80	16.07	6.57	0.82	44.04	212.36	-9999.00	-9999.00	0.06	0.49
40	f	'09-Mar-1991 12:30:00'	27.00	5.80	17.91	6.72	0.81	39.75	205.45	-9999.00	-9999.00	-0.14	0.07
41	f	'15-Jul-2002 21:30:00'	39.00	5.16	15.25	5.68	0.79	43.84	208.43	-9999.00	-9999.00	0.00	0.36
42	f	'30-Jun-2004 08:00:00'	30.00	5.71	15.56	6.49	0.78	42.28	210.09	-9999.00	-9999.00	0.07	0.61
43	f	'02-Sep-2007 00:30:00'	33.00	5.26	17.60	5.58	0.78	38.88	212.61	-9999.00	-9999.00	-0.11	0.27
44	f	'29-Jun-2008 23:00:00'	30.00	5.73	15.01	6.67	0.76	43.06	212.68	-9999.00	-9999.00	0.35	0.81
45	f	'22-Sep-2006 06:30:00'	27.00	5.85	16.29	6.53	0.75	39.67	211.09	-9999.00	-9999.00	0.17	0.52
46	f	'21-Jun-2009 23:00:00'	36.00	5.64	13.10	6.72	0.75	48.41	208.00	-9999.00	-9999.00	0.40	1.08
47	f	'30-Jul-1989 20:00:00'	30.00	5.49	16.23	6.07	0.73	38.58	212.03	-9999.00	-9999.00	0.06	0.54
48	f	'02-Jul-1992 20:00:00'	36.00	5.09	15.67	5.50	0.72	39.47	219.25	-9999.00	-9999.00	0.29	0.83
49	f	'01-Oct-2005 03:30:00'	33.00	5.14	16.93	5.60	0.72	36.94	209.76	-9999.00	-9999.00	-0.05	0.36
50	f	'10-Oct-2005 08:00:00'	30.00	5.48	15.50	6.39	0.72	39.03	212.35	-9999.00	-9999.00	-0.12	0.36
51	f	'12-May-1989 14:00:00'	36.00	5.00	16.25	5.21	0.71	37.90	205.72	-9999.00	-9999.00	0.07	0.39
52	f	'21-Aug-2000 11:00:00'	30.00	5.80	13.74	6.96	0.71	43.89	214.45	-9999.00	-9999.00	0.15	0.52
53	f	'20-Sep-2008 09:30:00'	27.00	5.55	17.42	5.92	0.71	35.54	212.28	-9999.00	-9999.00	0.12	0.57
54	f	'14-Jul-1997 17:00:00'	30.00	5.48	15.07	6.18	0.70	38.91	212.91	-9999.00	-9999.00	-0.11	0.16
55	f	'22-Aug-1987 15:30:00'	39.00	5.22	13.75	5.90	0.69	44.91	212.47	-9999.00	-9999.00	-0.02	0.48
56	f	'06-May-1997 11:00:00'	36.00	5.21	13.95	5.86	0.69	41.52	202.07	-9999.00	-9999.00	-0.10	0.37
57	f	'26-Sep-1990 09:30:00'	27.00	5.53	16.47	6.26	0.68	35.66	207.75	-9999.00	-9999.00	-0.13	0.25
58	f	'20-Aug-1991 08:00:00'	36.00	5.29	13.63	5.70	0.68	42.62	214.65	-9999.00	-9999.00	0.06	0.48
59	f	'05-Jul-2005 23:00:00'	42.00	4.94	13.50	5.52	0.68	42.99	209.40	-9999.00	-9999.00	0.16	0.78
60	f	'08-Jul-1989 23:00:00'	30.00	5.76	13.44	6.69	0.68	43.15	203.98	-9999.00	-9999.00	0.00	0.36
61	f	'16-Sep-1991 06:30:00'	33.00	5.76	12.21	6.64	0.68	47.62	211.91	-9999.00	-9999.00	0.02	0.50
62	f	'14-Aug-1990 00:30:00'	33.00	5.44	13.58	6.83	0.67	42.09	213.08	-9999.00	-9999.00	0.07	0.62
63	f	'24-Jul-1990 02:00:00'	30.00	5.42	14.78	5.98	0.66	37.85	217.68	-9999.00	-9999.00	0.31	0.96
64	f	'29-Aug-2003 21:30:00'	33.00	5.41	13.35	5.98	0.65	41.57	206.57	-9999.00	-9999.00	-0.02	0.52
65	f	'30-Apr-1998 18:30:00'	27.00	5.43	16.48	5.91	0.65	34.33	201.72	-9999.00	-9999.00	-0.13	0.32
66	f	'02-Aug-2004 06:30:00'	27.00	5.66	14.87	6.49	0.65	37.62	214.38	-9999.00	-9999.00	0.07	0.61
67	f	'27-Jul-1998 14:00:00'	36.00	5.52	11.73	6.36	0.65	47.32	206.00	-9999.00	-9999.00	0.04	0.46
68	f	'17-Oct-1992 00:30:00'	27.00	5.34	17.00	5.77	0.64	32.95	210.78	-9999.00	-9999.00	-0.09	0.34
69	f	'09-Jun-1995 20:00:00'	30.00	5.39	14.43	5.97	0.63	37.18	210.85	-9999.00	-9999.00	0.29	0.76
70	f	'10-Sep-2001 06:30:00'	27.00	5.23	17.12	5.66	0.62	31.56	214.88	-9999.00	-9999.00	0.08	0.45
71	f	'16-Aug-2001 15:30:00'	27.00	5.63	14.28	6.05	0.62	36.78	211.18	-9999.00	-9999.00	-0.03	0.58
72	f	'28-Jul-2003 14:00:00'	30.00	5.18	15.34	5.53	0.62	34.42	212.73	-9999.00	-9999.00	-0.10	0.49
73	f	'29-May-1993 18:30:00'	33.00	5.45	13.07	6.47	0.61	41.56	207.25	-9999.00	-9999.00	0.12	0.39
74	f	'29-Aug-1991 08:00:00'	30.00	5.39	13.85	5.75	0.61	37.13	211.51	-9999.00	-9999.00	-0.04	0.39
75	f	'12-May-2000 15:30:00'	33.00	5.40	12.56	6.04	0.60	41.35	207.87	-9999.00	-9999.00	0.29	0.64
76	f	'26-May-2000 12:30:00'	33.00	5.12	13.90	5.61	0.60	36.77	195.29	-9999.00	-9999.00	0.12	0.39
77	f	'20-Apr-1992 05:00:00'	30.00	5.17	14.84	5.76	0.60	34.28	211.20	-9999.00	-9999.00	0.07	0.50
78	f	'07-Aug-2003 09:30:00'	33.00	4.79	15.95	4.93	0.59	31.65	201.69	-9999.00	-9999.00	-0.17	0.18
79	f	'21-Jul-1995 14:00:00'	30.00	5.54	12.26	6.56	0.58	40.03	212.03	-9999.00	-9999.00	0.27	0.58
80	f	'01-Aug-2007 05:00:00'	30.00	5.00	15.76	5.31	0.58	31.66	216.45	-9999.00	-9999.00	0.33	0.89
81	f	'12-Apr-2003 23:00:00'	30.00	5.59	12.70	6.34	0.58	39.99	210.82	-9999.00	-9999.00	0.37	0.76
82	f	'21-Jun-1987 06:30:00'	27.00	5.08	16.54	5.57	0.57	29.66	214.99	-9999.00	-99		

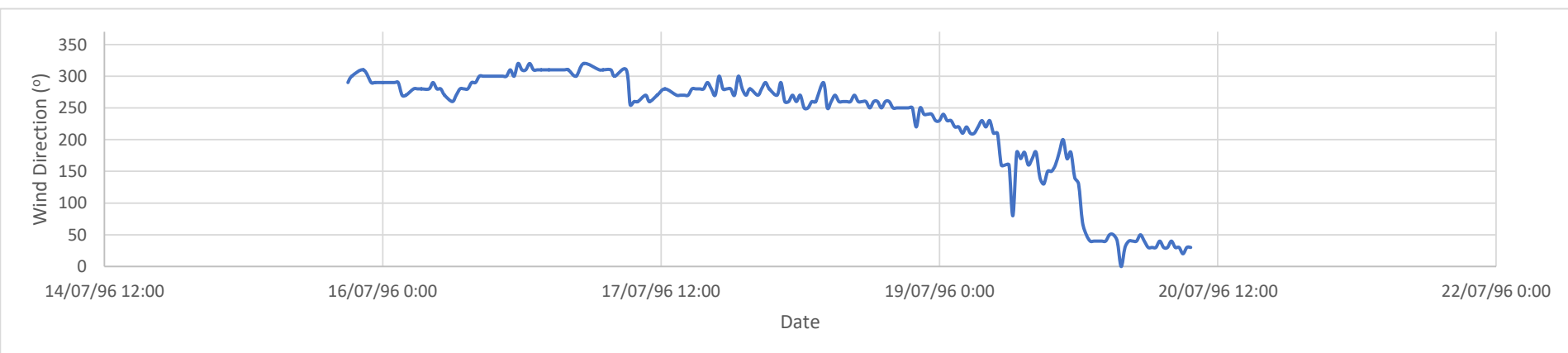
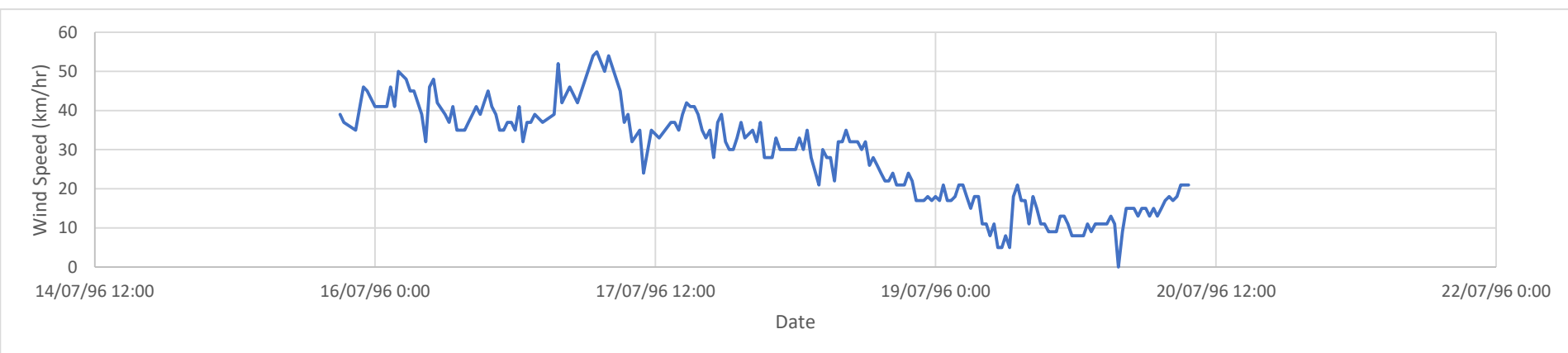
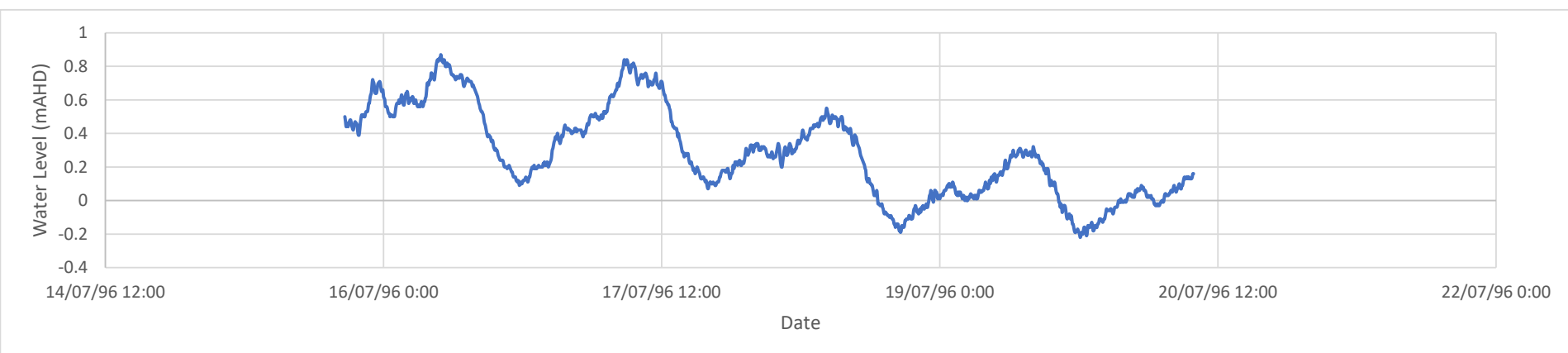
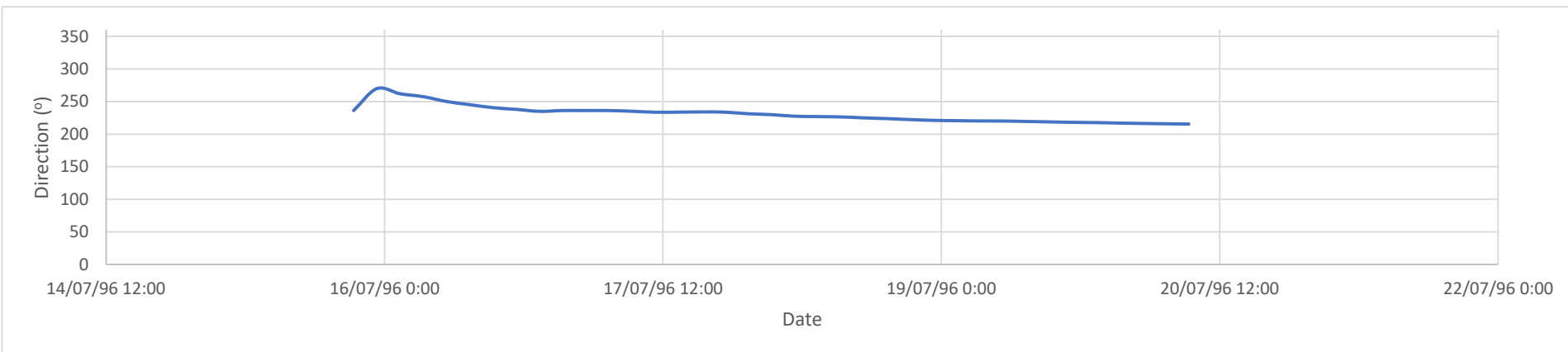
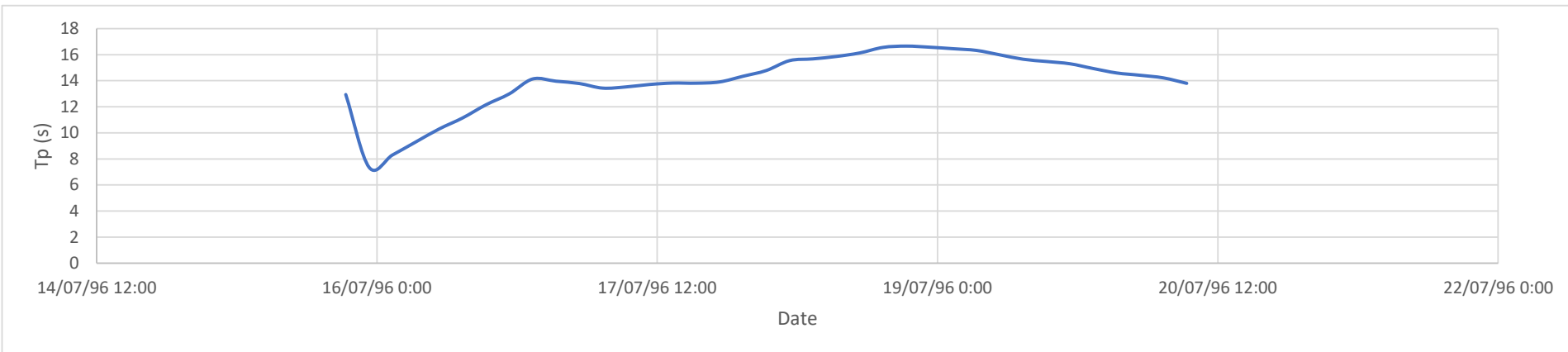
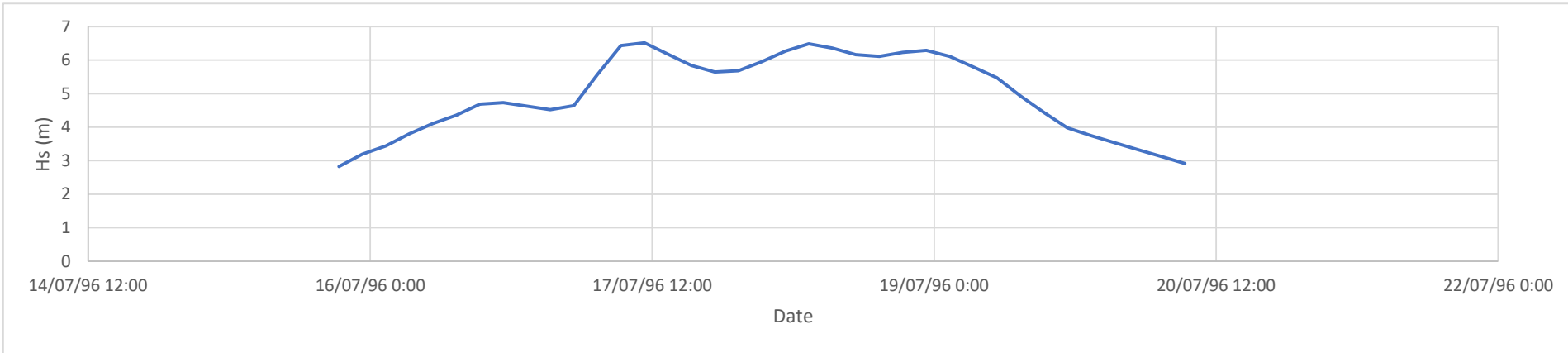
Location	Esperance
Method	72 Hour Comparison
Title	Esperance 72 Hour Comparison



Appendix C Time Histories of Key Storms

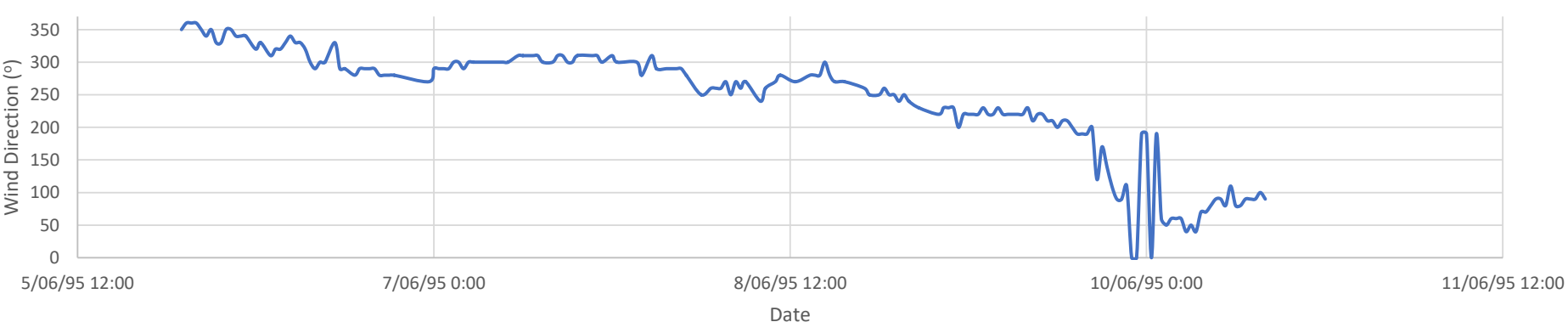
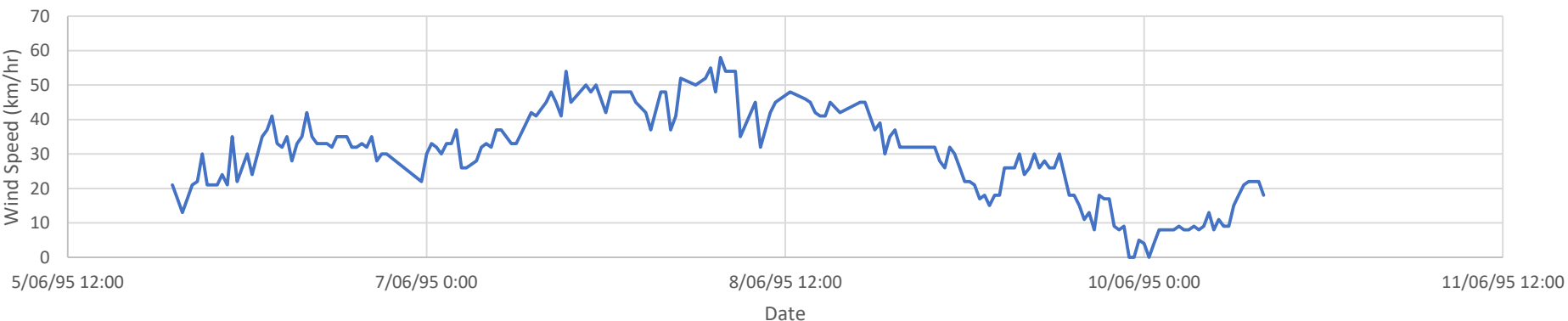
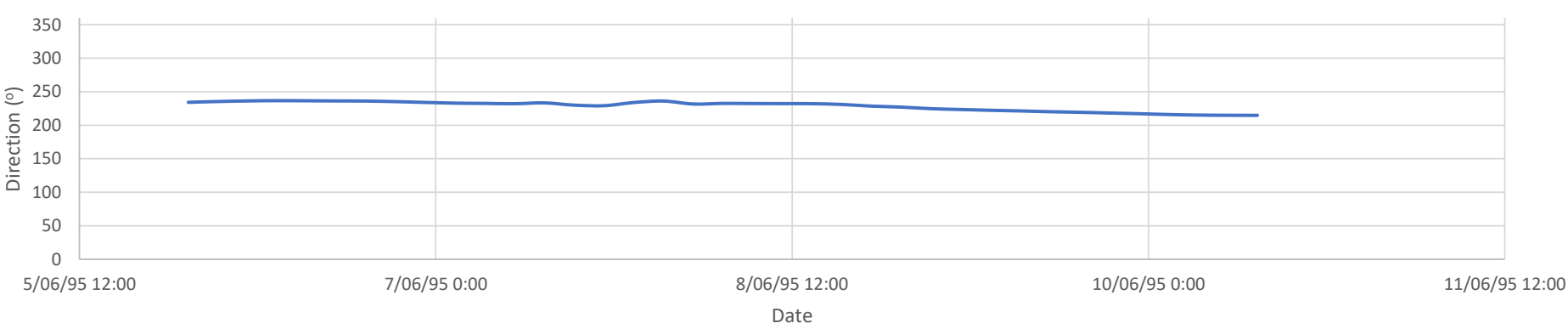
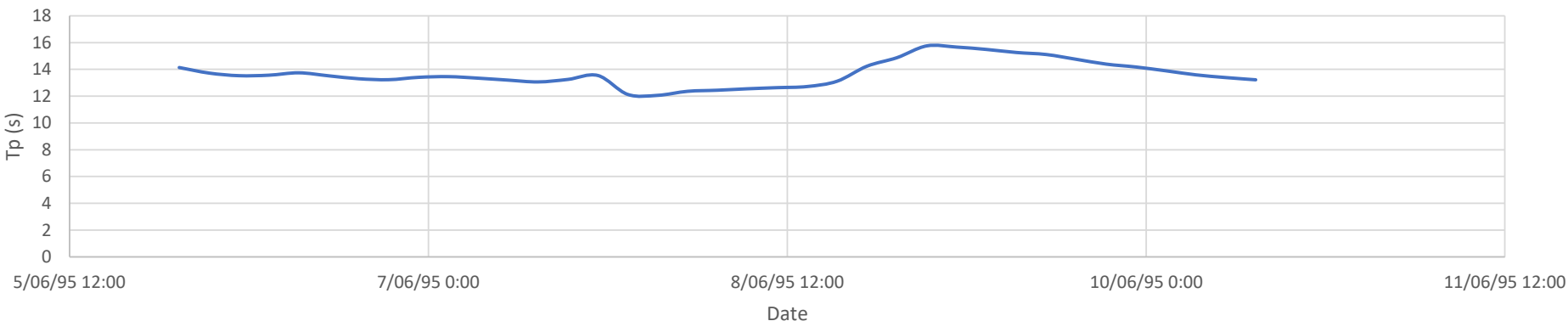
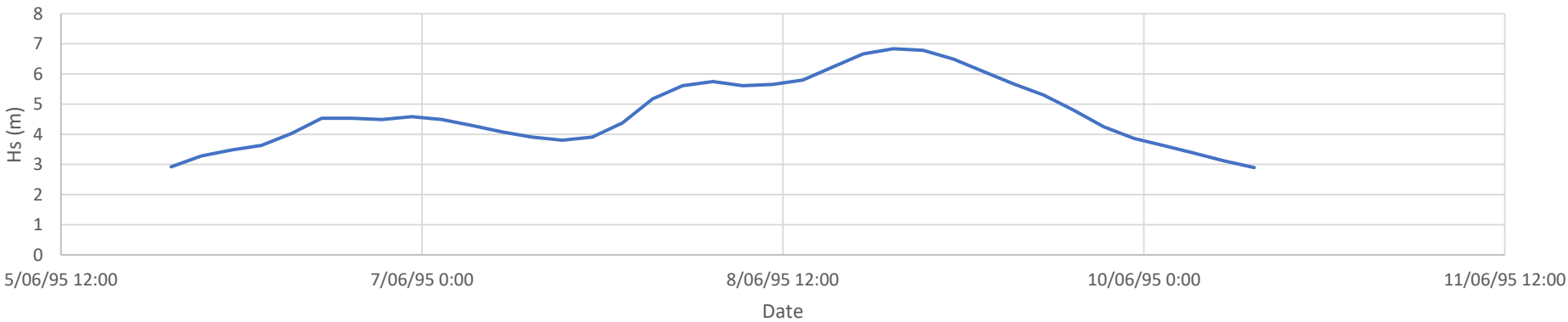
K1509 - South West Storm Selection
Top Mid-West (Geraldton) Storm Plots

Location	Geraldton
Start Date	15-07-96 20:00
End Date	20-07-96 8:00



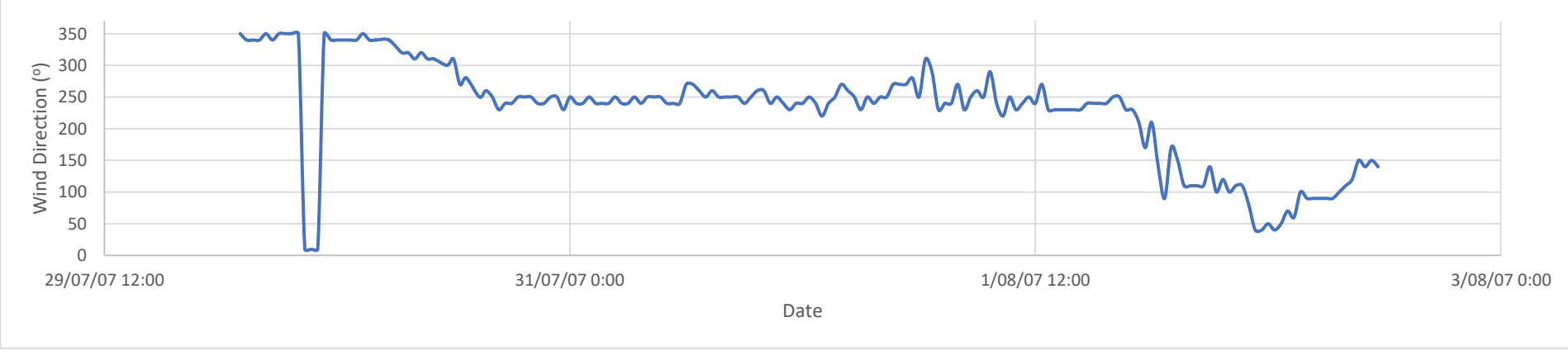
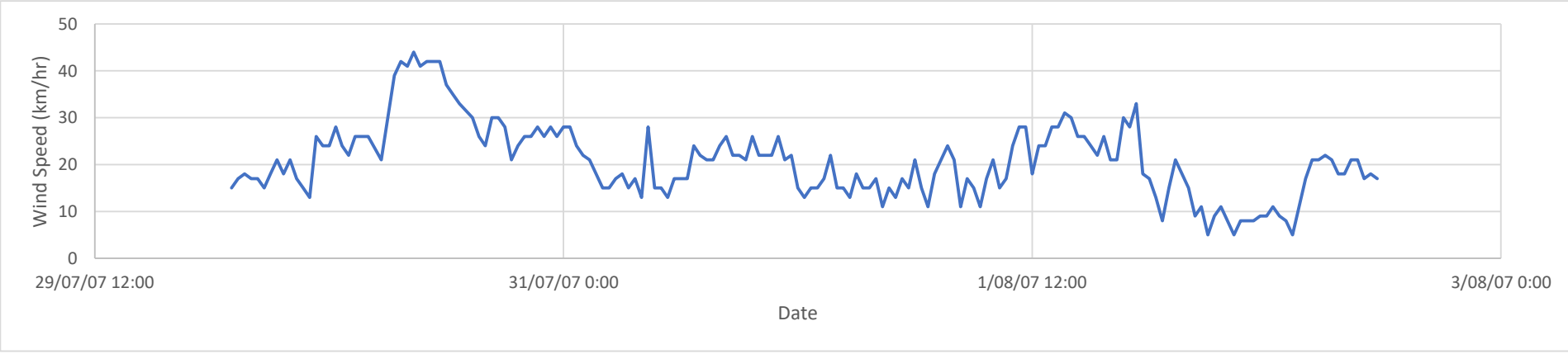
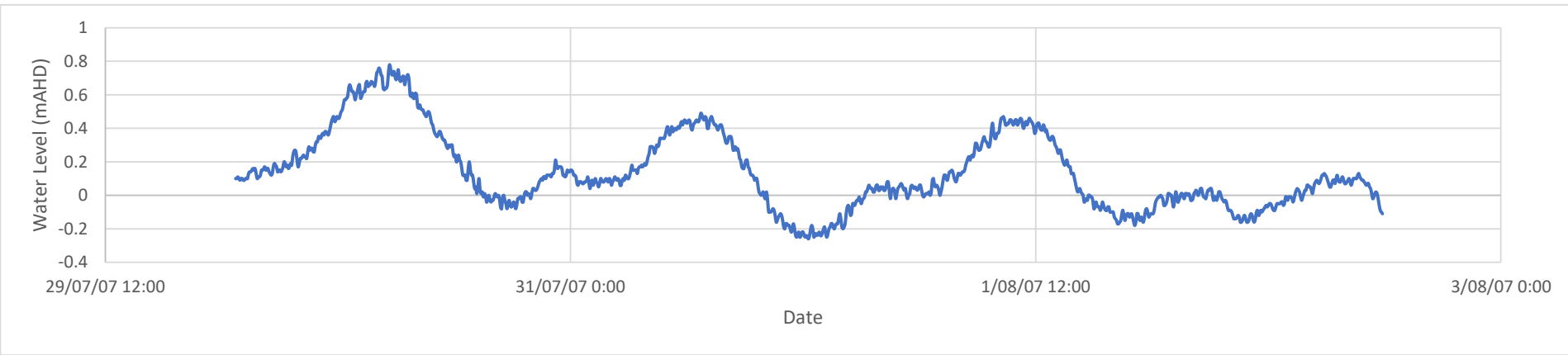
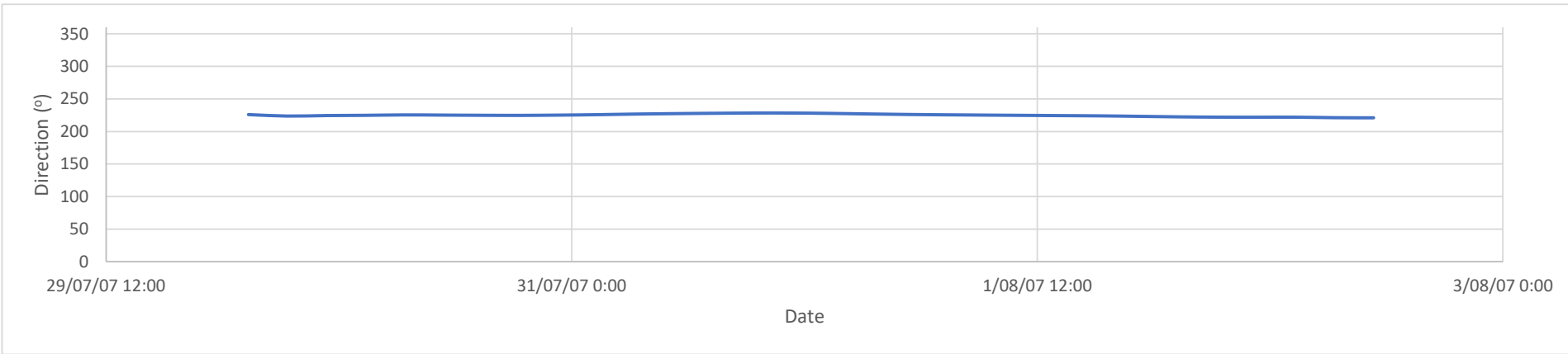
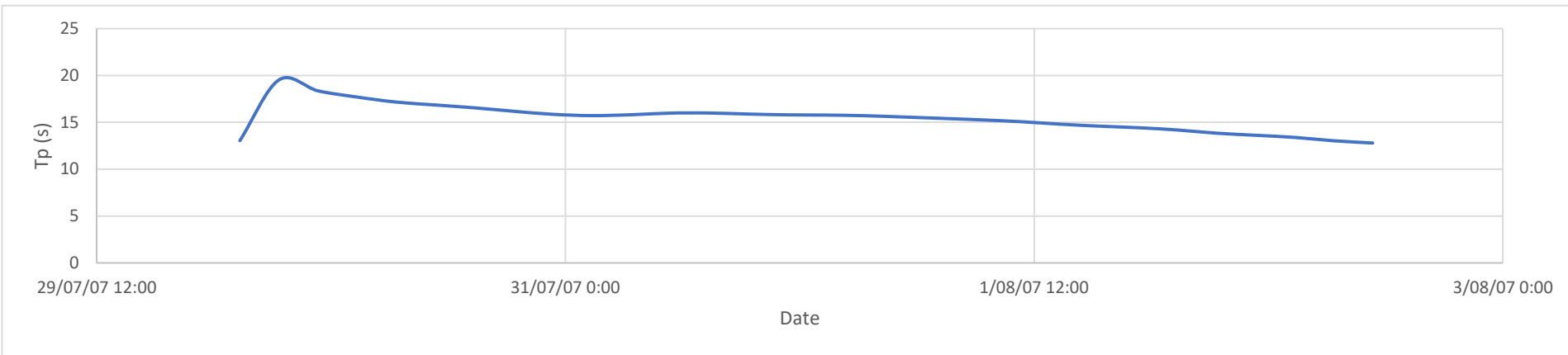
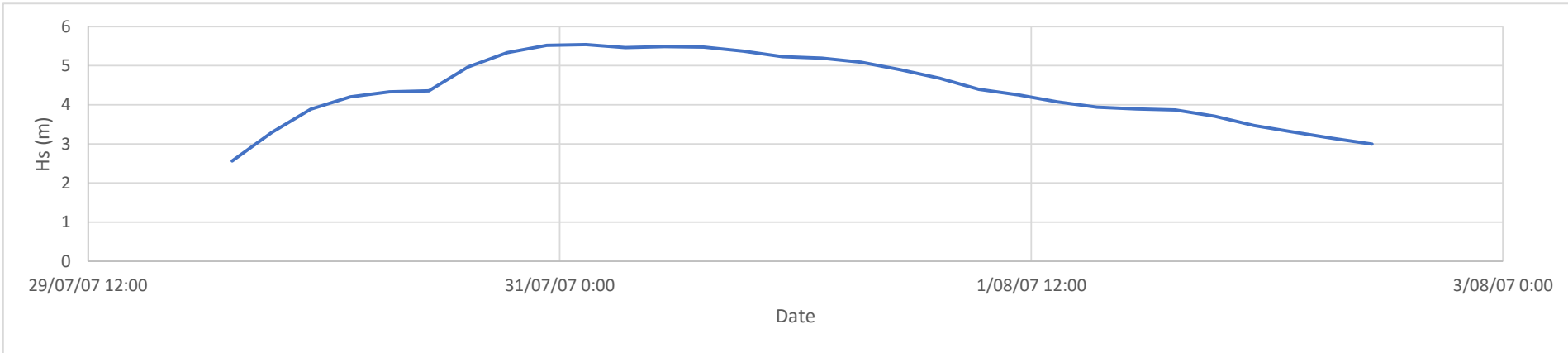
K1509 - South West Storm Selection
Top Mid-West (Geraldton) Storm Plots

Location	Geraldton
Start Date	05-06-95 23:00
End Date	10-06-95 11:00



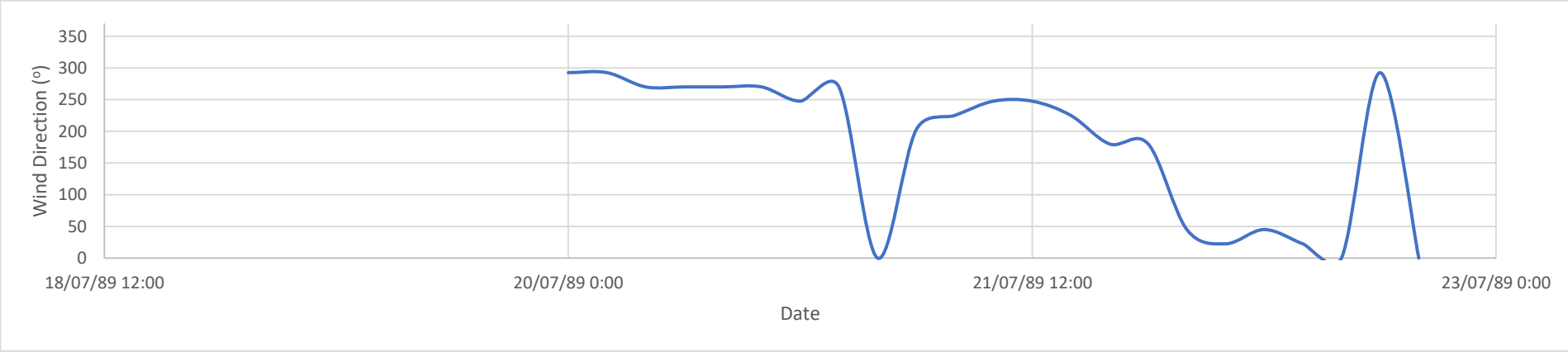
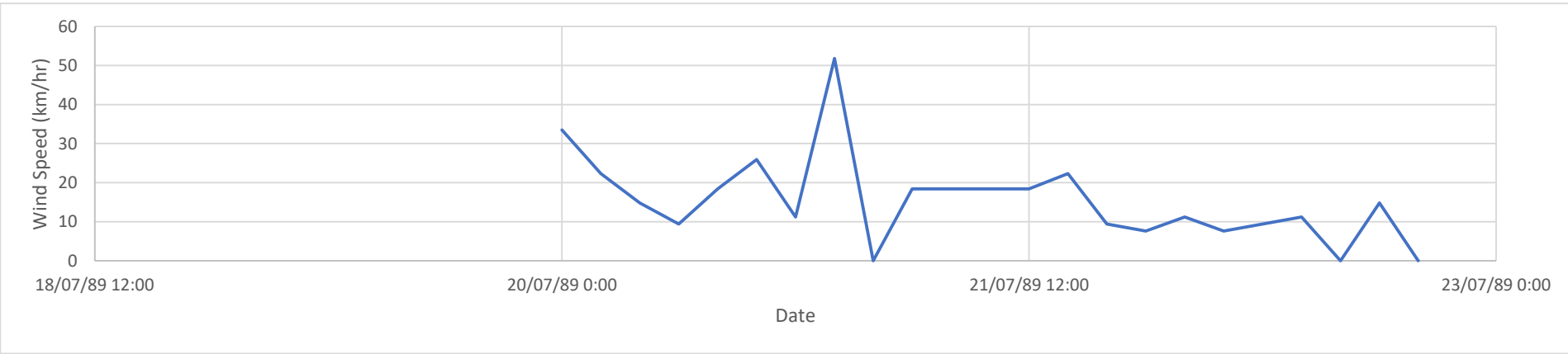
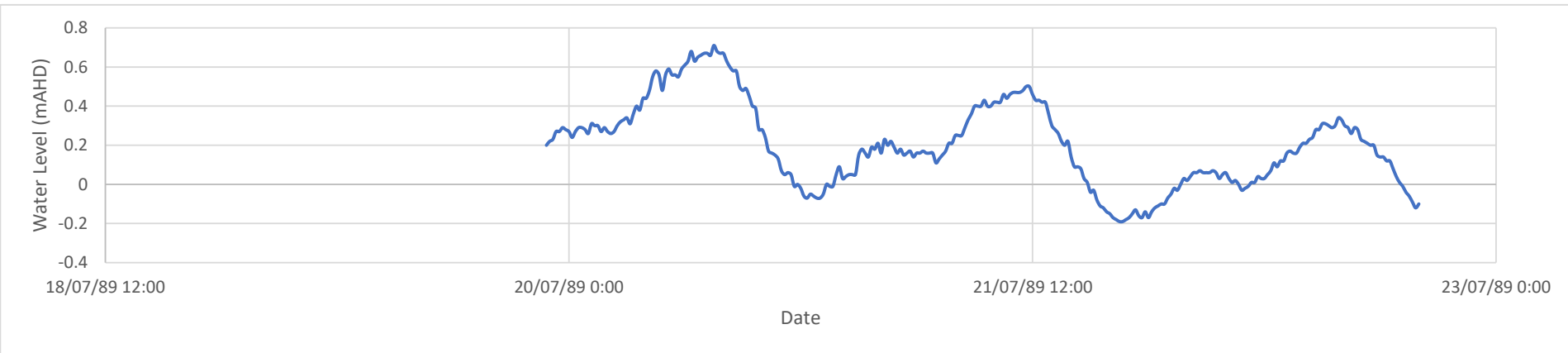
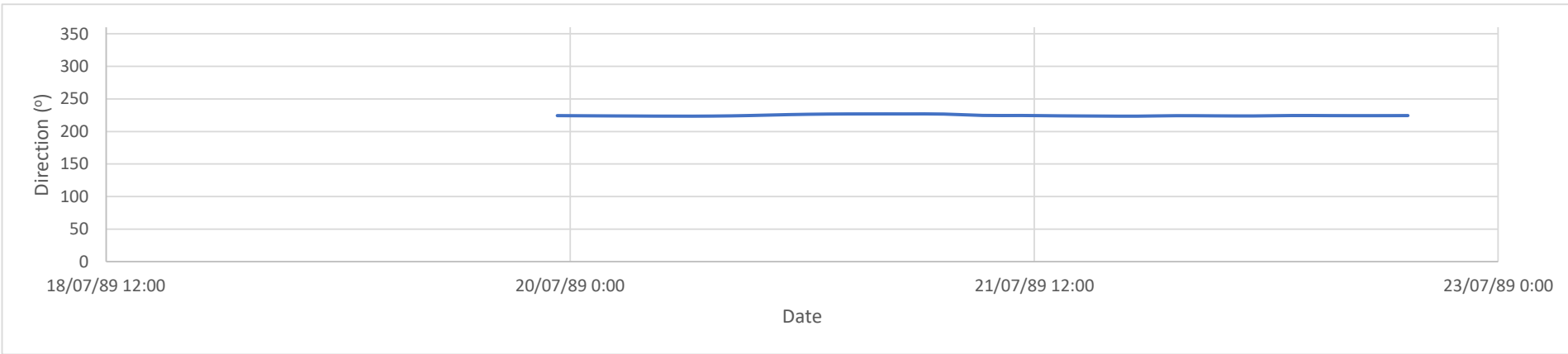
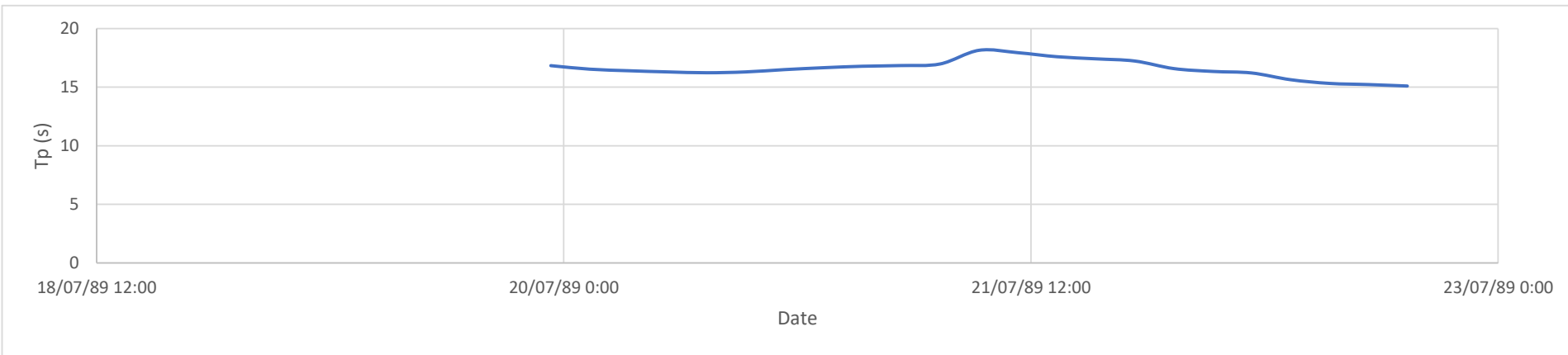
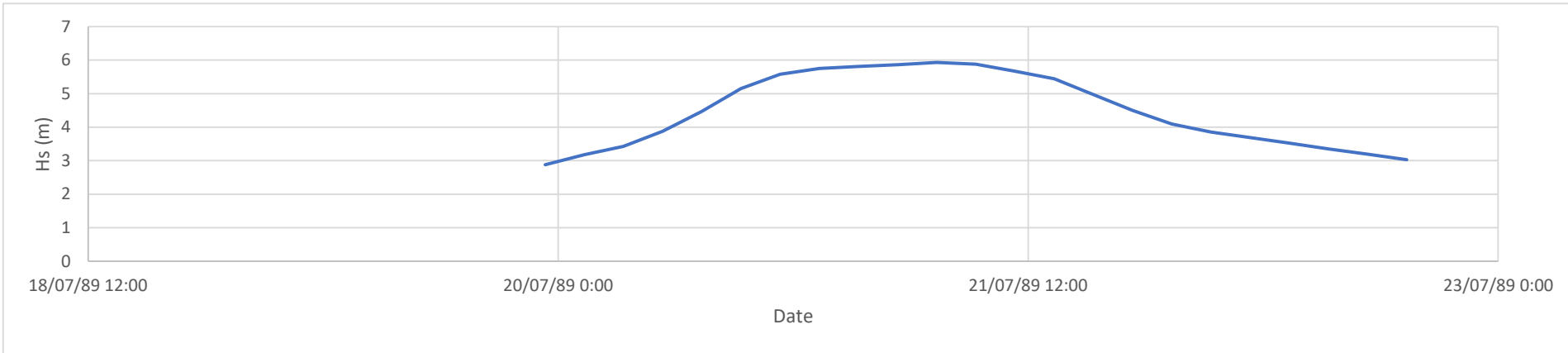
K1509 - South West Storm Selection
Top Mid-West (Geraldton) Storm Plots

Location	Geraldton
Start Date	29-07-07 23:00
End Date	02-08-07 14:00



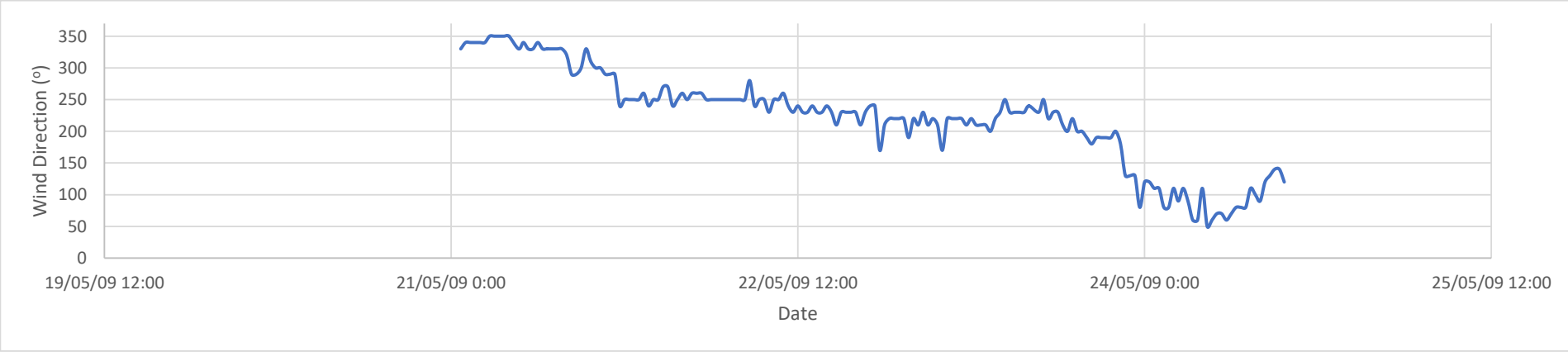
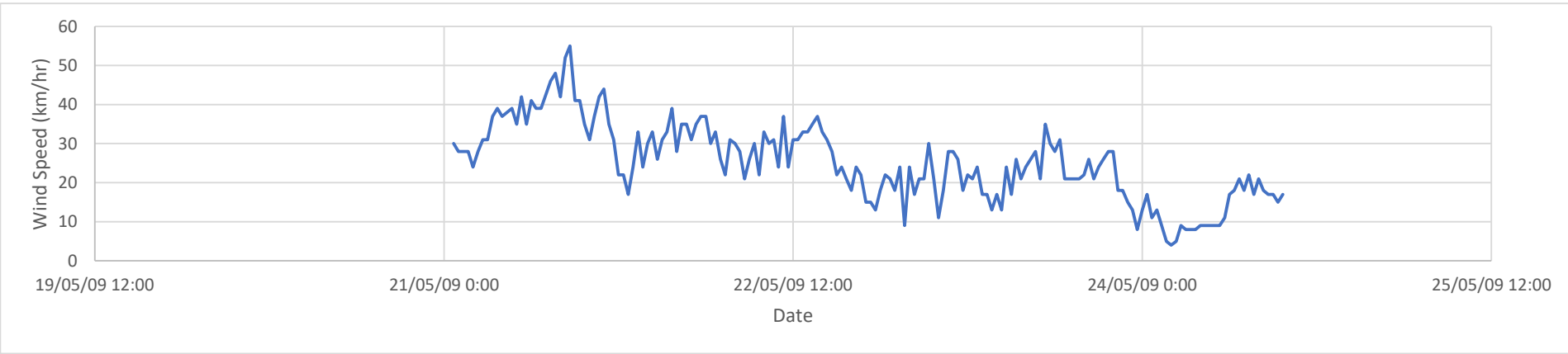
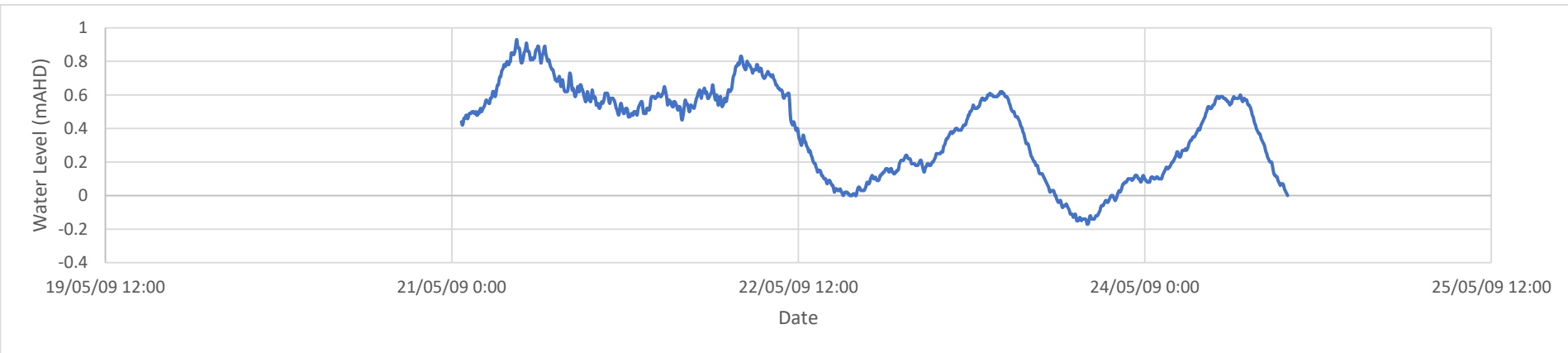
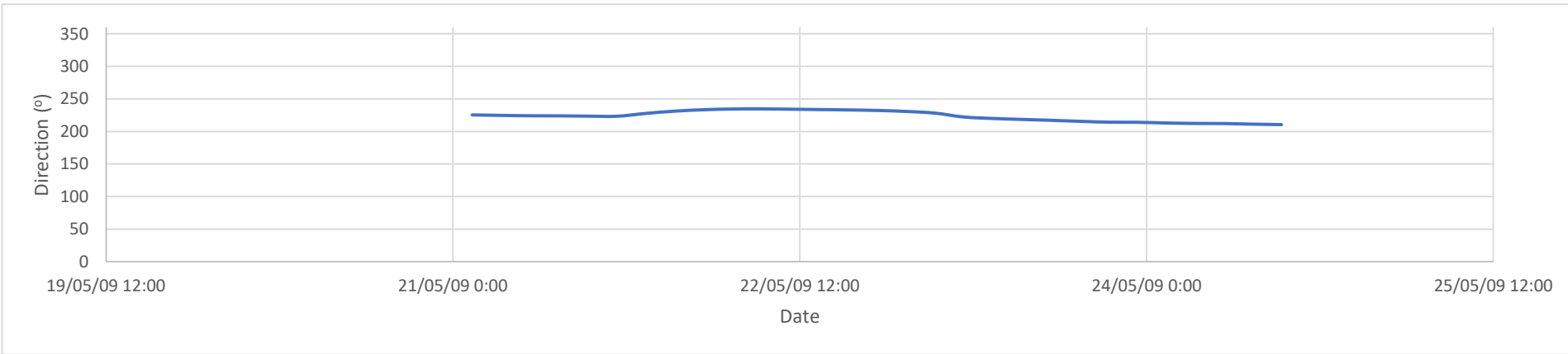
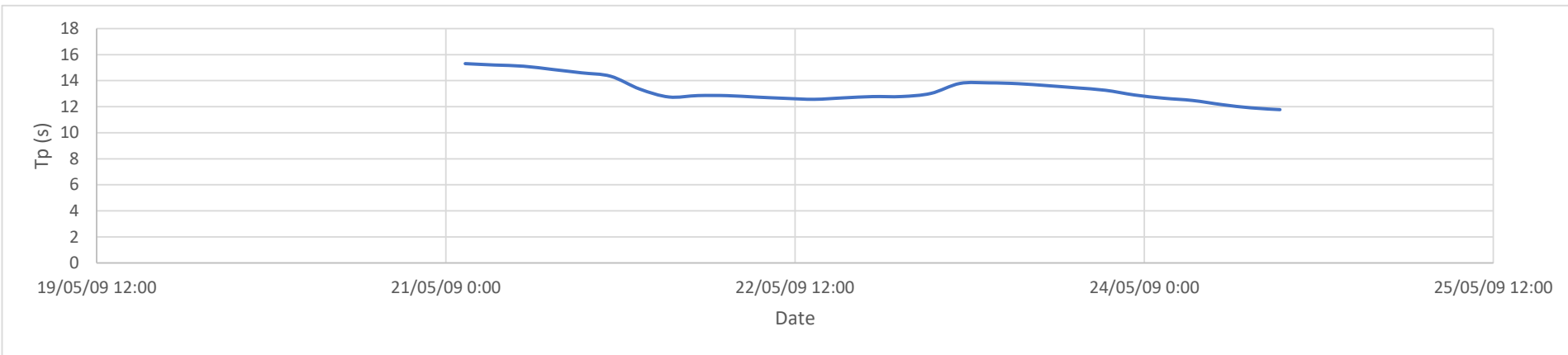
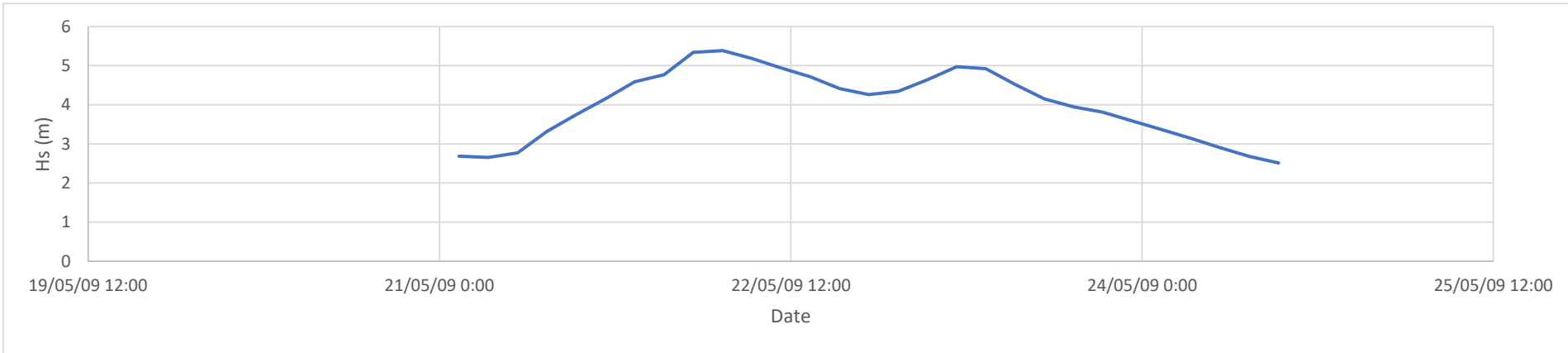
K1509 - South West Storm Selection
Top Mid-West (Geraldton) Storm Plots

Location	Geraldton
Start Date	19-07-89 23:00
End Date	22-07-89 17:00



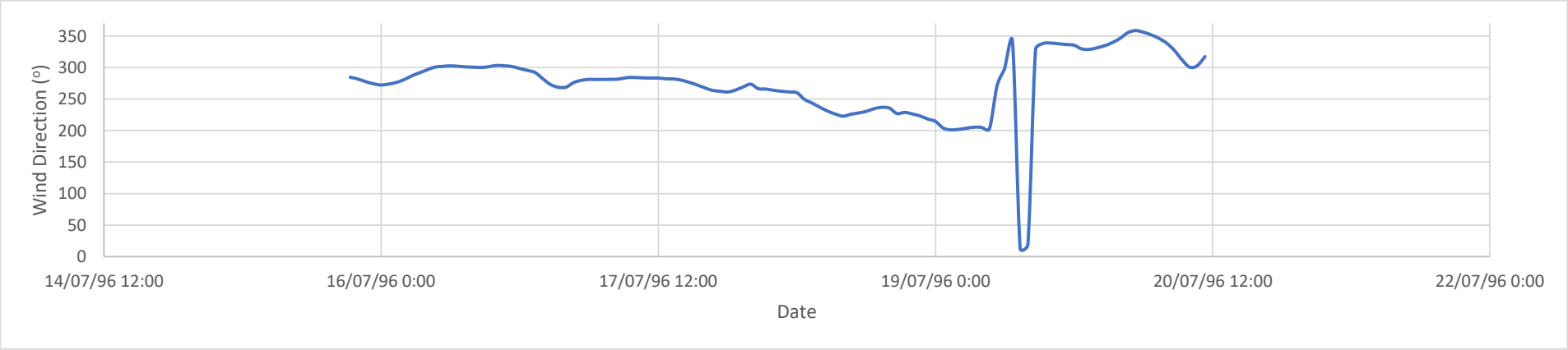
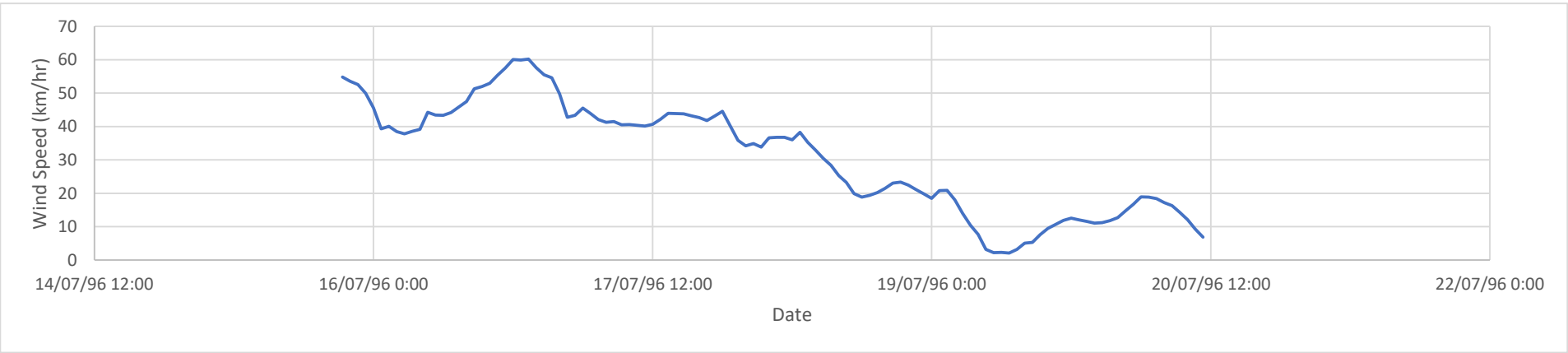
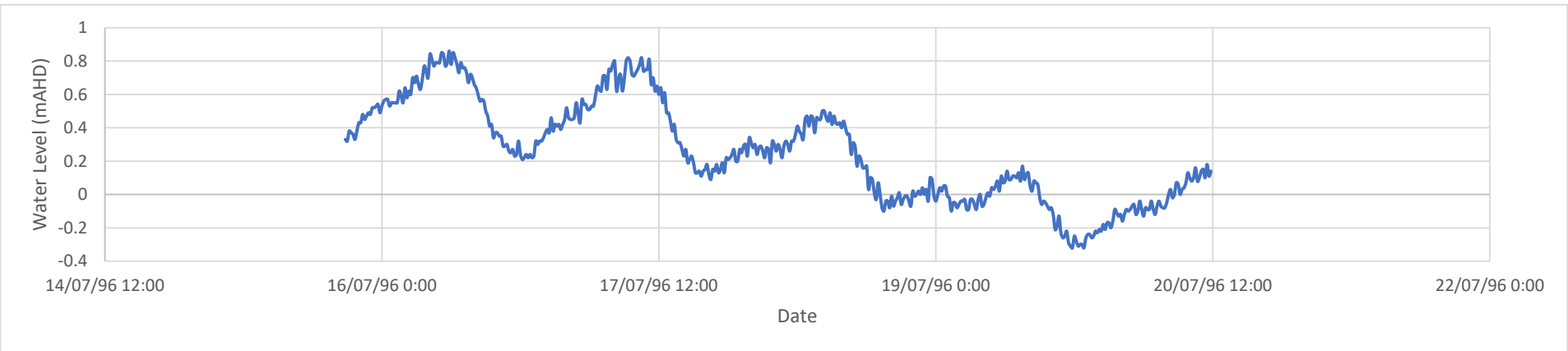
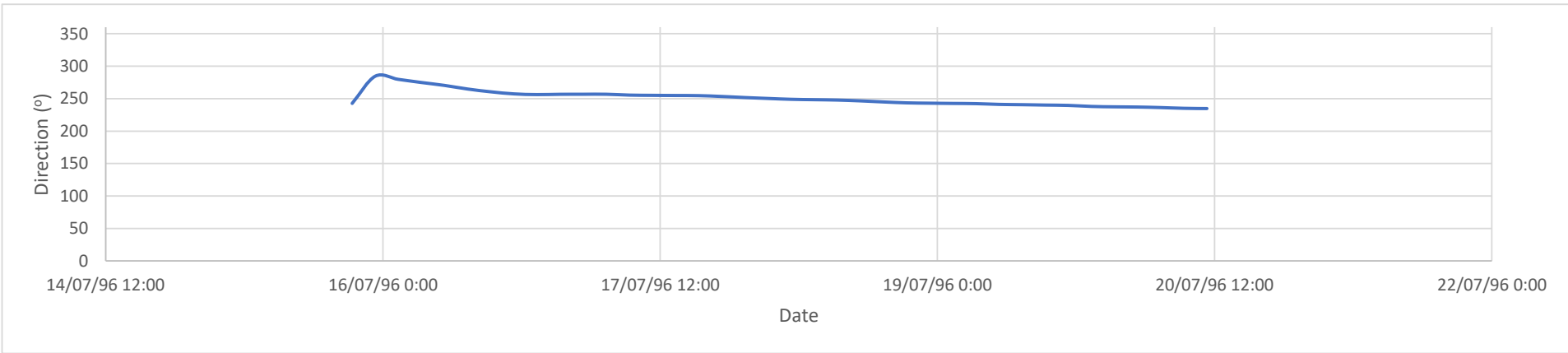
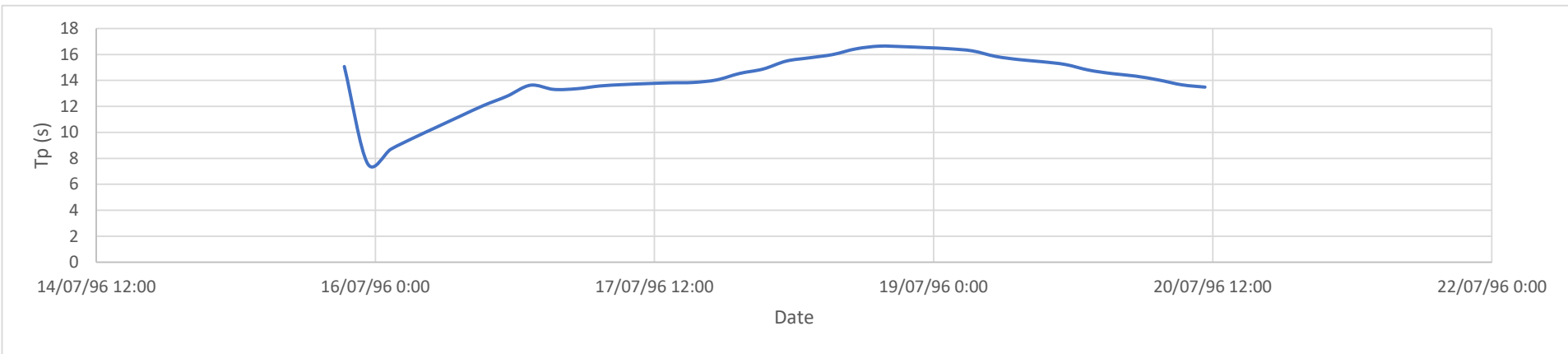
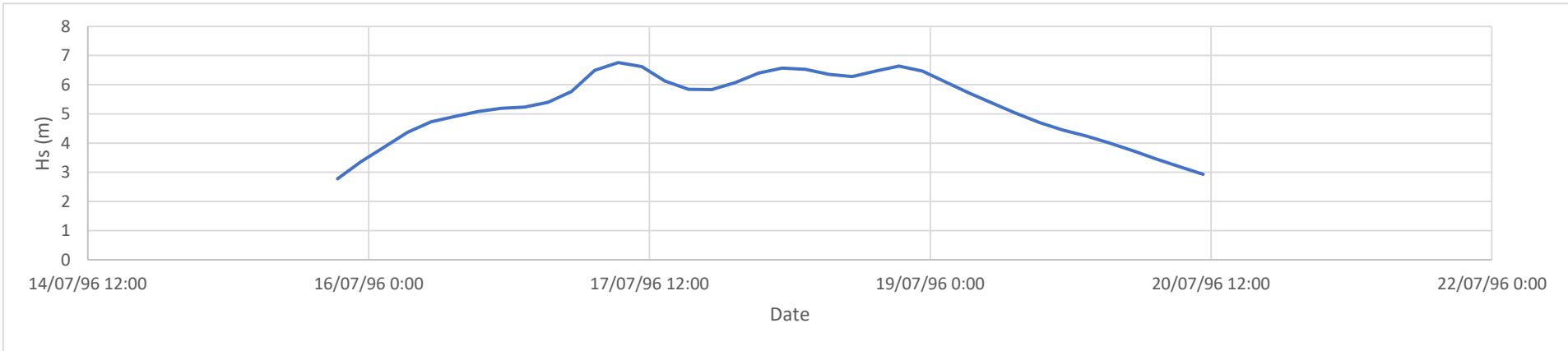
K1509 - South West Storm Selection
Top Mid-West (Geraldton) Storm Plots

Location	Geraldton
Start Date	21-05-09 2:00
End Date	24-05-09 14:00



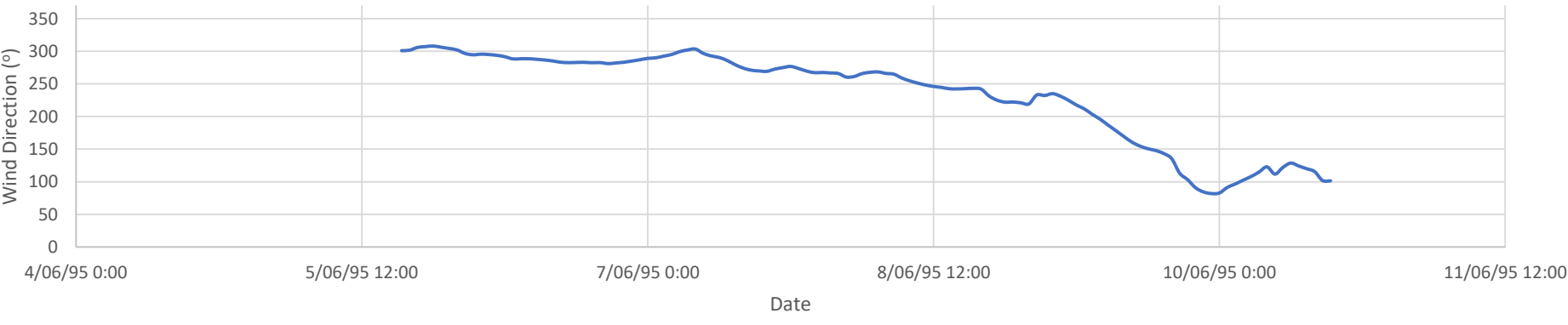
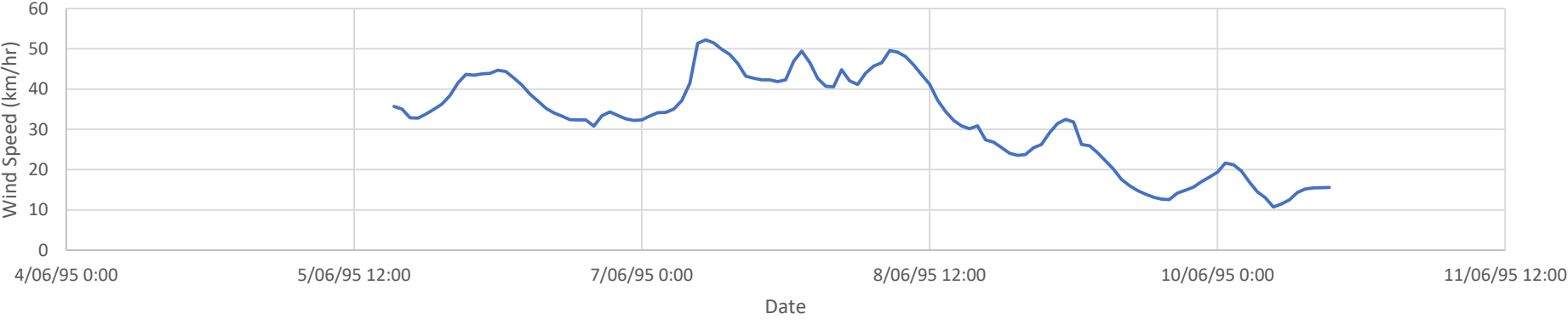
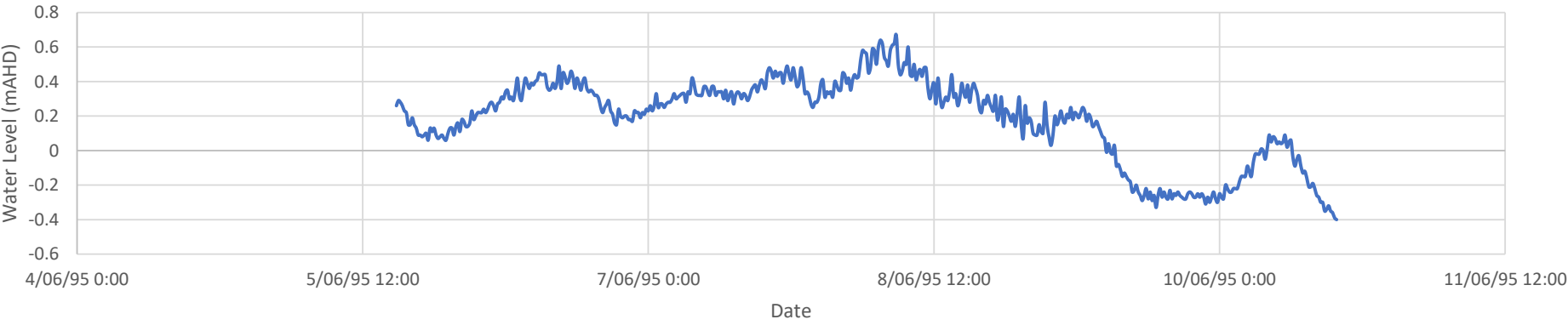
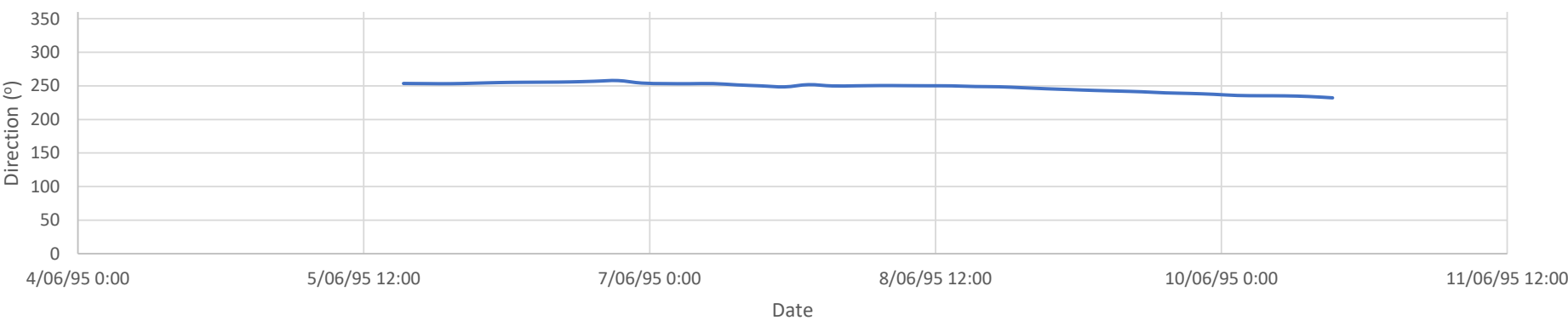
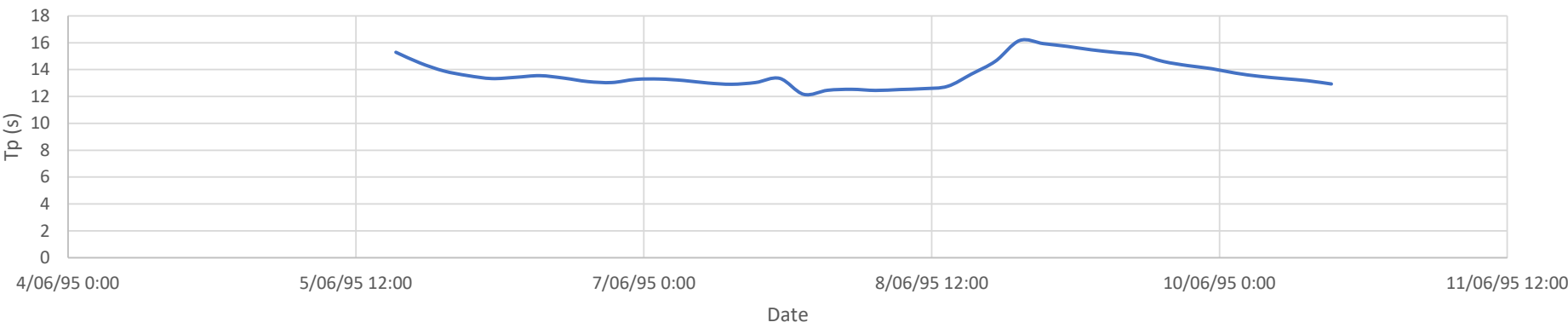
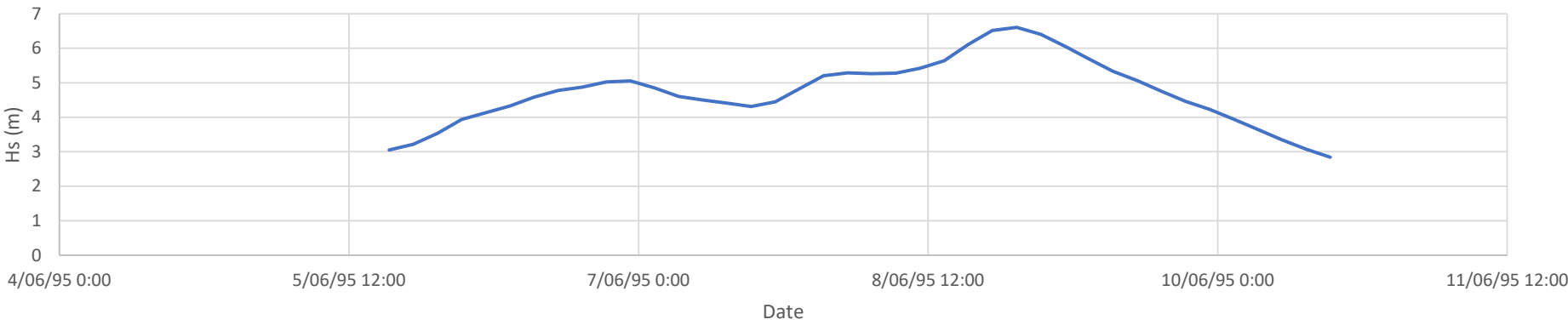
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	15-07-96 20:00
End Date	20-07-96 11:00



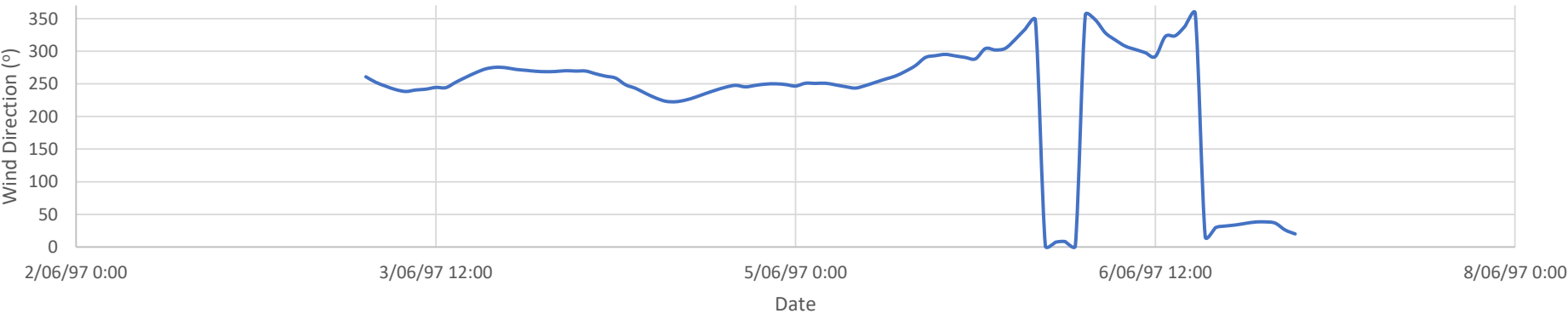
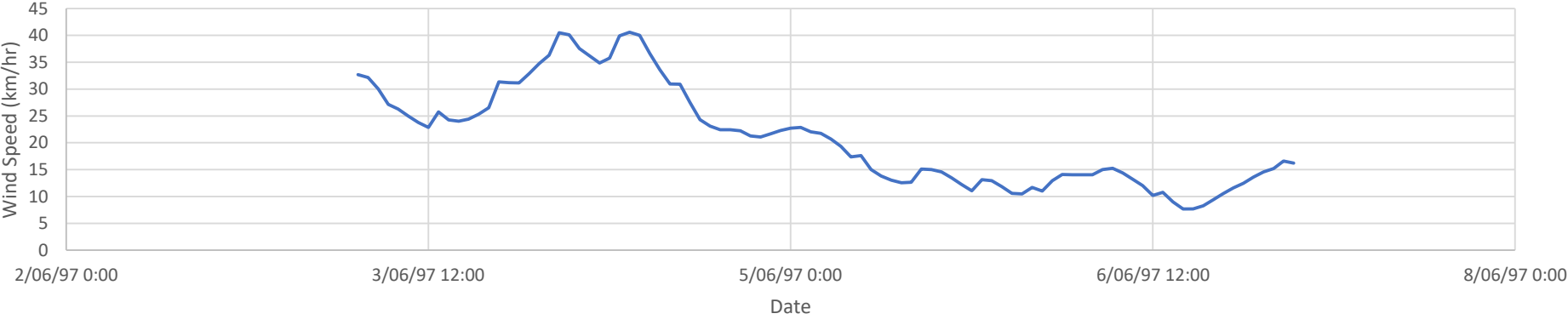
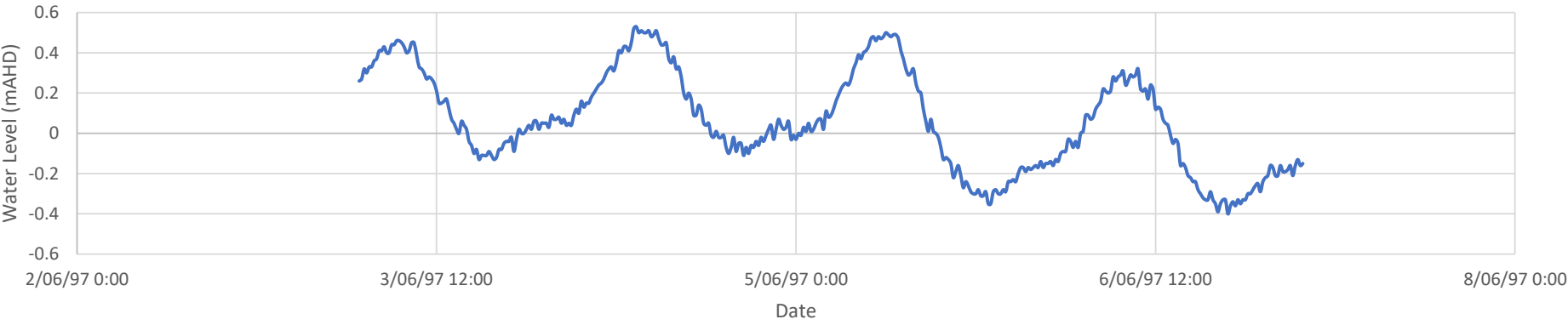
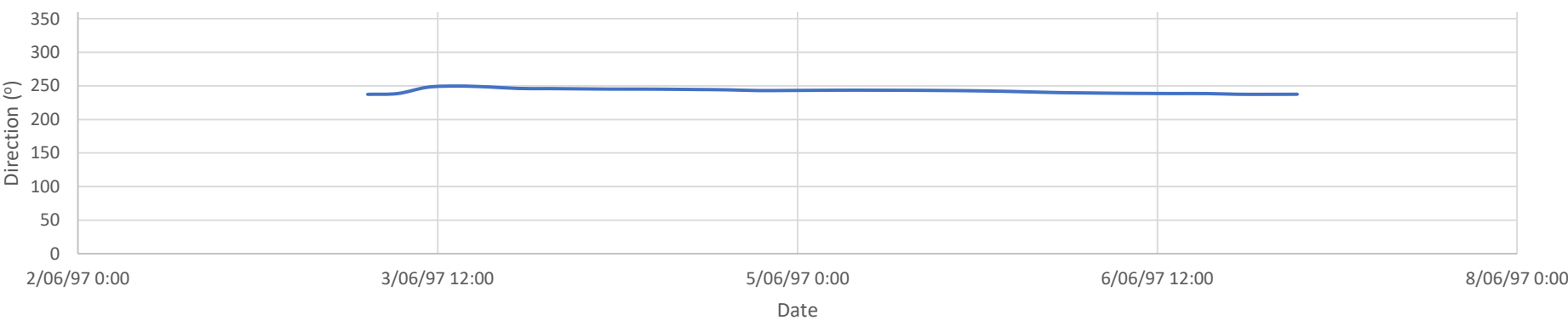
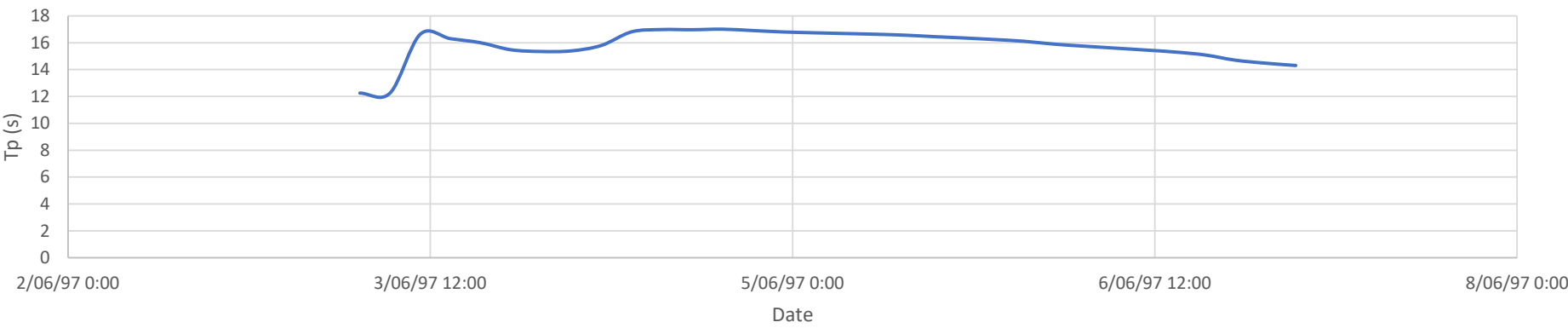
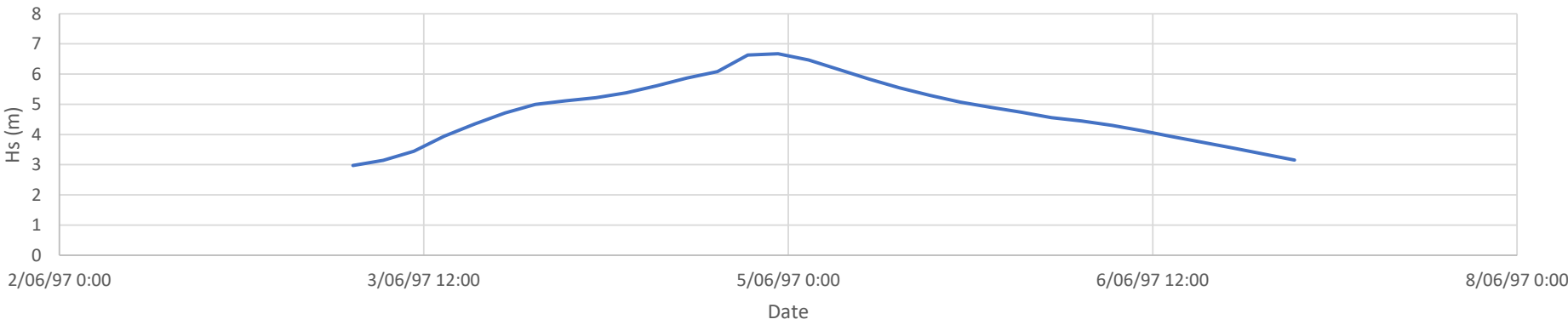
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	05-06-95 17:00
End Date	10-06-95 14:00



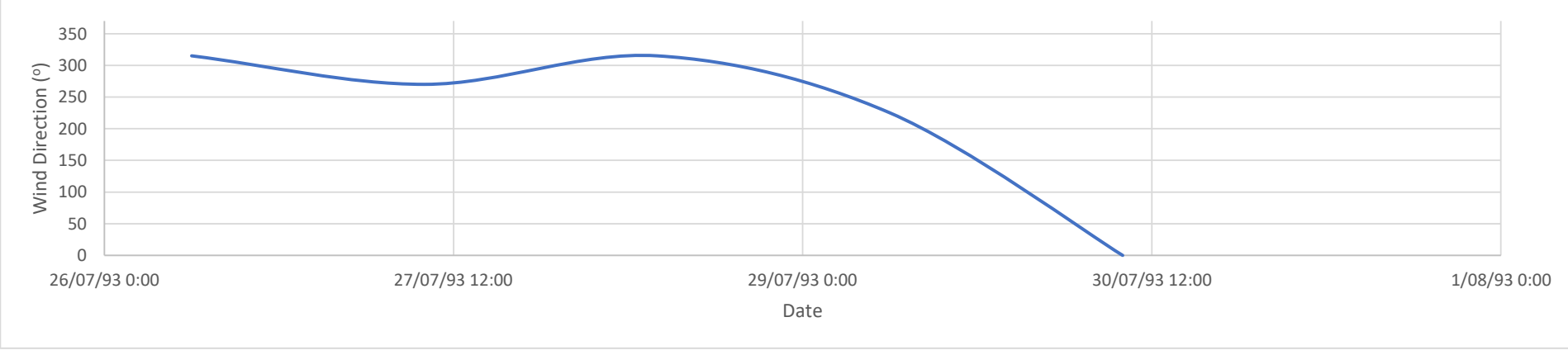
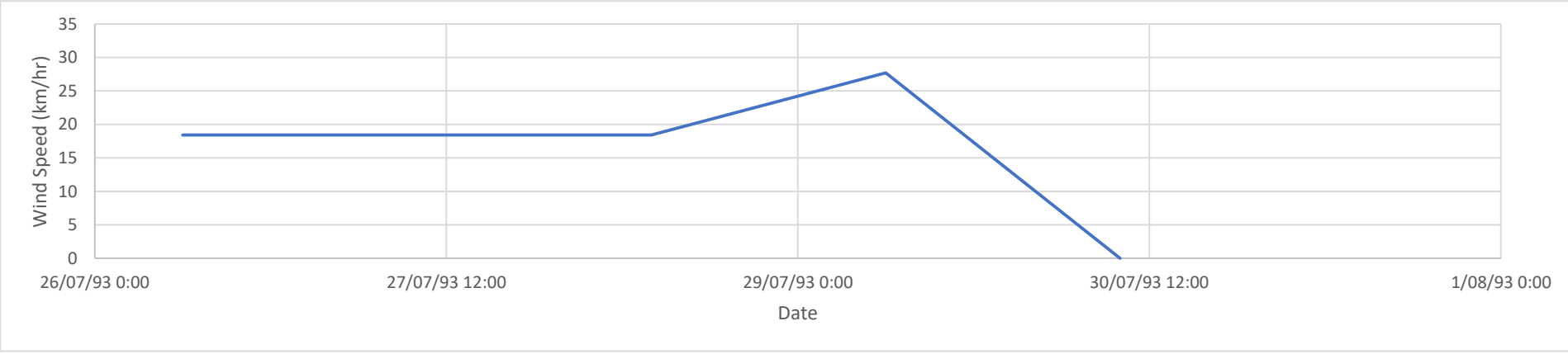
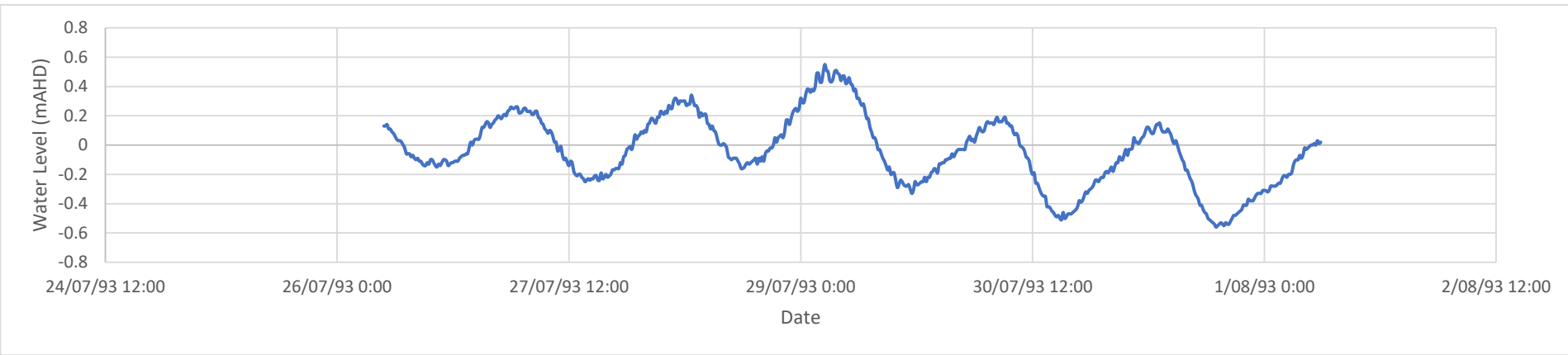
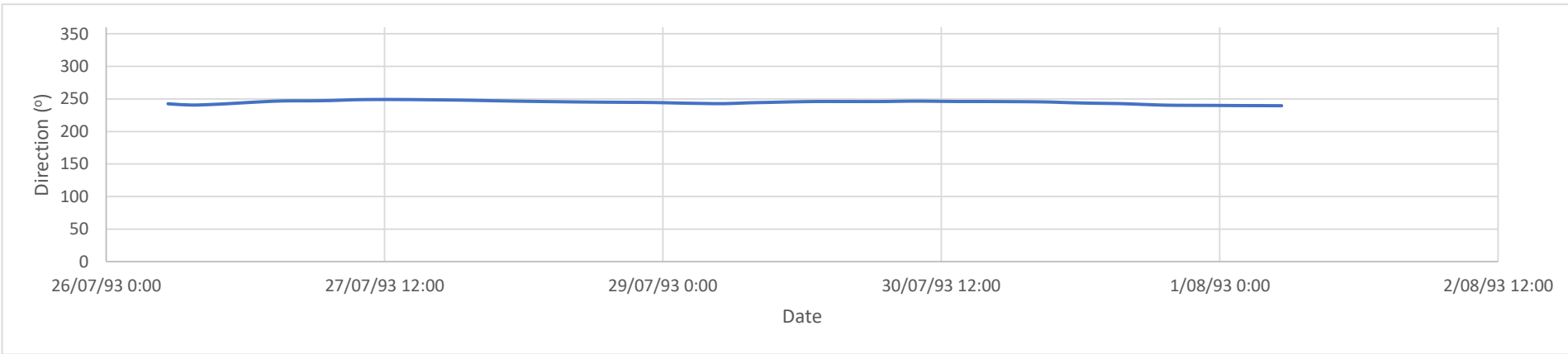
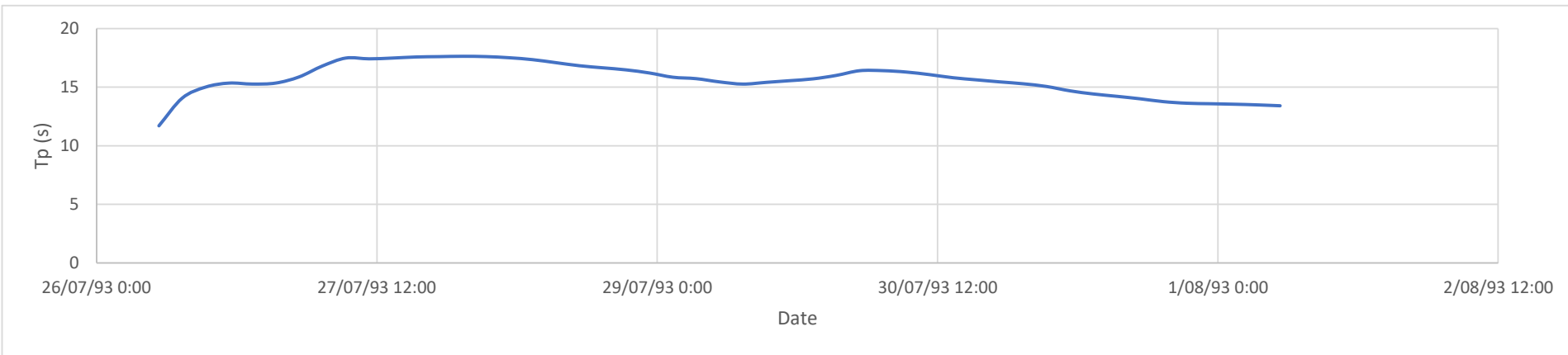
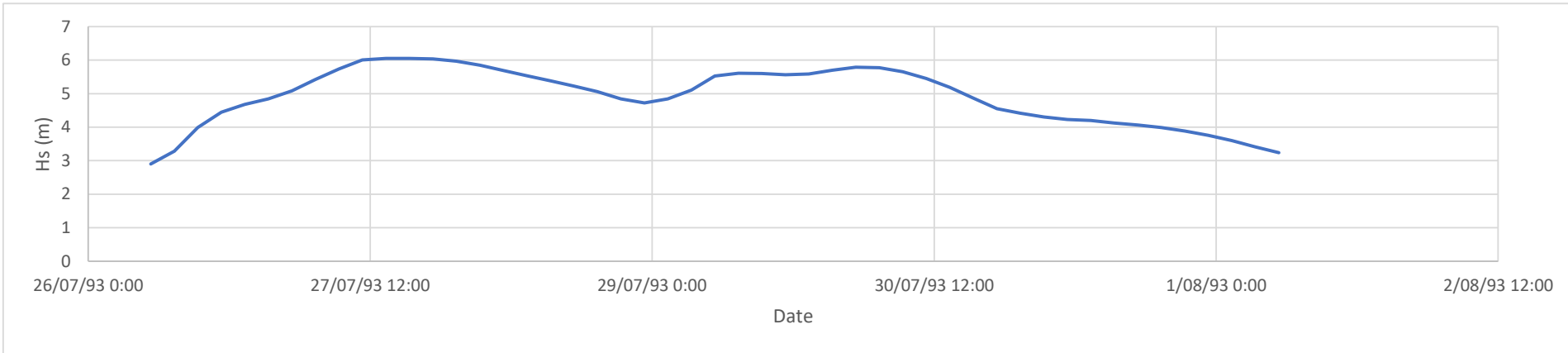
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	03-06-97 5:00
End Date	07-06-97 2:00



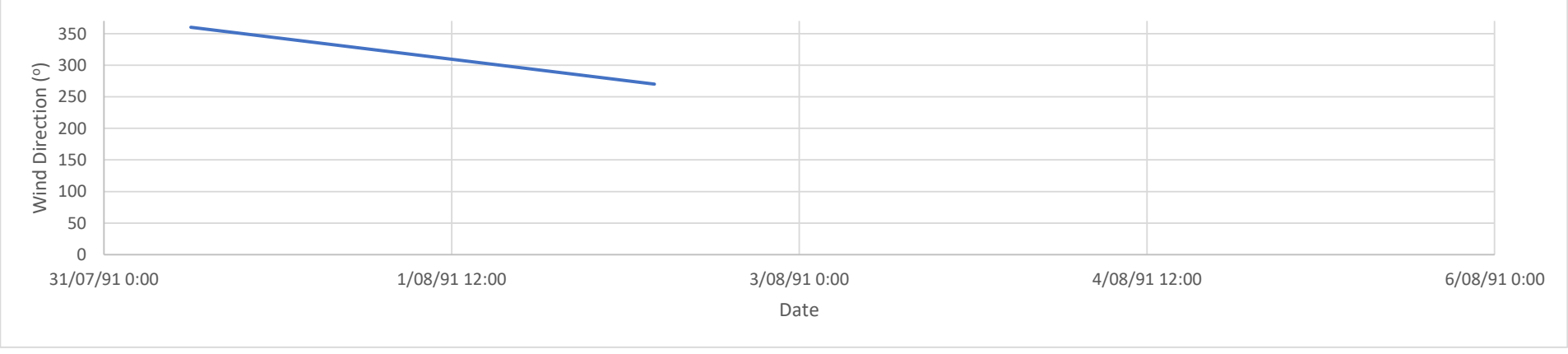
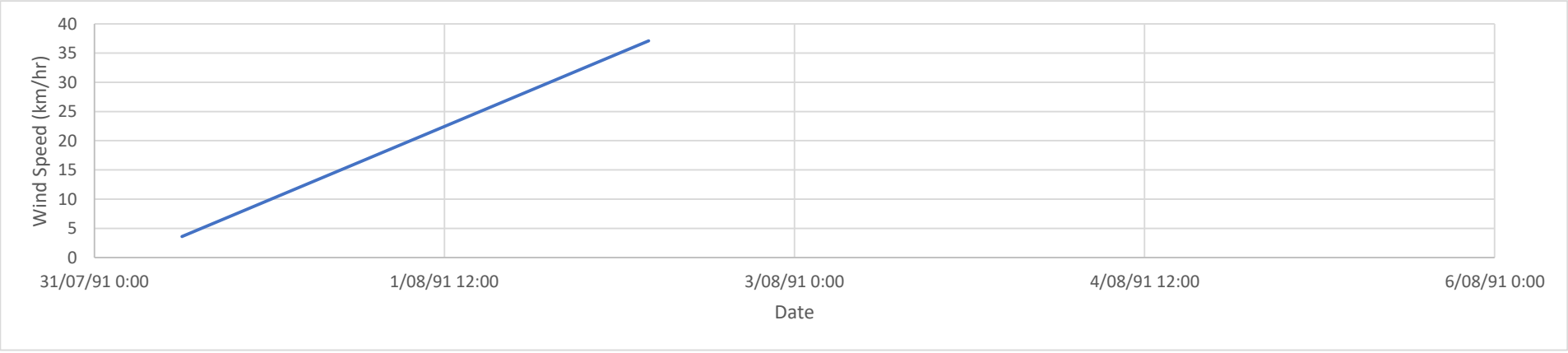
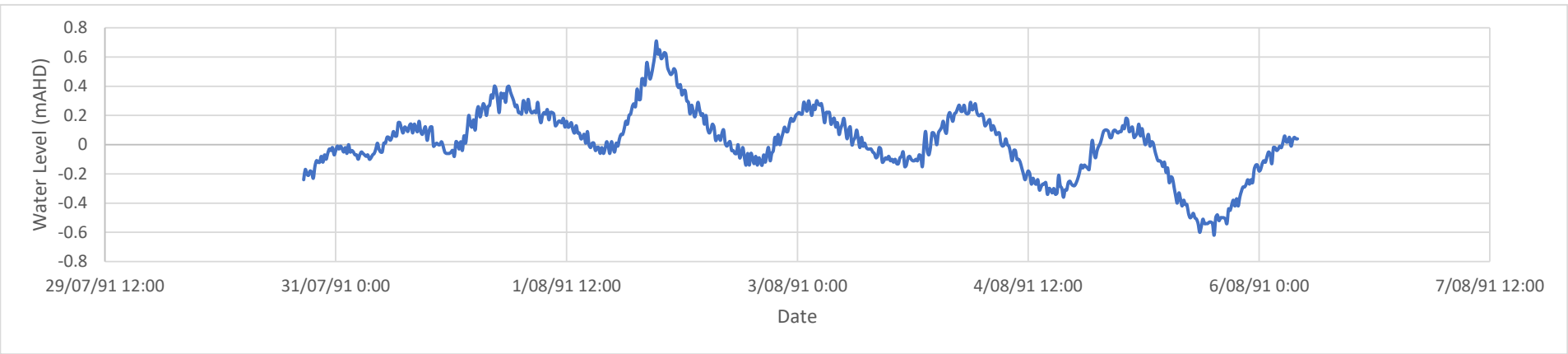
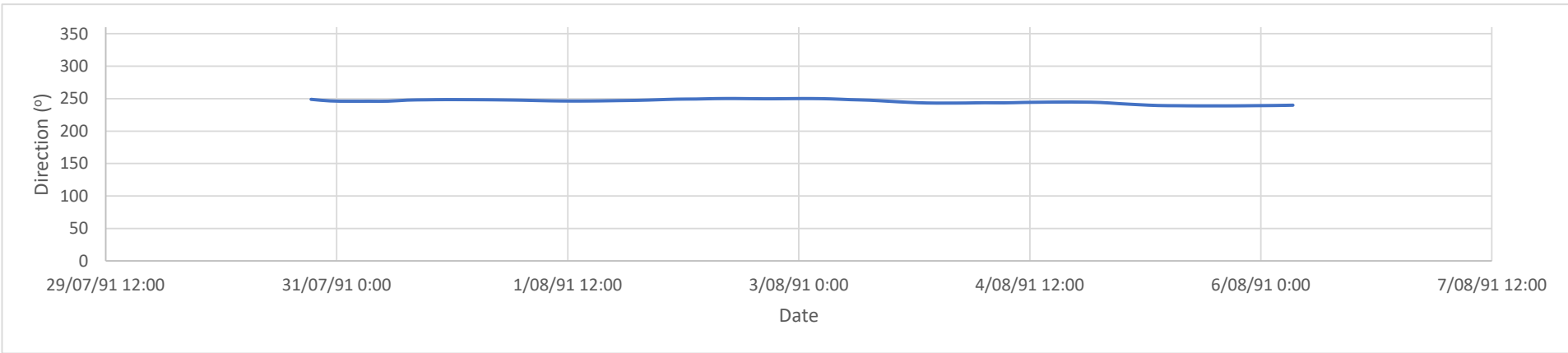
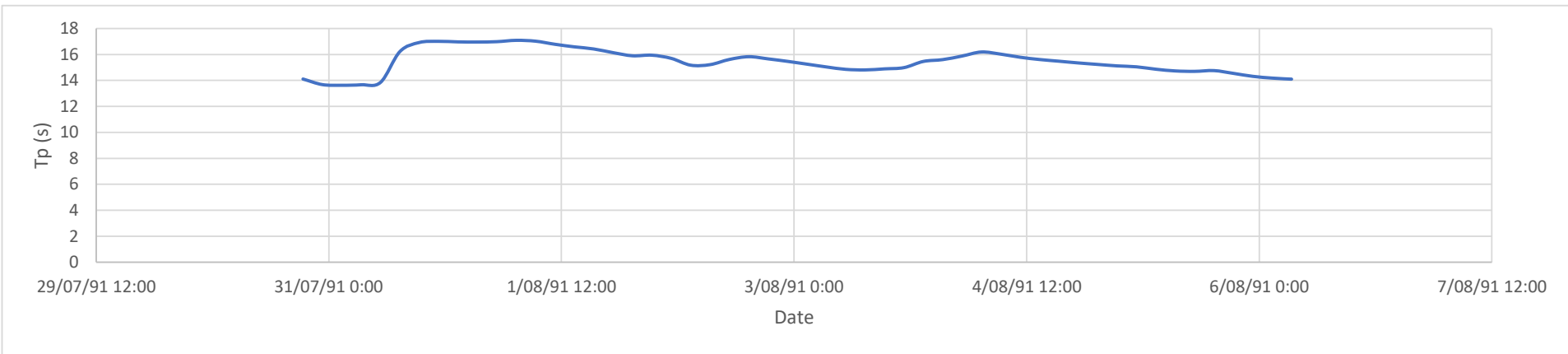
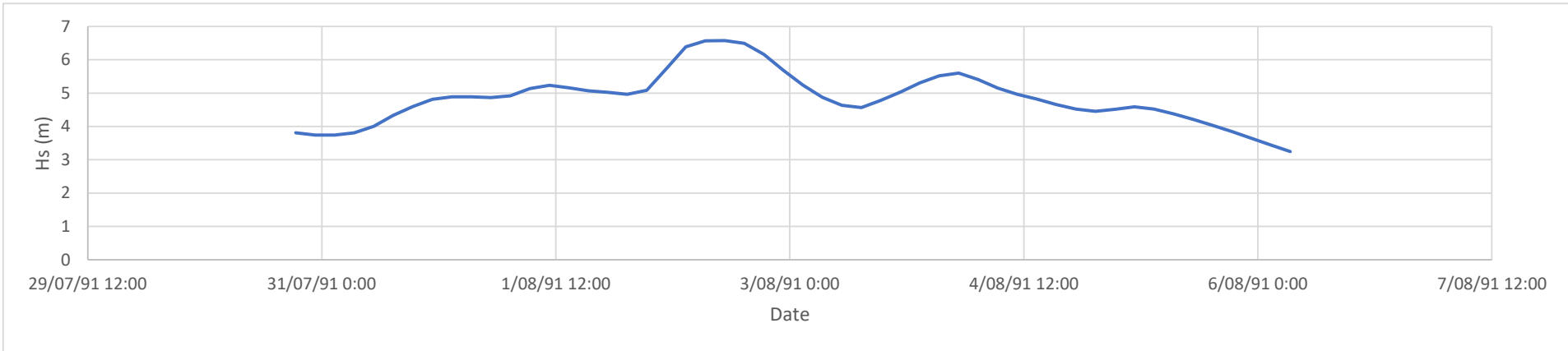
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	26-07-93 8:00
End Date	01-08-93 8:00



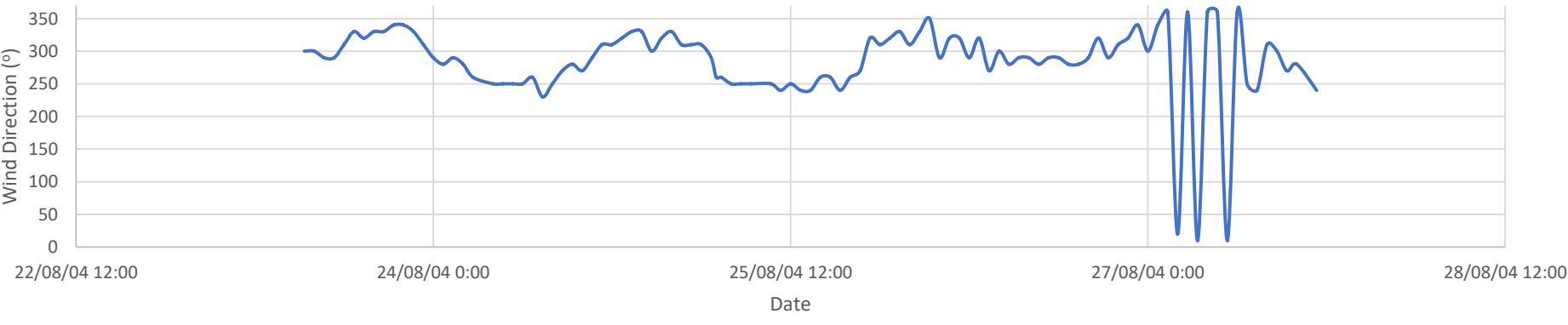
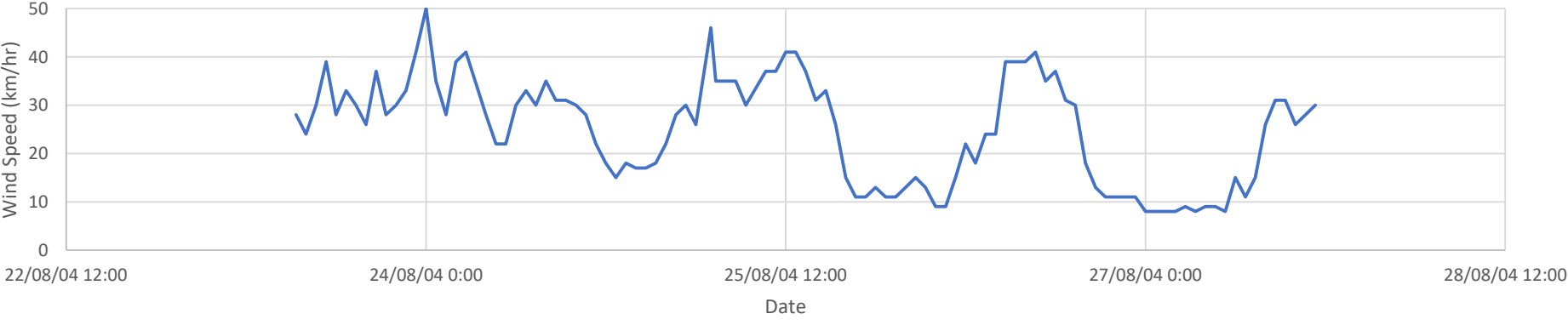
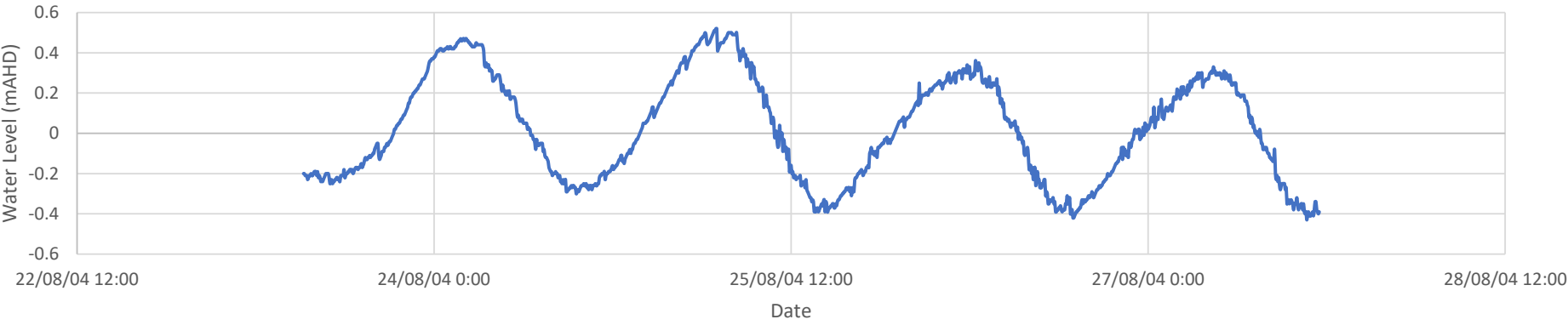
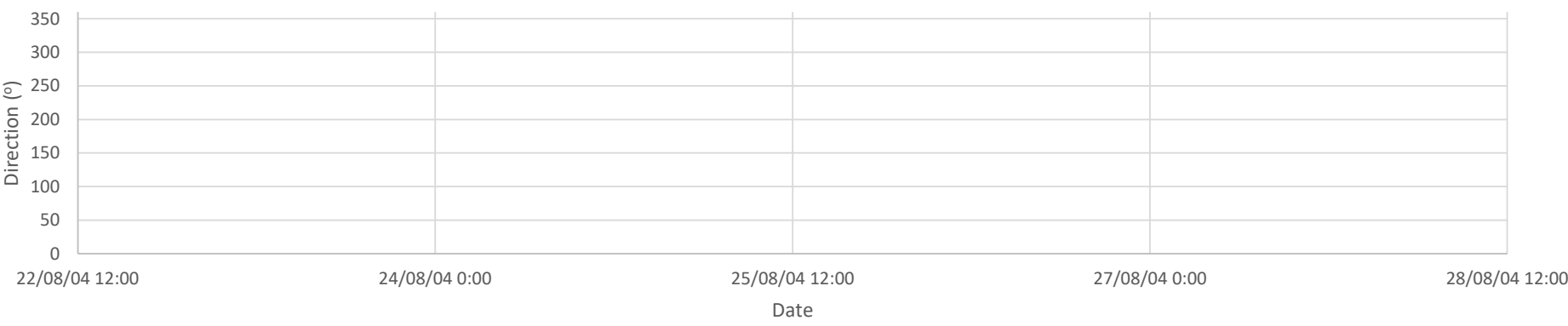
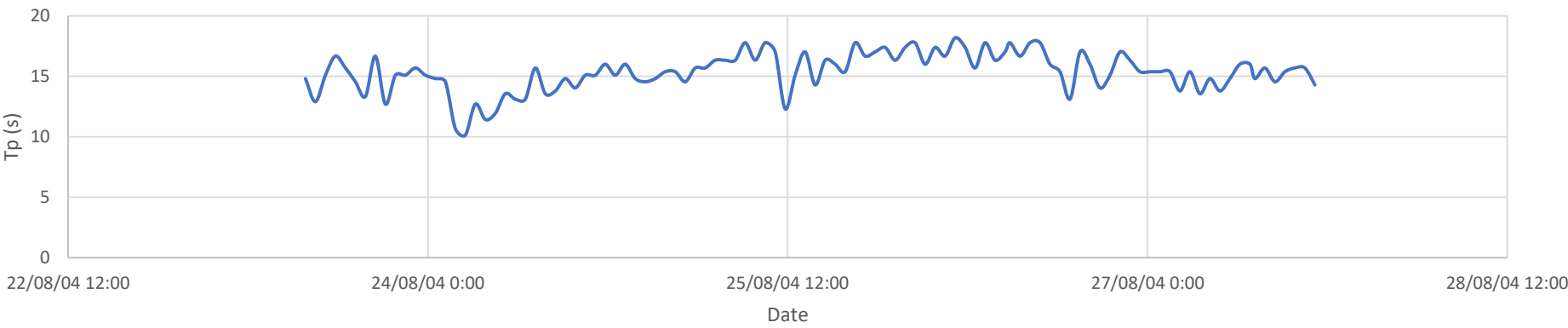
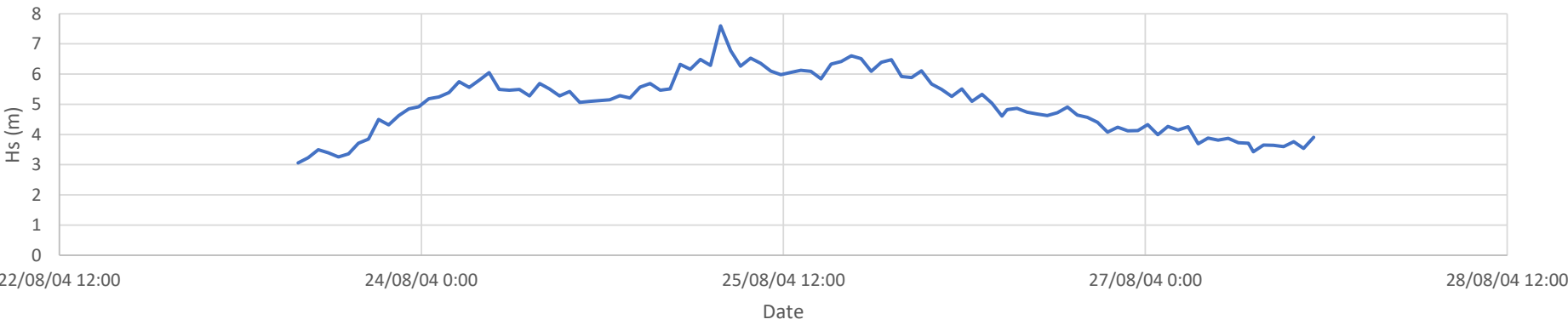
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	30-07-91 20:00
End Date	06-08-91 5:00



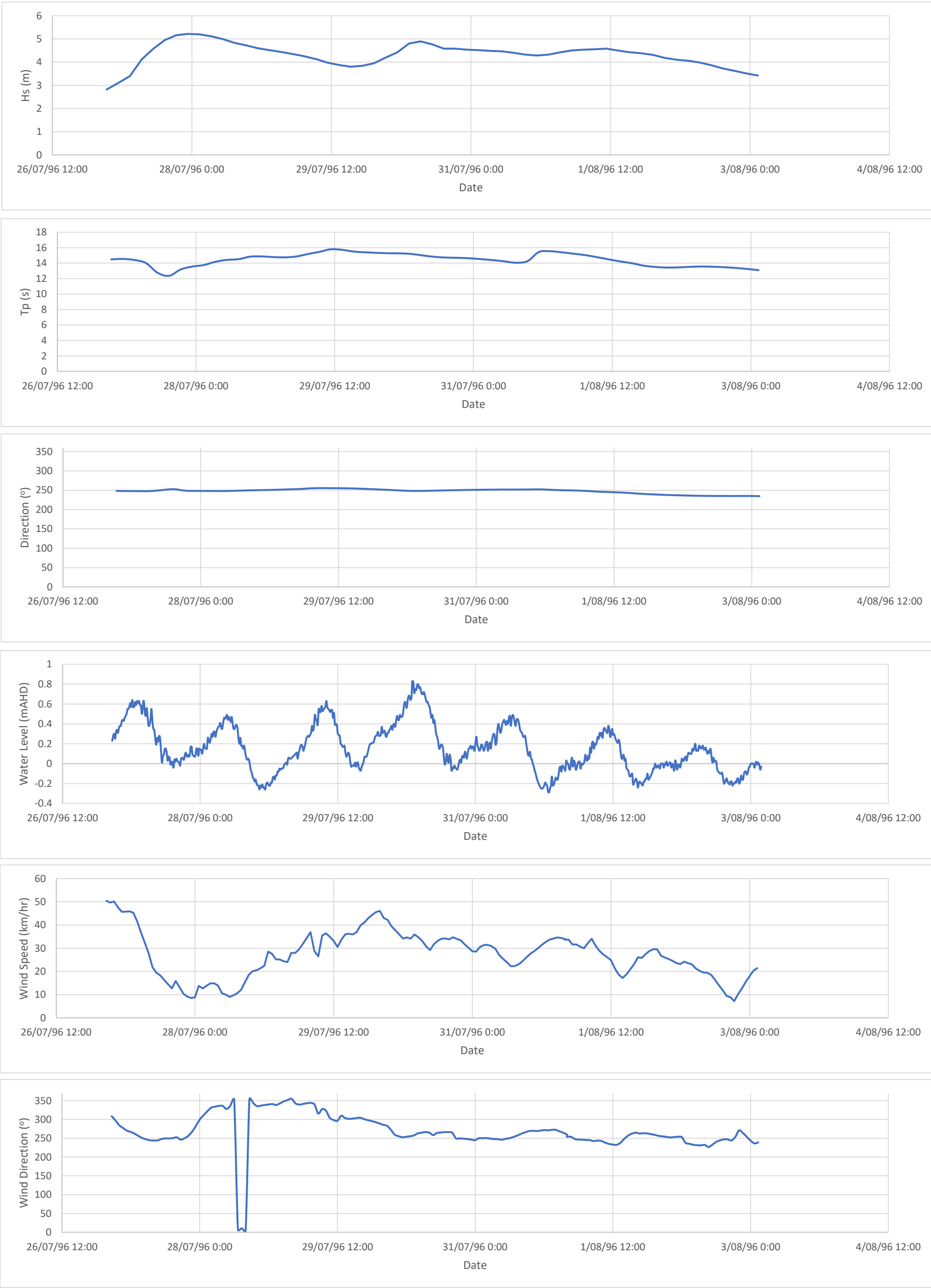
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	23-08-04 11:45
End Date	27-08-04 16:15



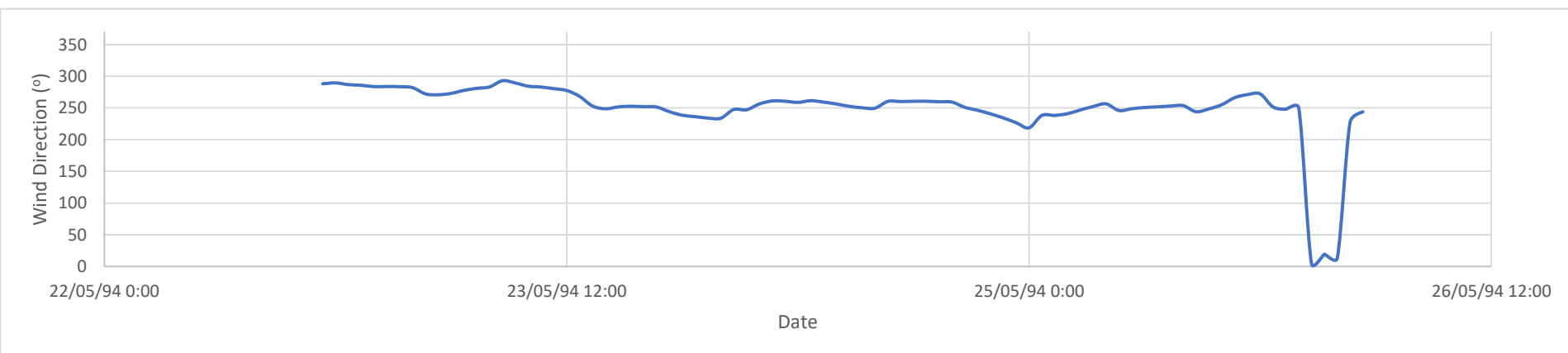
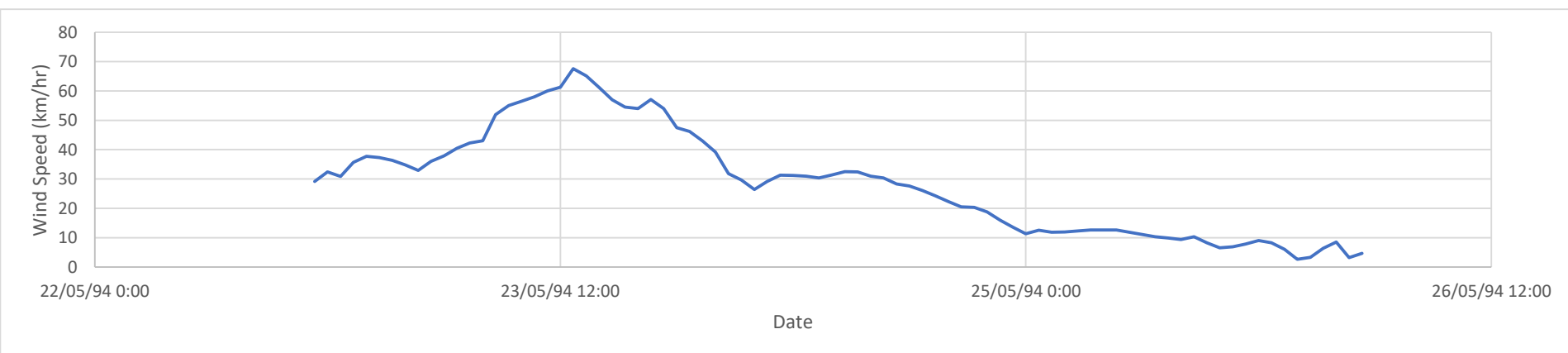
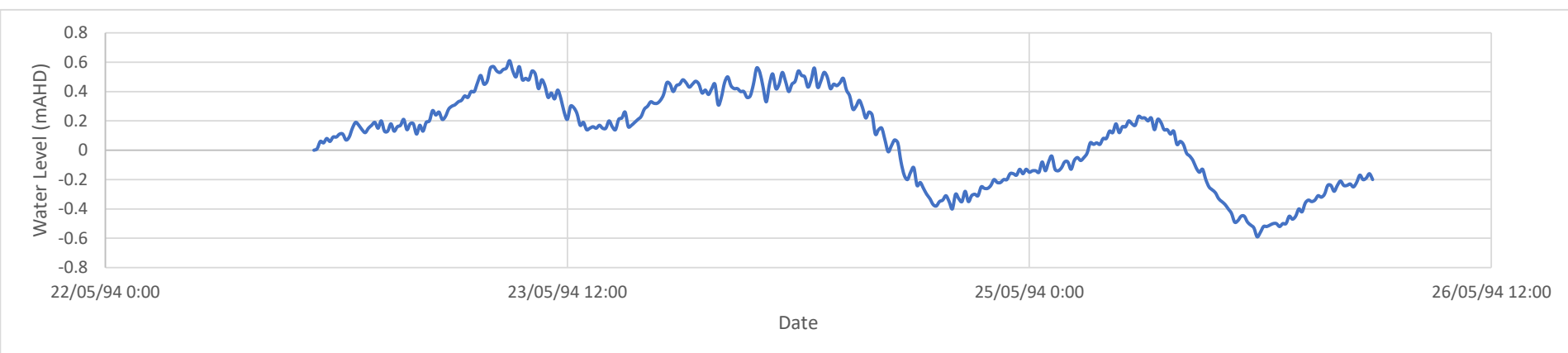
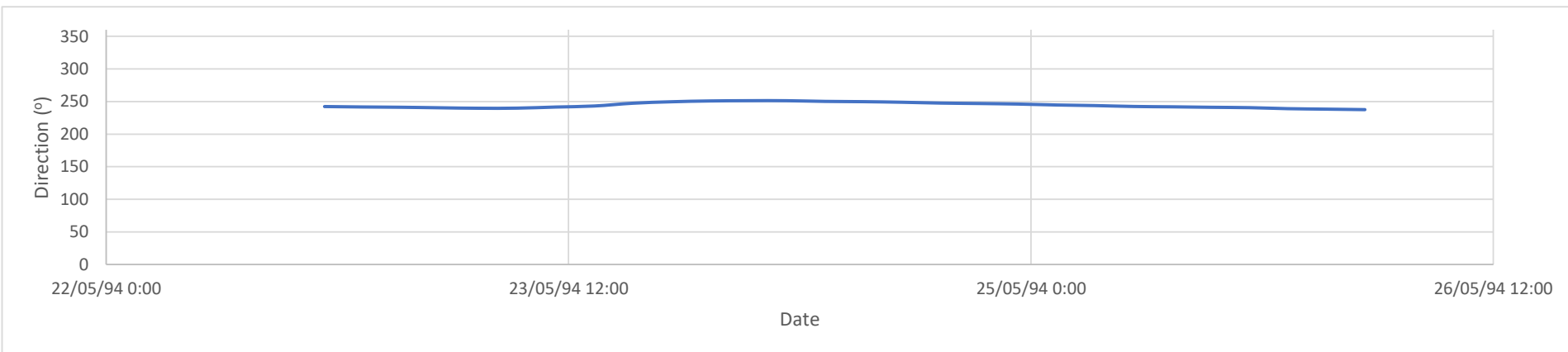
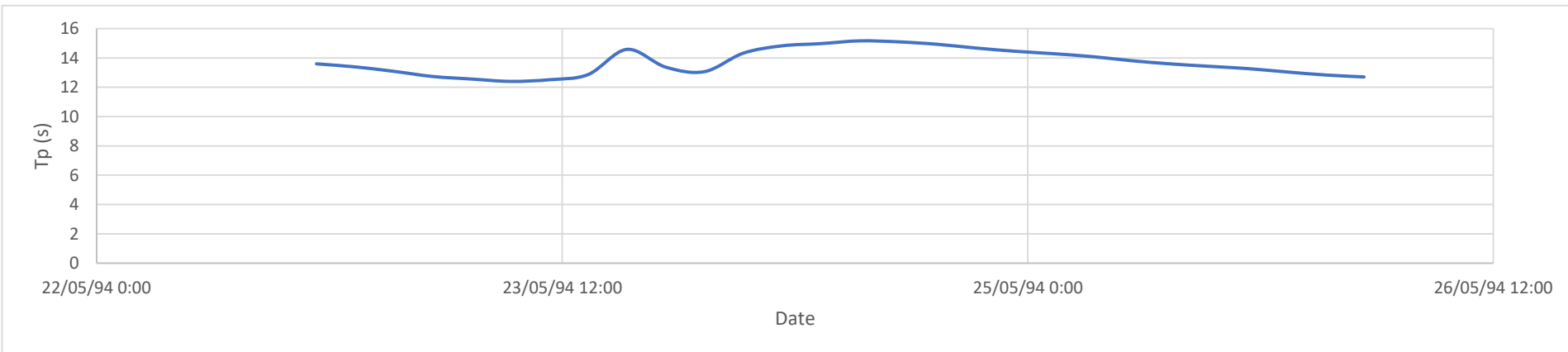
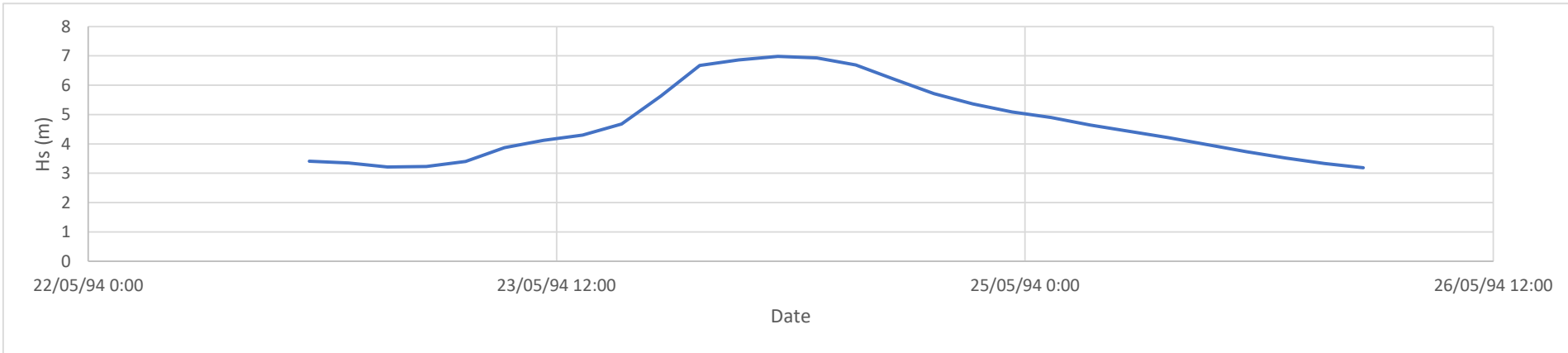
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	27-07-96 2:00
End Date	03-08-96 2:00



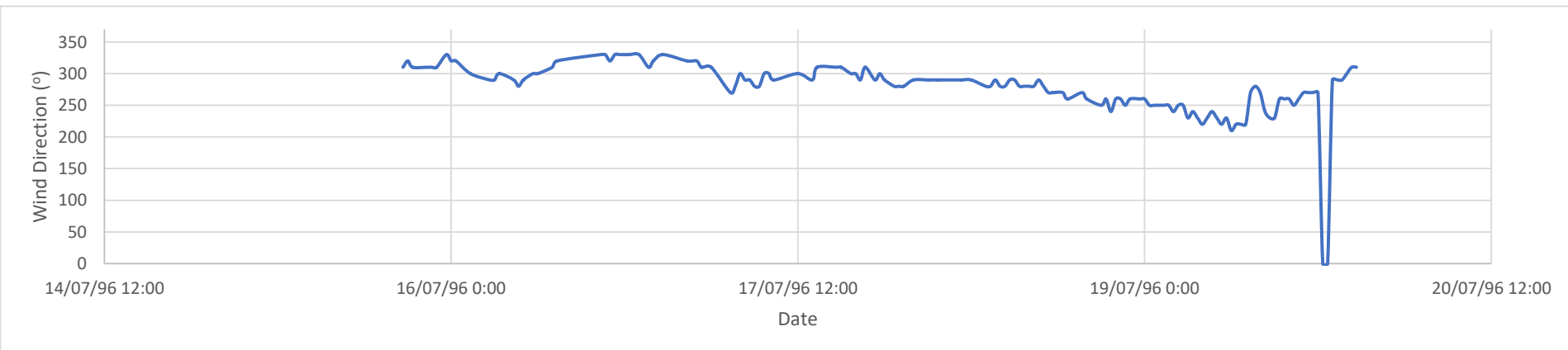
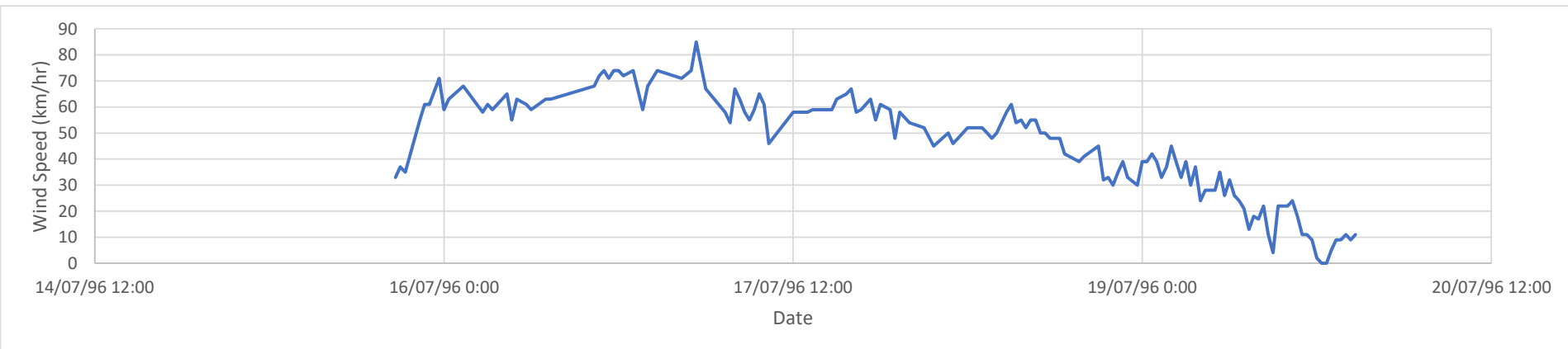
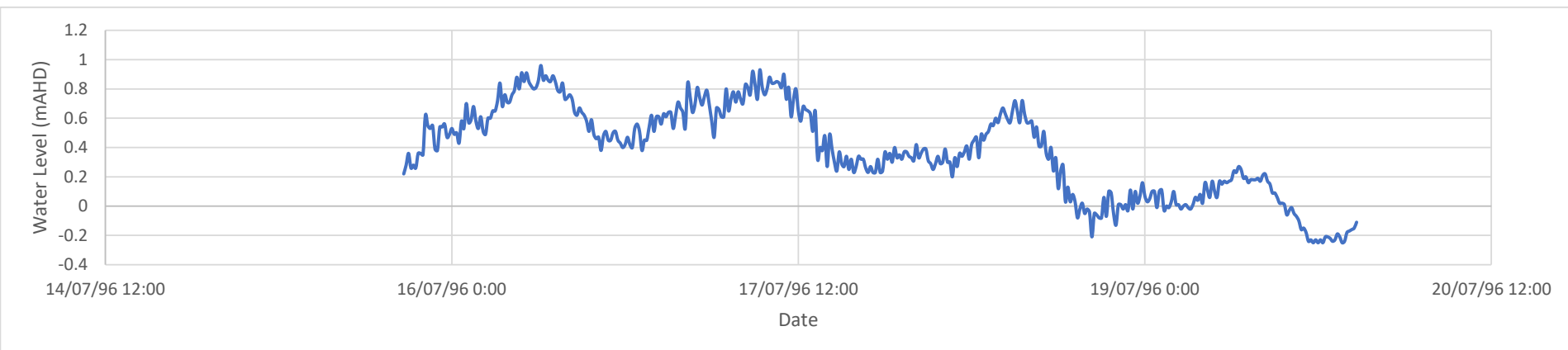
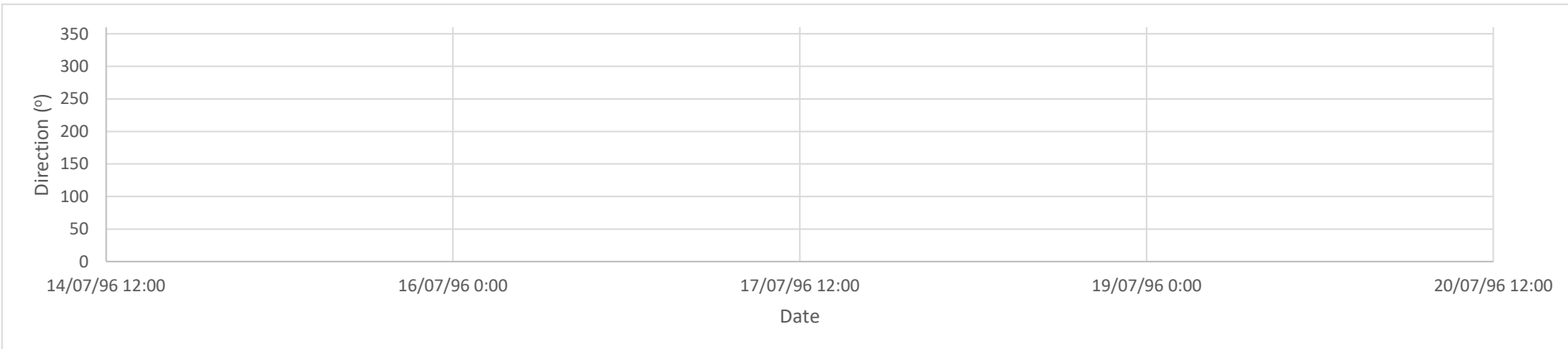
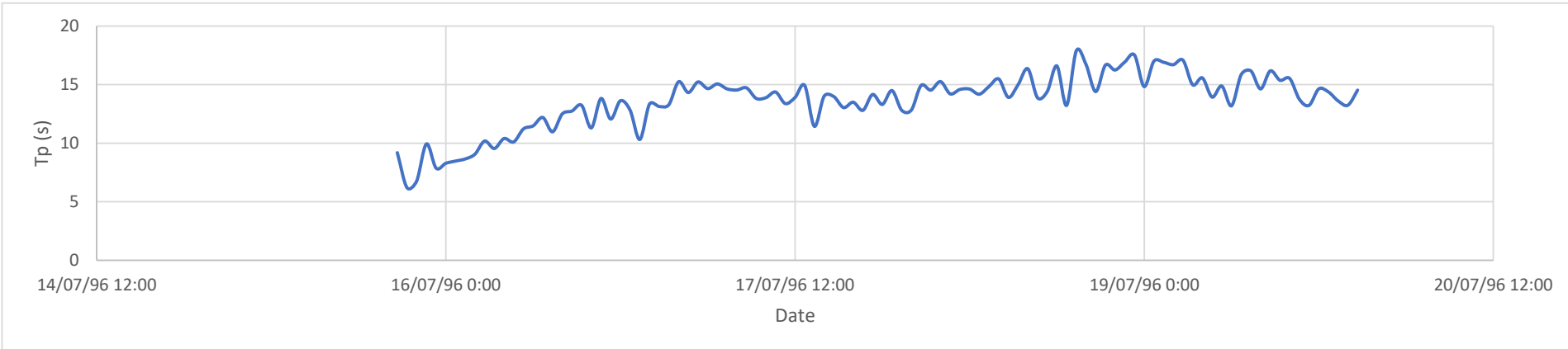
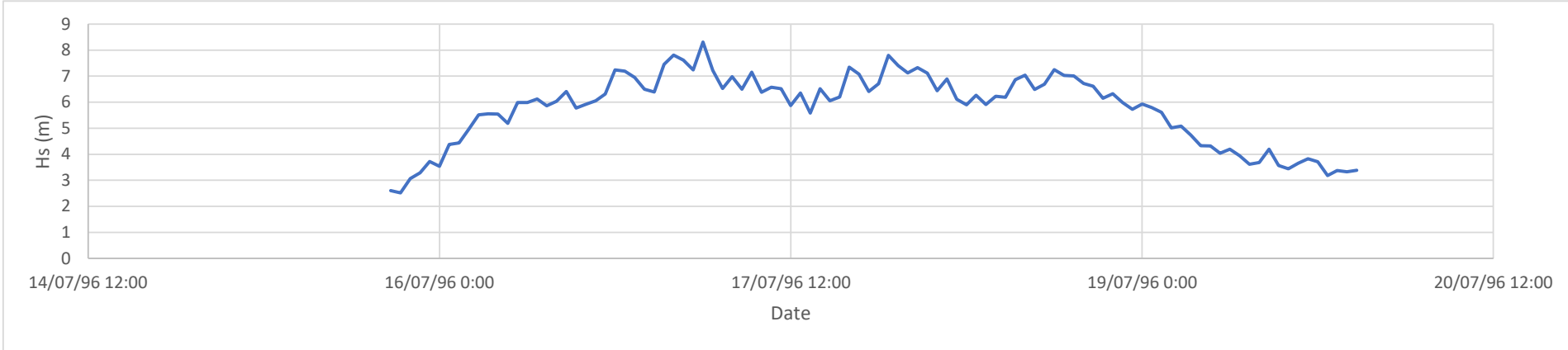
K1509 - South West Storm Selection
Top Wheatbelt (Jurien) Storm Plots

Location	Jurien Bay
Start Date	22-05-94 17:00
End Date	26-05-94 2:00



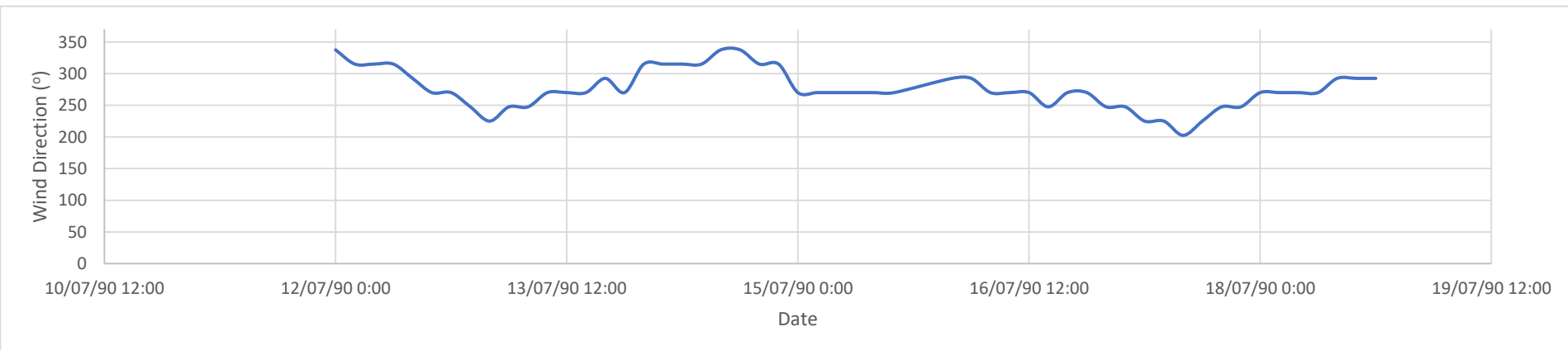
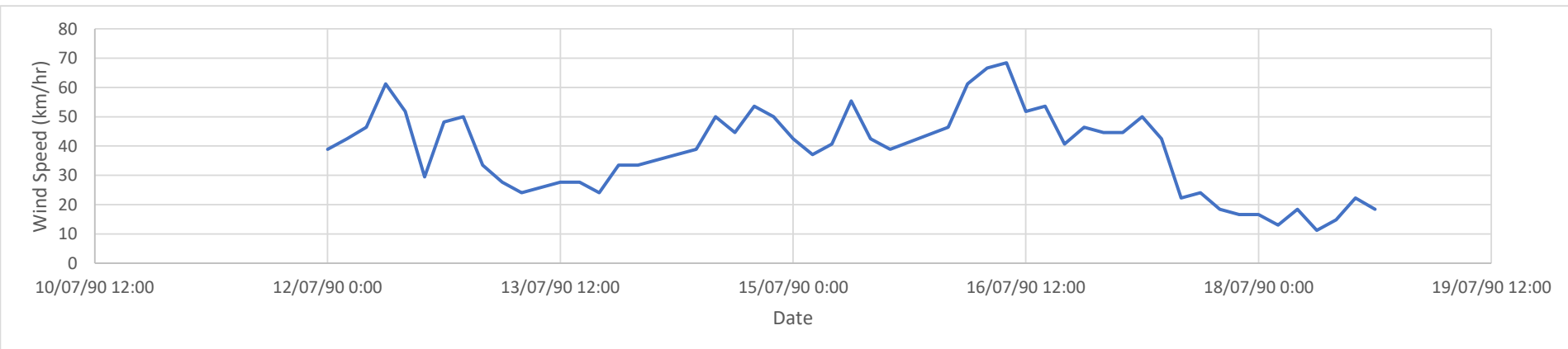
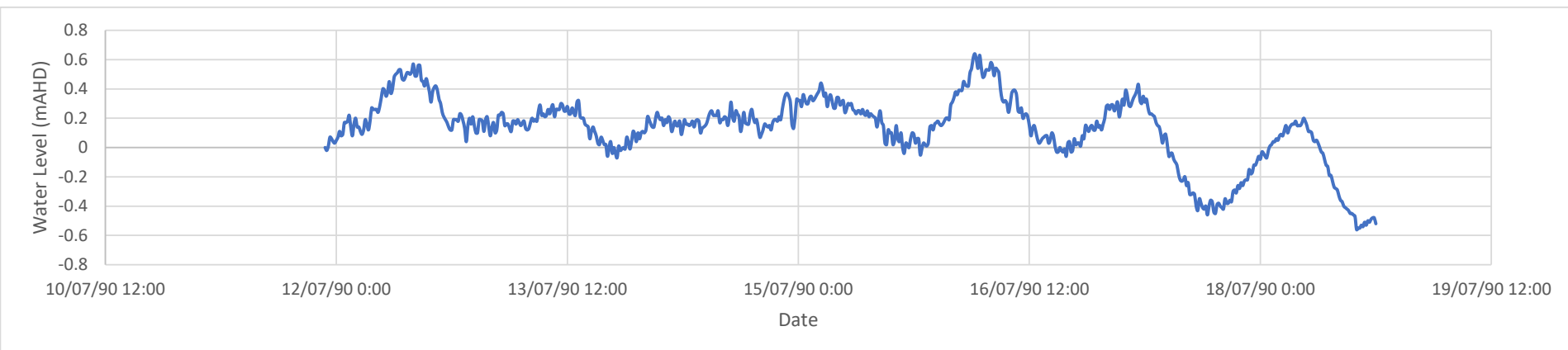
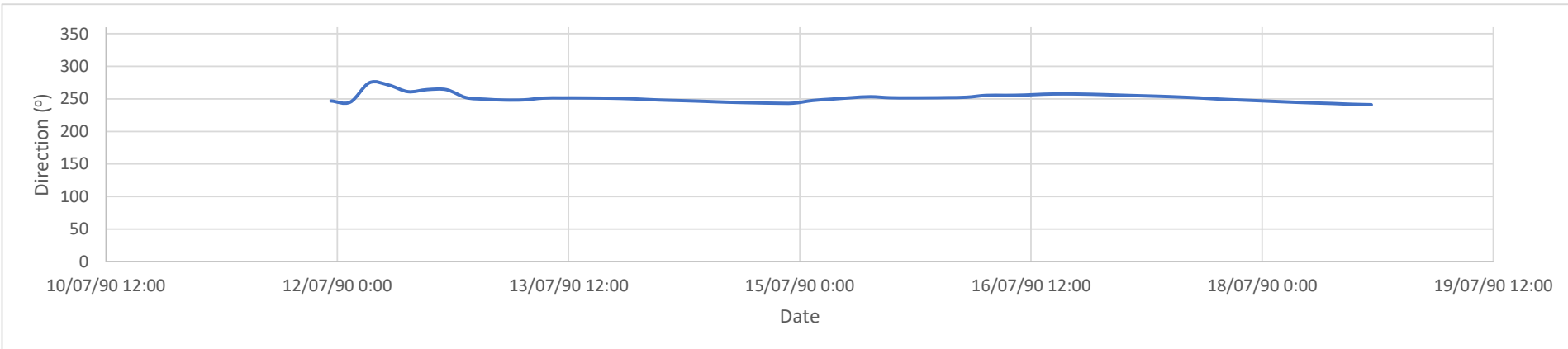
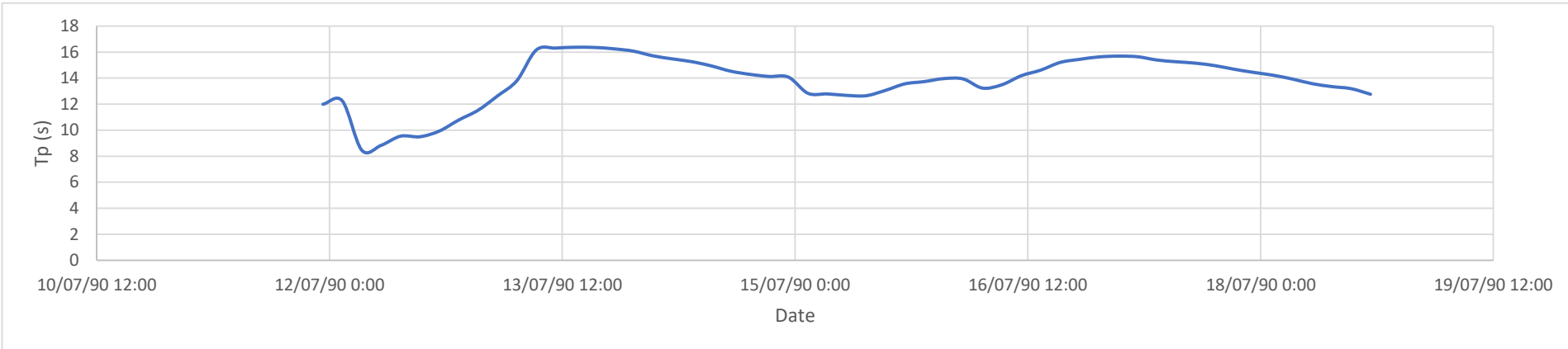
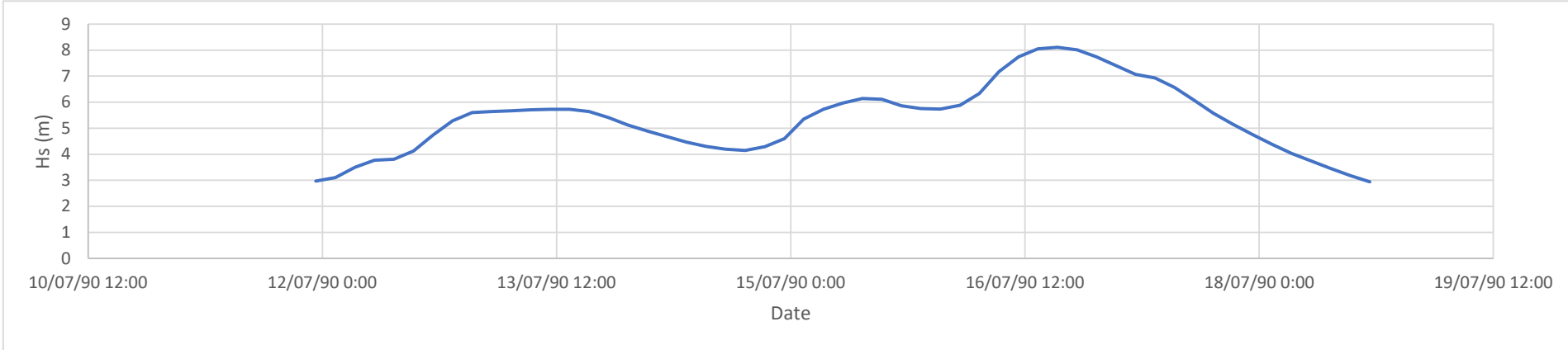
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	15-07-96 20:00
End Date	19-07-96 21:00



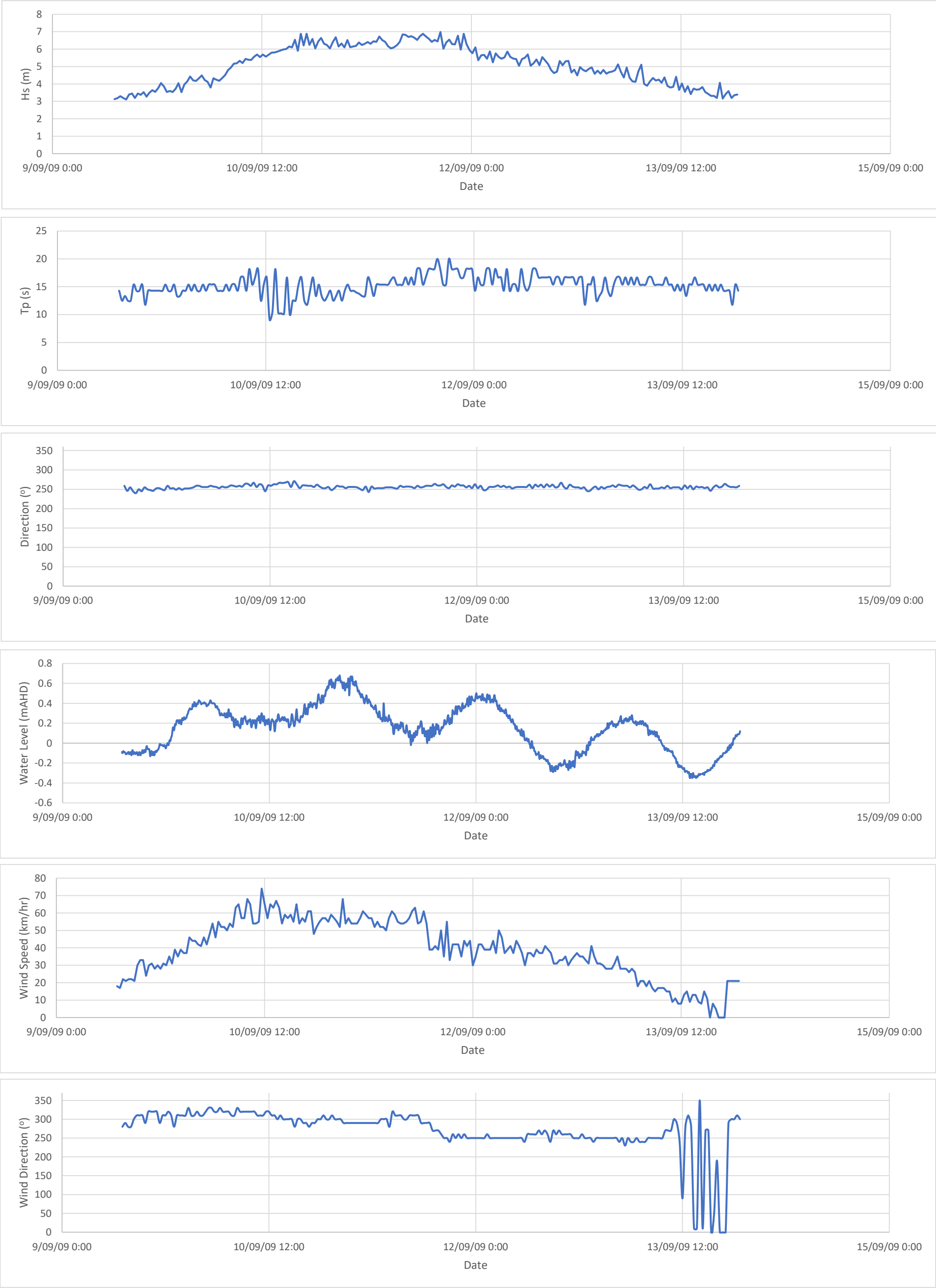
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	11-07-90 23:00
End Date	18-07-90 17:00



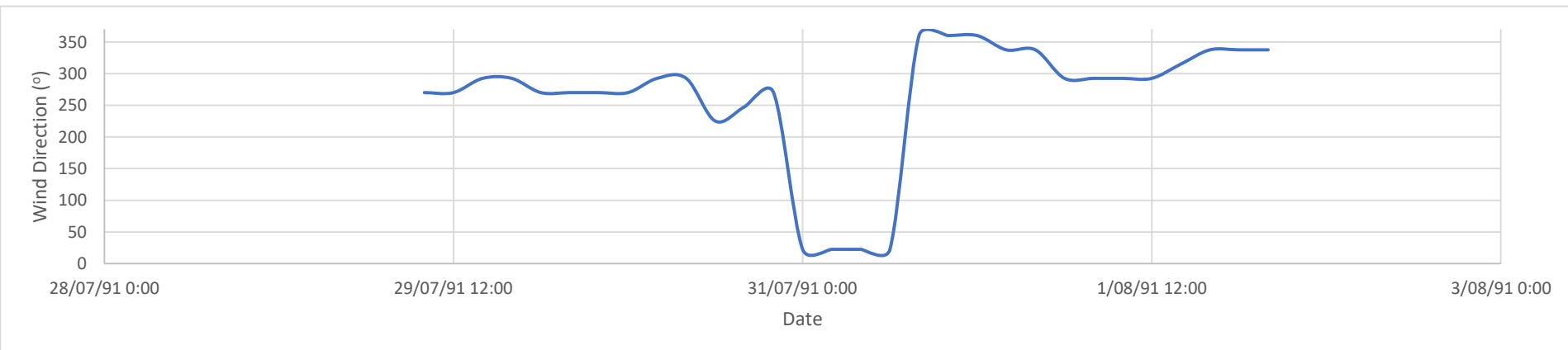
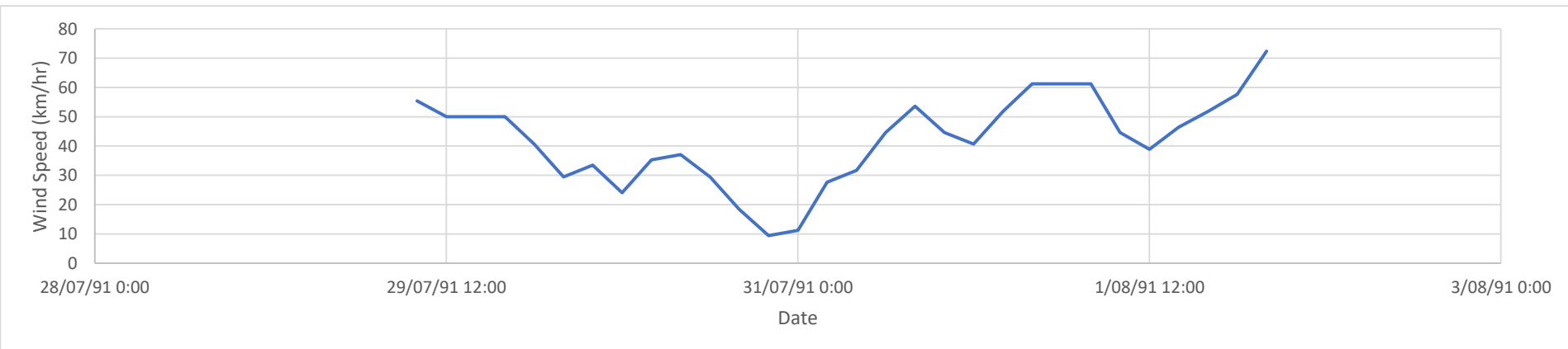
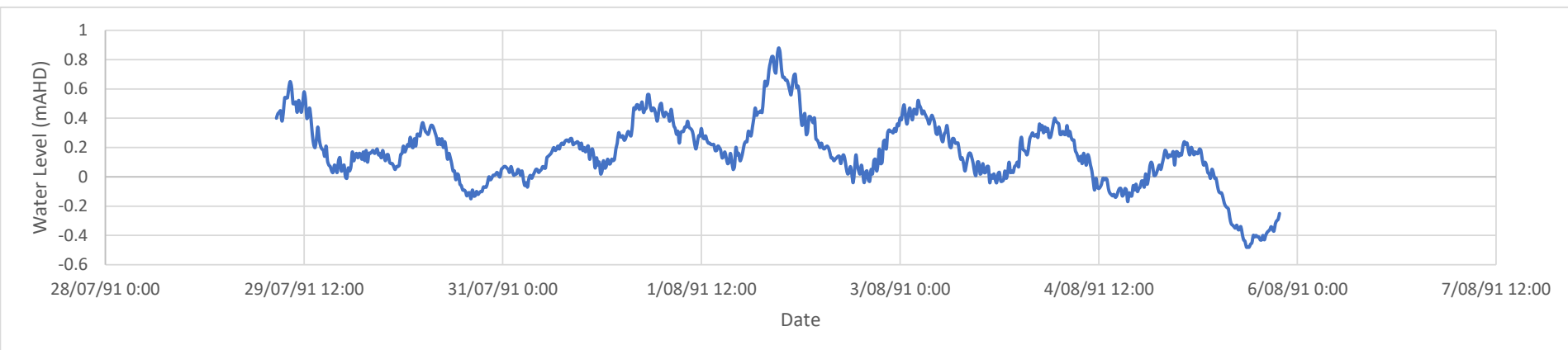
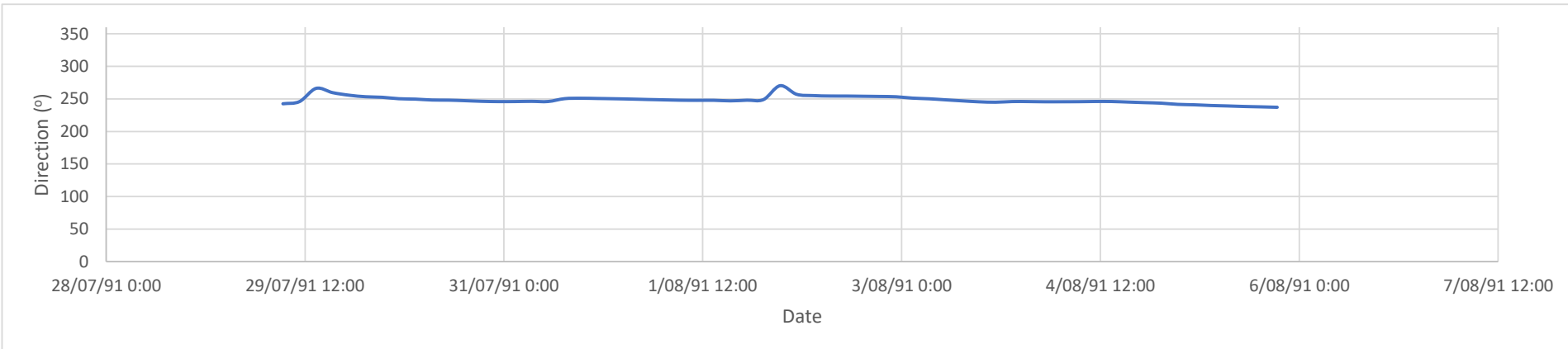
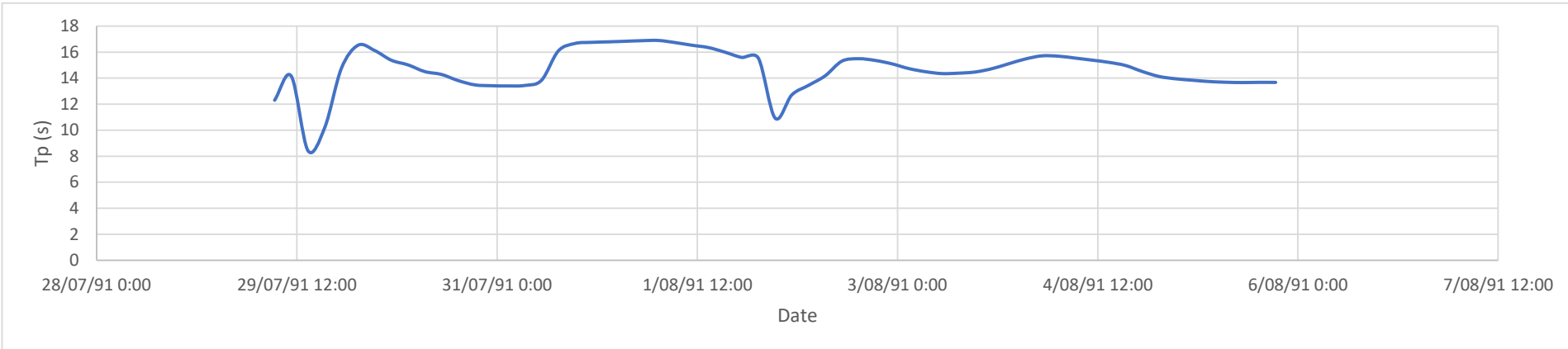
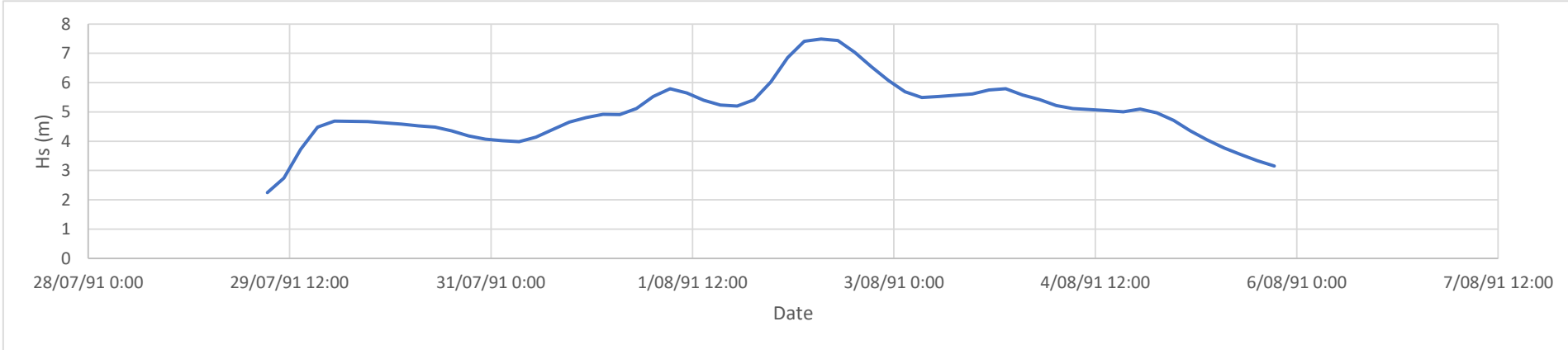
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	09-09-09 11:10
End Date	13-09-09 21:10



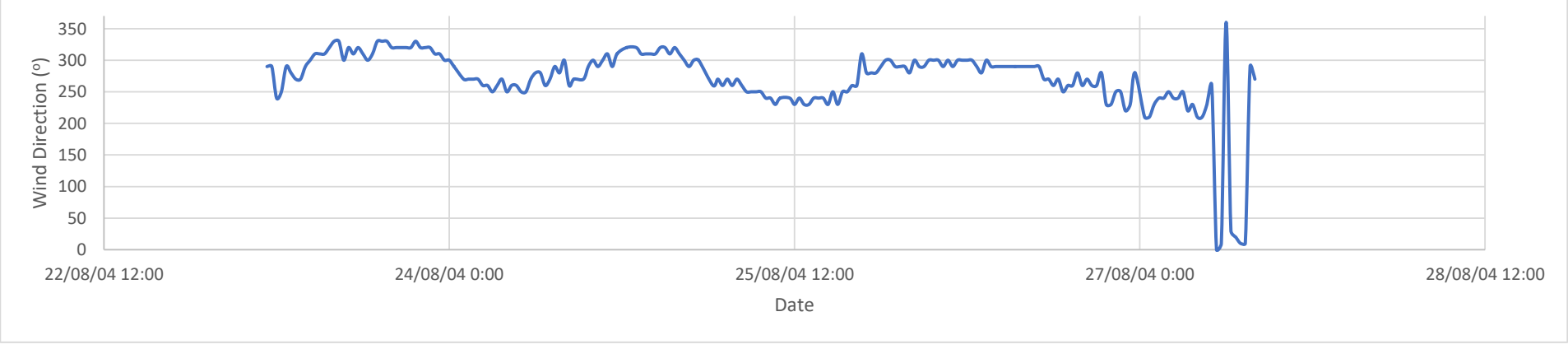
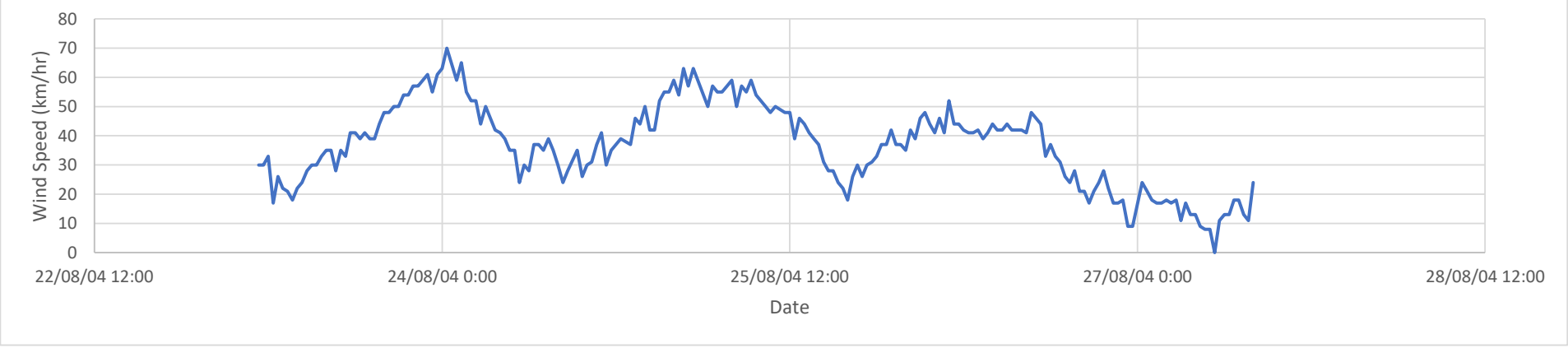
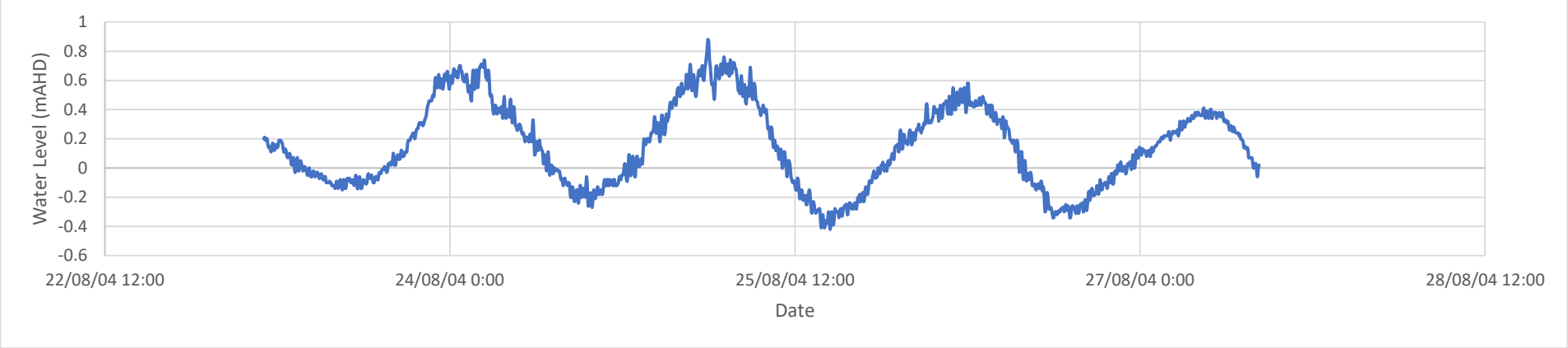
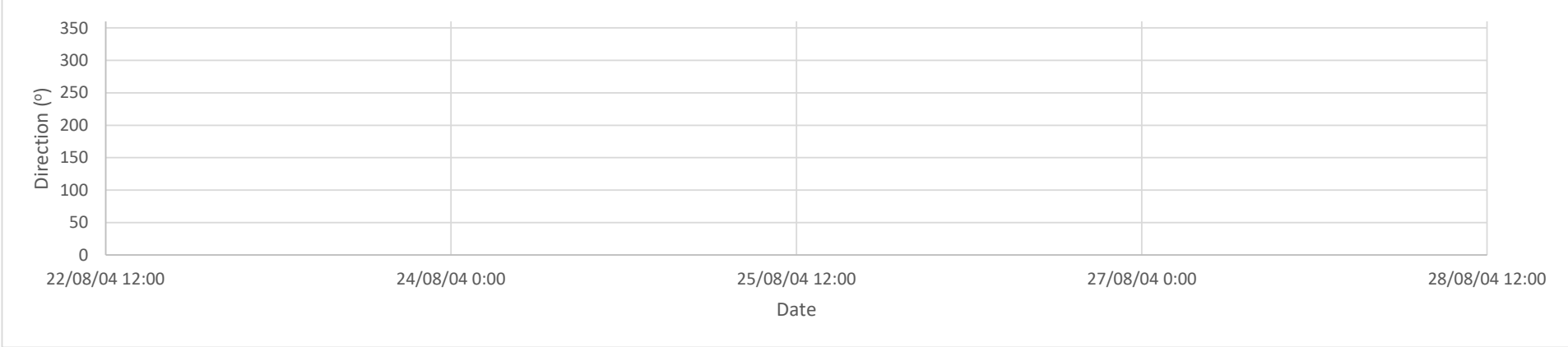
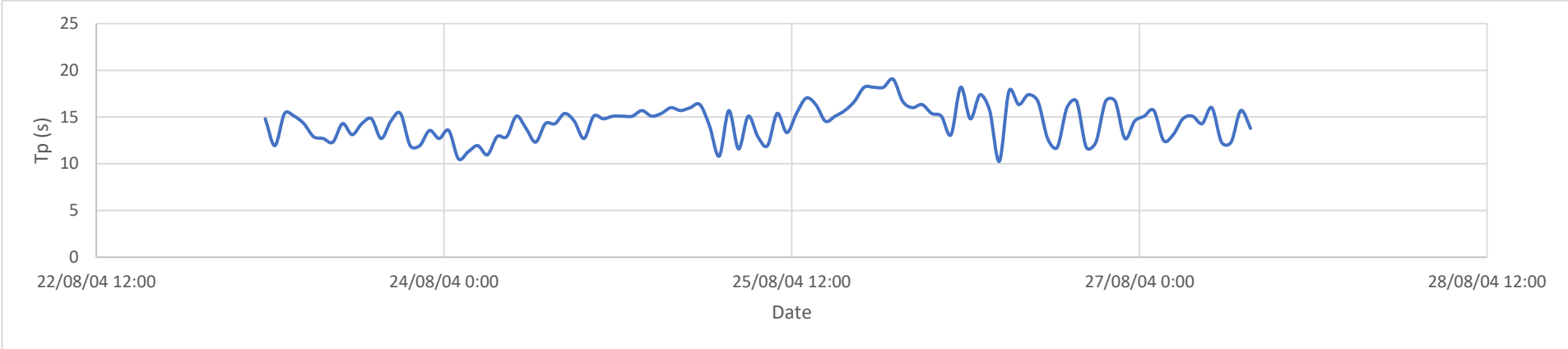
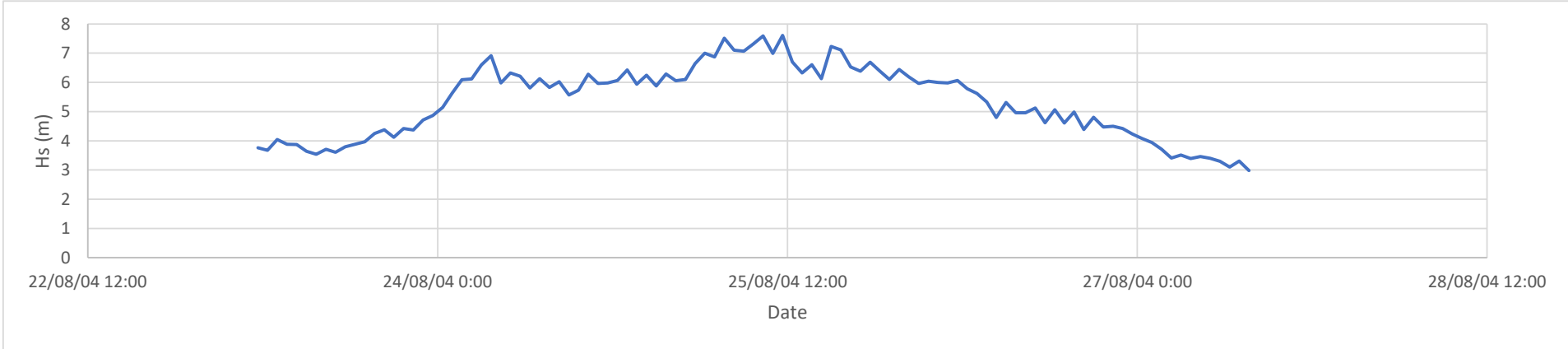
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	29-07-91 8:00
End Date	05-08-91 20:00



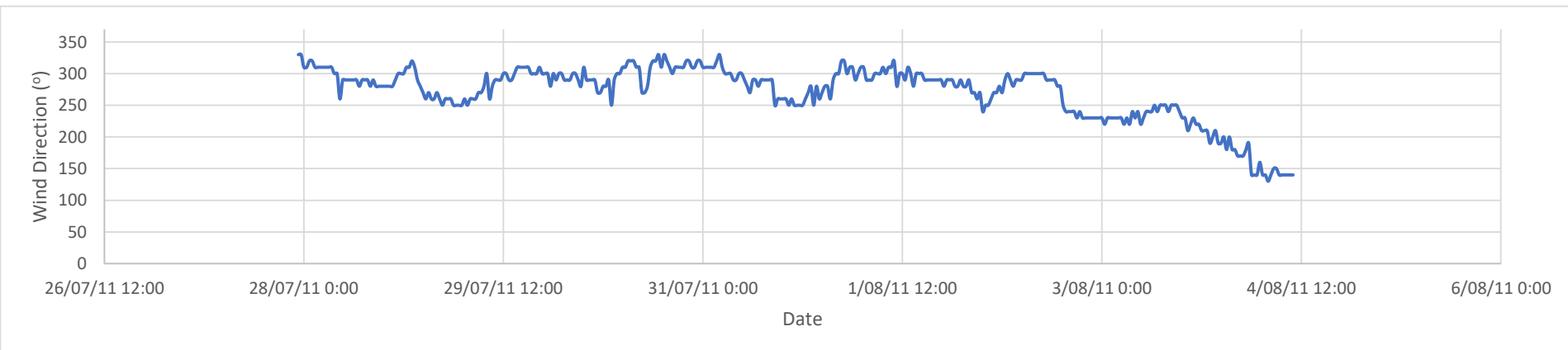
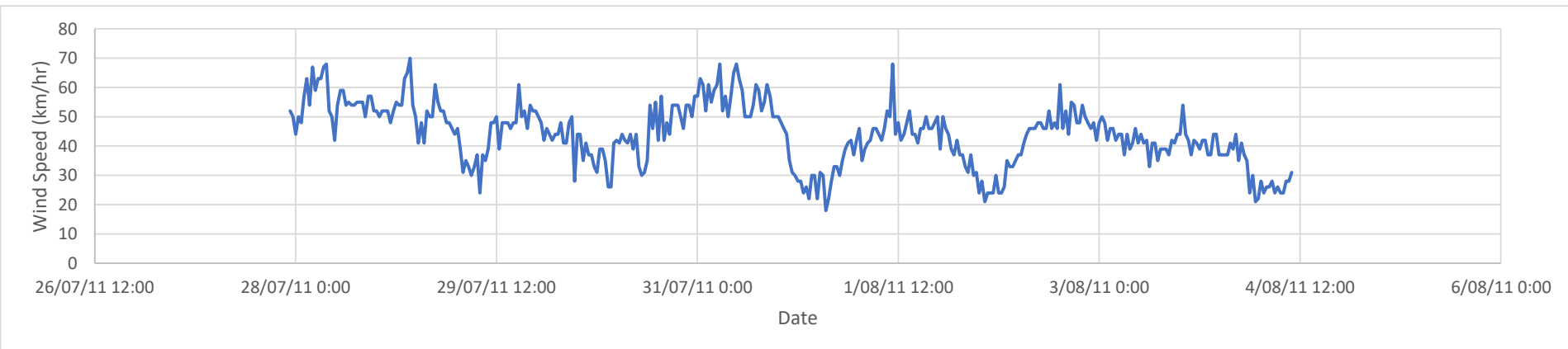
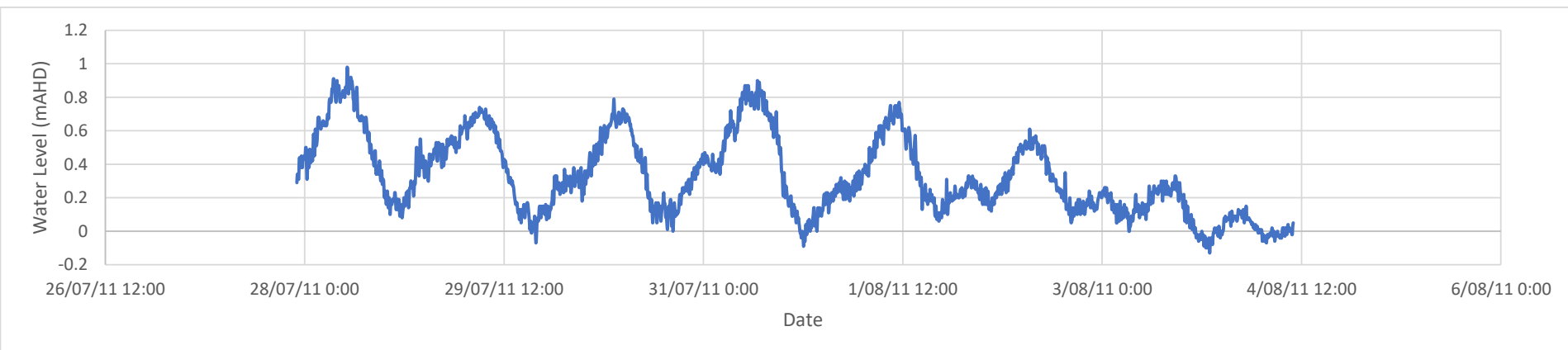
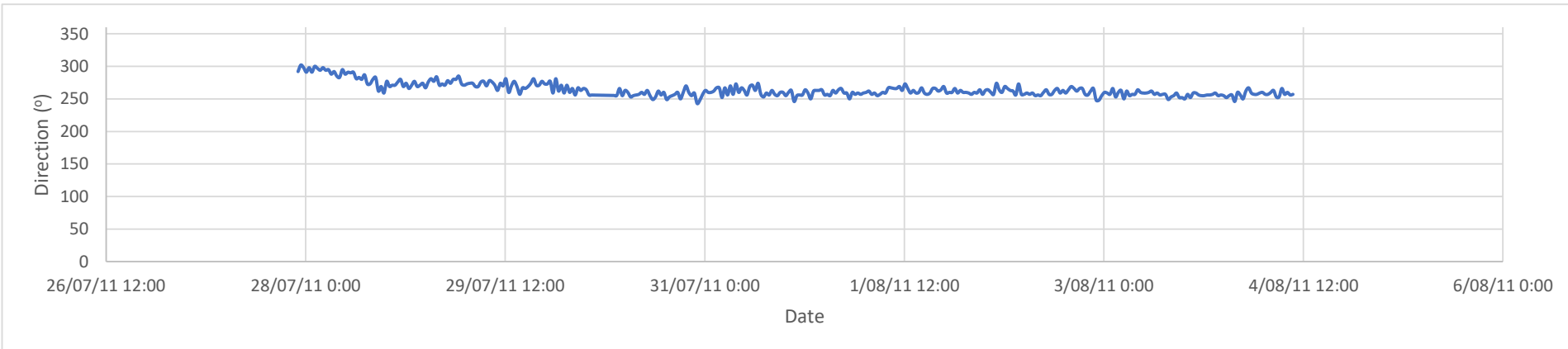
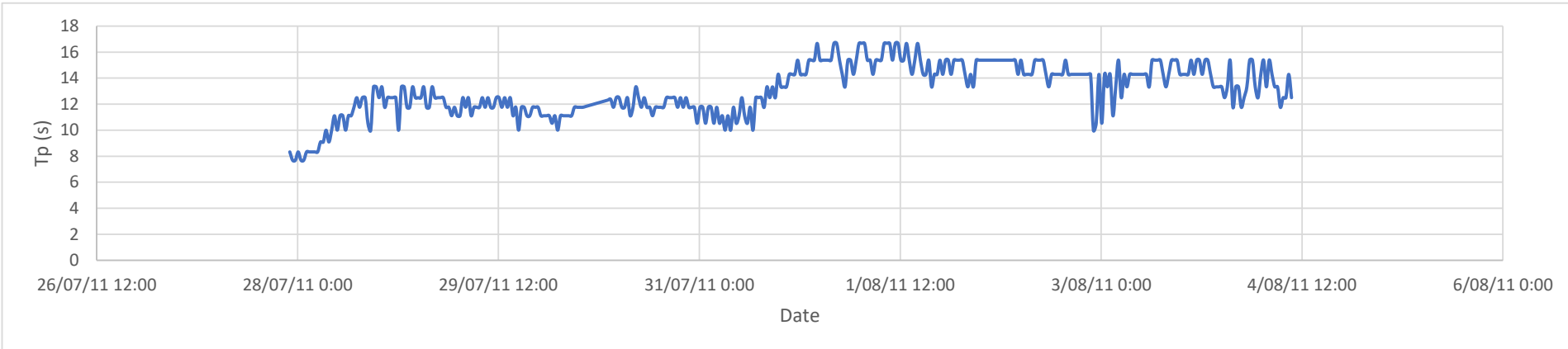
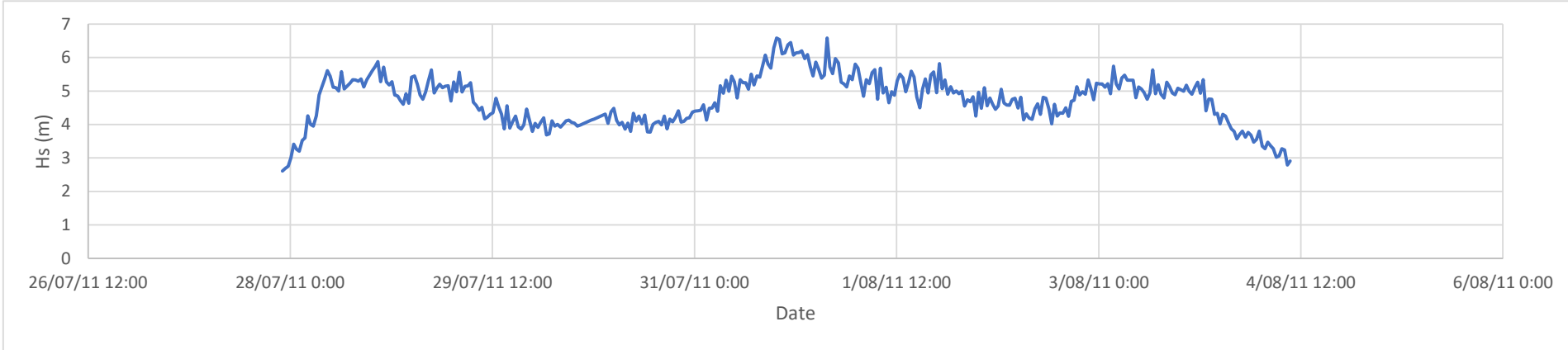
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	23-08-04 5:30
End Date	27-08-04 11:30



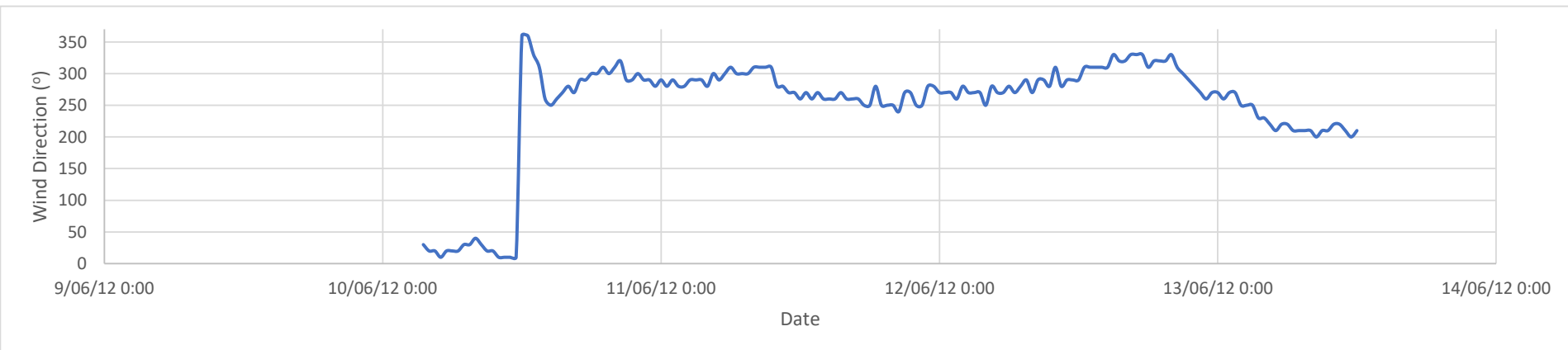
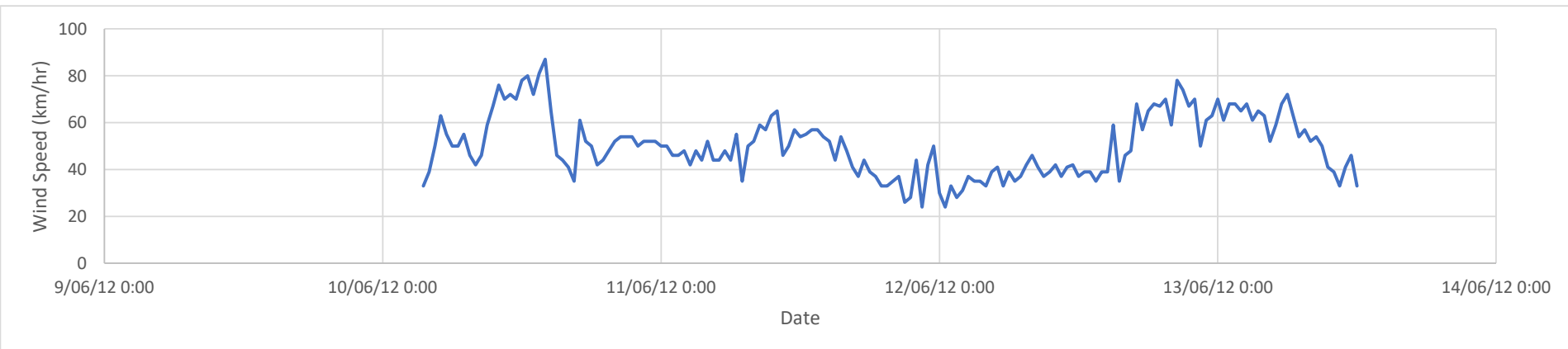
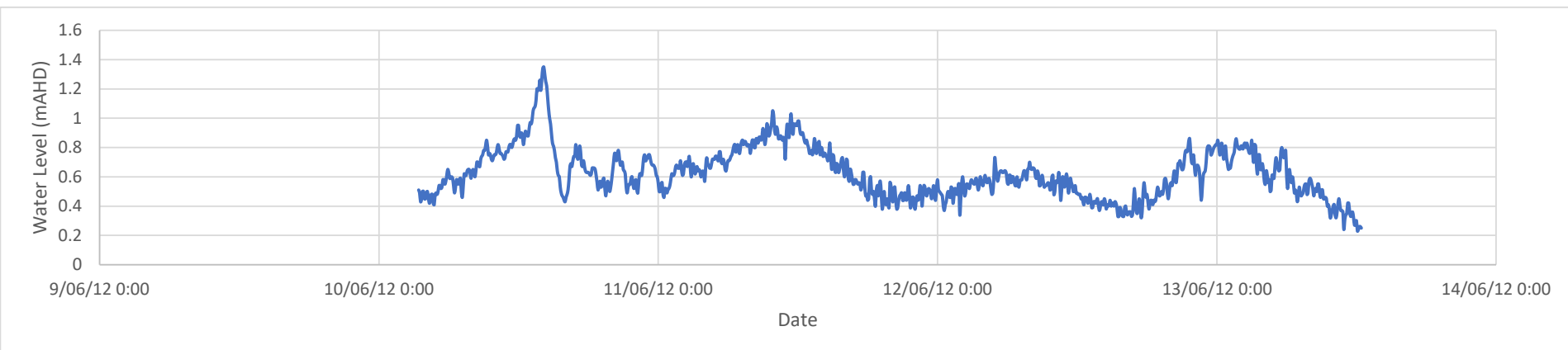
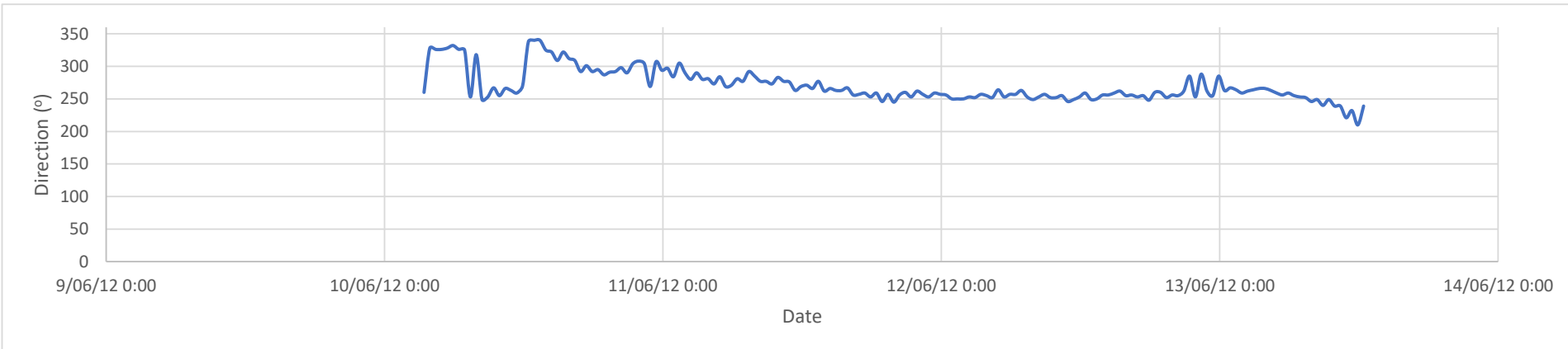
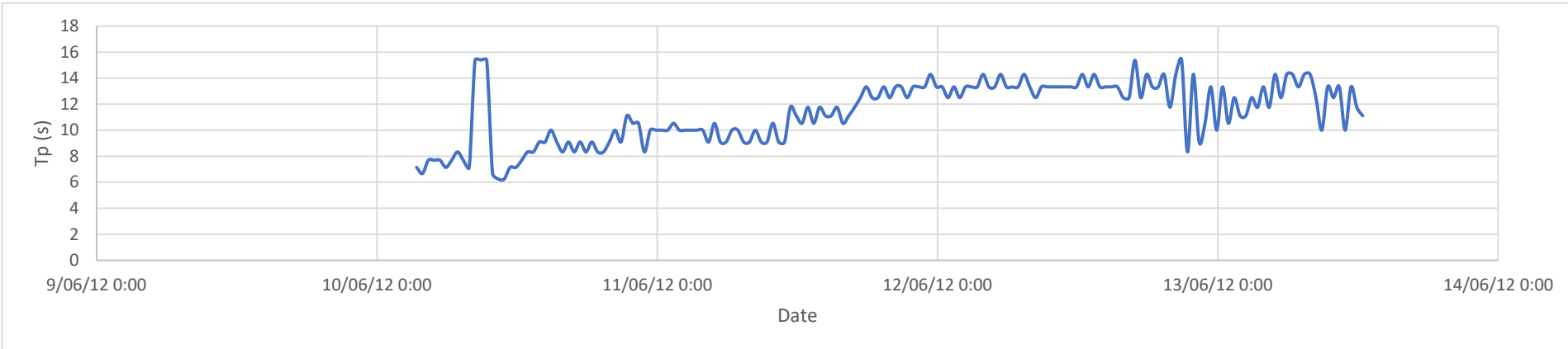
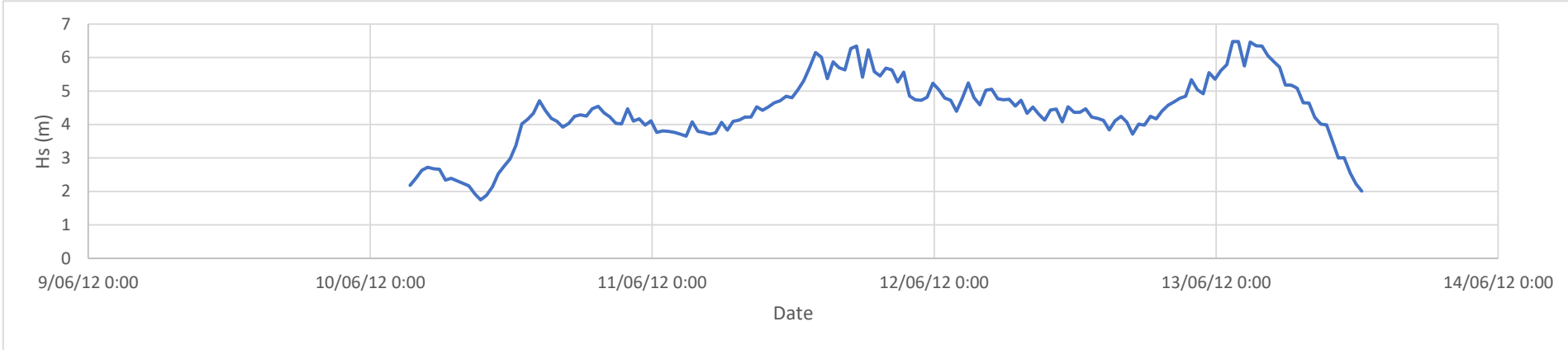
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	27-07-11 23:37
End Date	04-08-11 9:37



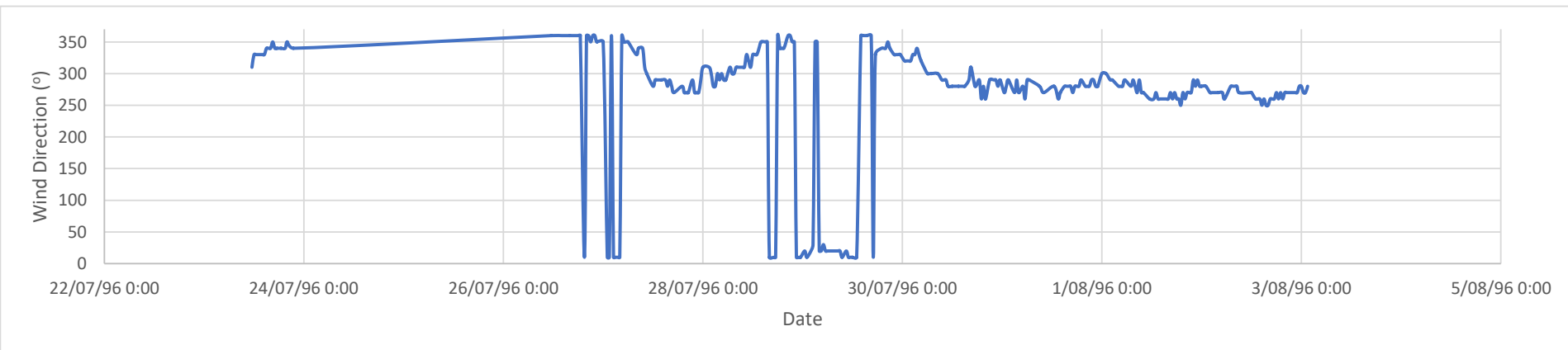
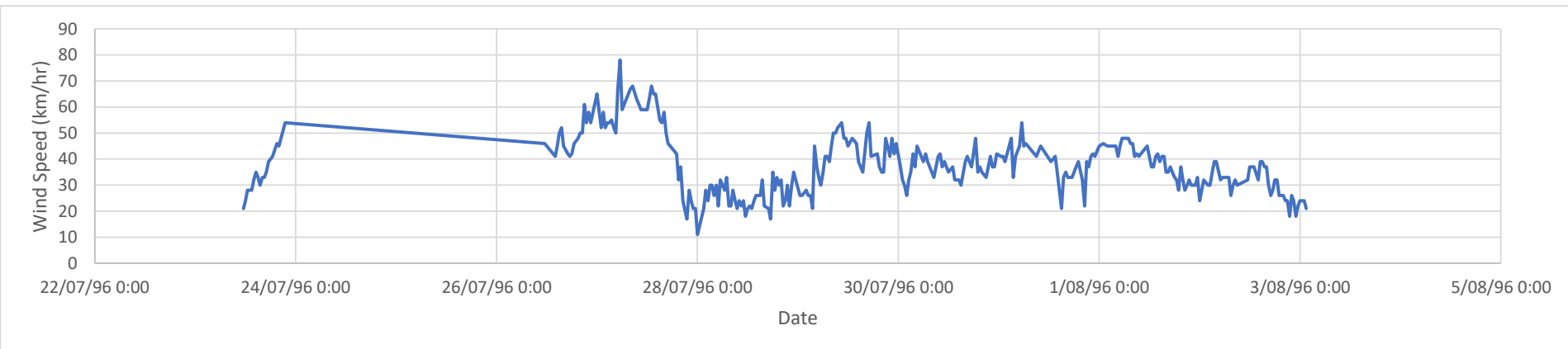
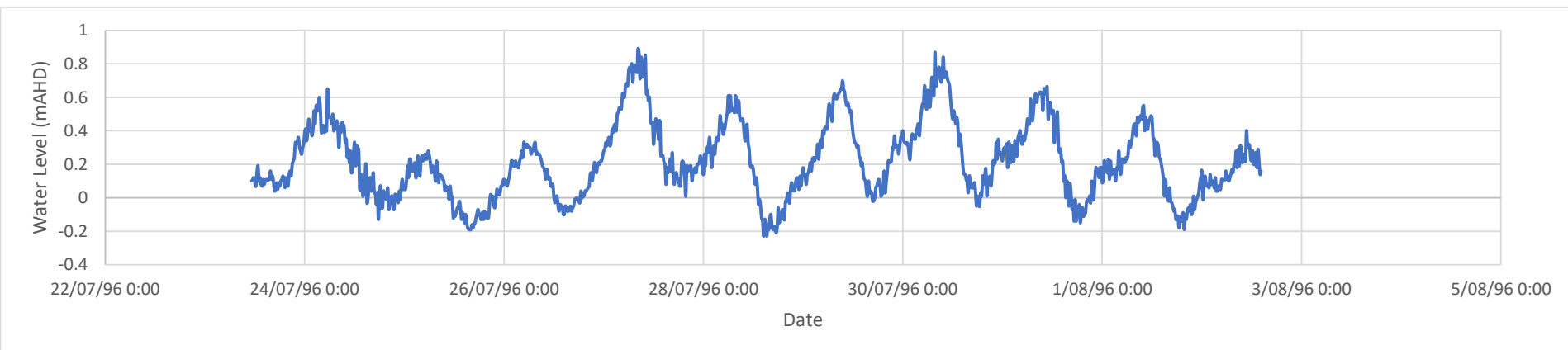
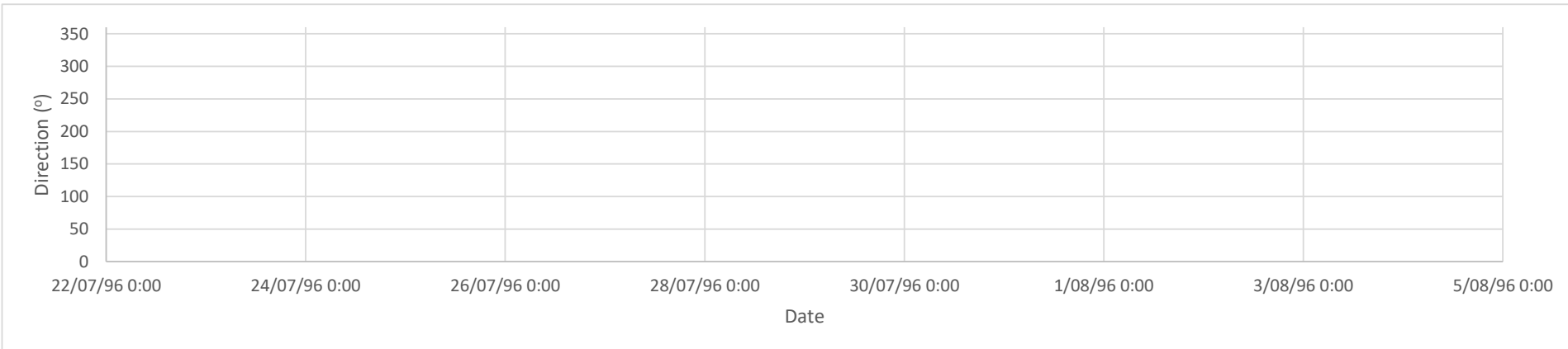
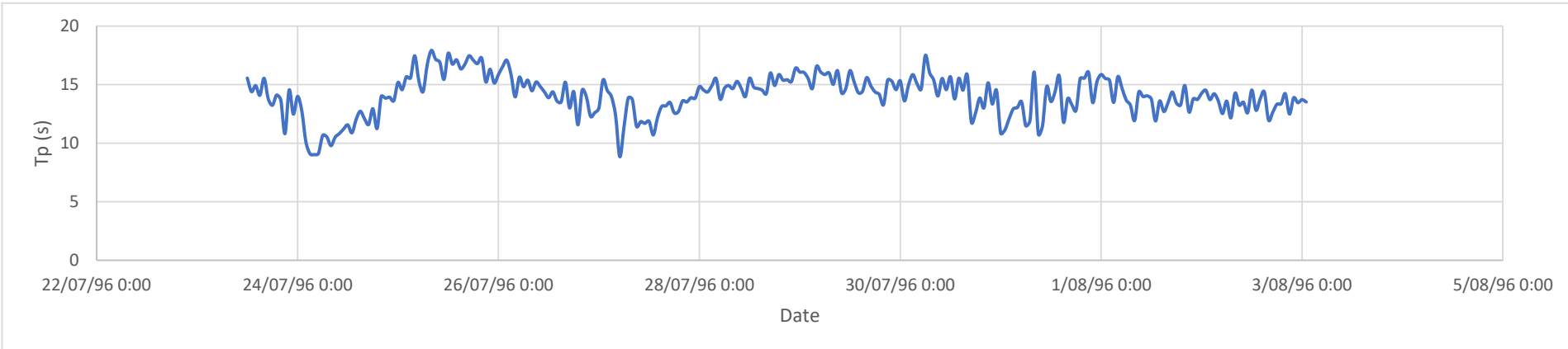
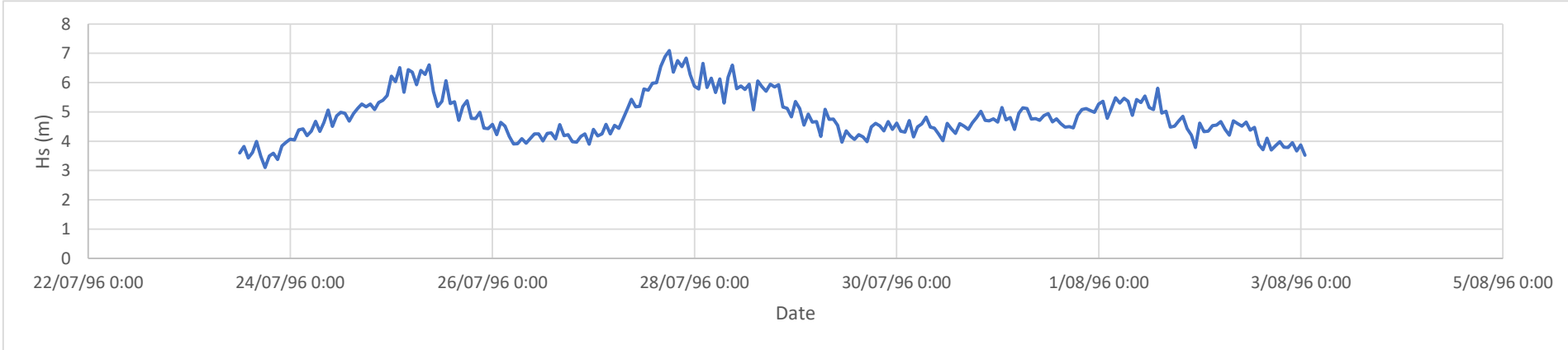
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	10-06-12 4:24
End Date	13-06-12 11:24



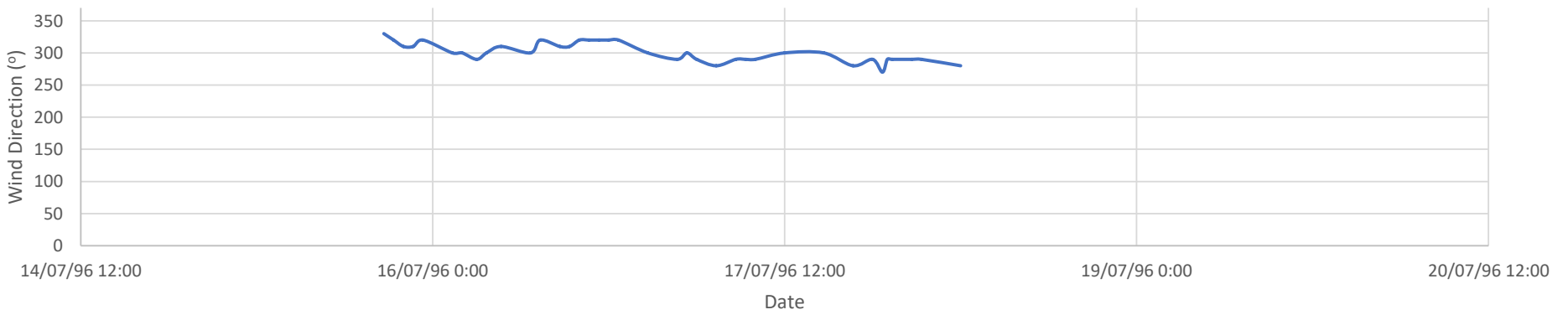
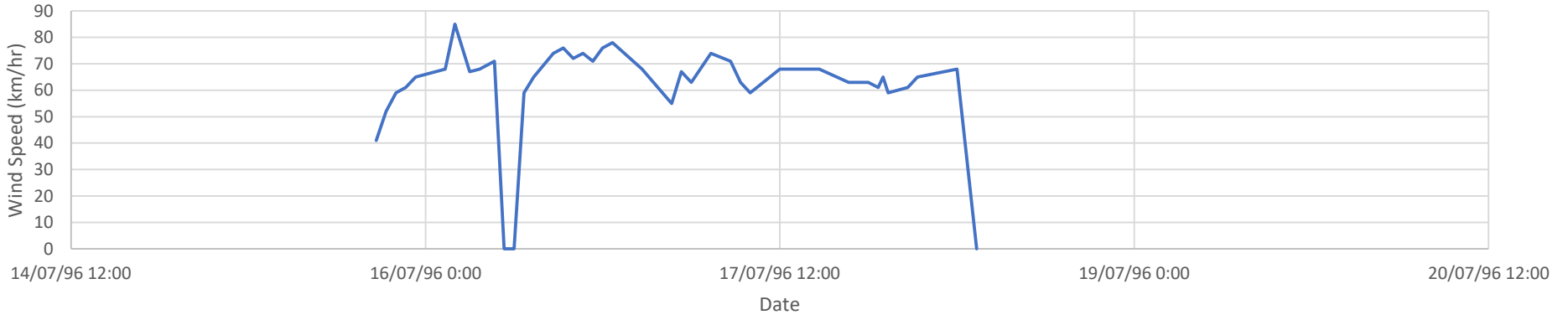
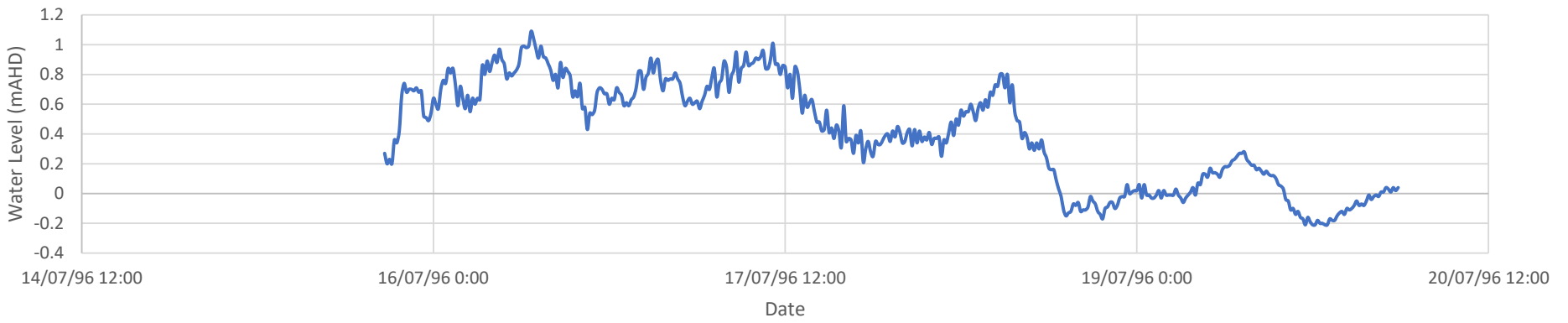
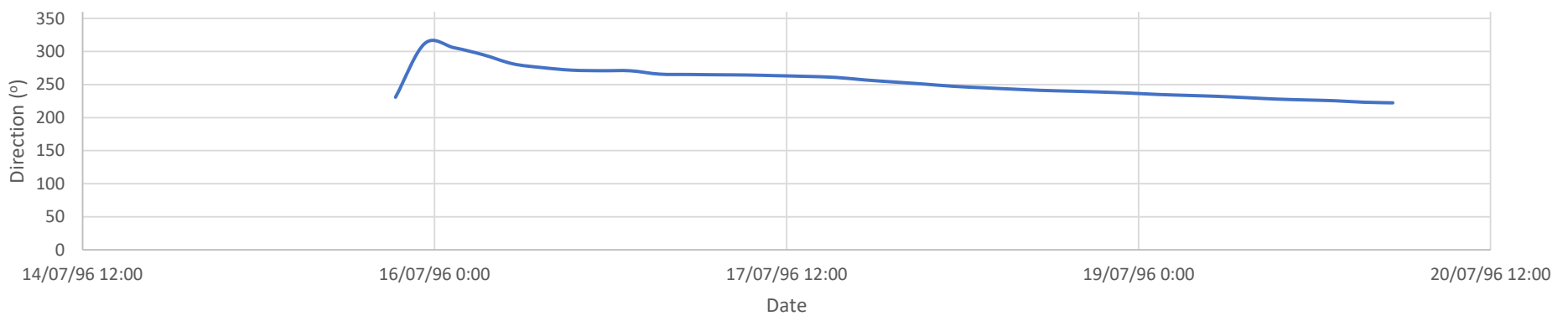
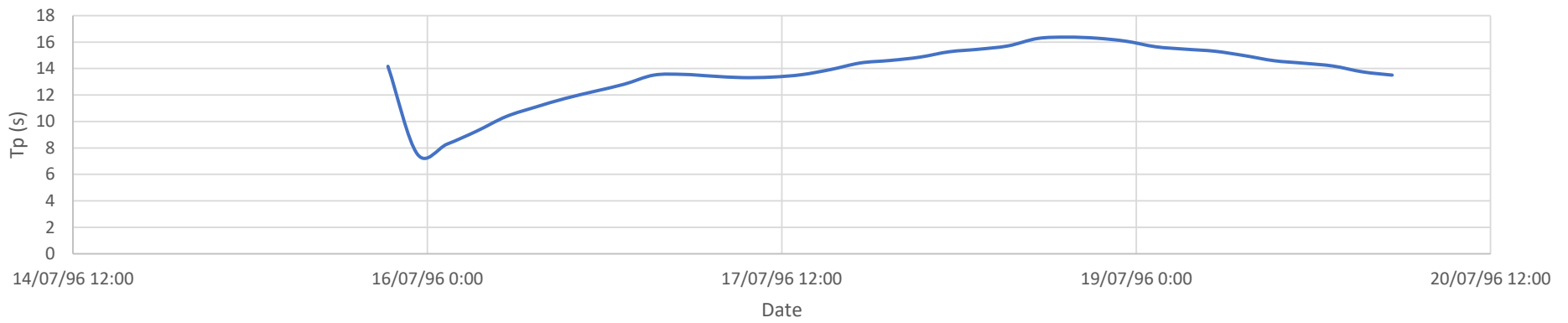
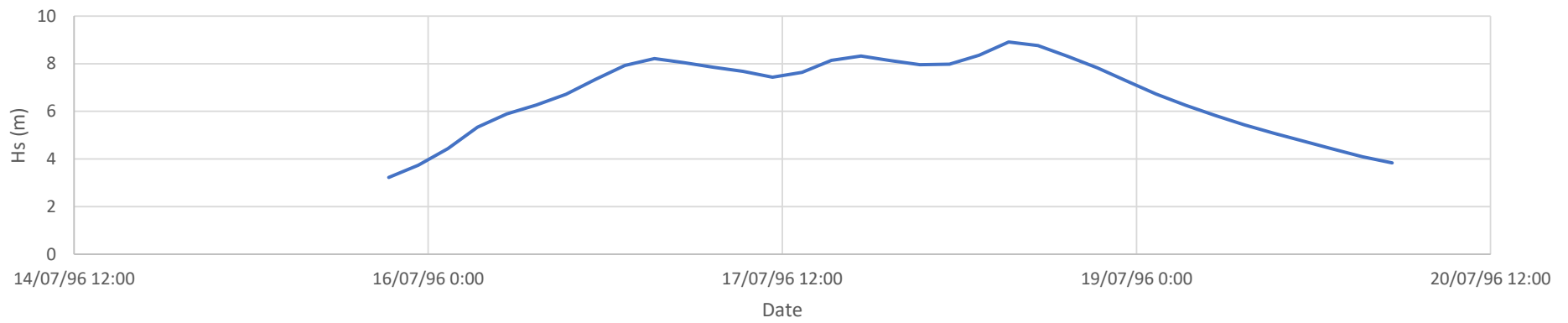
K1509 - South West Storm Selection
Top Storm (Metropolitan) Plots

Location	Rottnest
Start Date	23-07-96 12:00
End Date	03-08-96 1:00



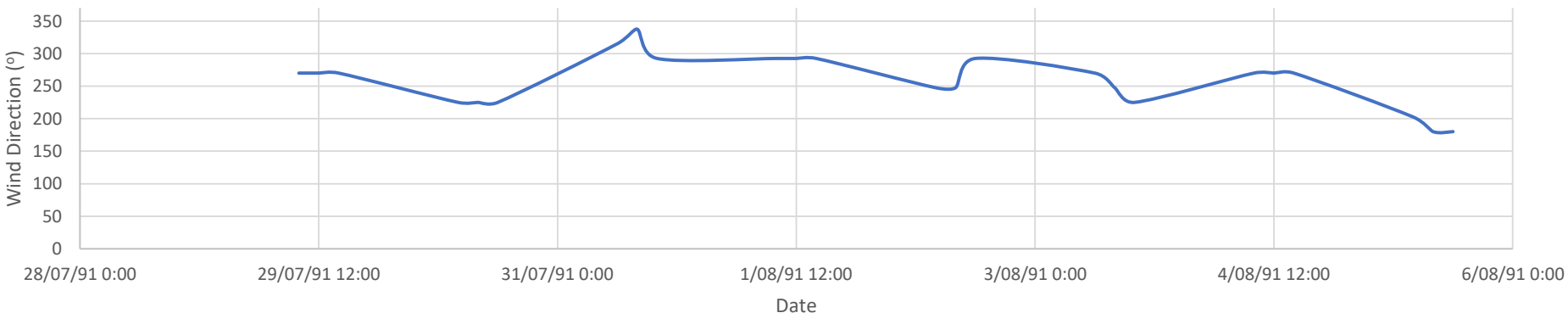
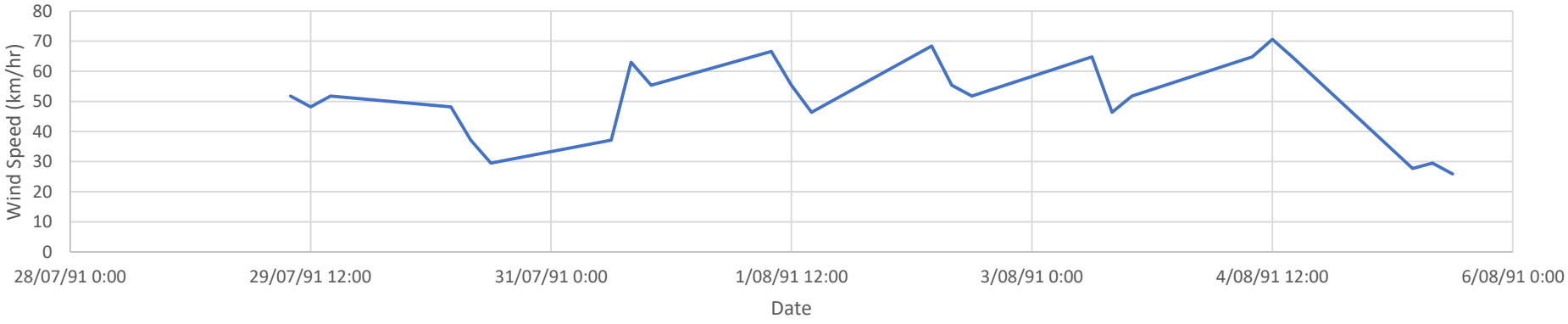
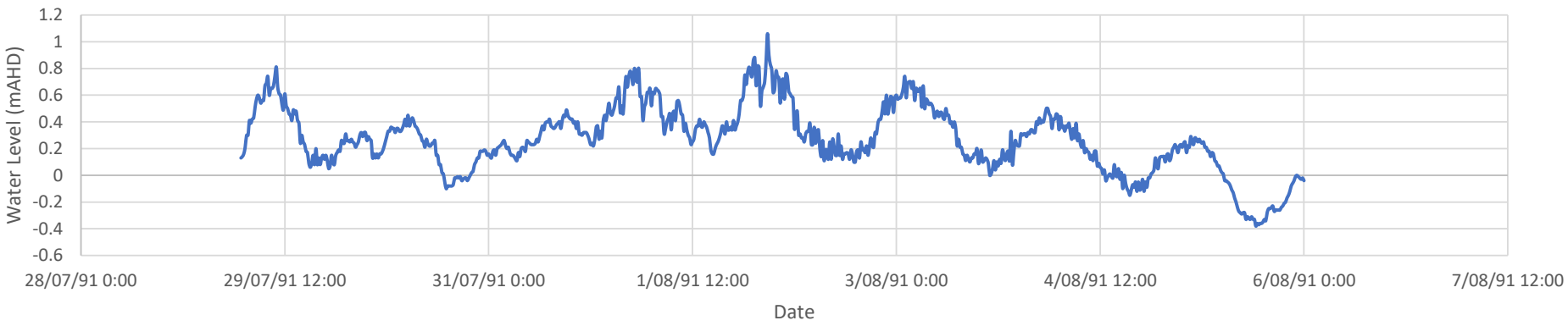
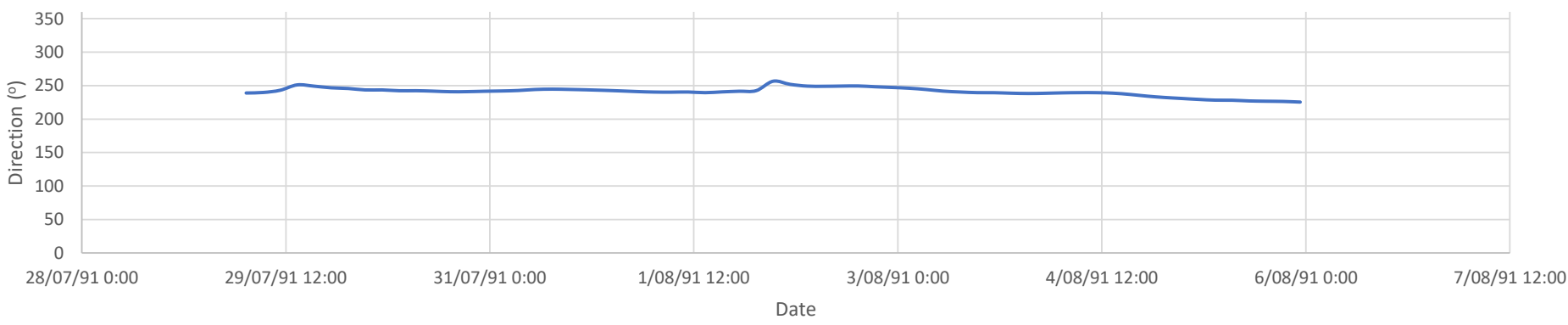
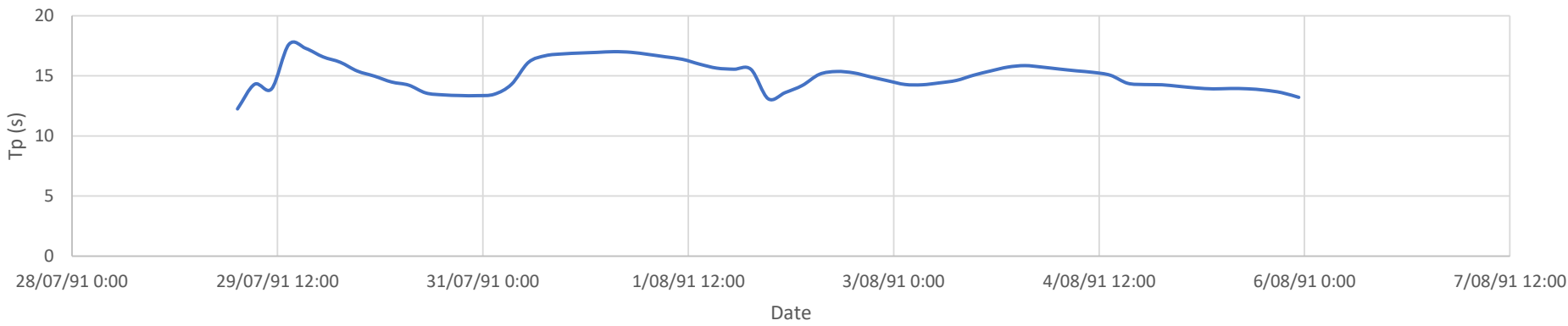
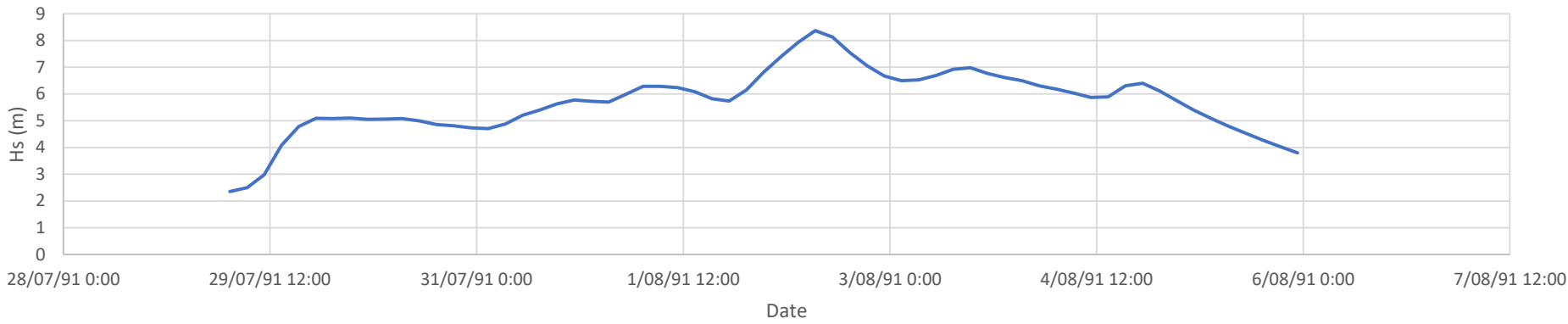
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	15-07-96 20:00
End Date	20-07-96 2:00



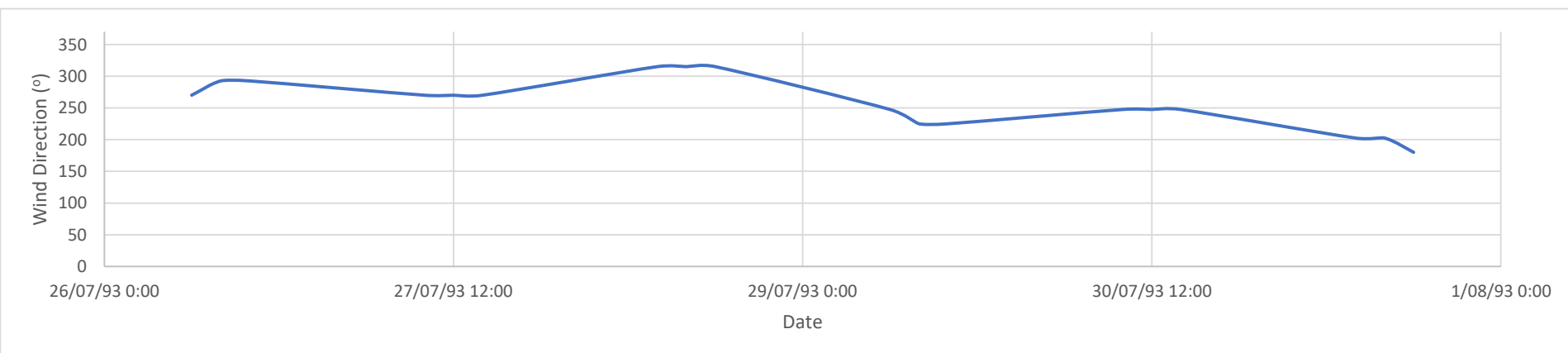
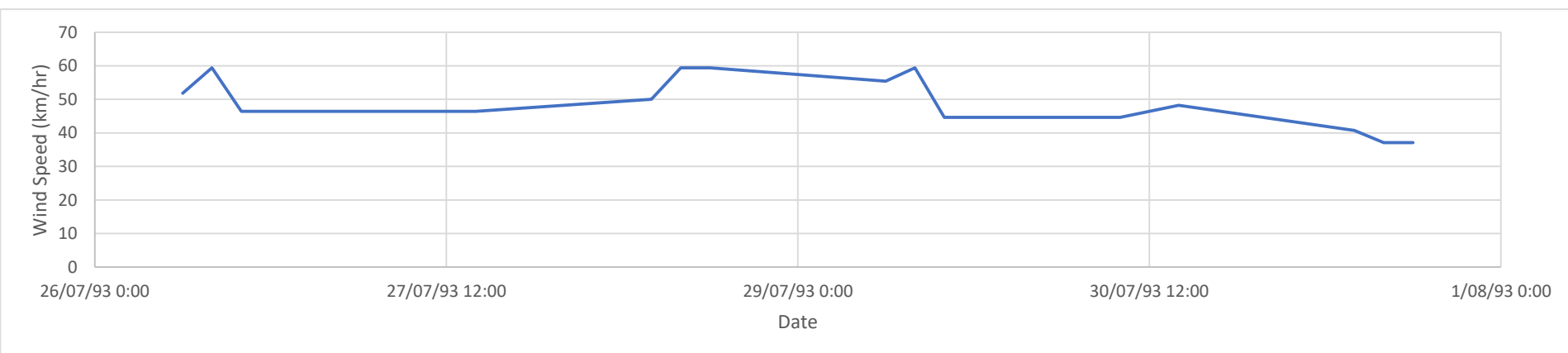
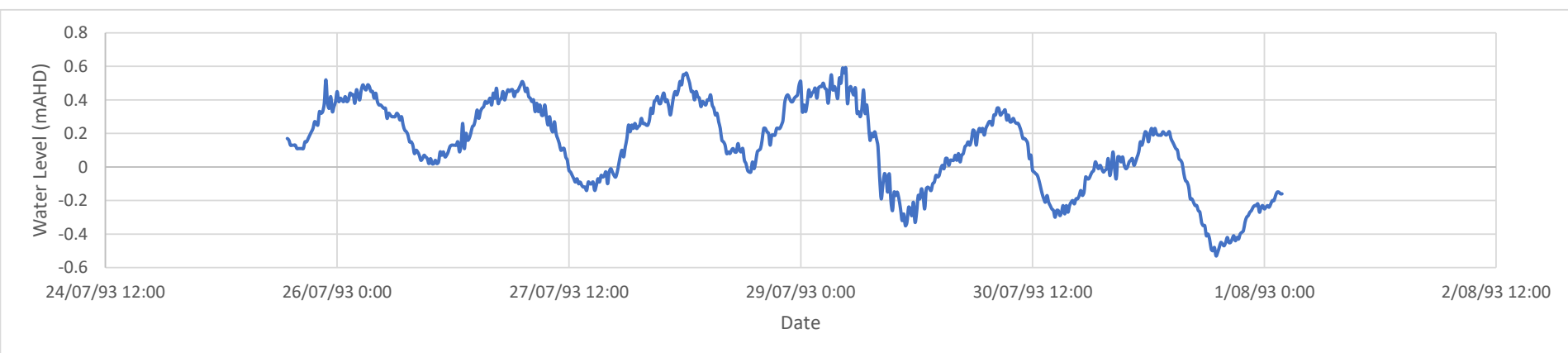
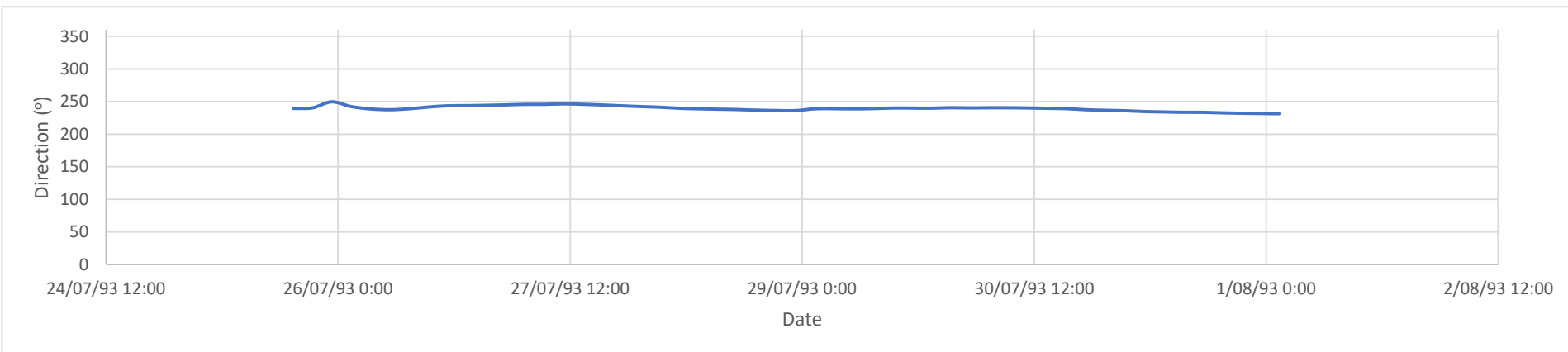
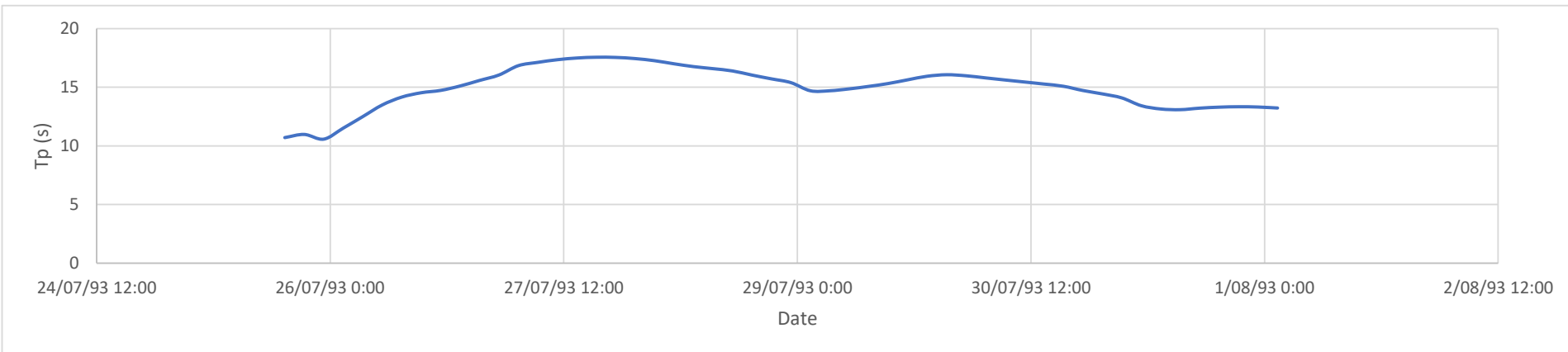
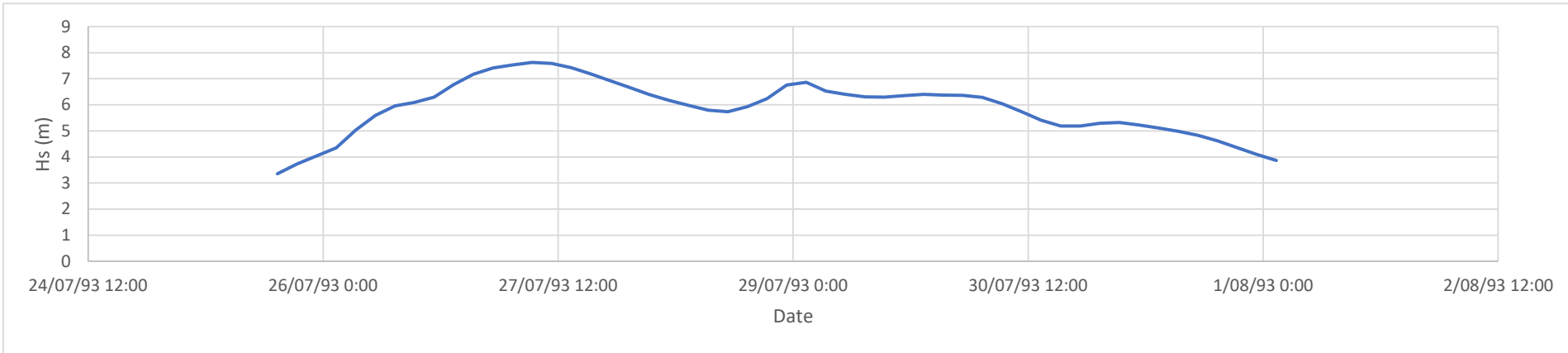
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	29-07-91 5:00
End Date	05-08-91 23:00



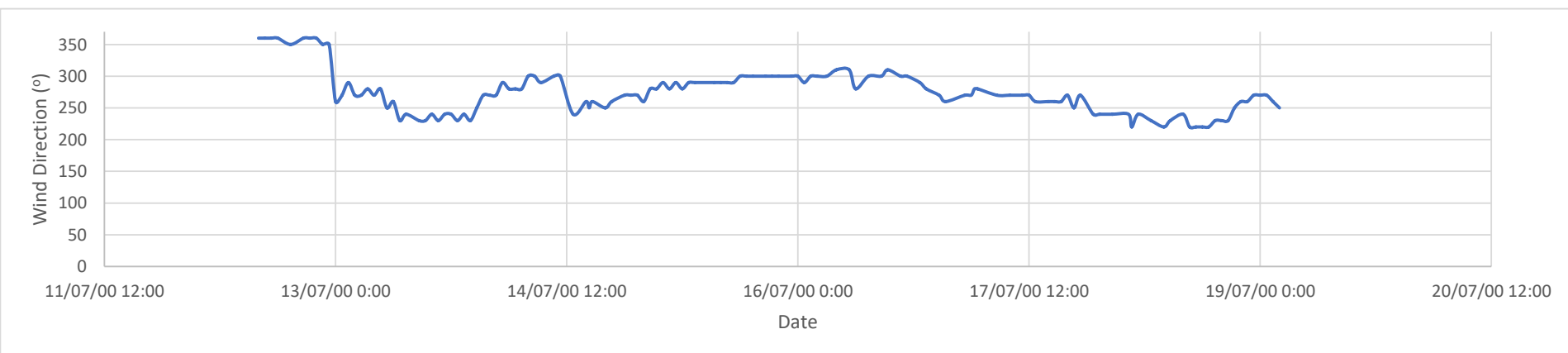
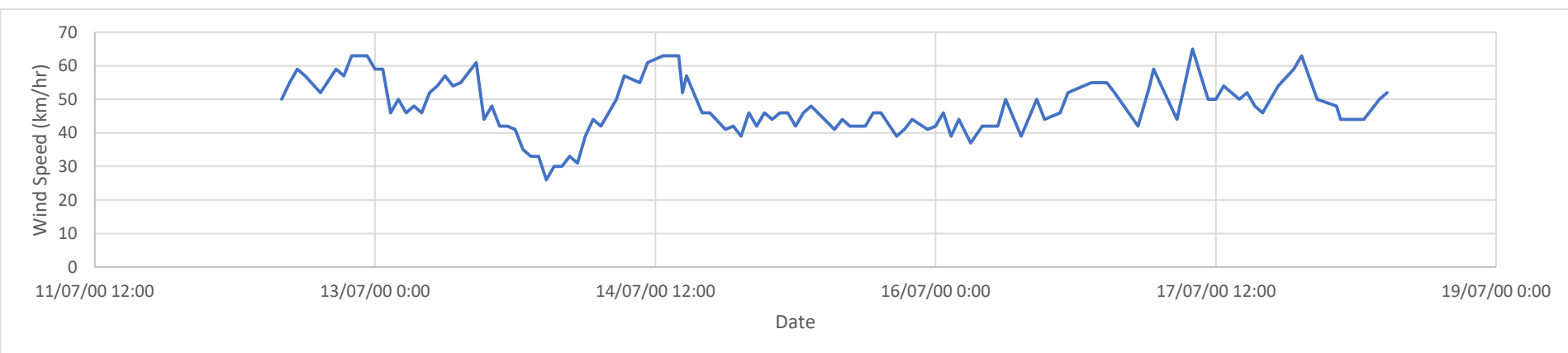
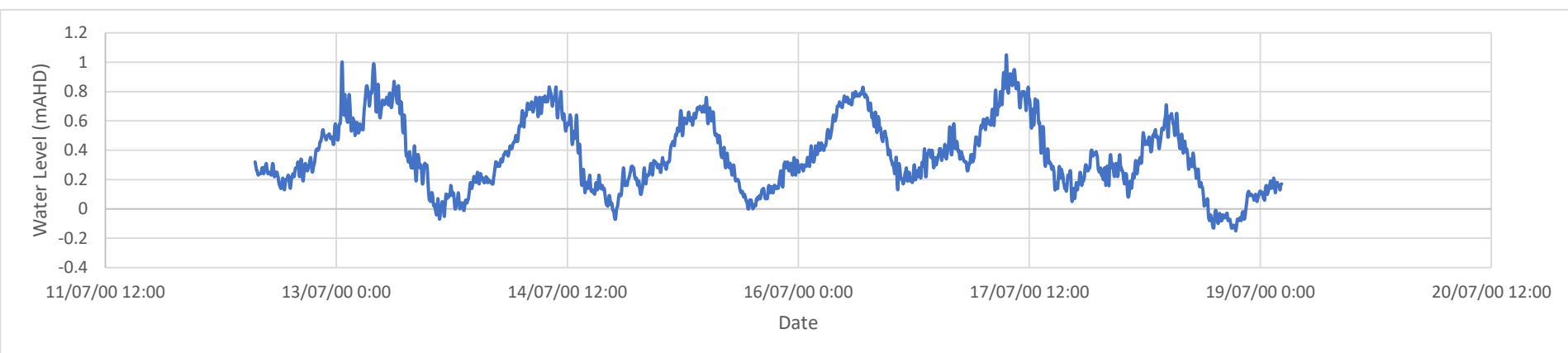
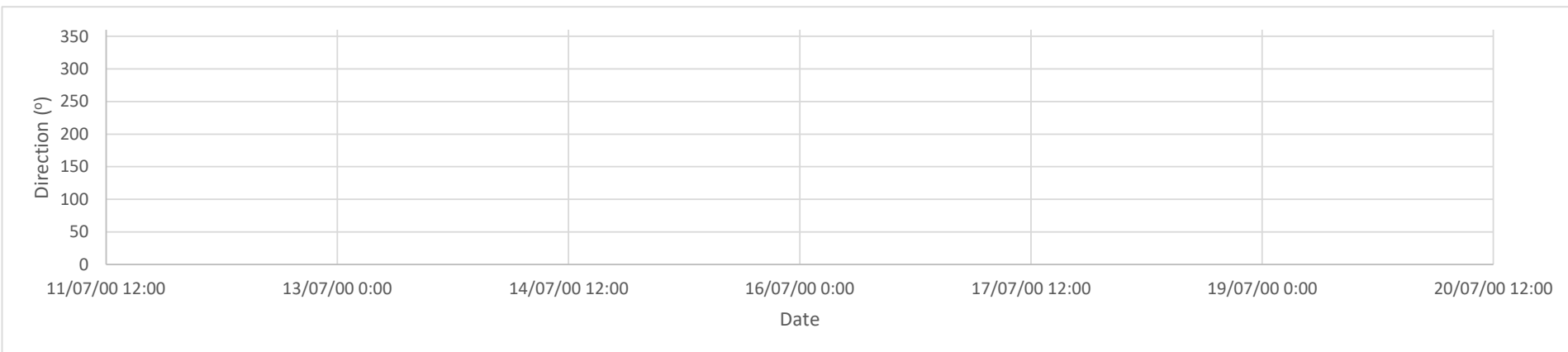
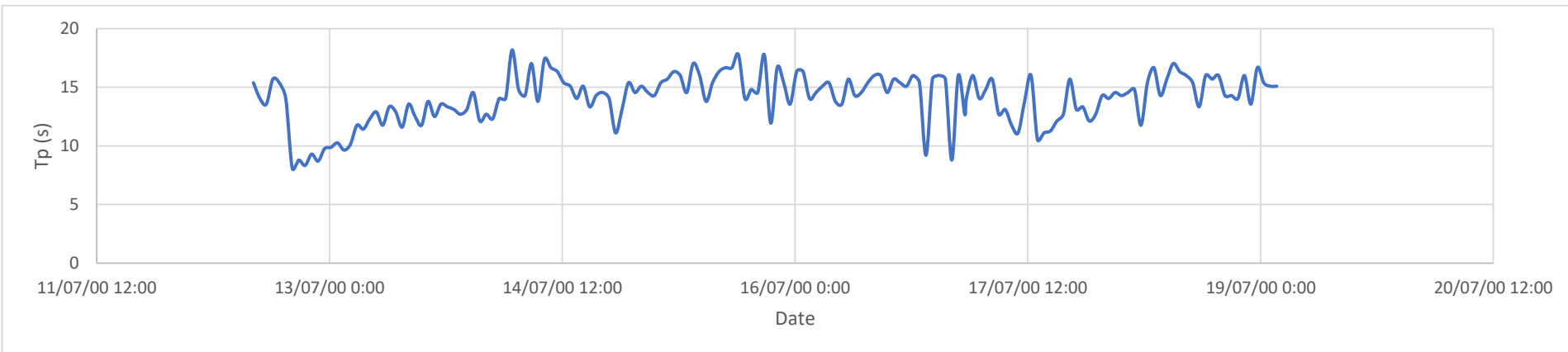
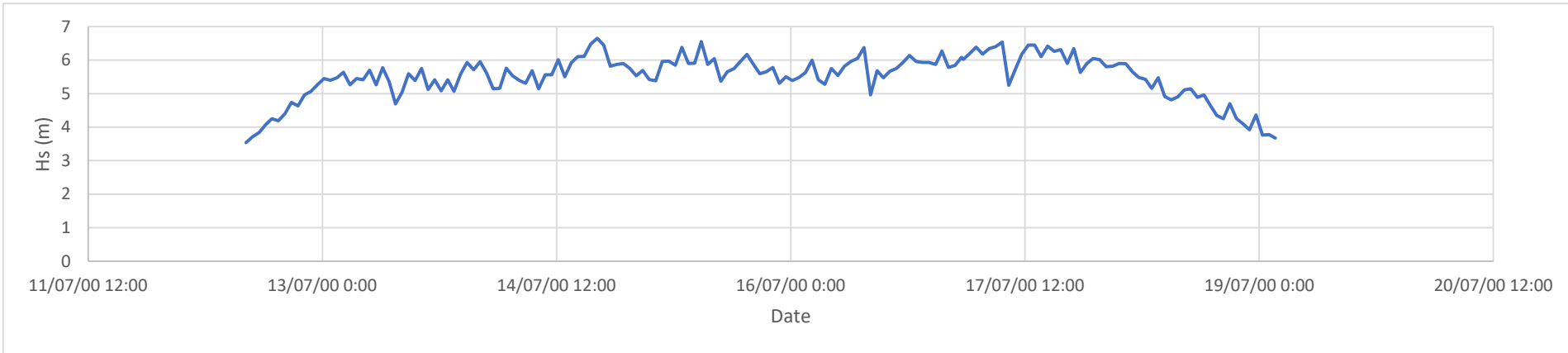
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	25-07-93 17:00
End Date	01-08-93 2:00



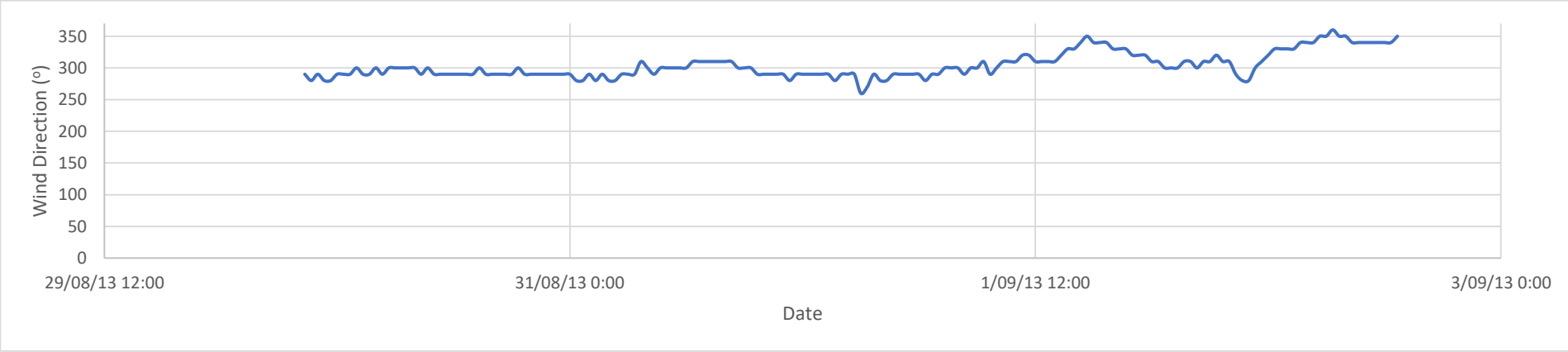
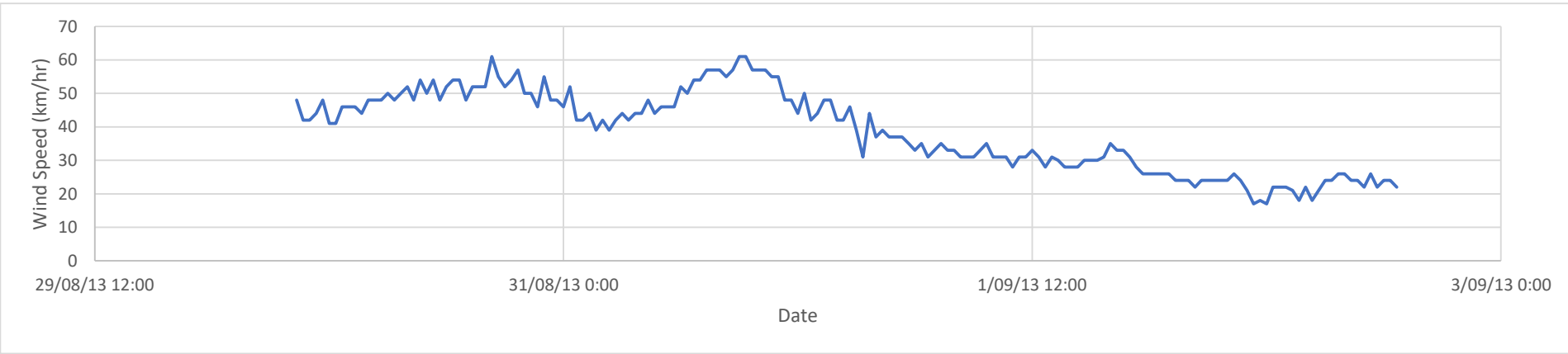
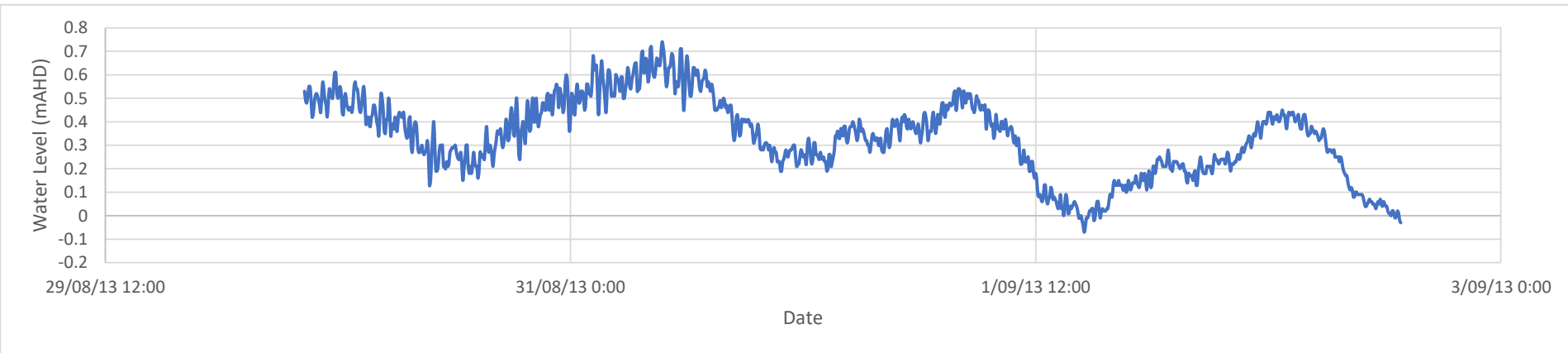
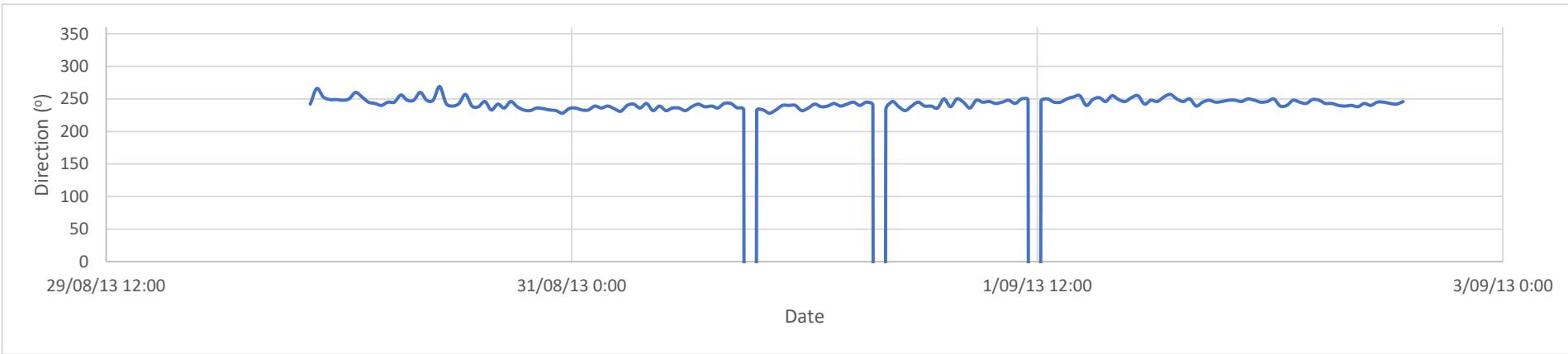
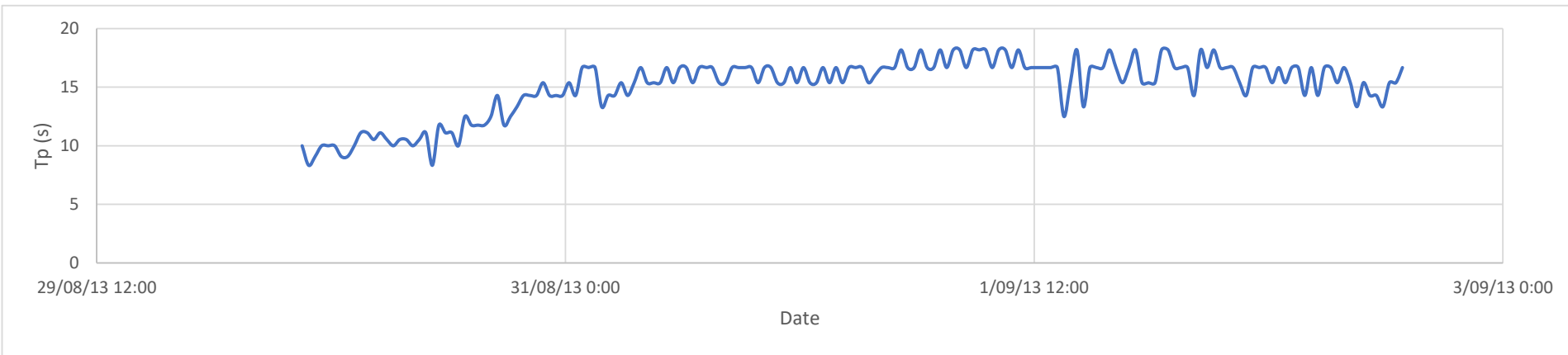
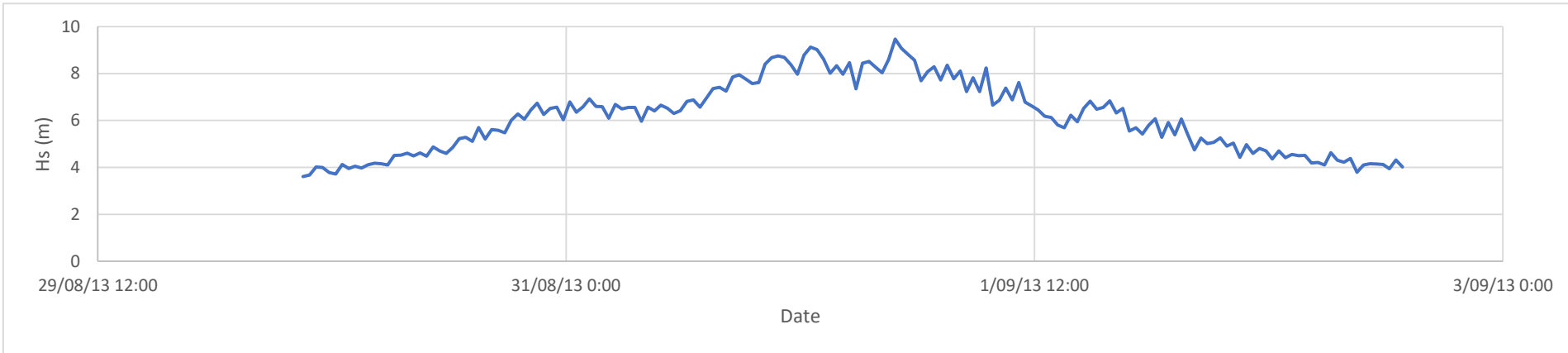
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	12-07-00 12:15
End Date	19-07-00 2:30



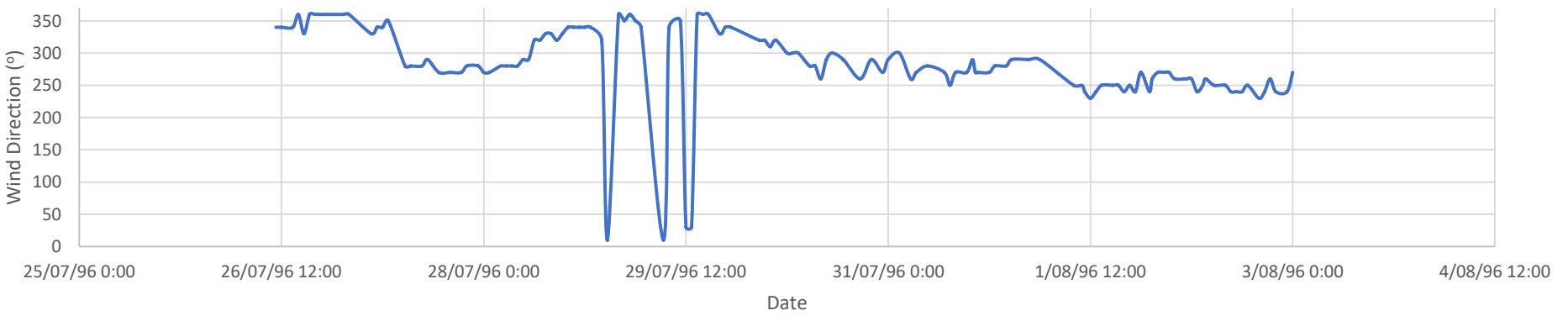
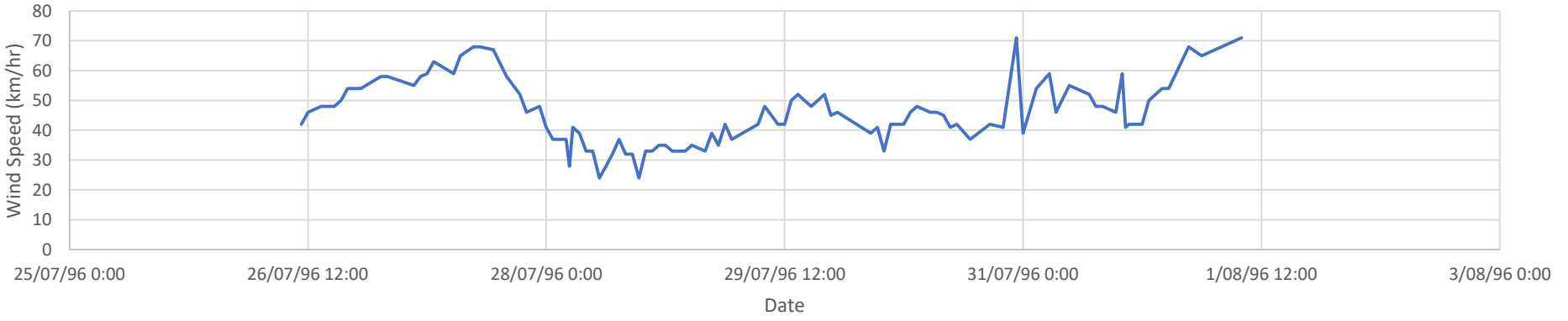
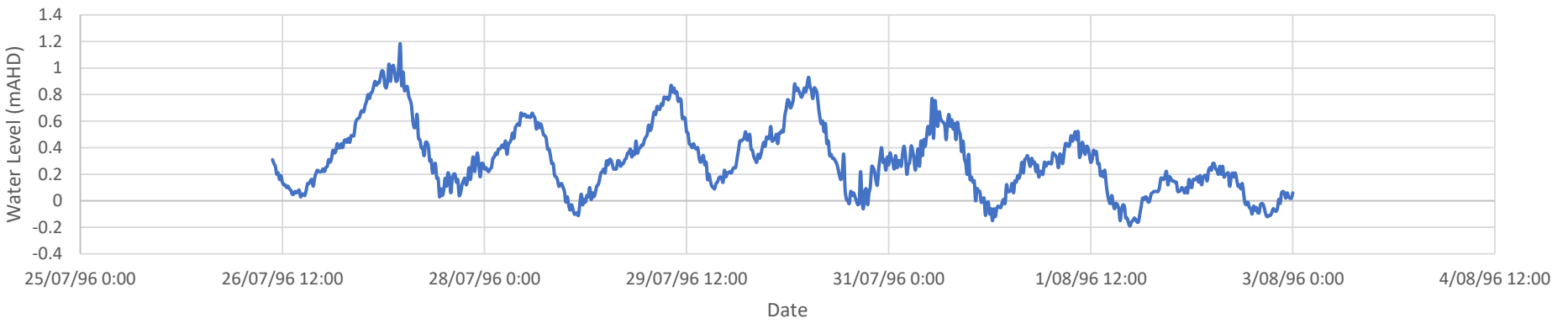
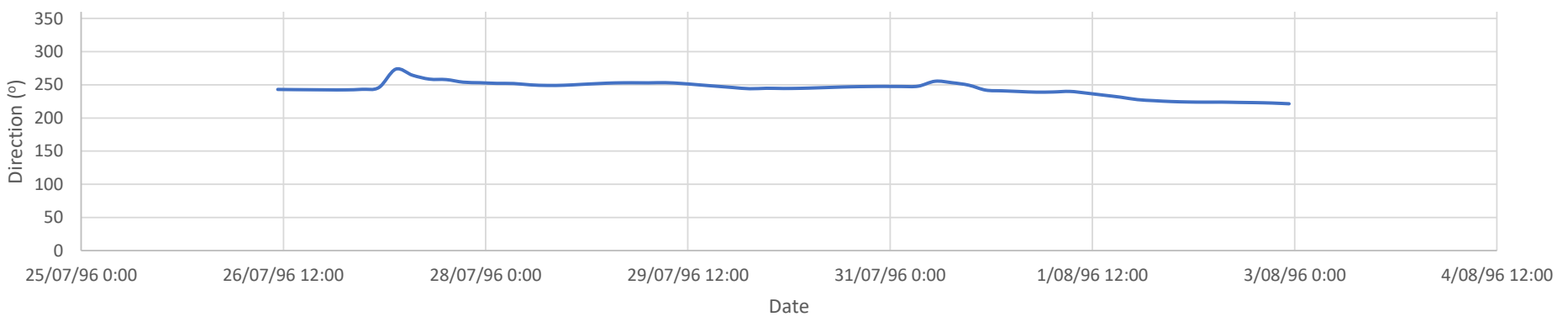
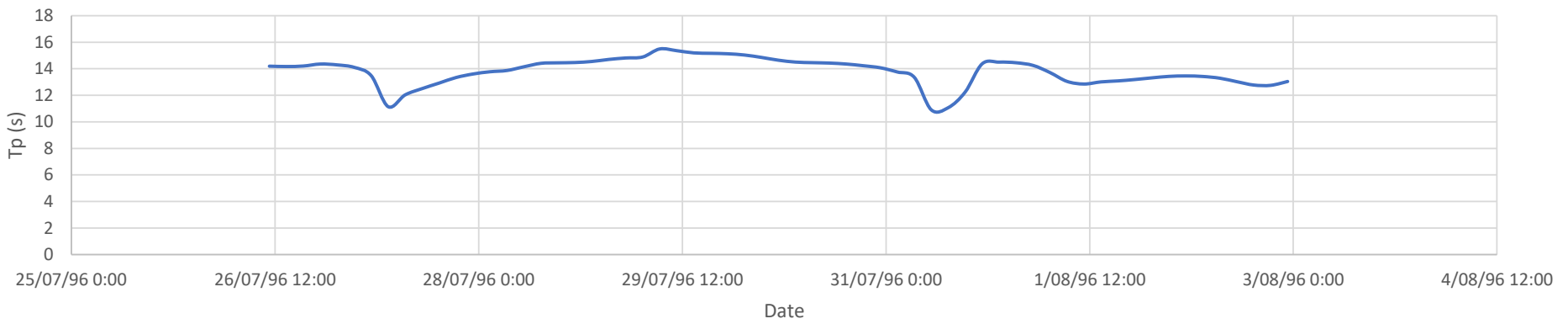
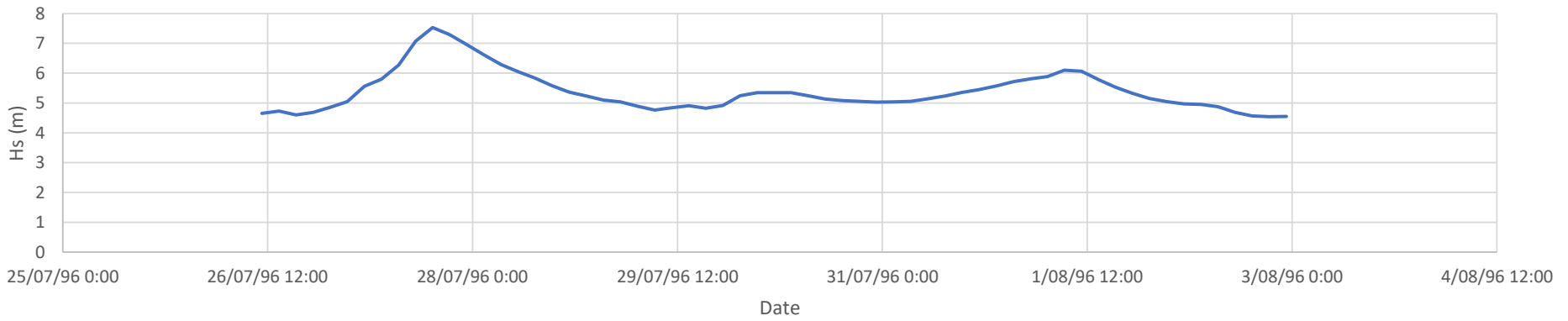
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	30-08-13 4:17
End Date	02-09-13 15:17



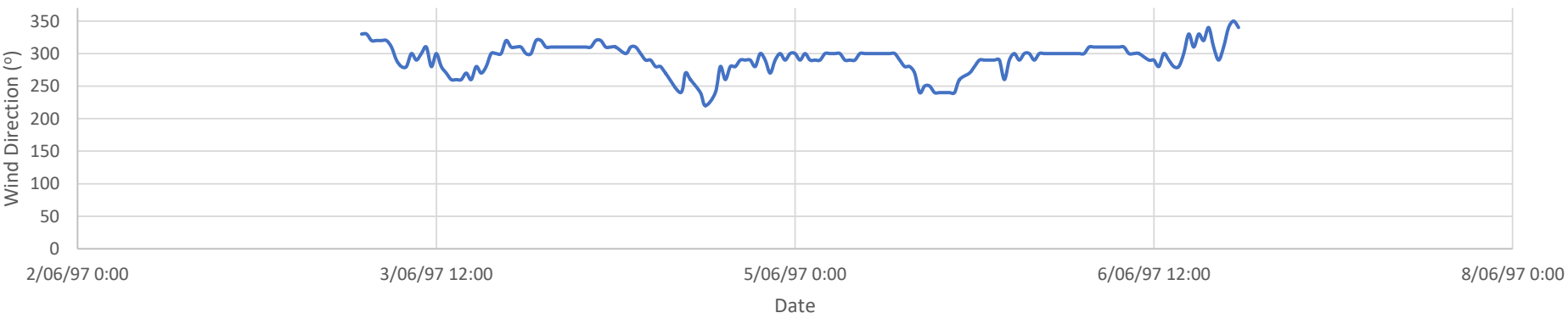
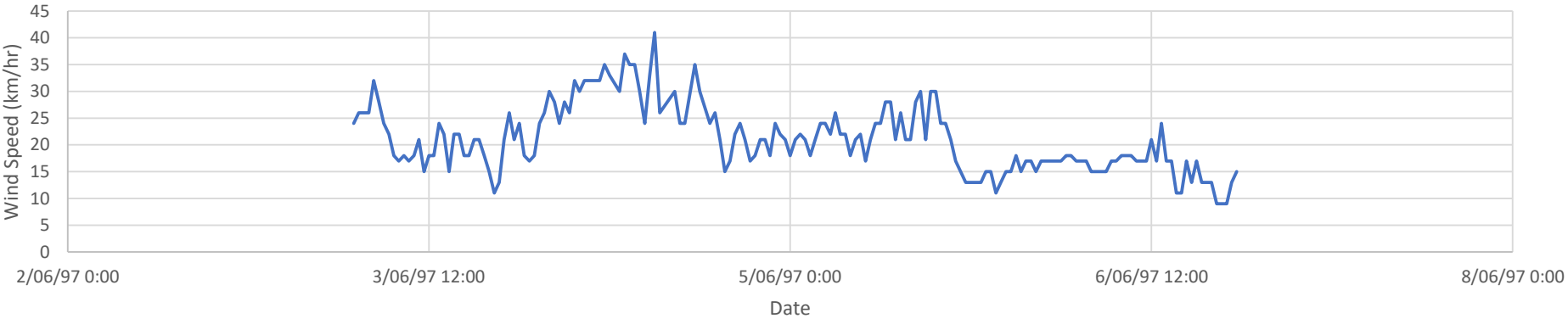
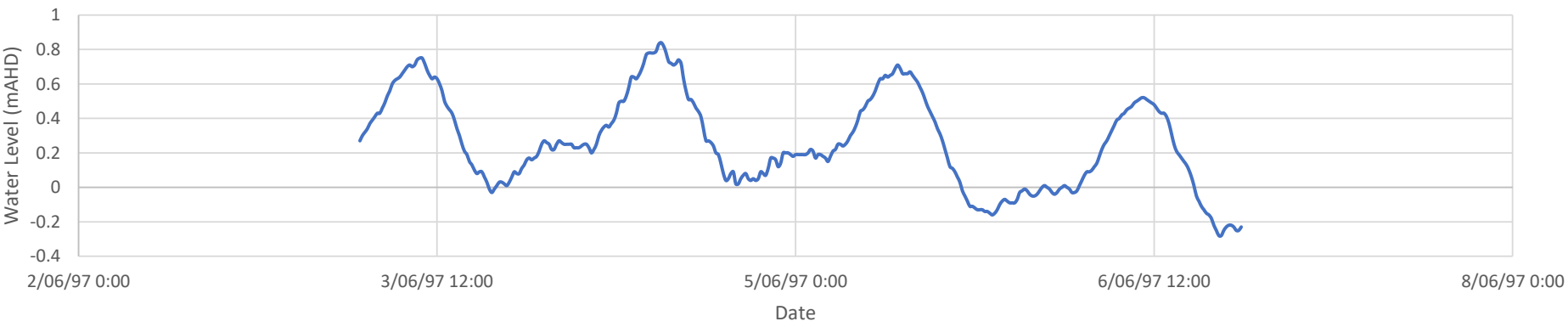
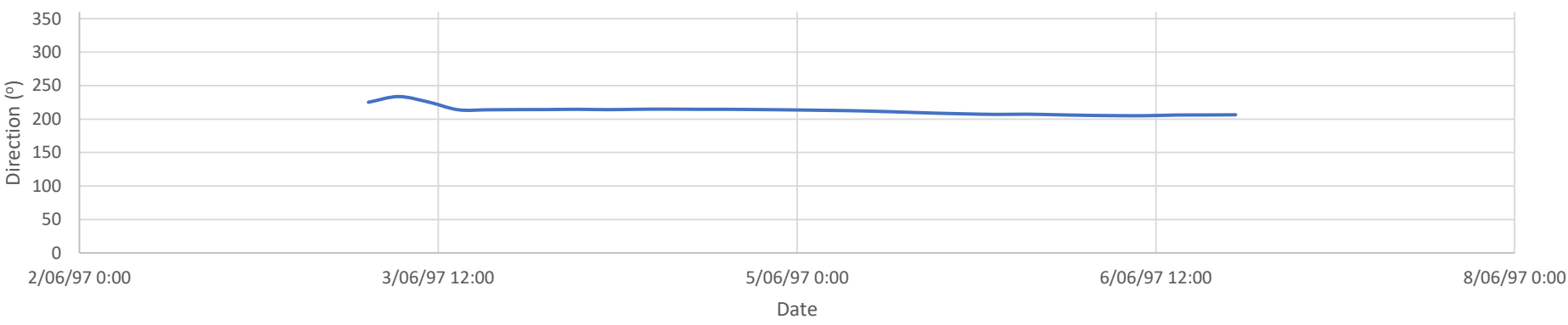
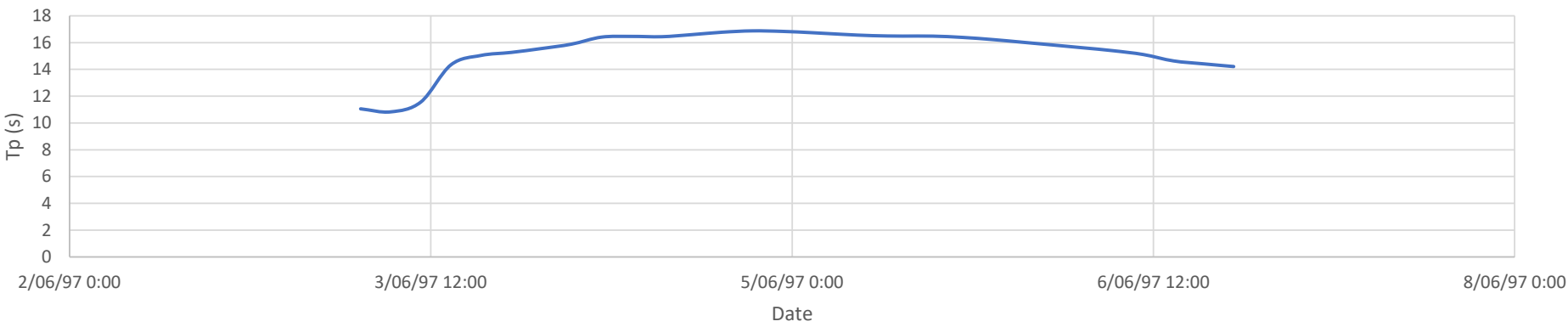
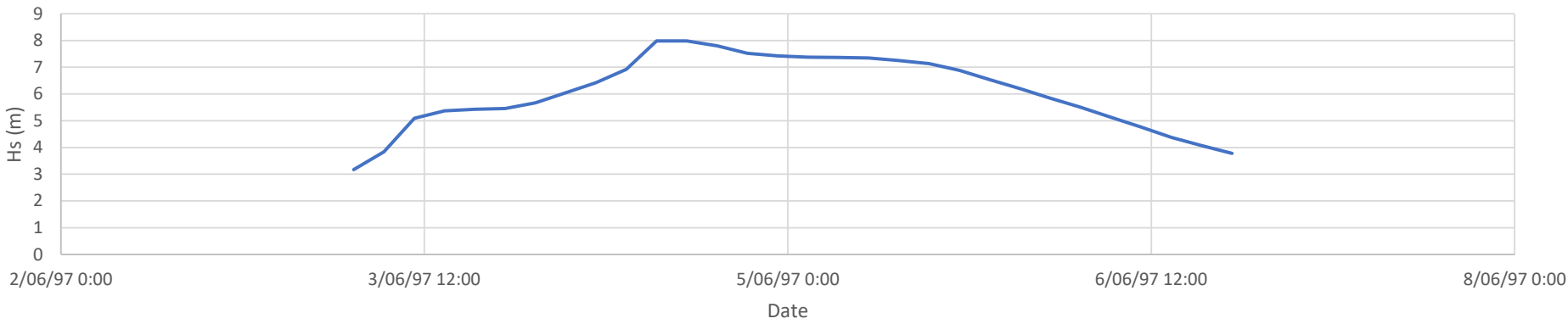
K1509 - South West Storm Selection
Top South West (Cape Nat) Storm Plots

Location	Cape Naturaliste
Start Date	26-07-96 11:00
End Date	02-08-96 23:00



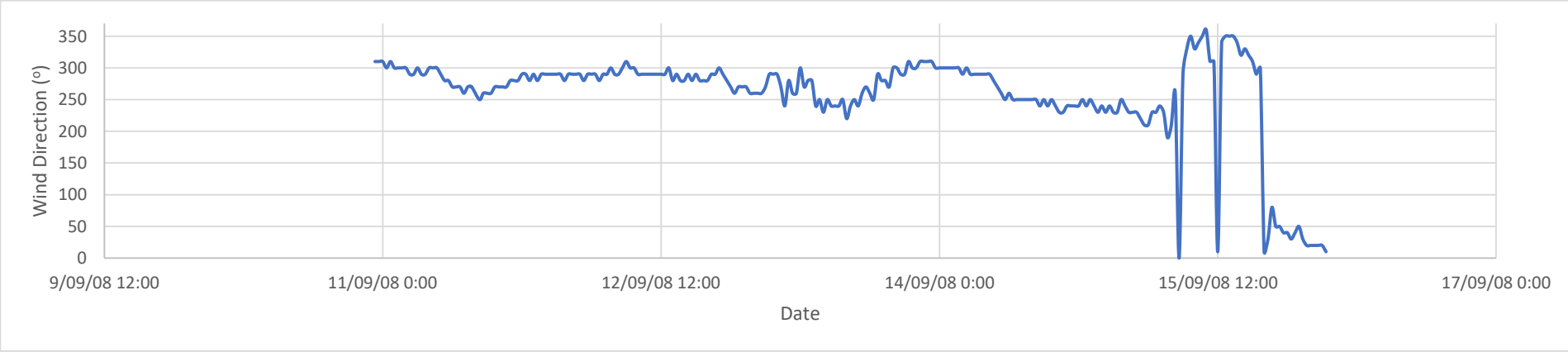
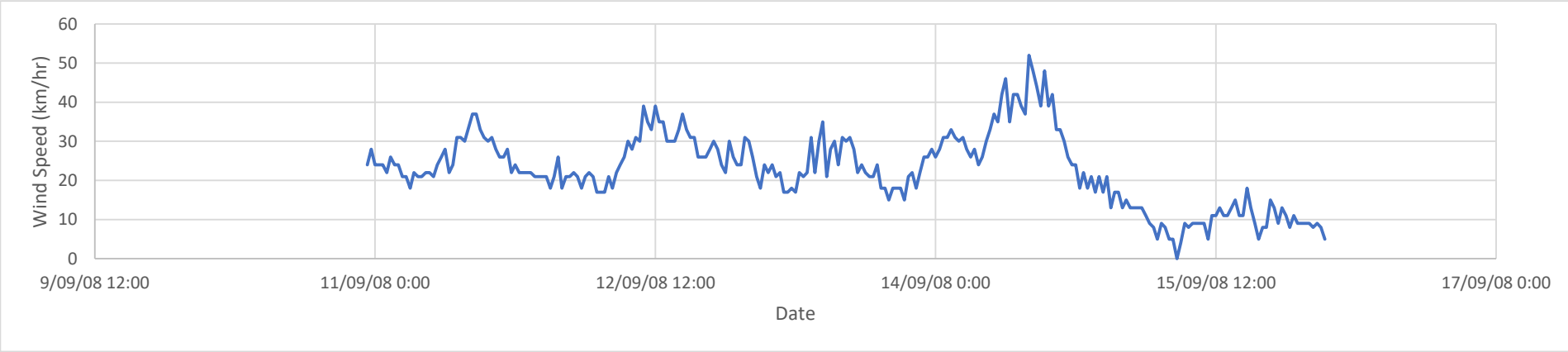
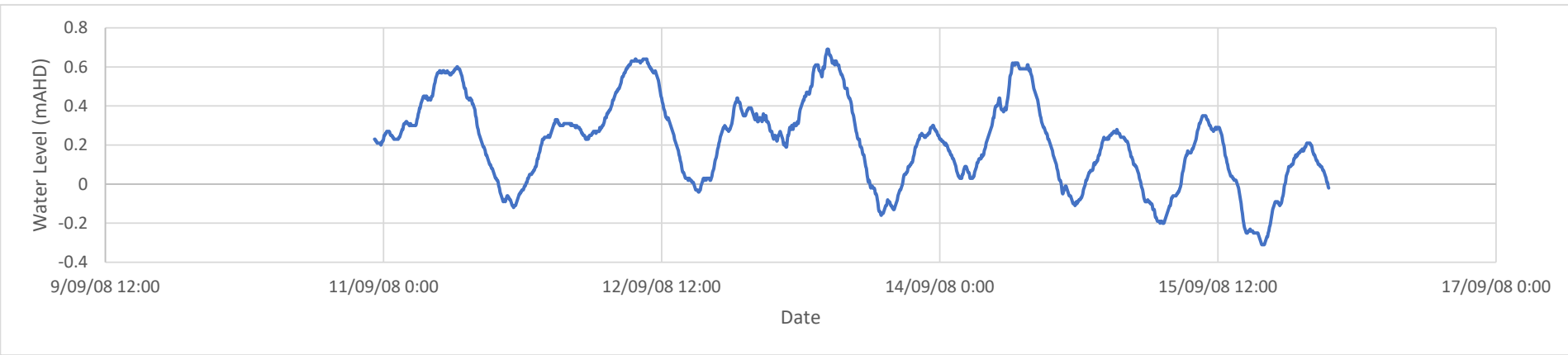
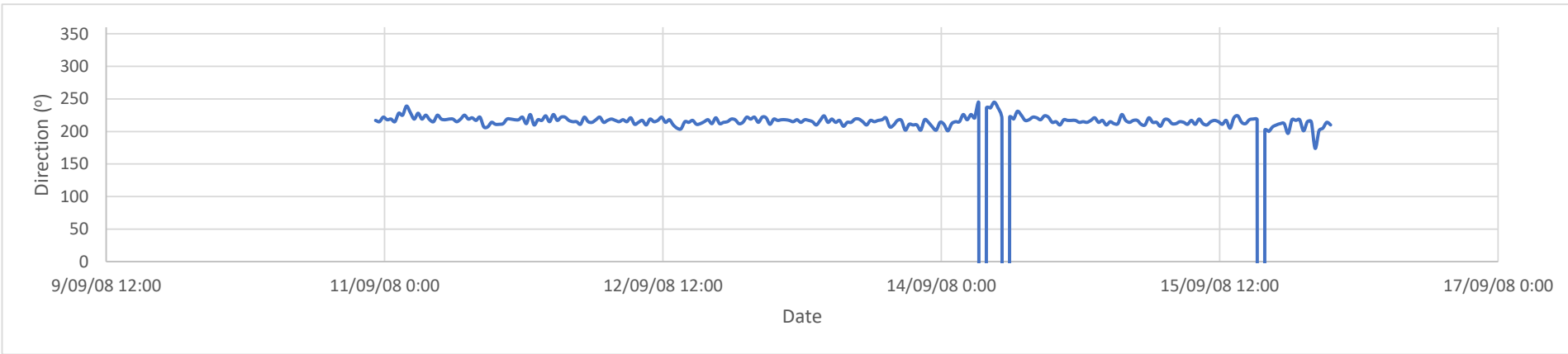
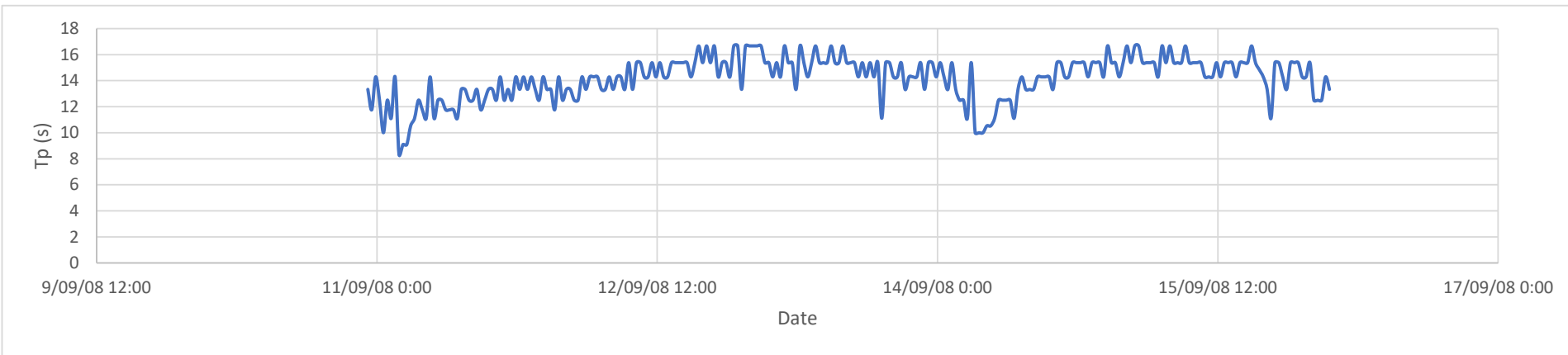
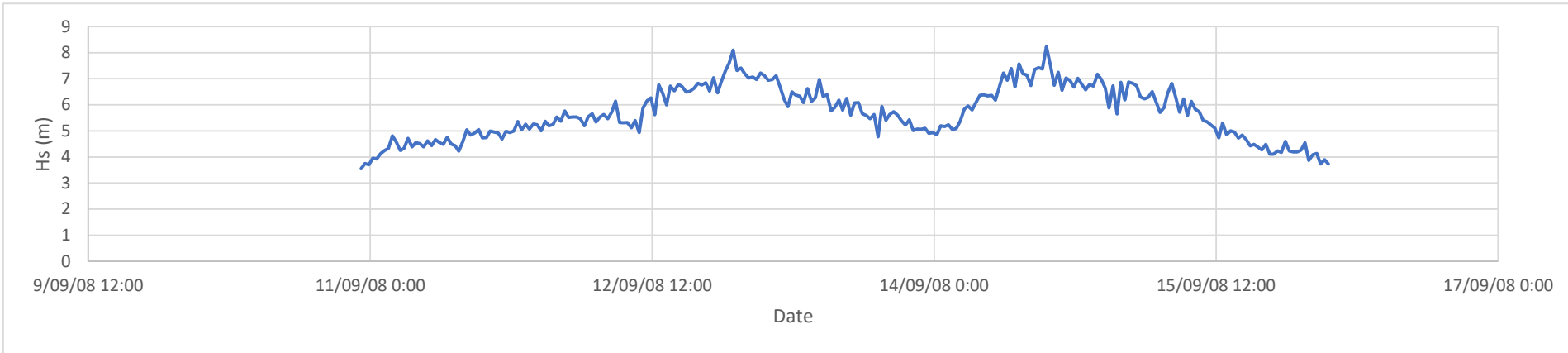
K1509 - South West Storm Selection
Top South Coast (Albany) Storm Plots

Location	Albany
Start Date	03-06-97 5:00
End Date	06-06-97 20:00



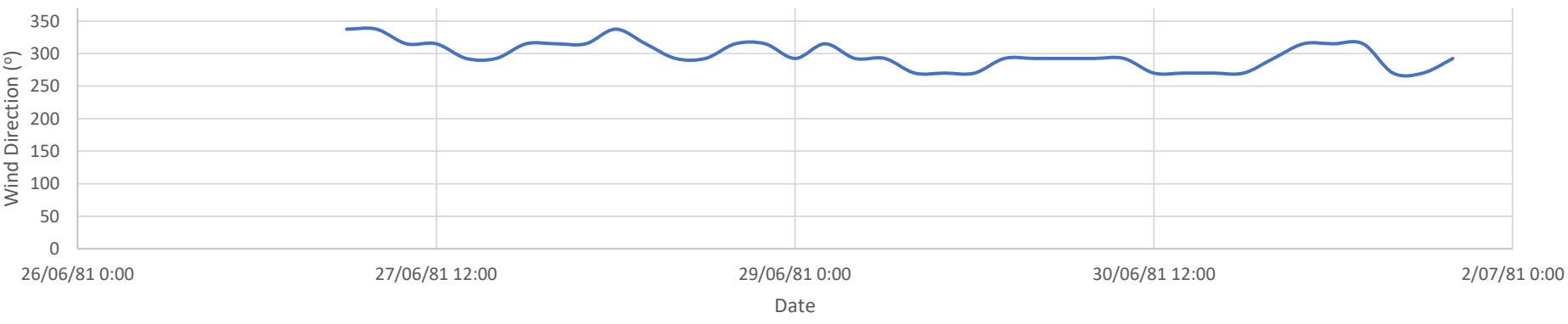
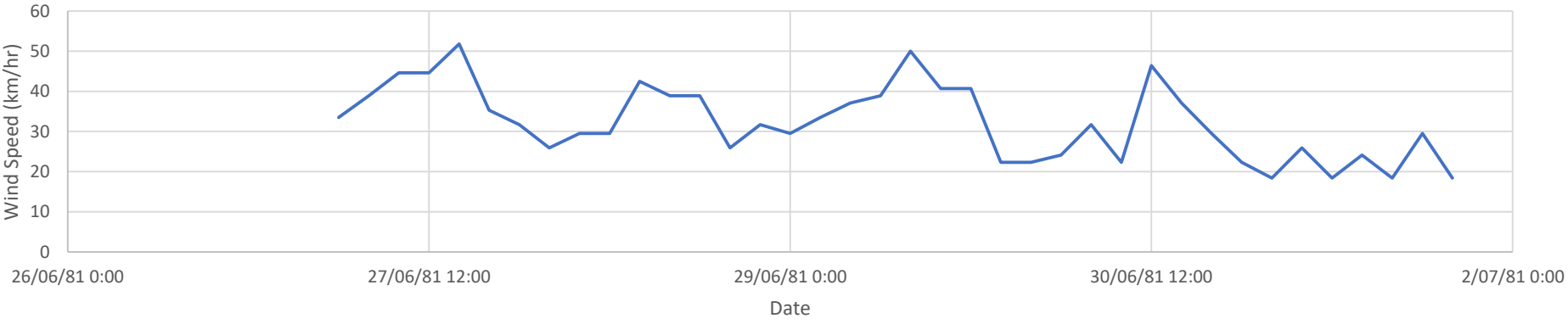
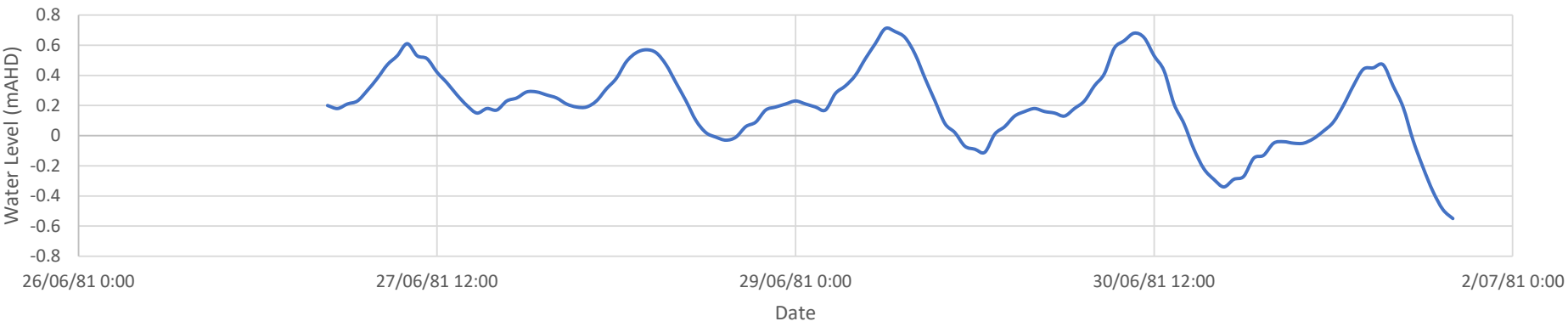
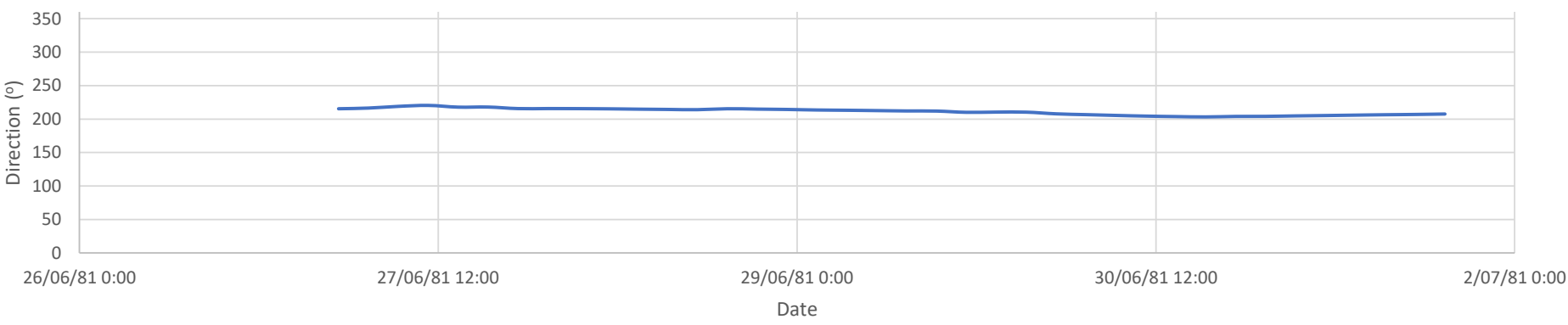
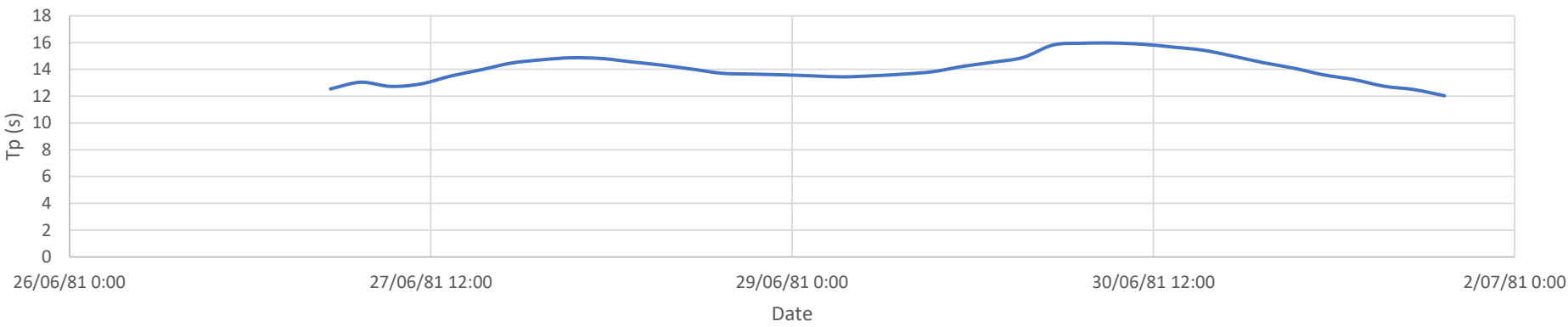
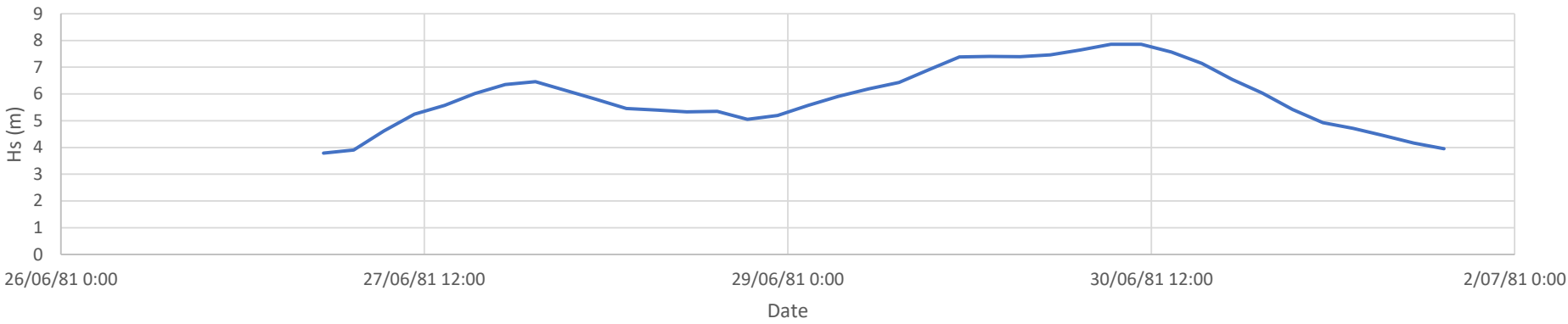
K1509 - South West Storm Selection
Top South Coast (Albany) Storm Plots

Location	Albany
Start Date	10-09-08 23:50
End Date	16-09-08 1:20



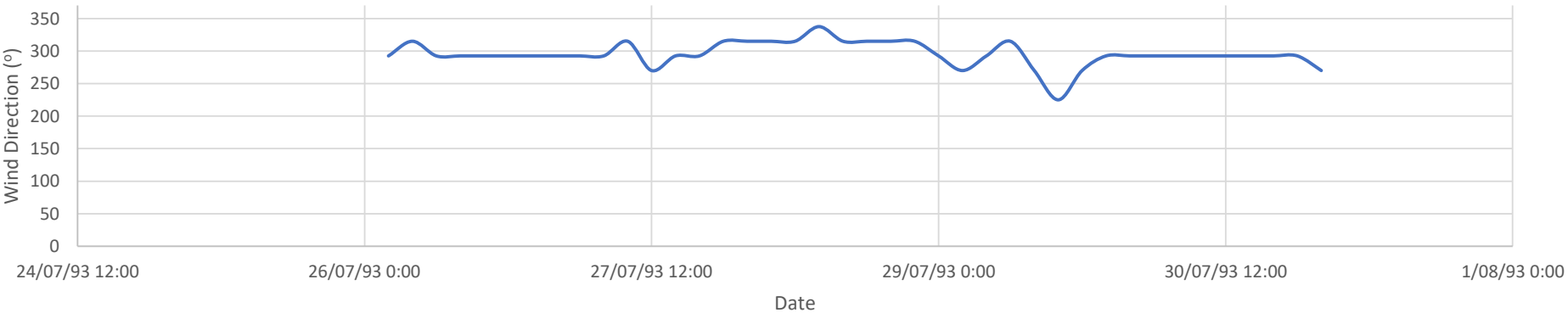
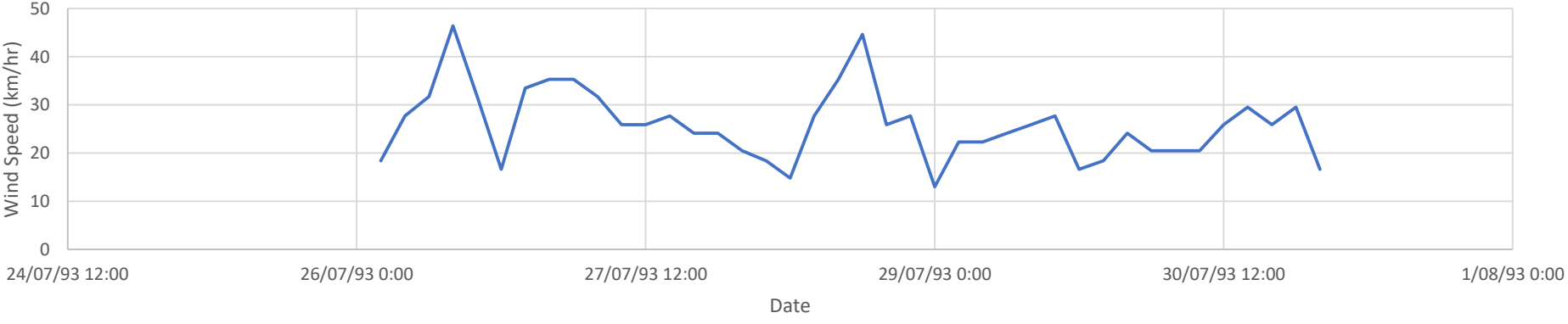
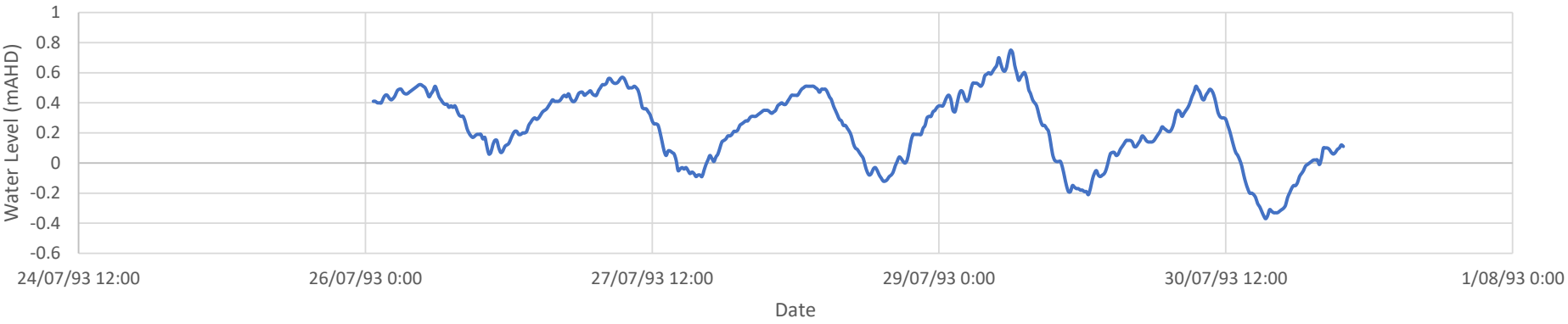
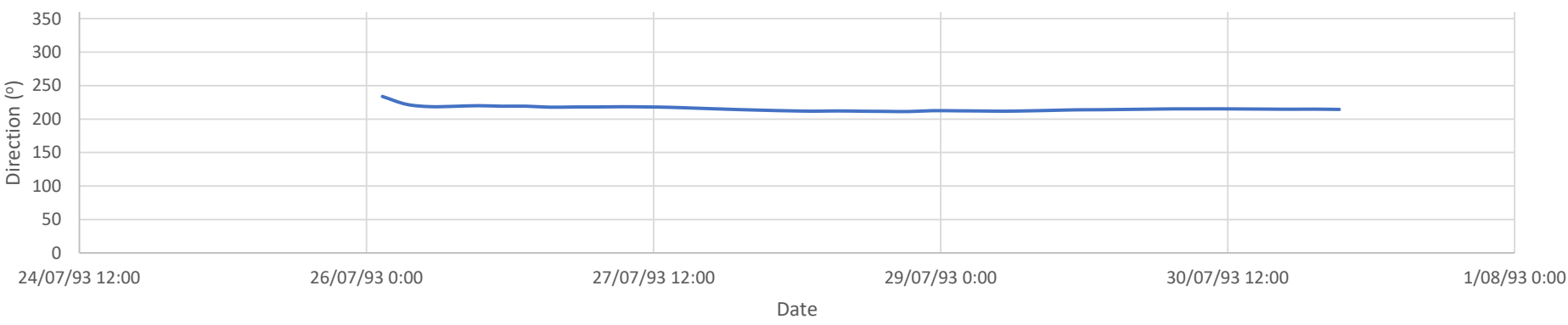
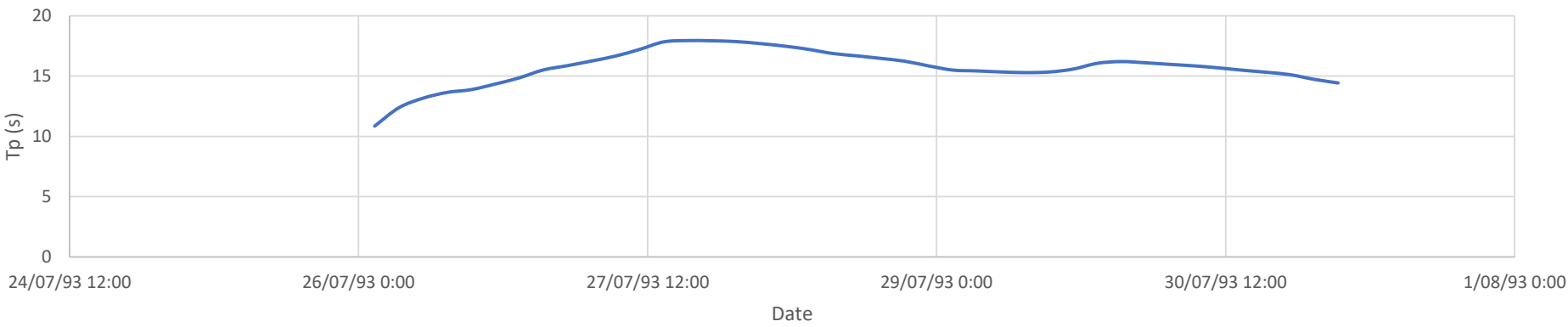
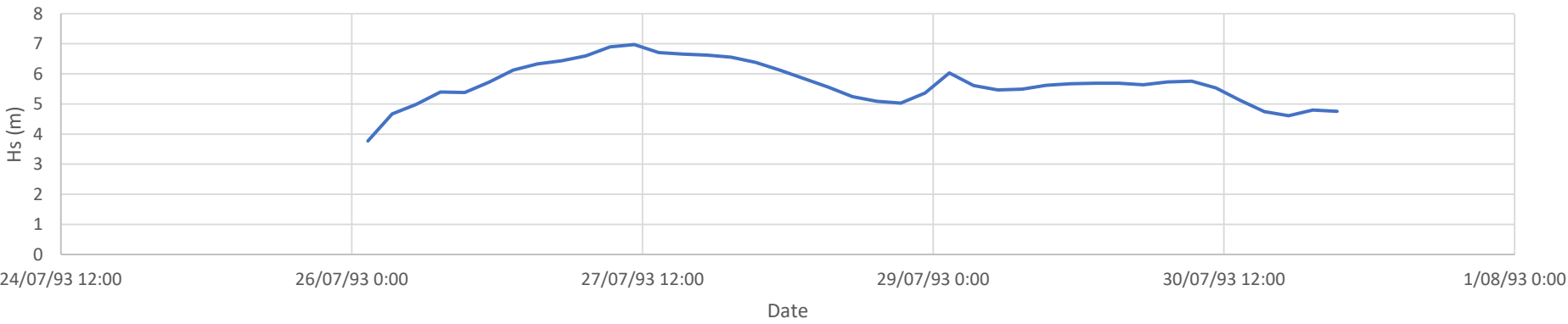
K1509 - South West Storm Selection
Top South Coast (Albany) Storm Plots

Location	Albany
Start Date	27-06-81 2:00
End Date	01-07-81 17:00



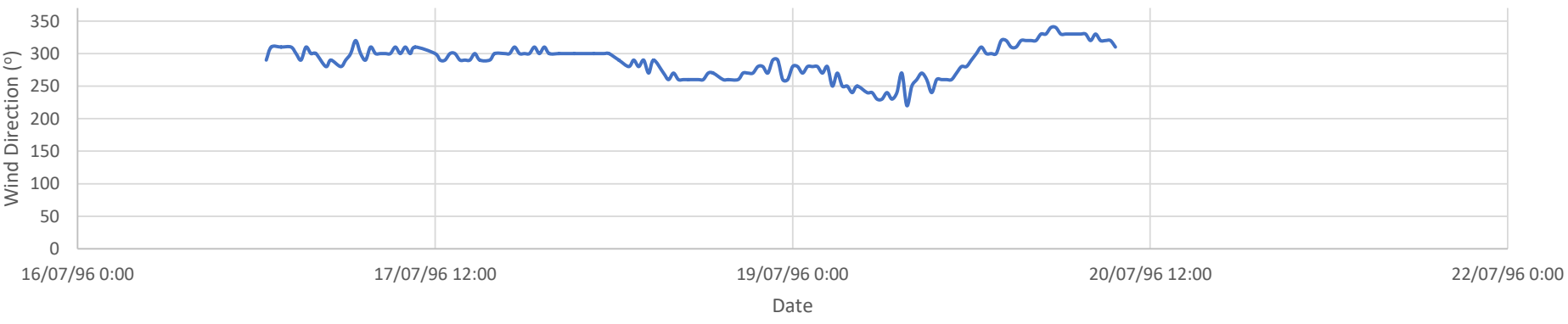
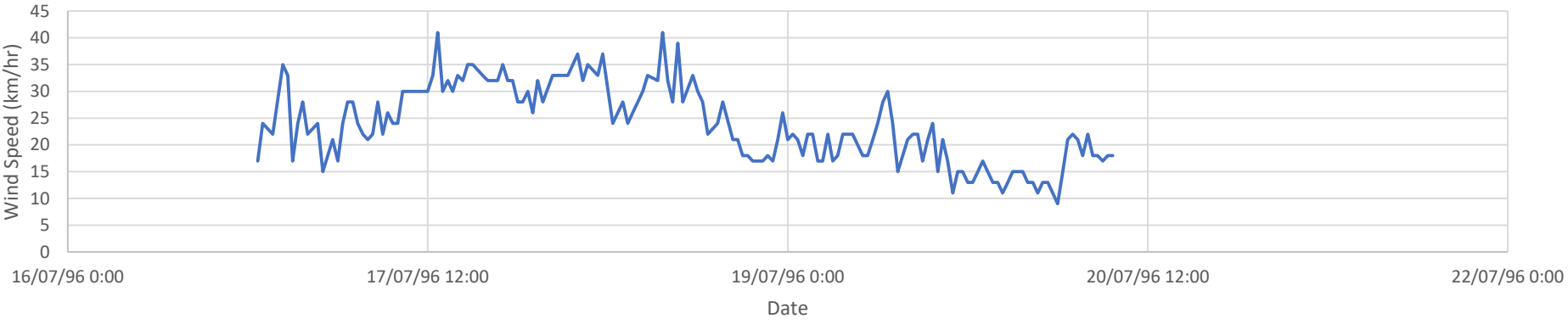
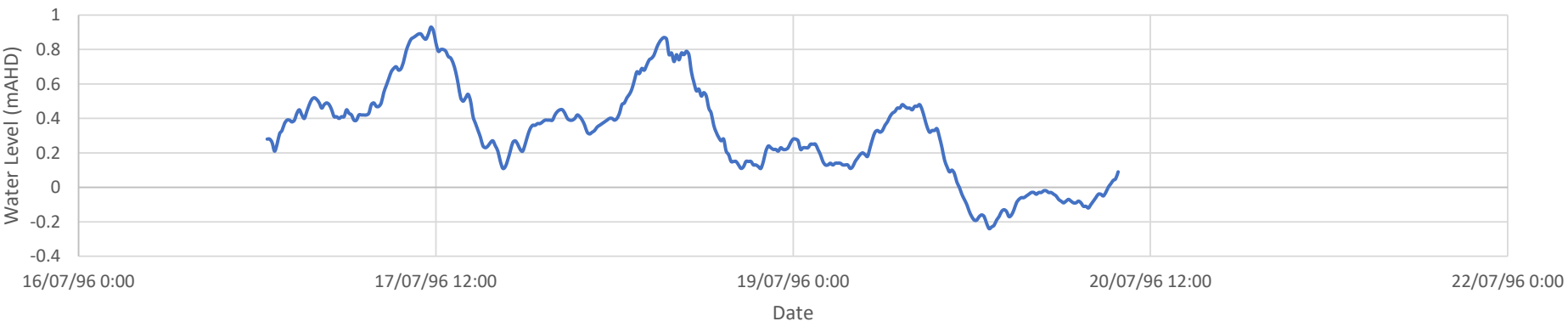
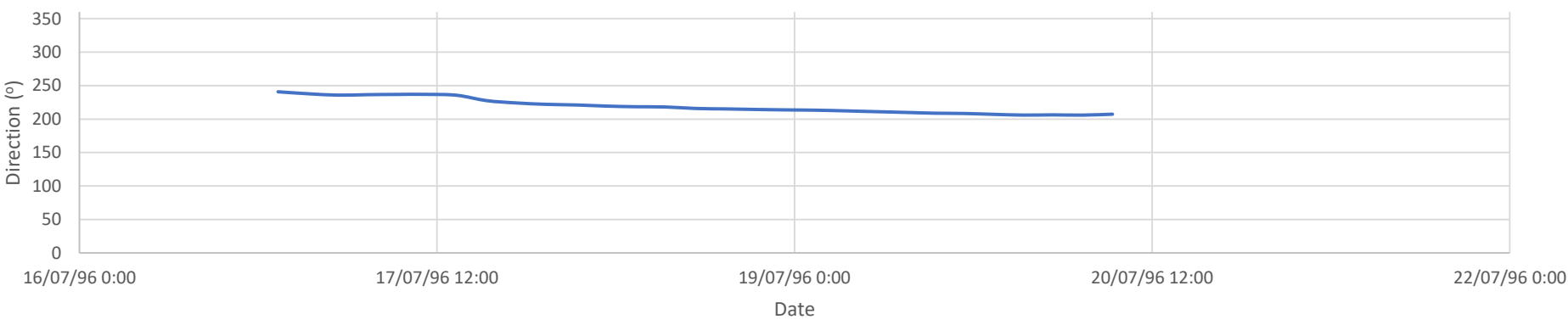
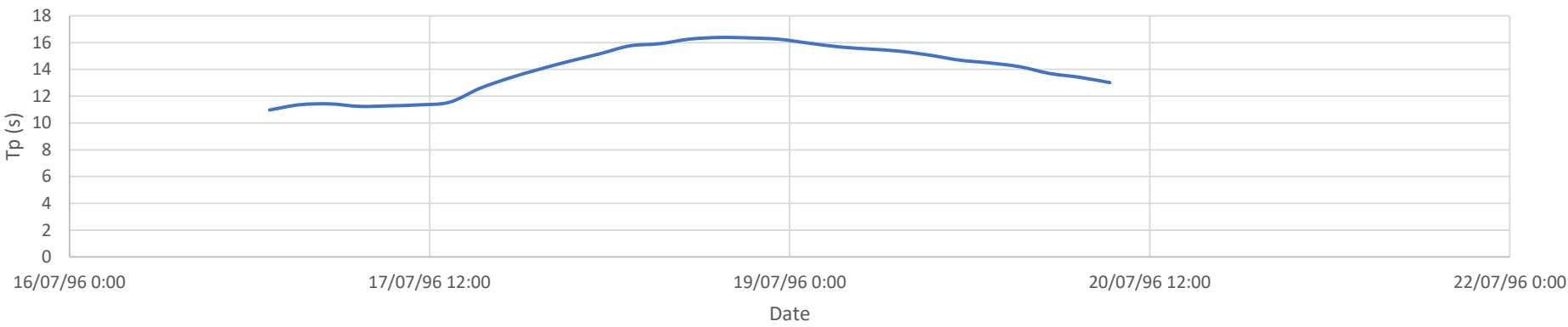
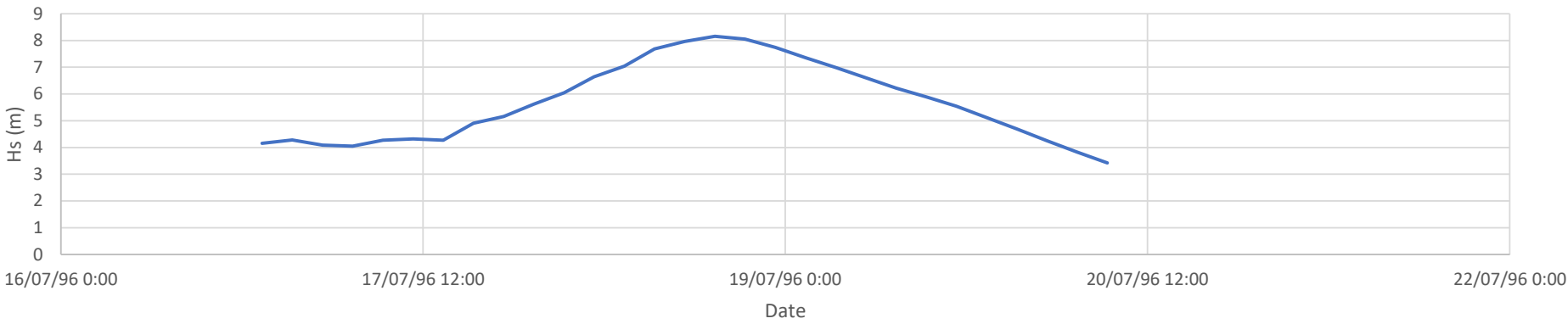
K1509 - South West Storm Selection
Top South Coast (Albany) Storm Plots

Location	Albany
Start Date	26-07-93 2:00
End Date	31-07-93 2:00



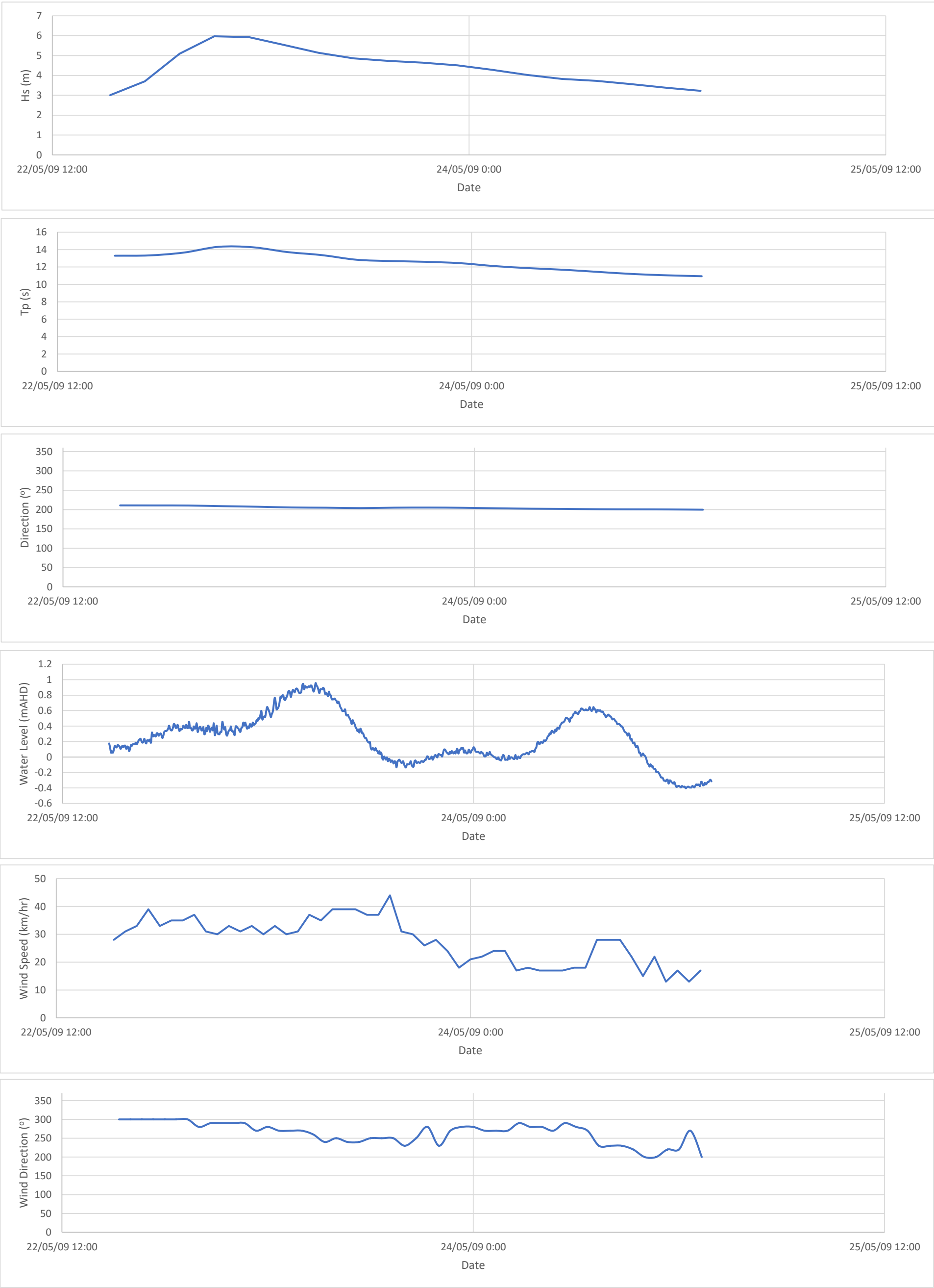
K1509 - South West Storm Selection
Top South Coast (Albany) Storm Plots

Location	Albany
Start Date	16-07-96 20:00
End Date	20-07-96 8:00



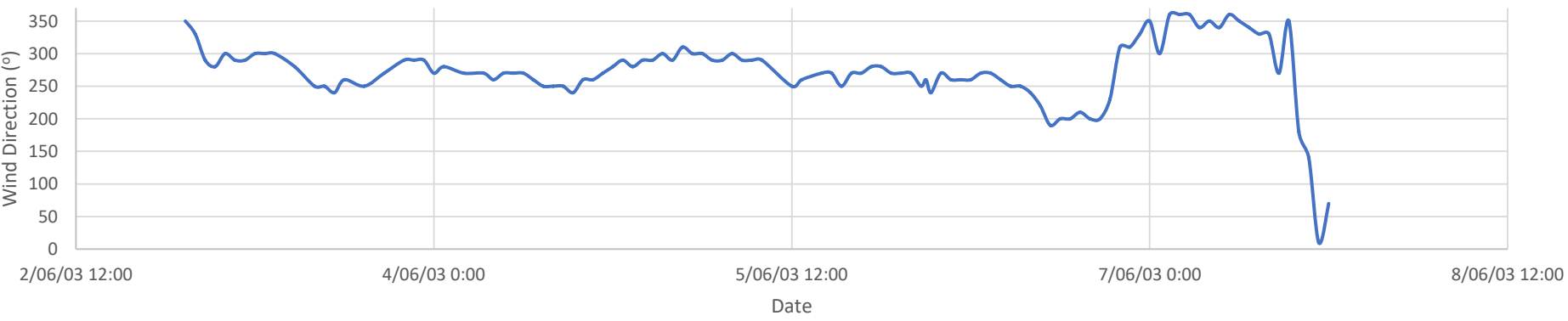
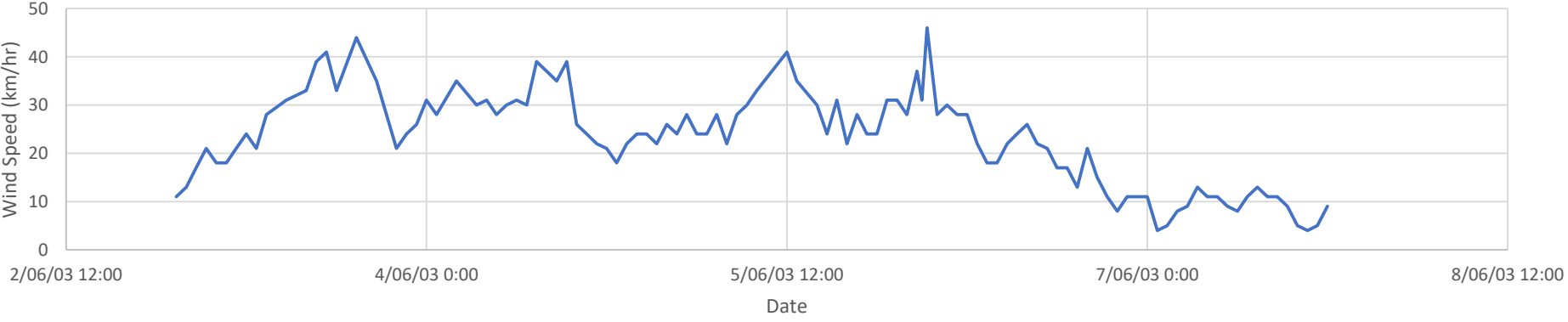
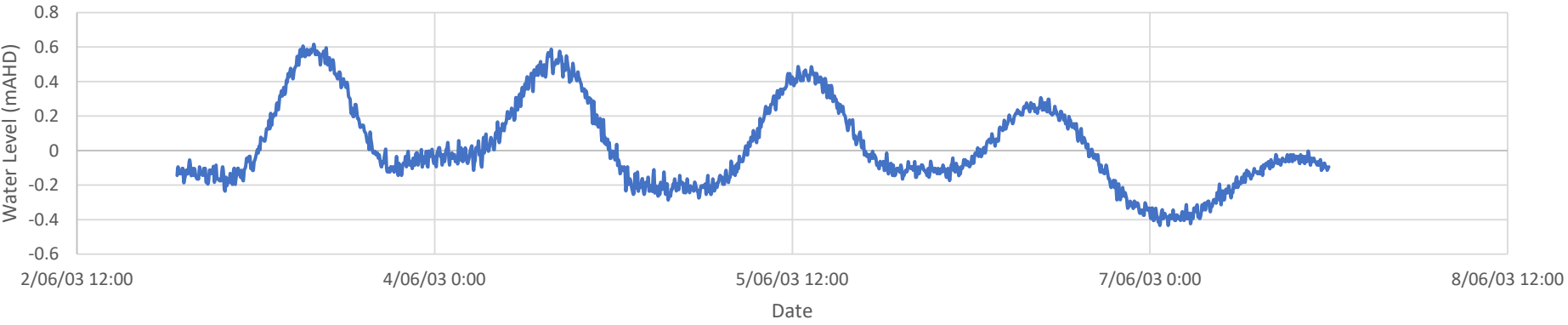
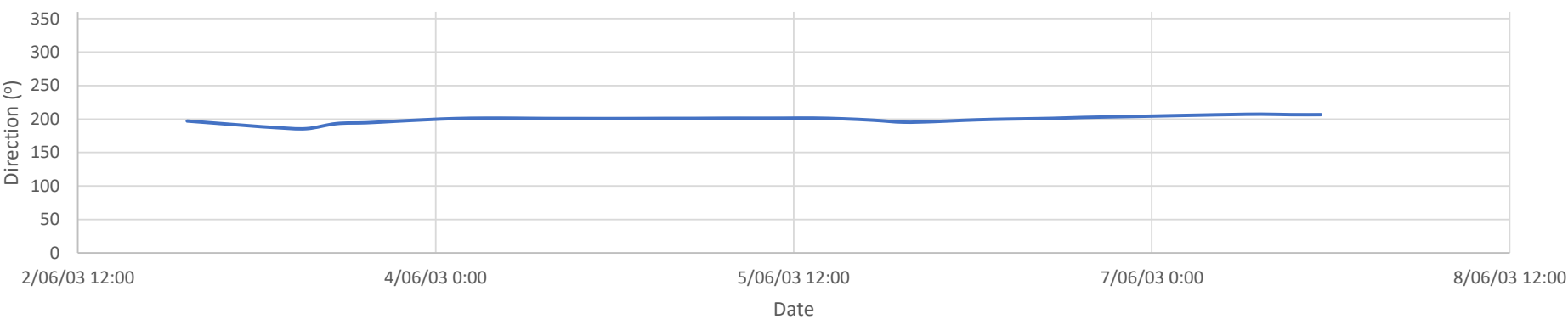
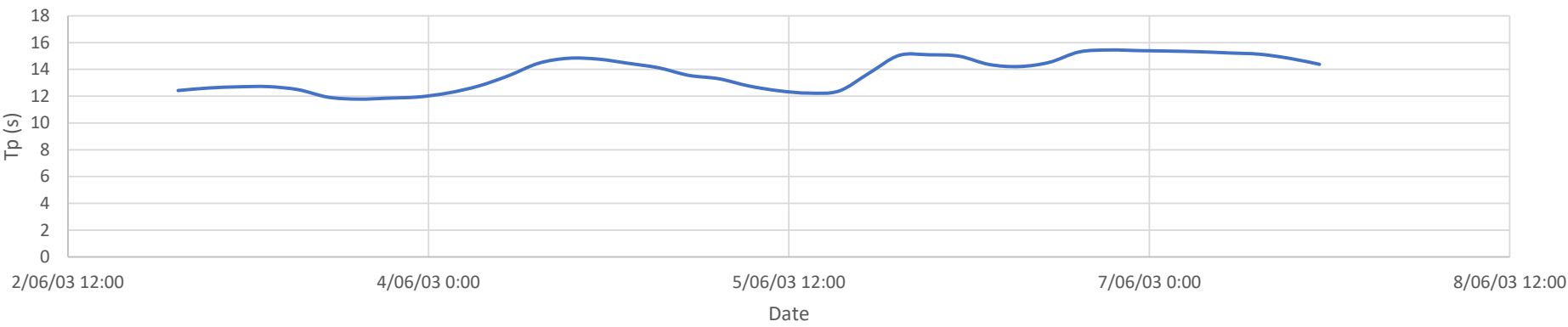
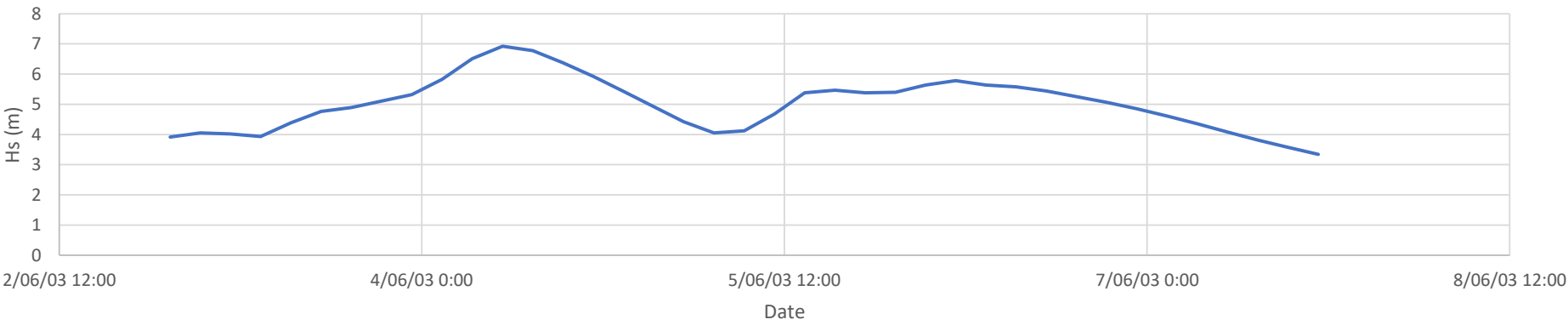
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	22-05-09 17:00
End Date	24-05-09 20:00



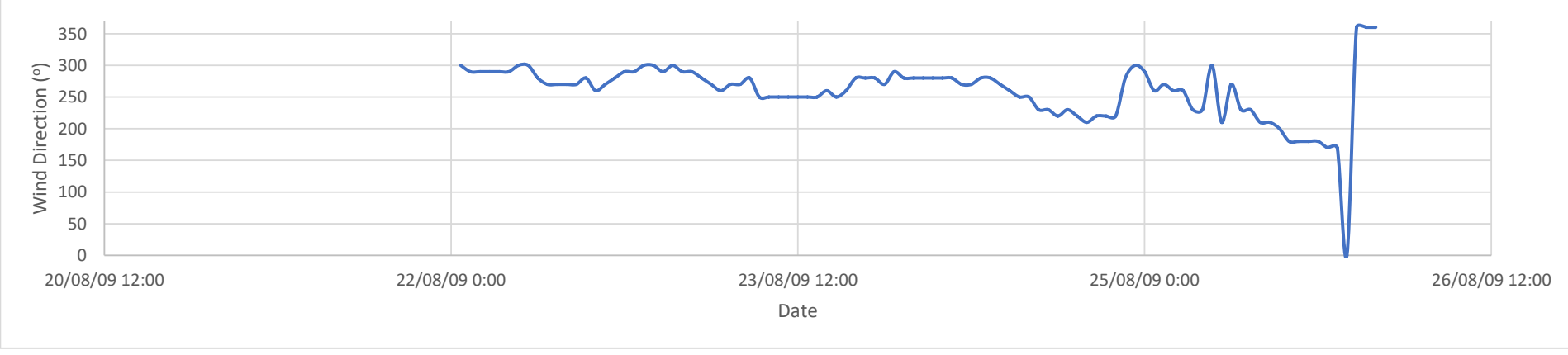
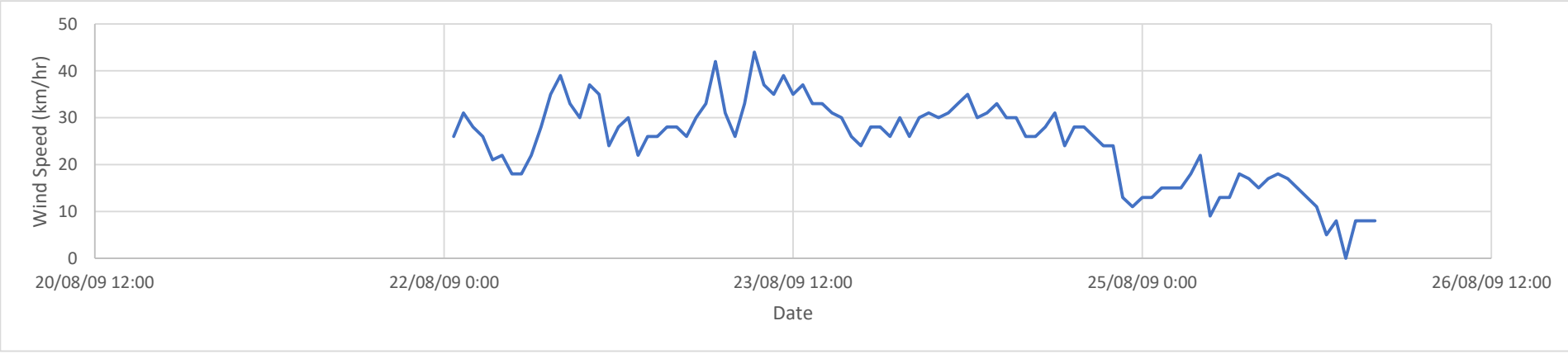
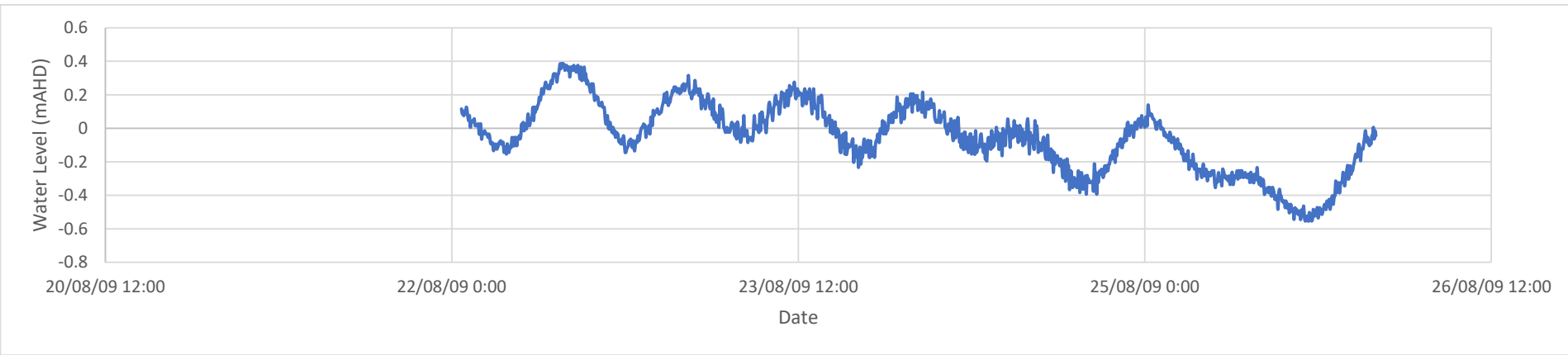
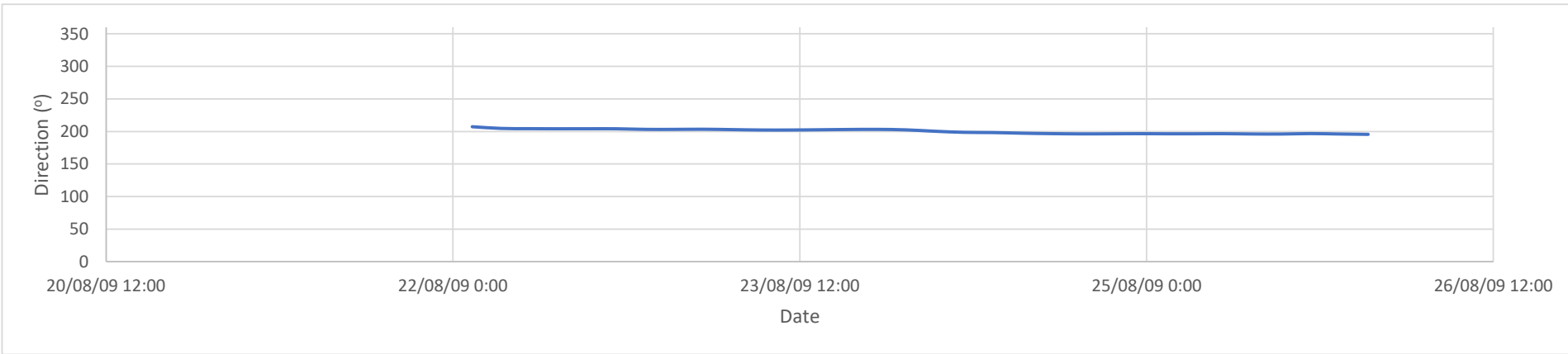
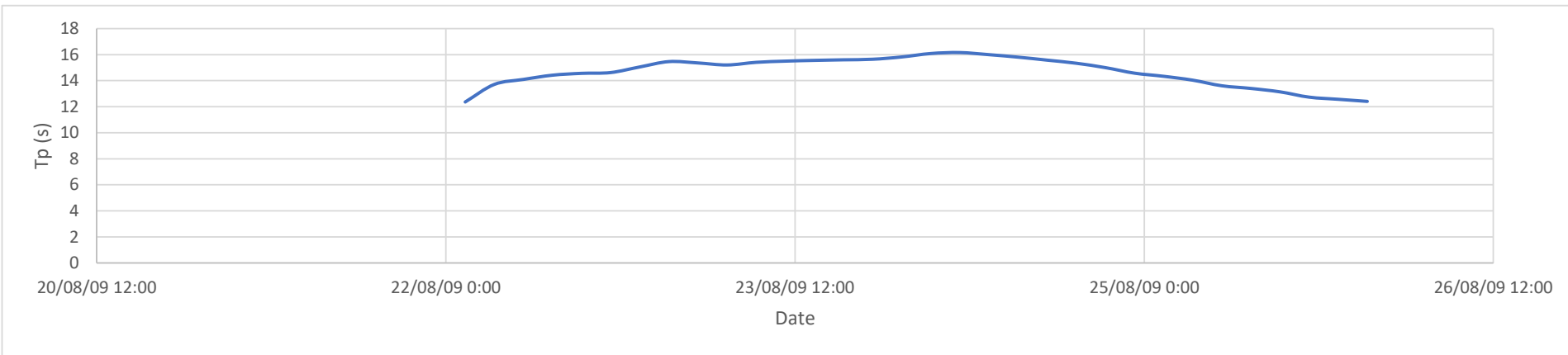
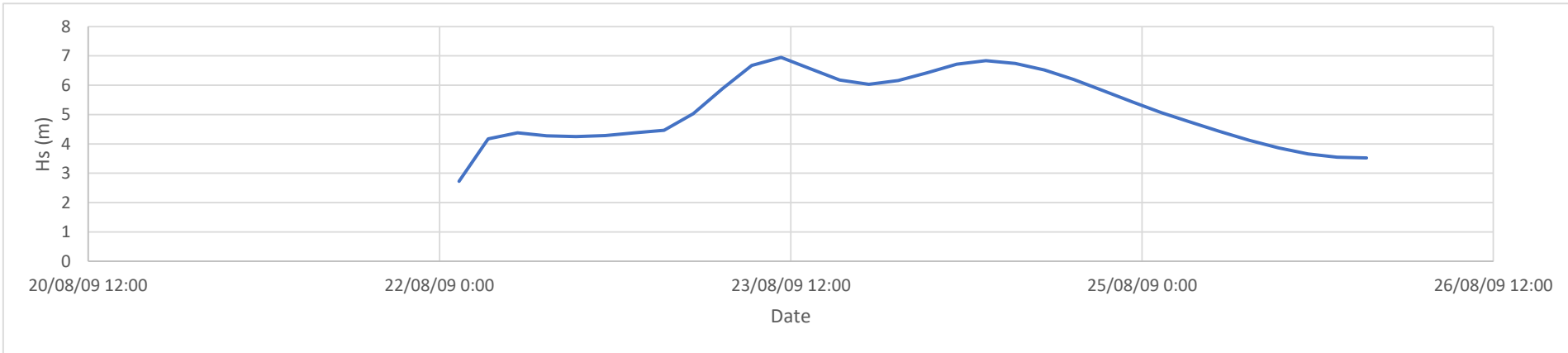
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	02-06-03 23:00
End Date	07-06-03 17:00



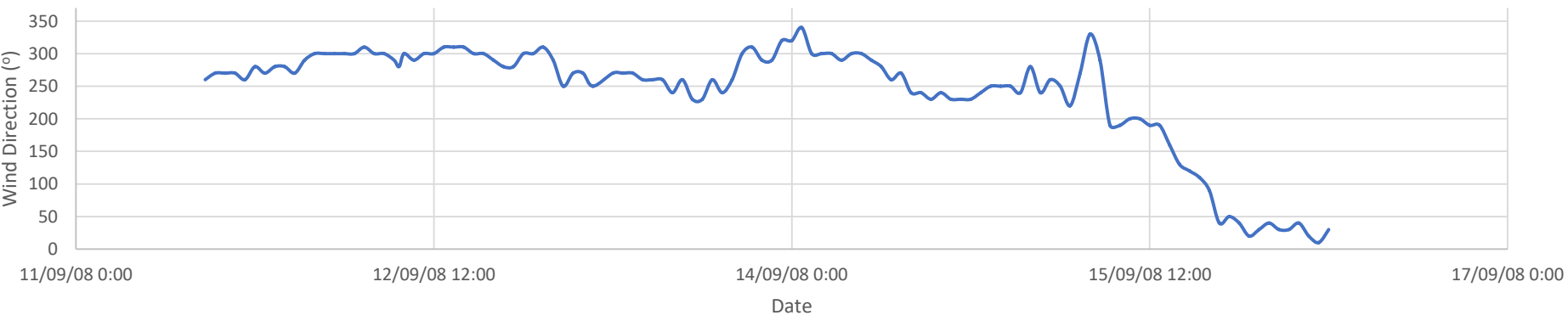
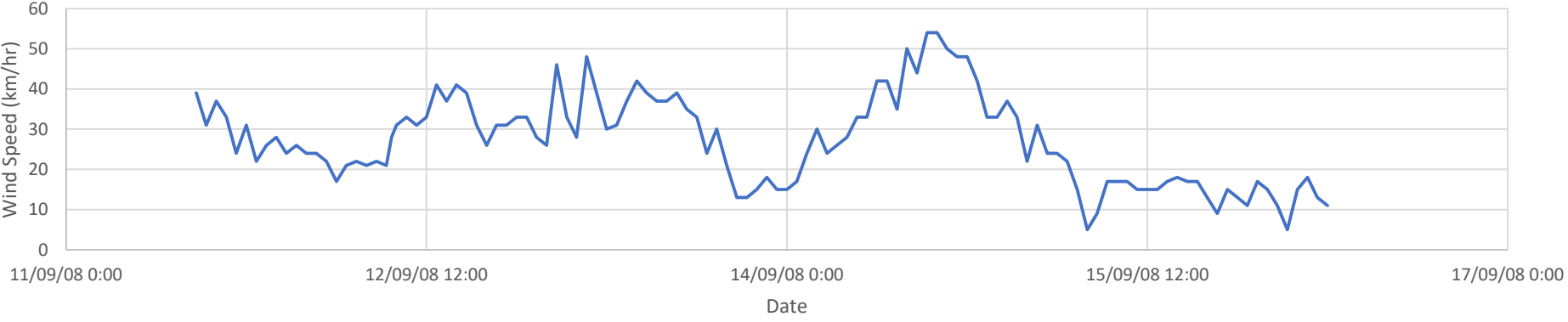
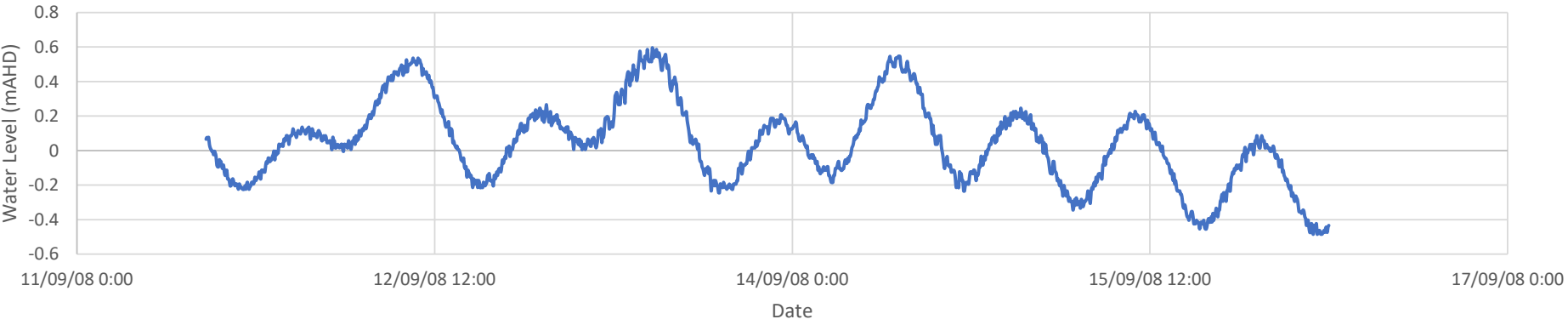
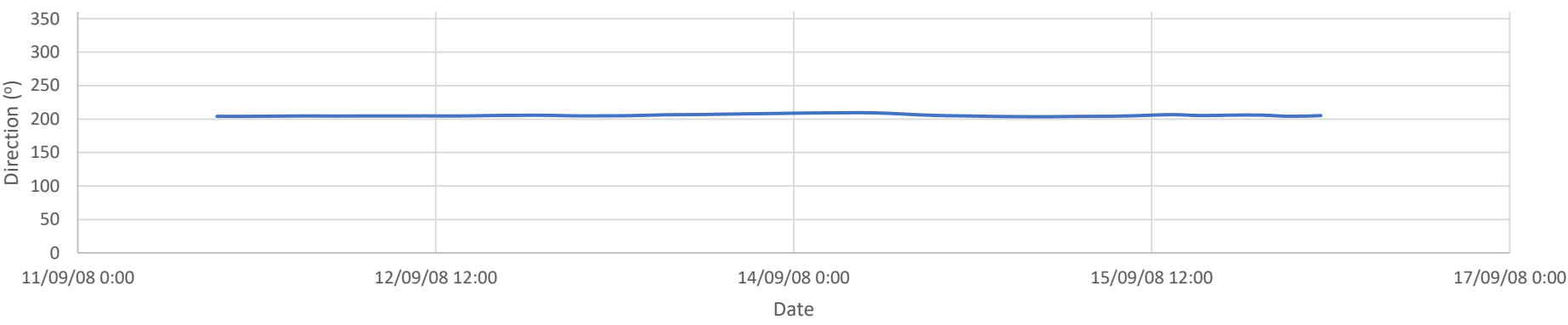
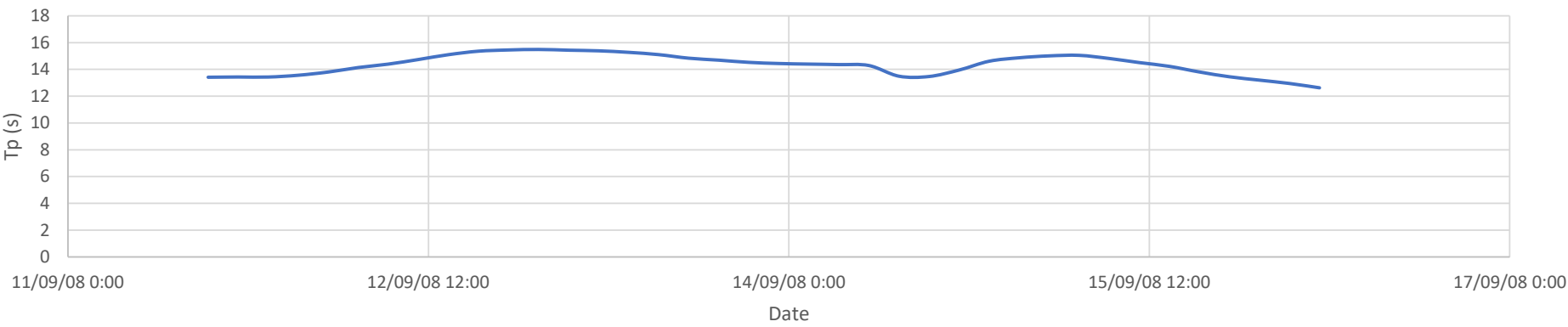
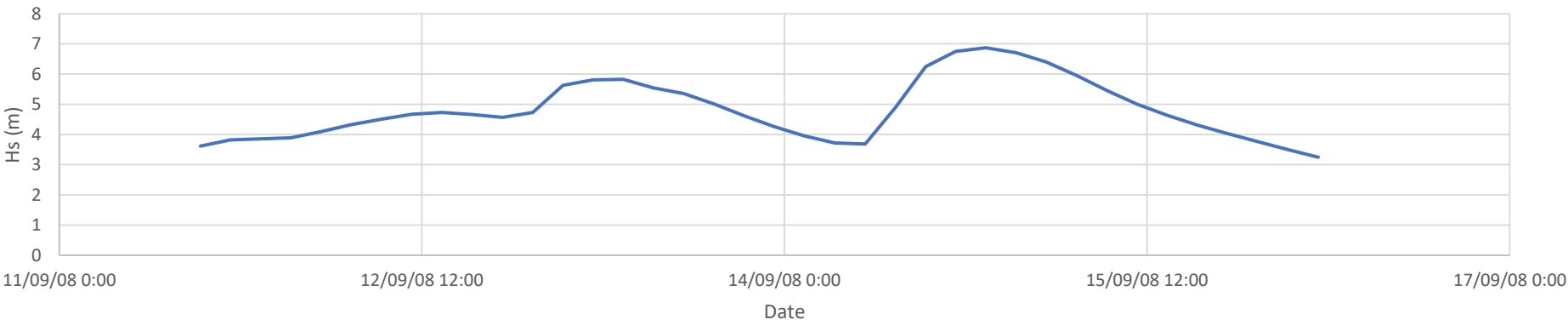
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	22-08-09 2:00
End Date	25-08-09 23:00



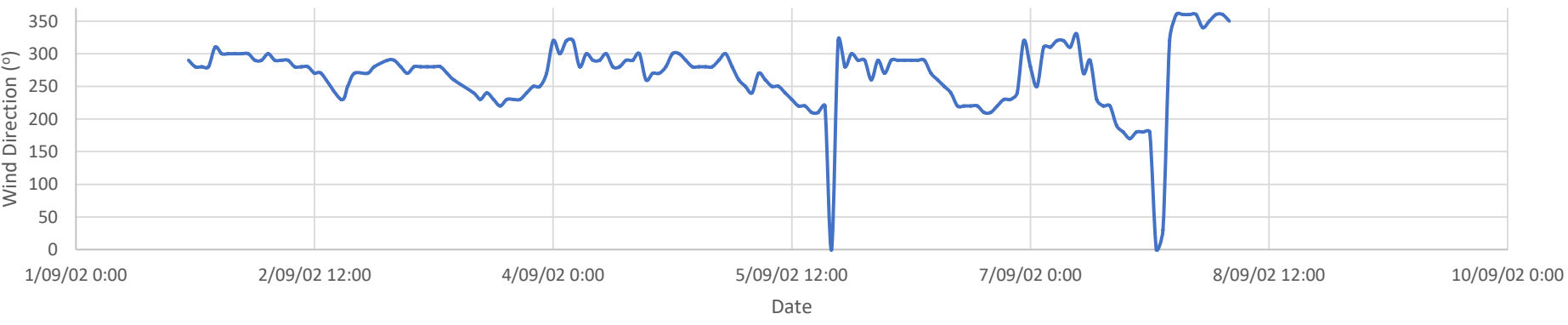
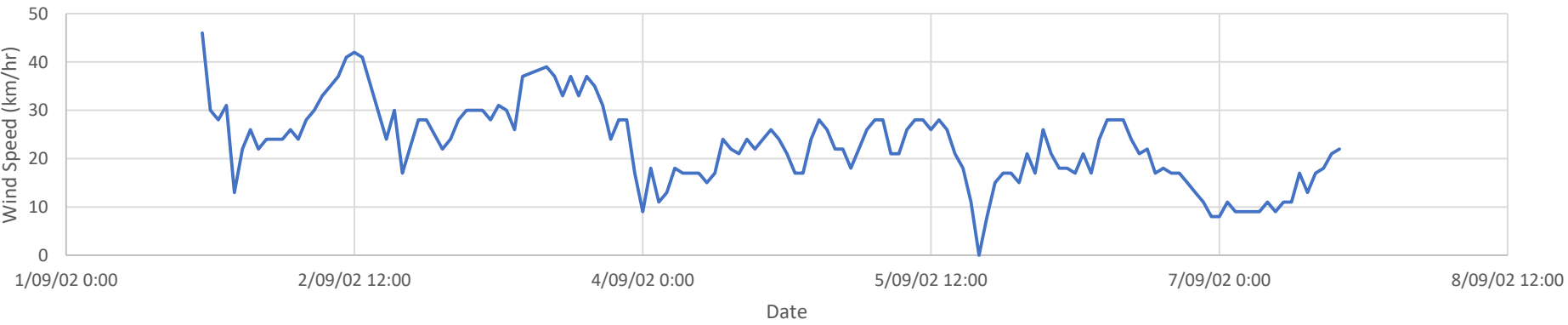
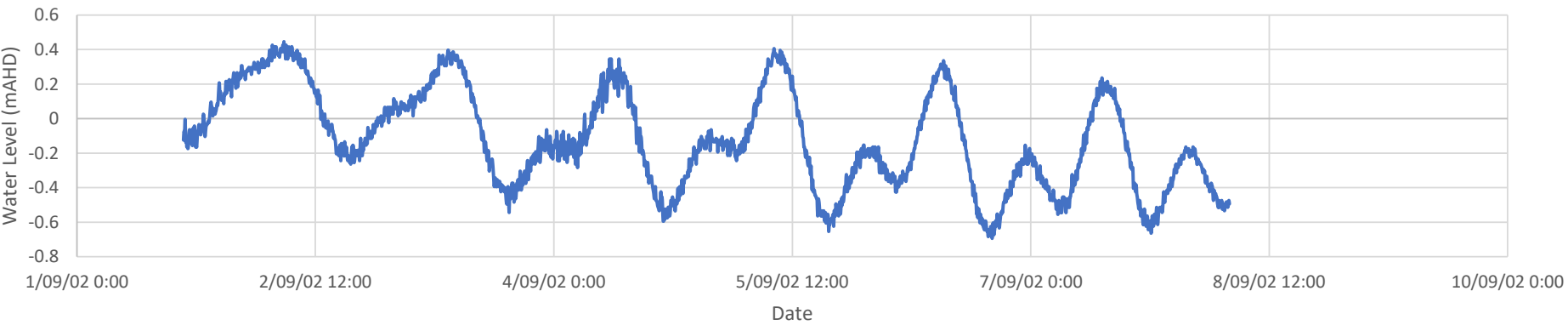
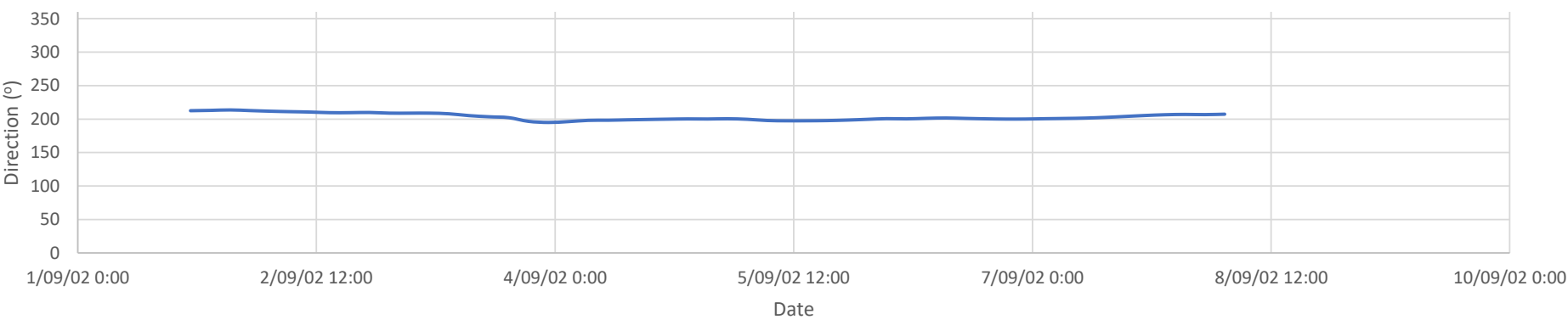
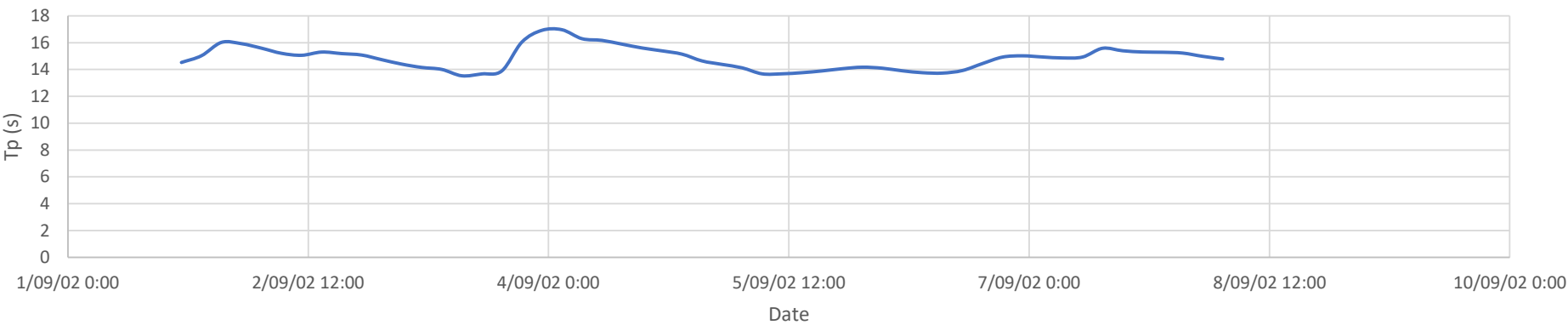
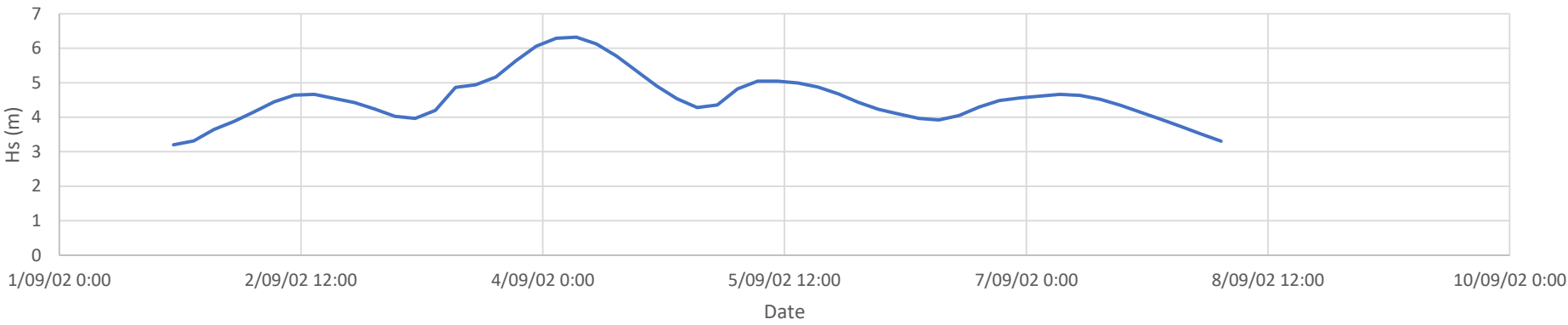
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	11-09-08 14:00
End Date	16-09-08 5:00



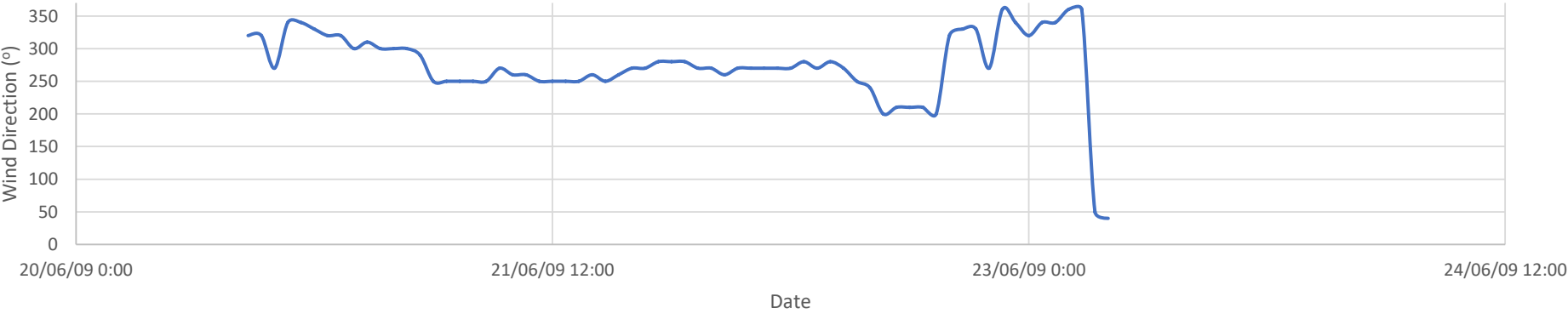
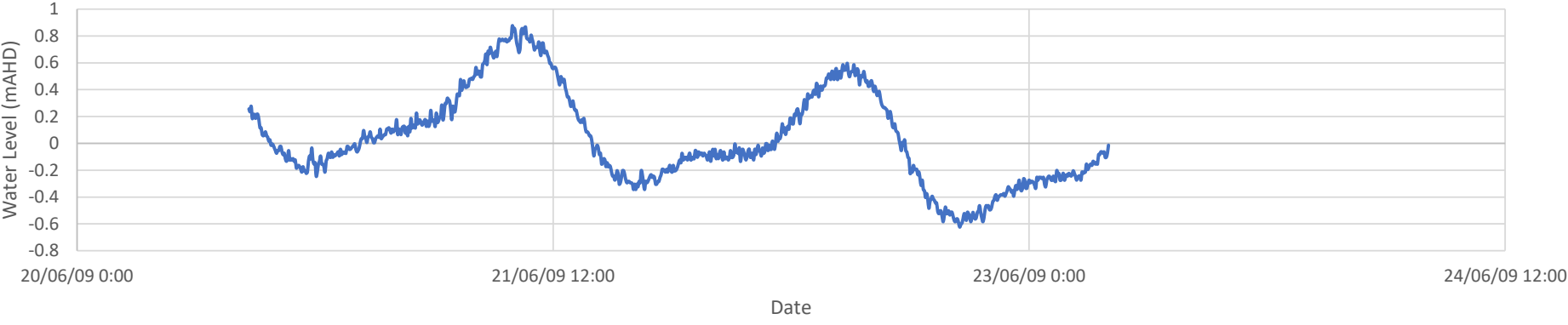
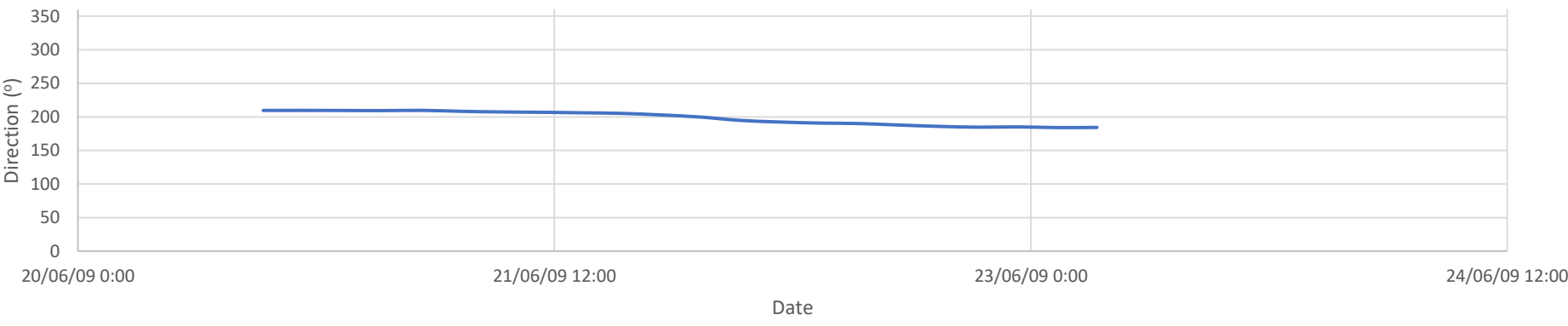
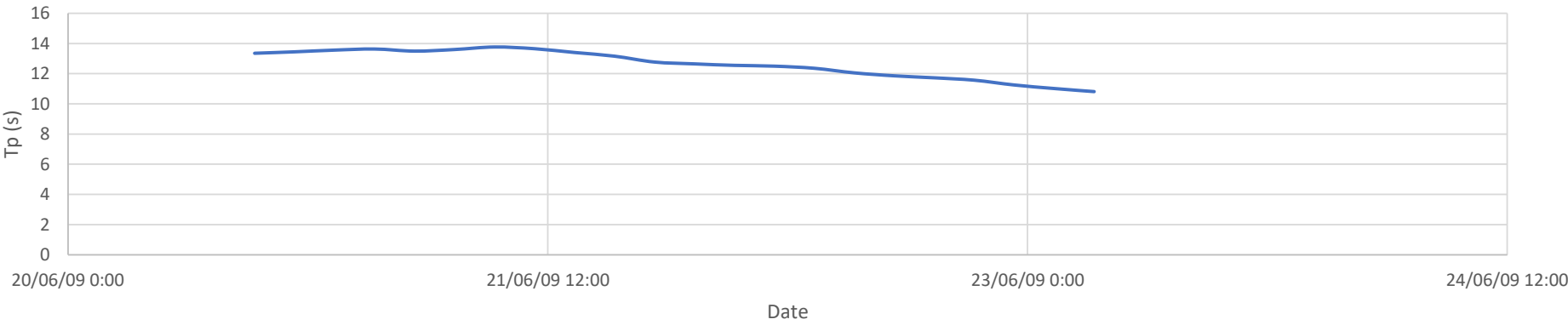
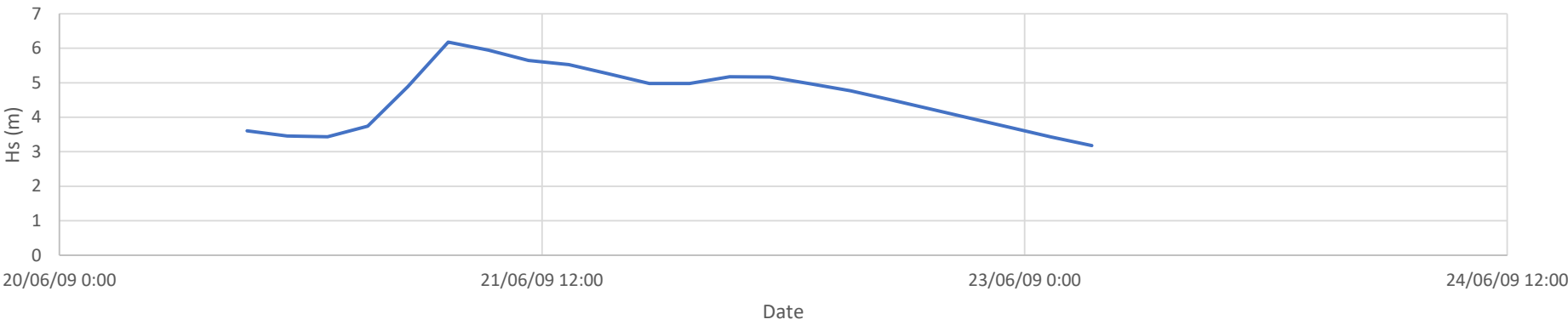
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	01-09-02 17:00
End Date	08-09-02 5:00



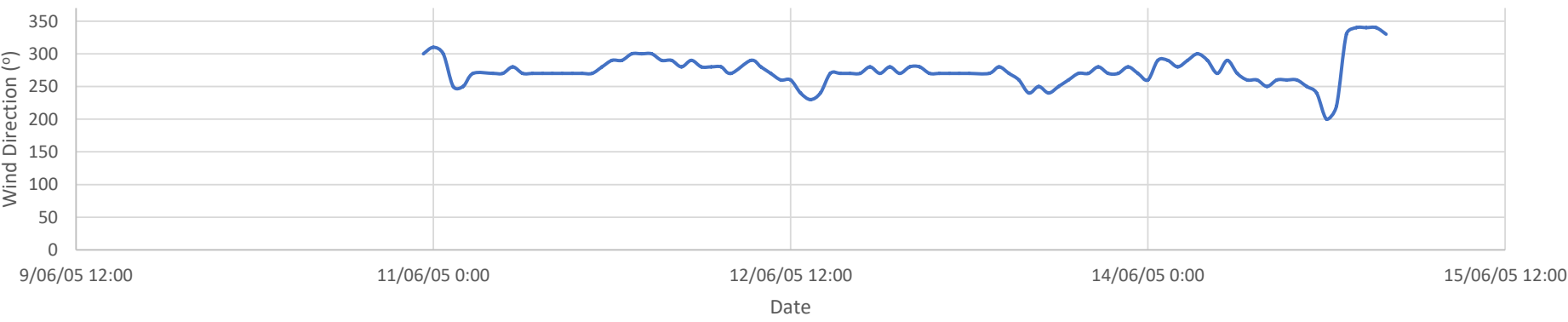
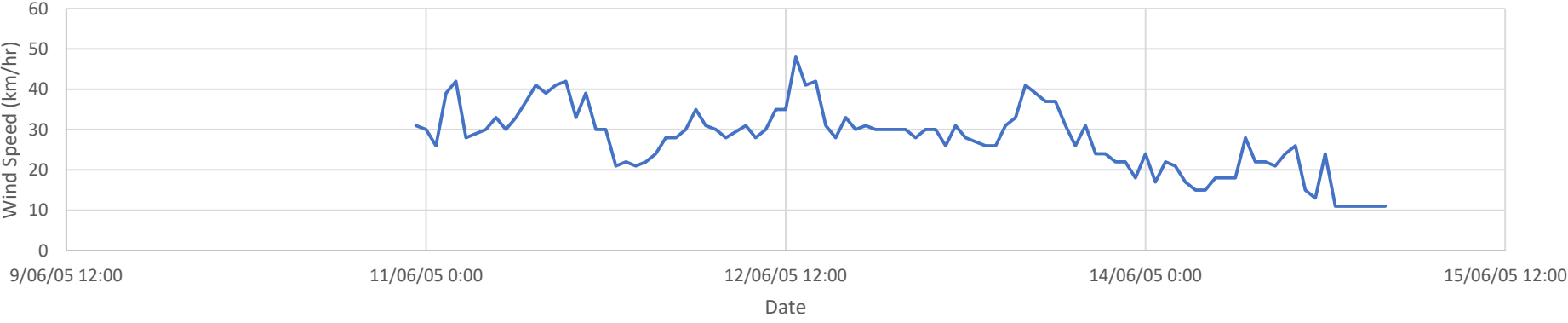
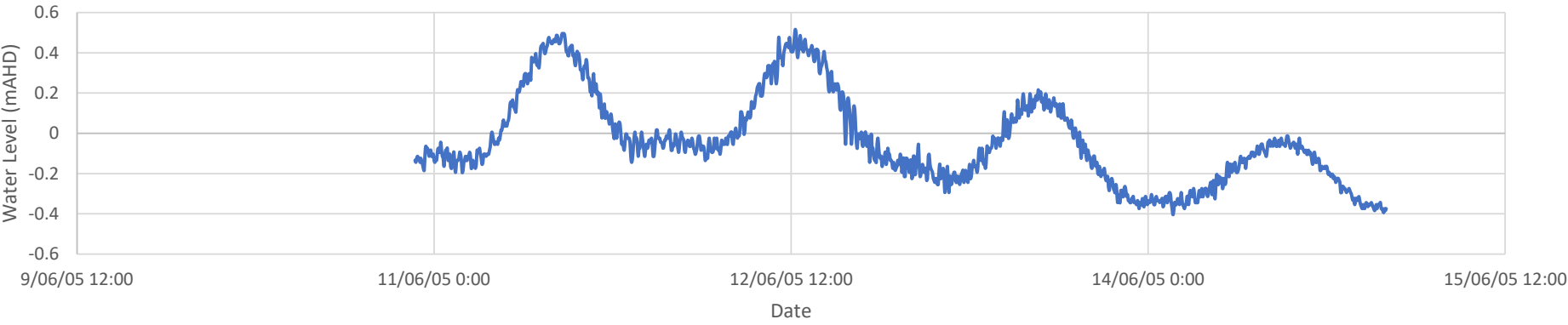
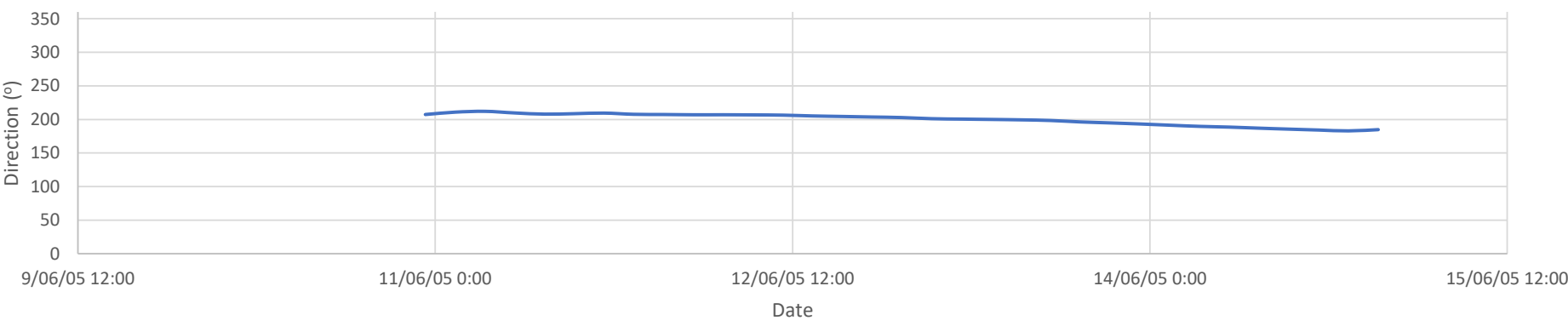
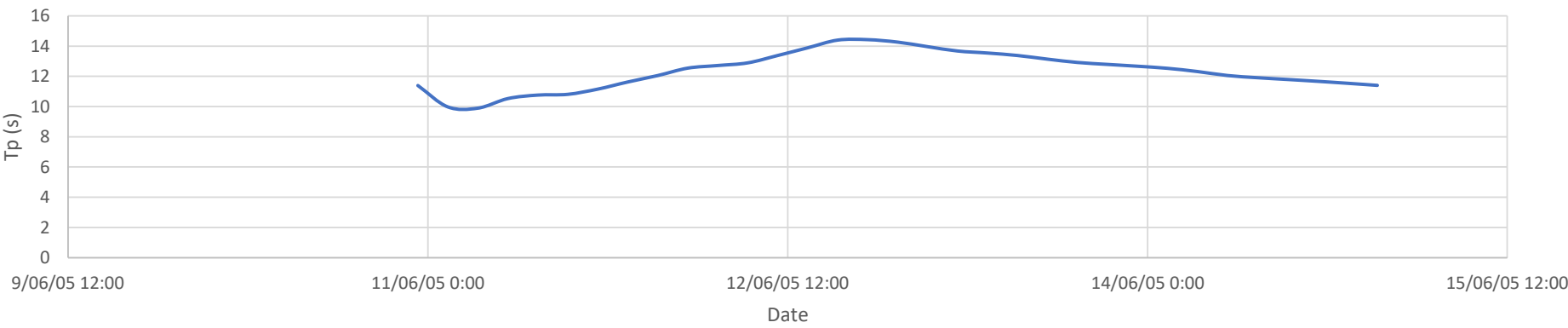
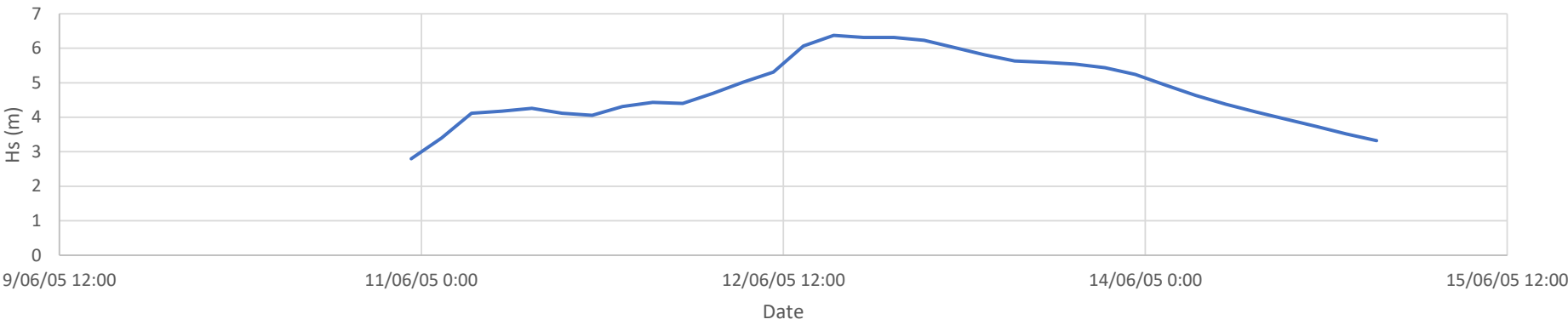
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	20-06-09 14:00
End Date	23-06-09 5:00



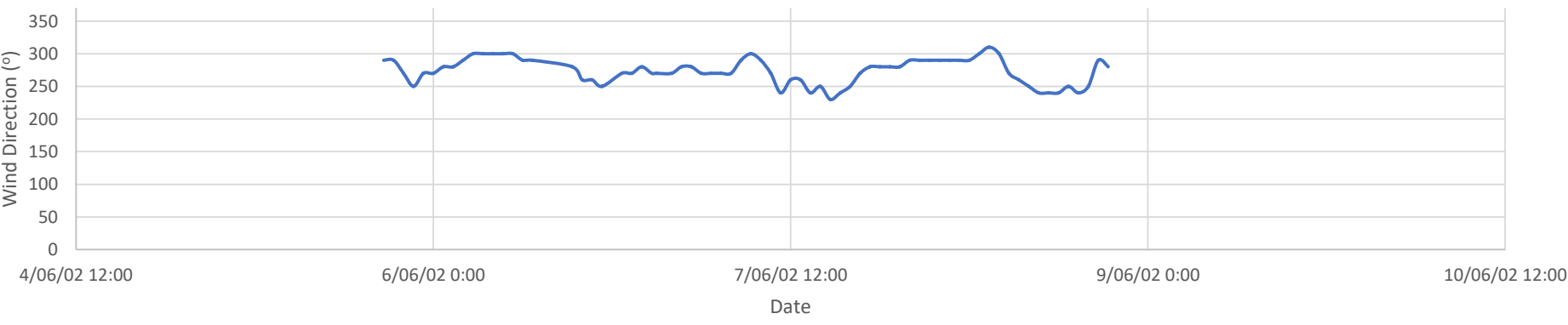
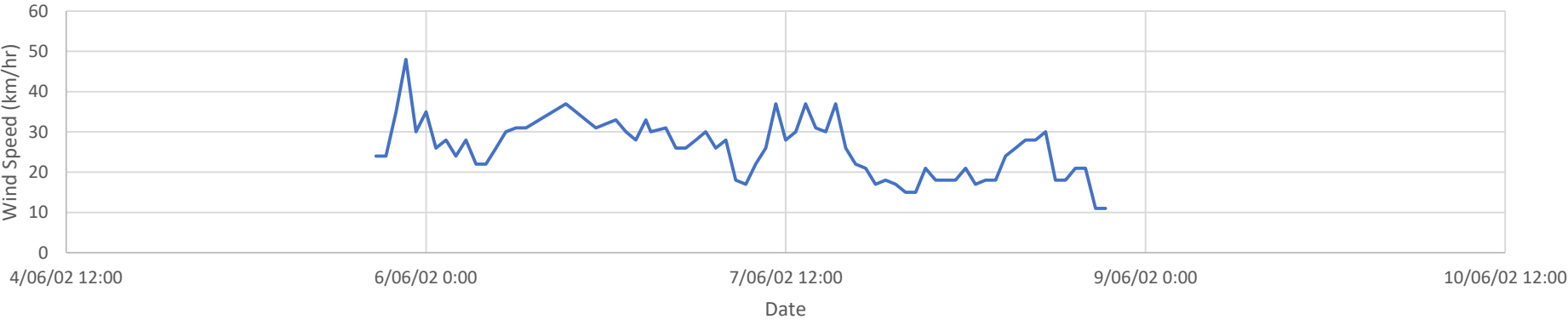
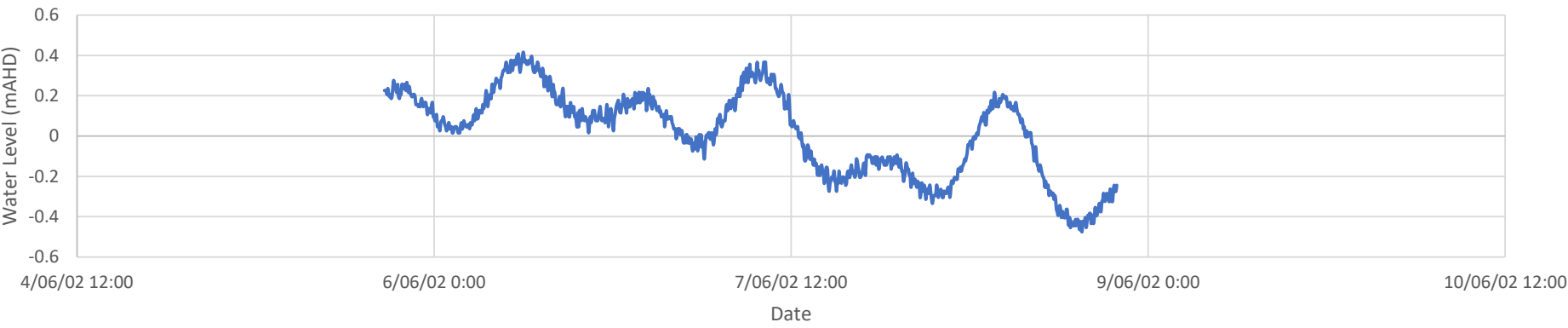
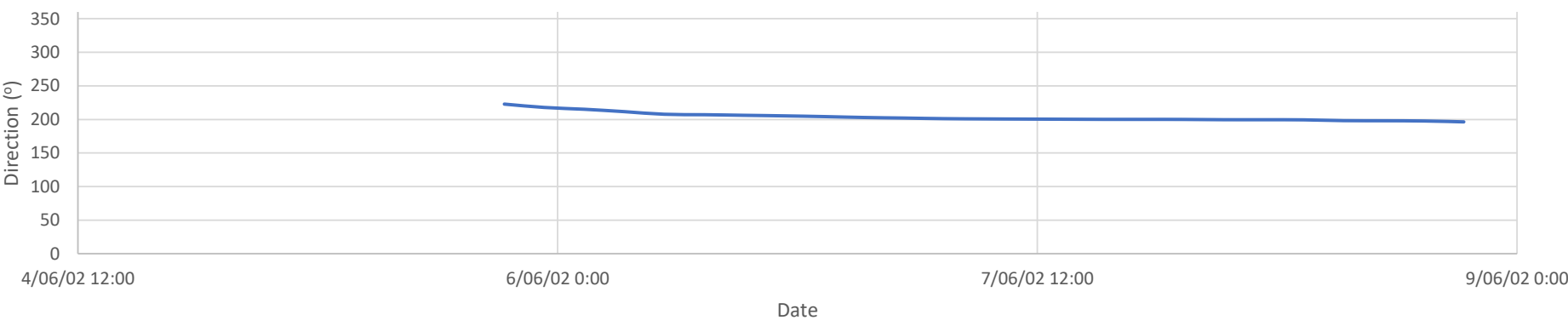
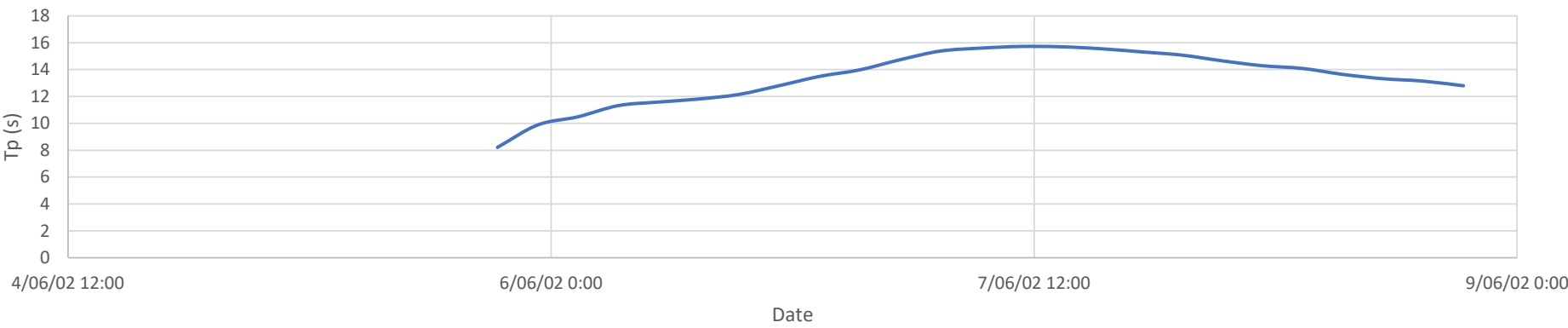
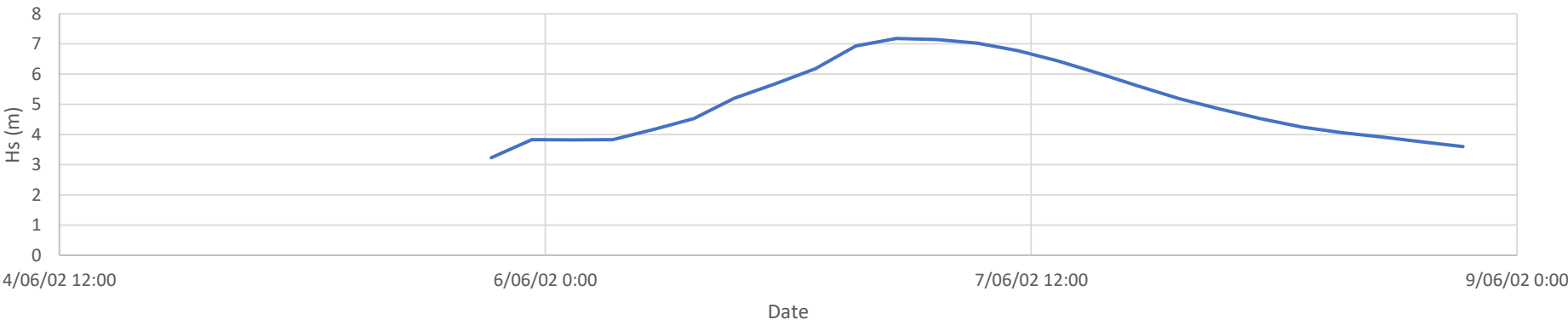
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	10-06-05 23:00
End Date	14-06-05 23:00



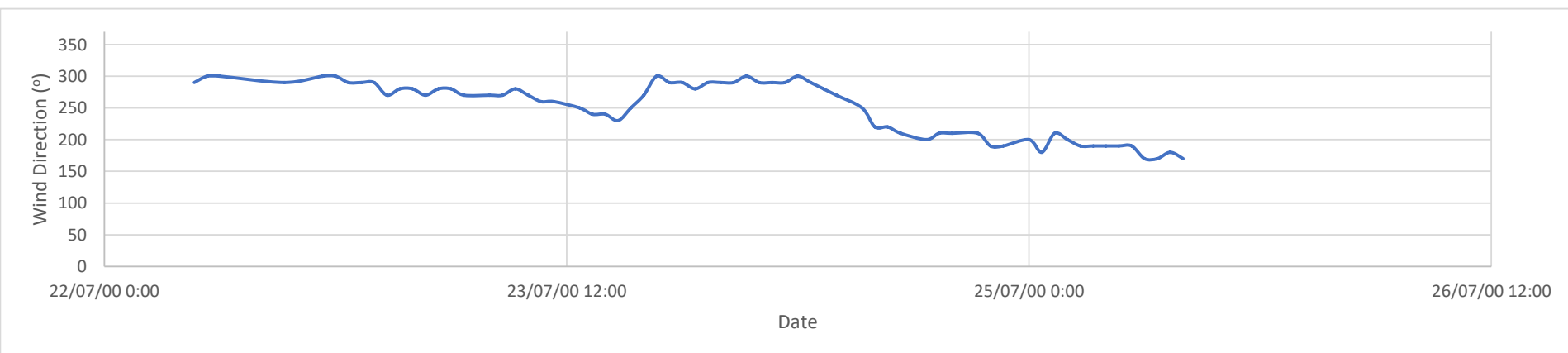
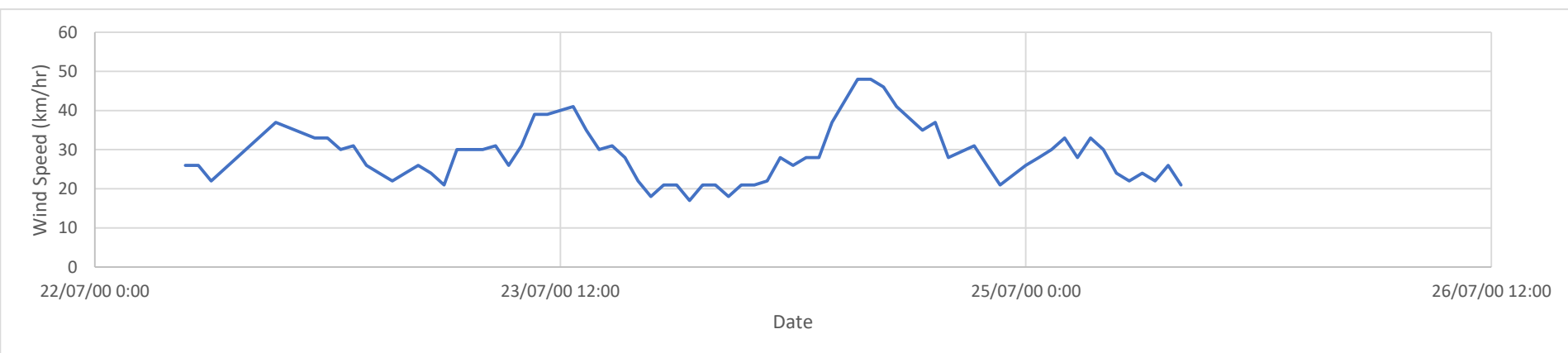
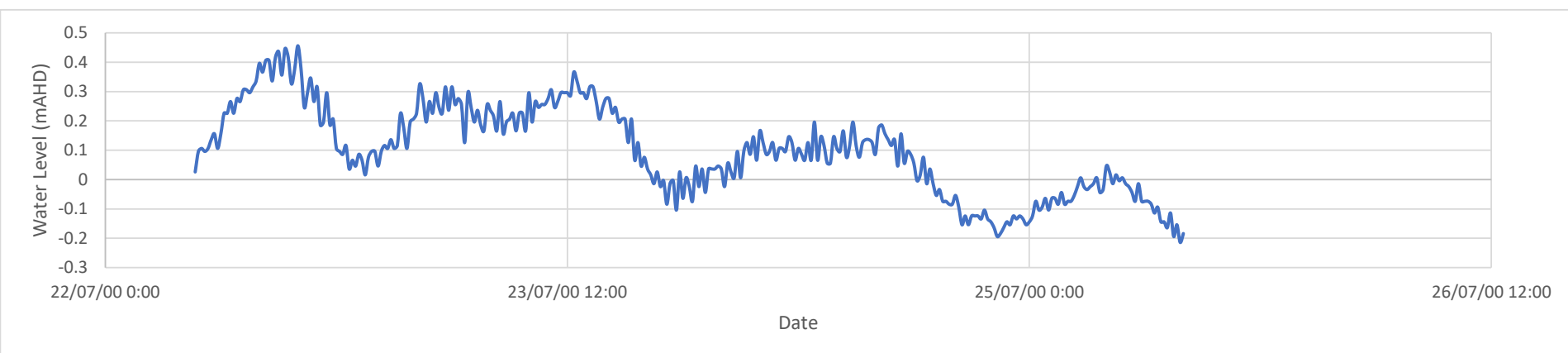
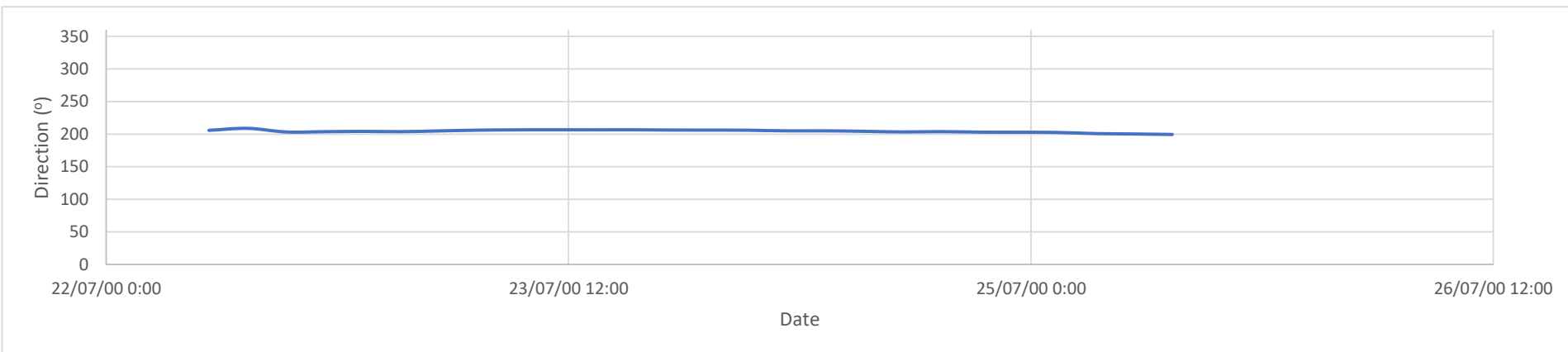
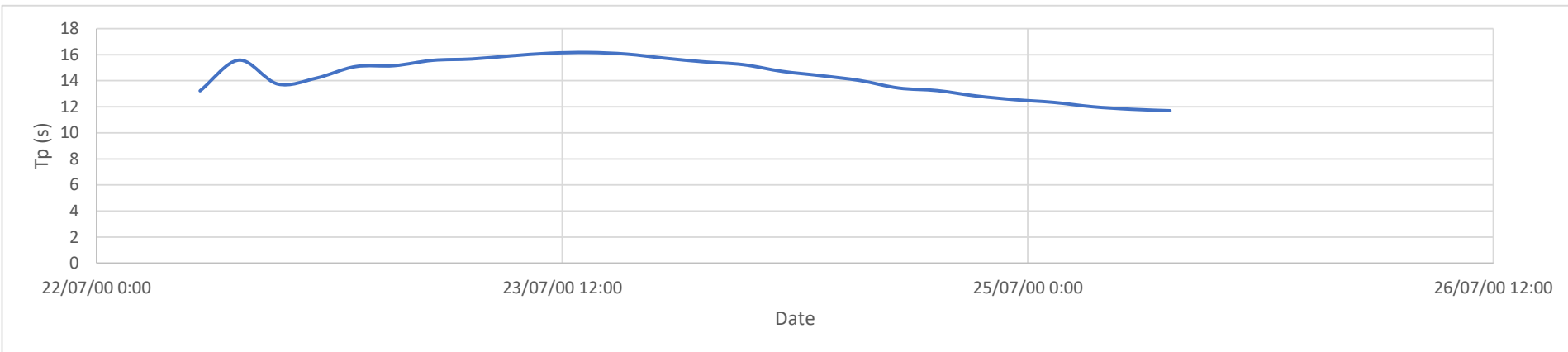
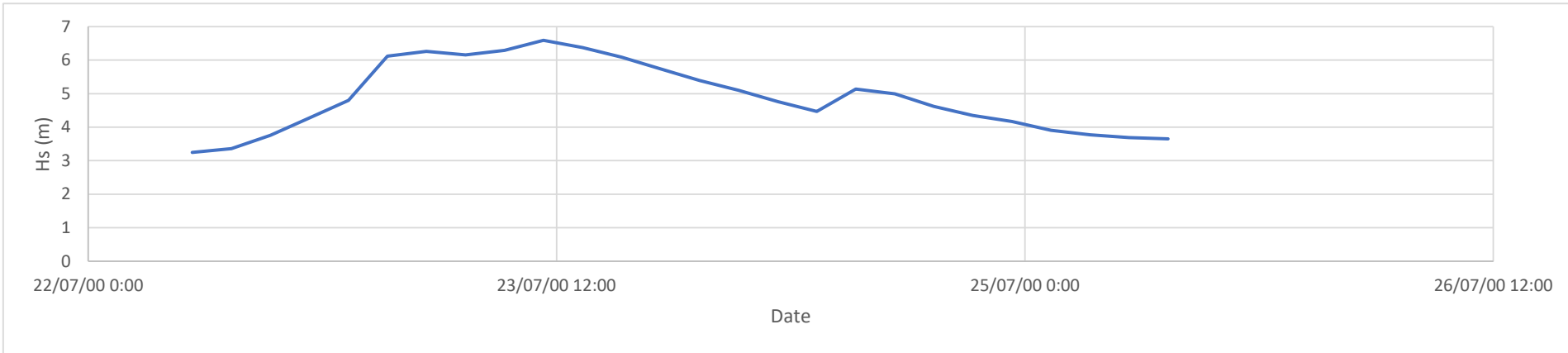
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	05-06-02 20:00
End Date	08-06-02 20:00



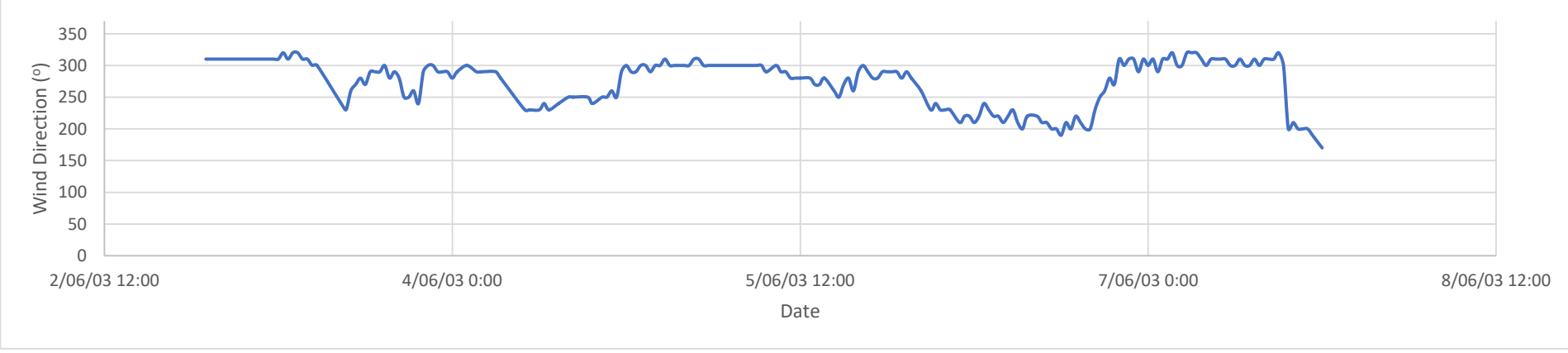
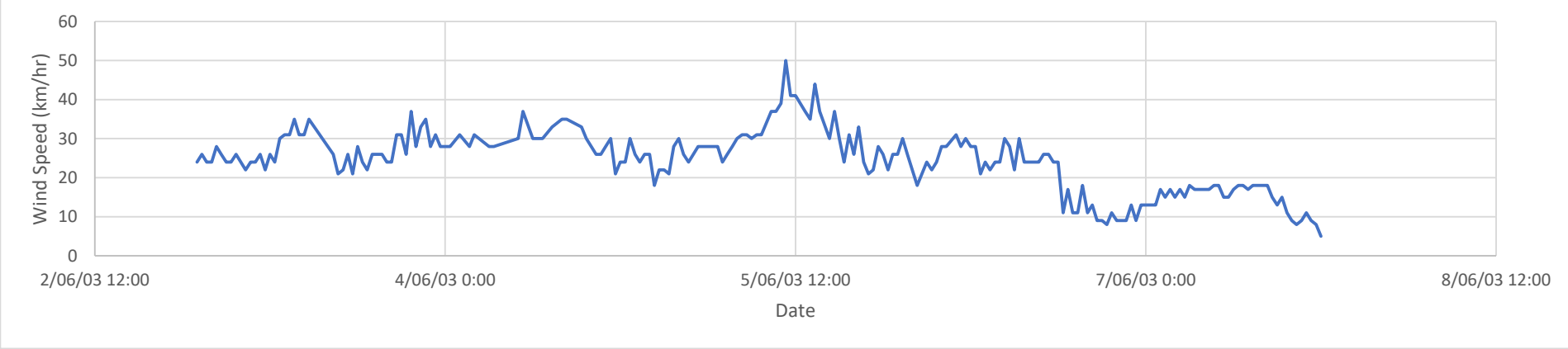
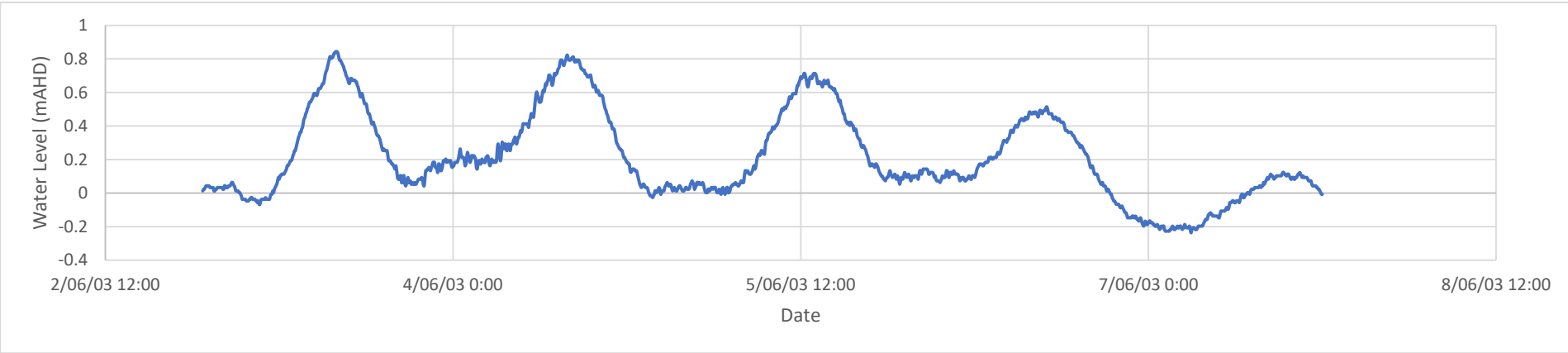
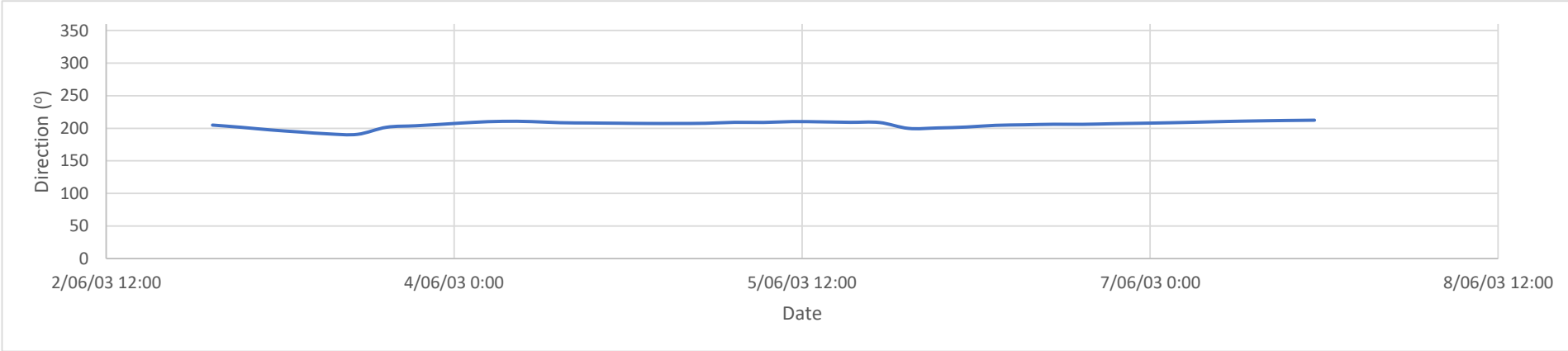
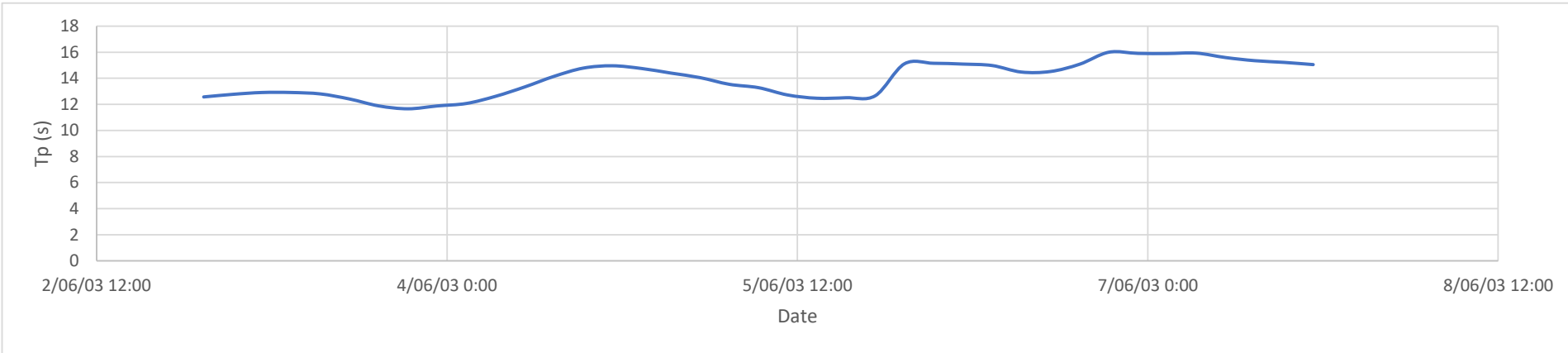
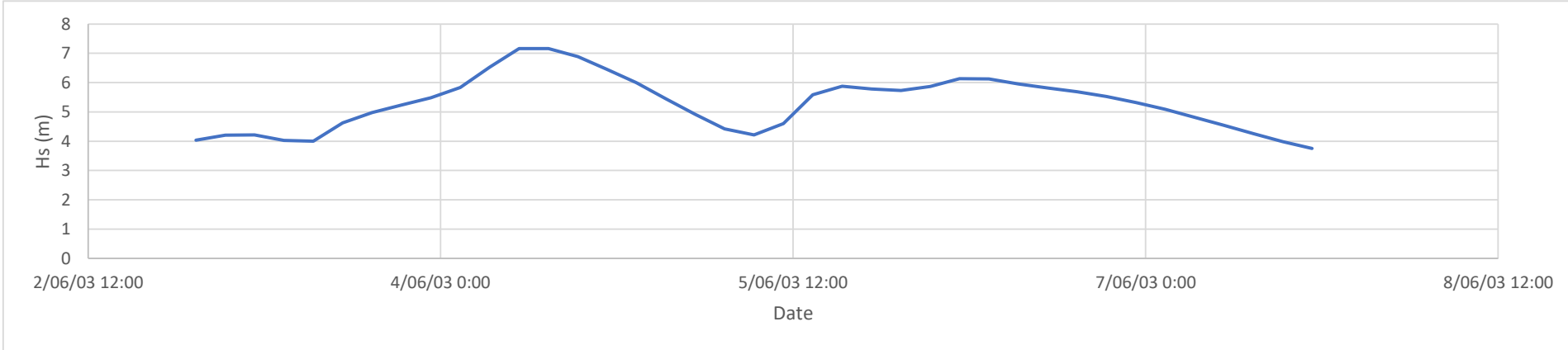
K1509 - South West Storm Selection
Top Hopetoun, Bremer Storm Plots

Location	Hopetoun, Bremer
Start Date	22-07-00 8:00
End Date	25-07-00 11:00



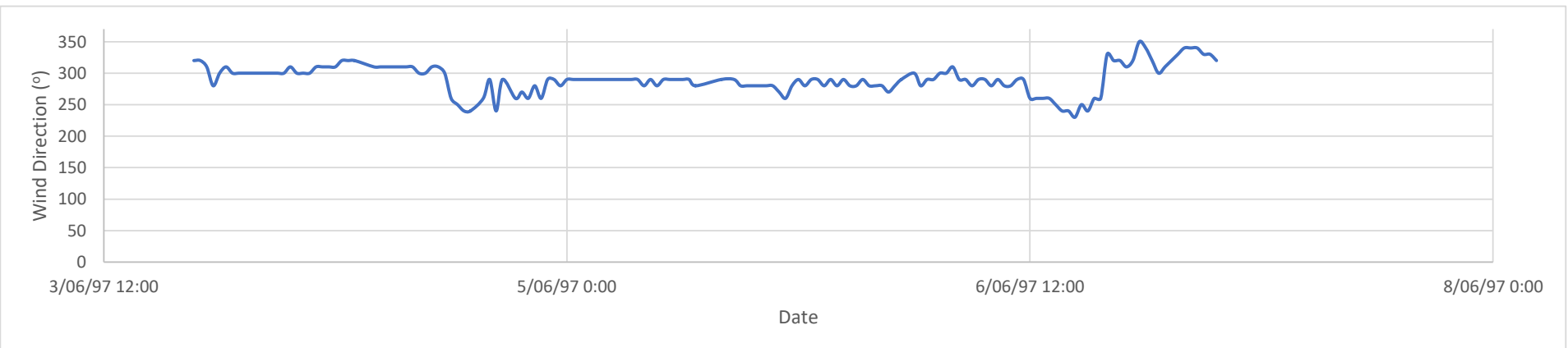
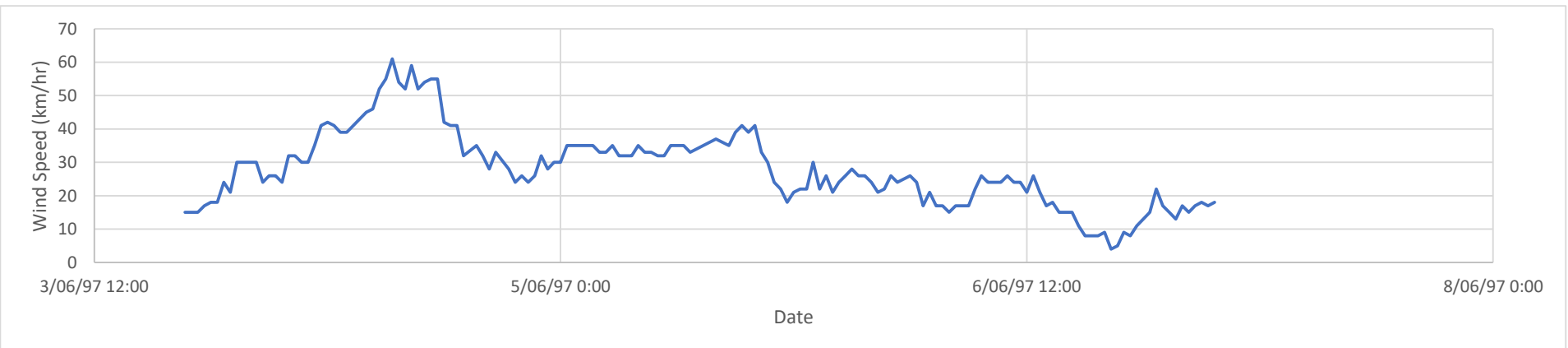
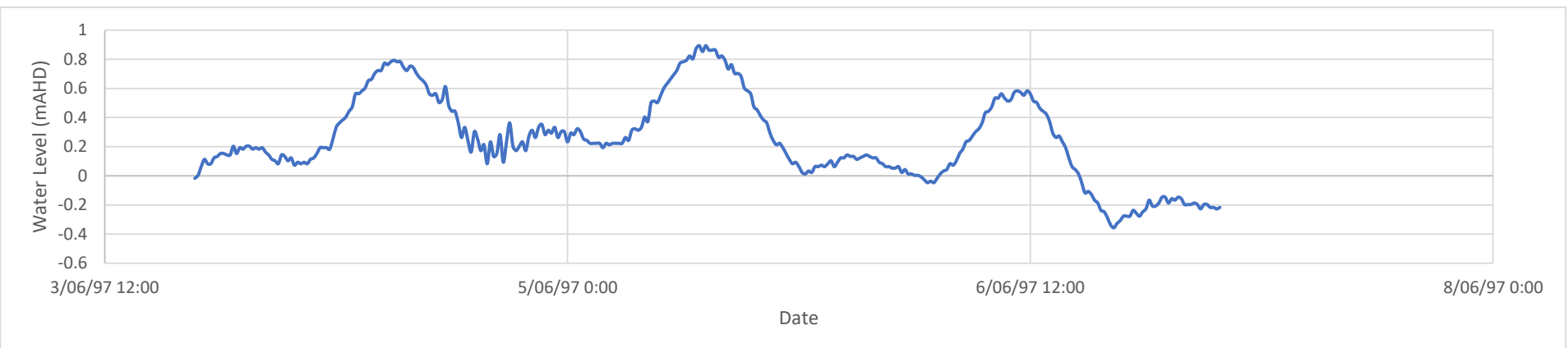
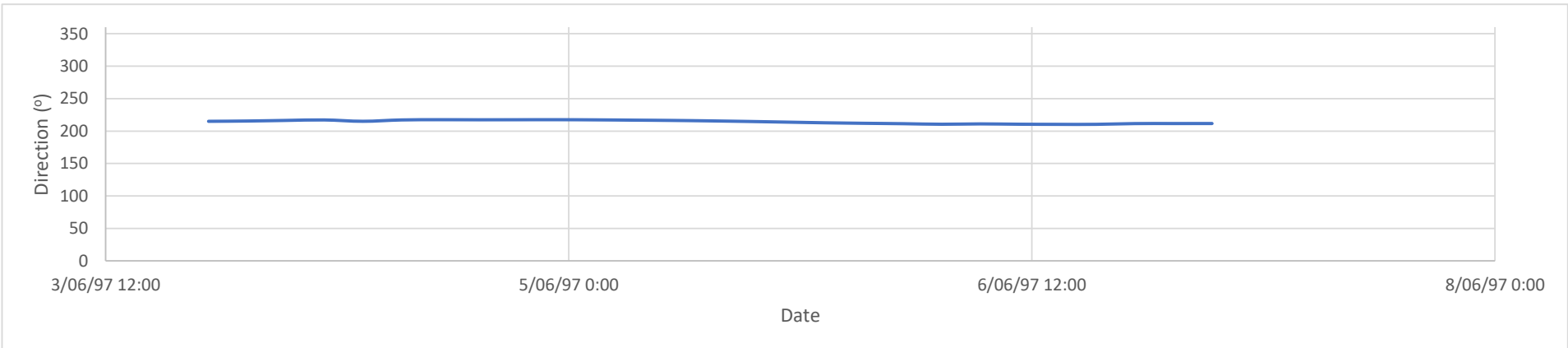
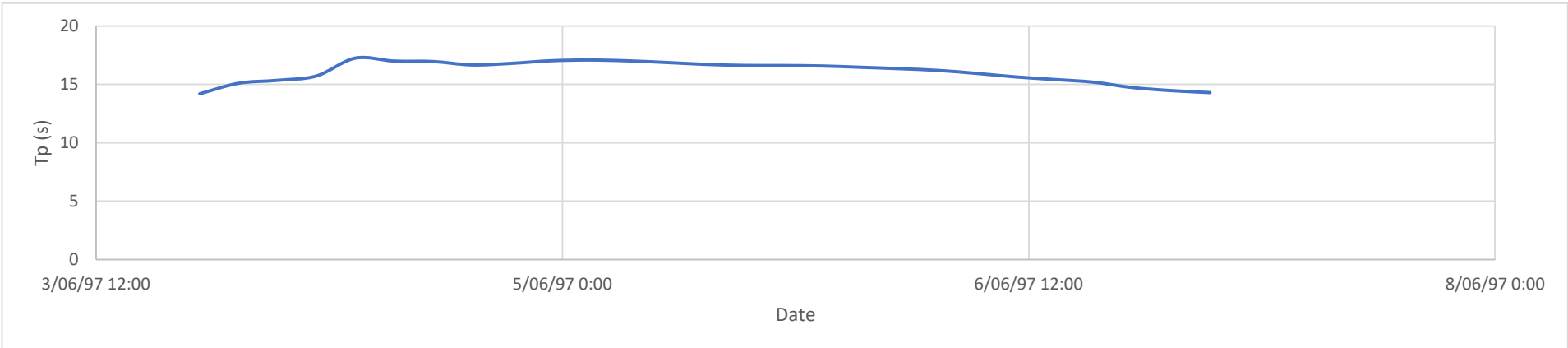
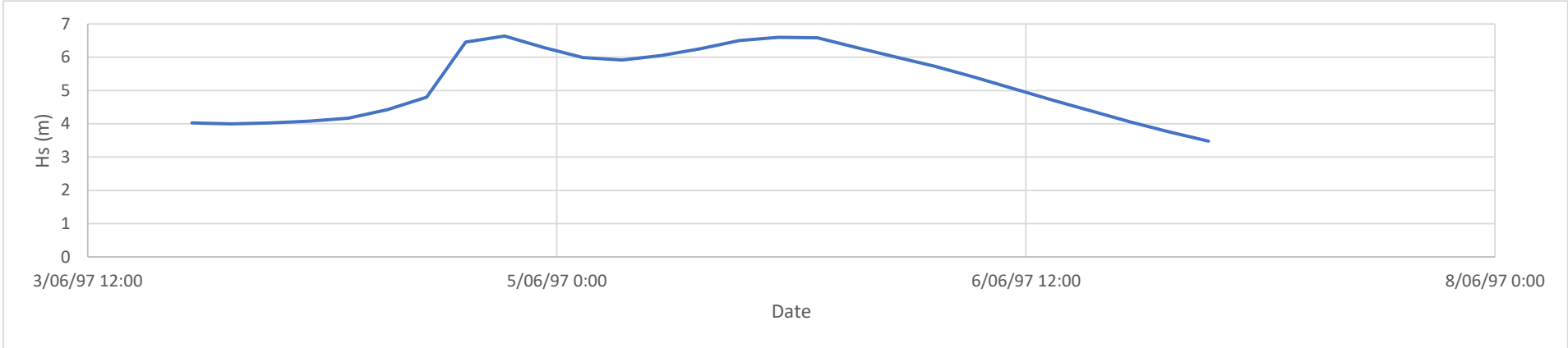
K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots

Location	Esperance
Start Date	02-06-03 23:00
End Date	07-06-03 17:00



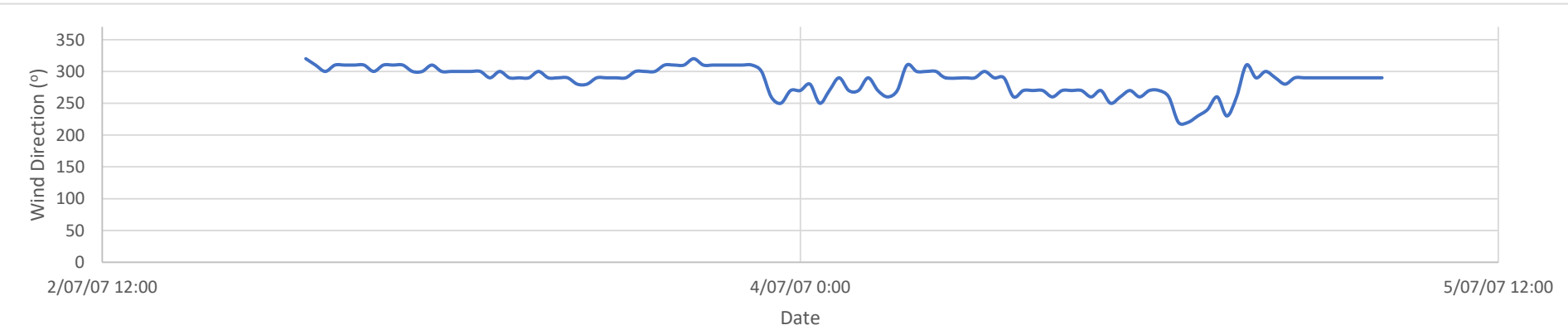
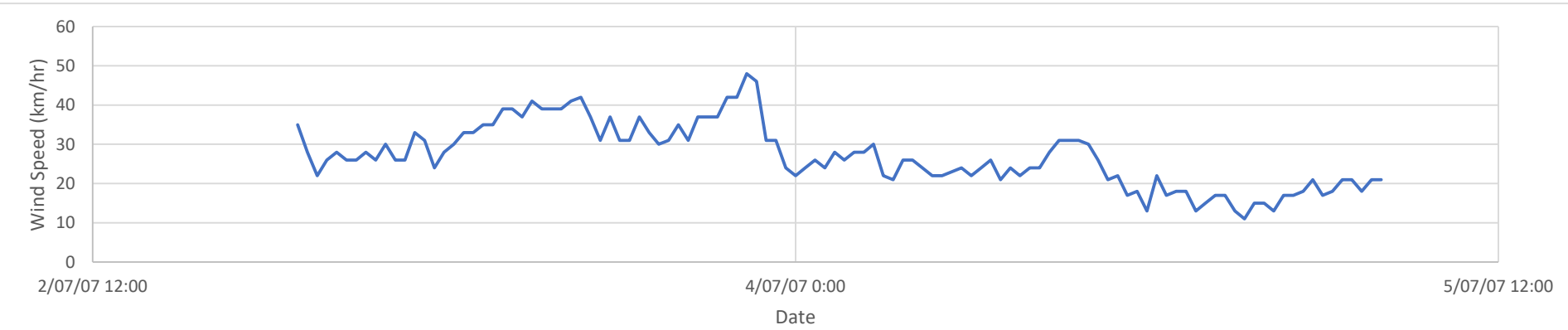
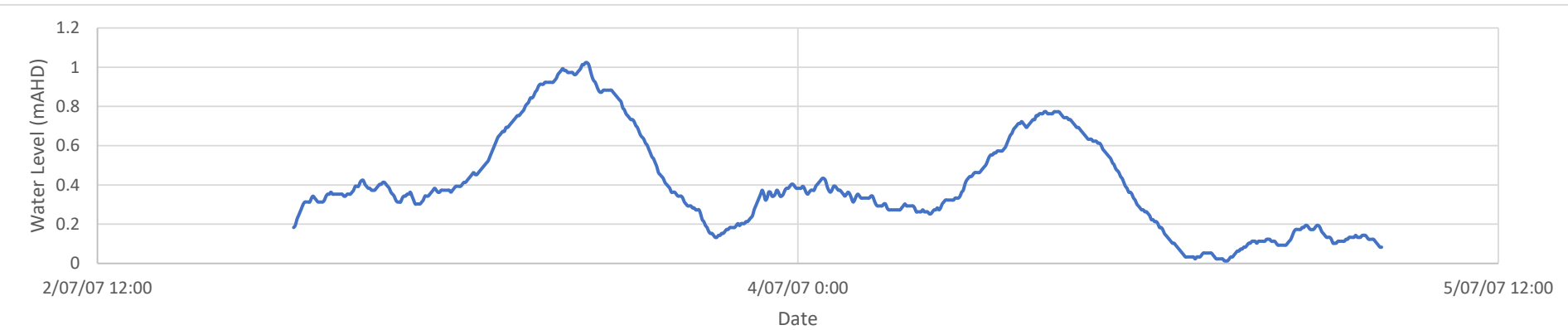
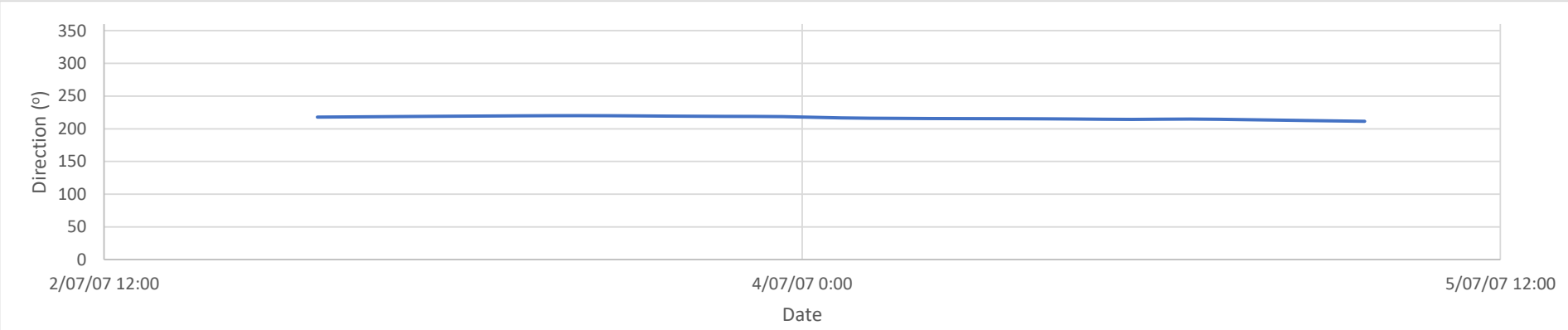
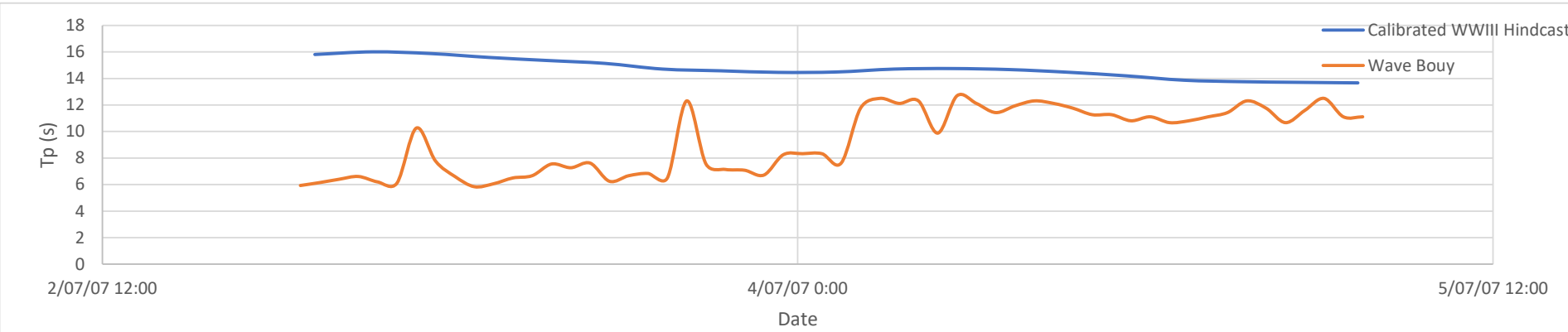
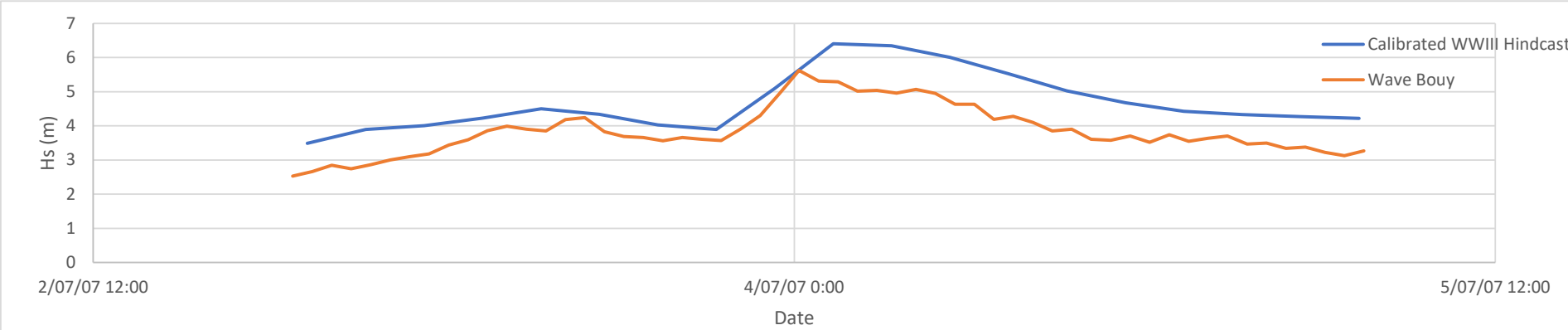
K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots

Location	Esperance
Start Date	03-06-97 20:00
End Date	07-06-97 2:00



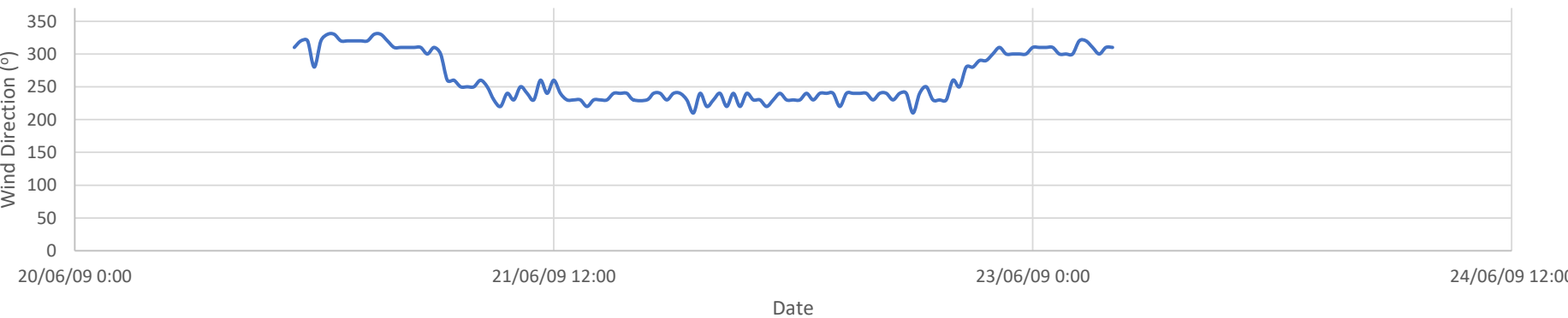
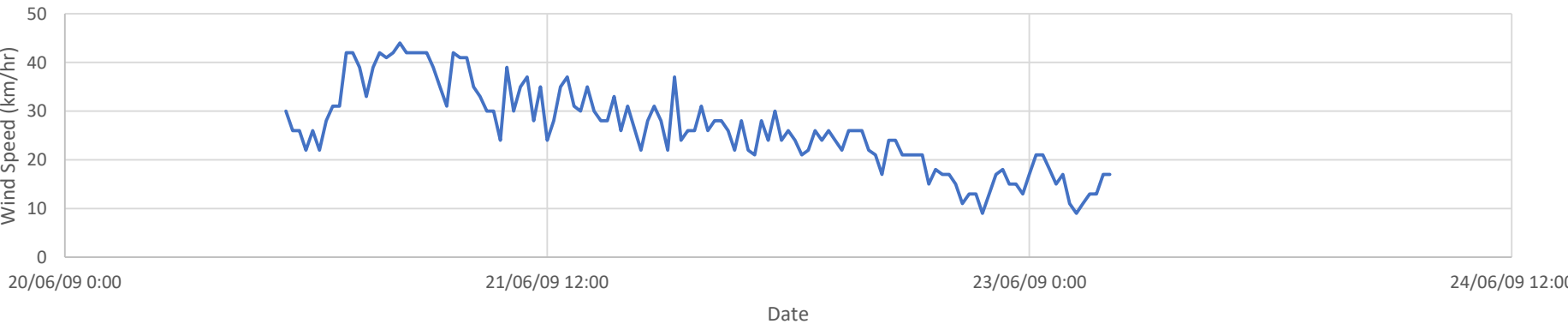
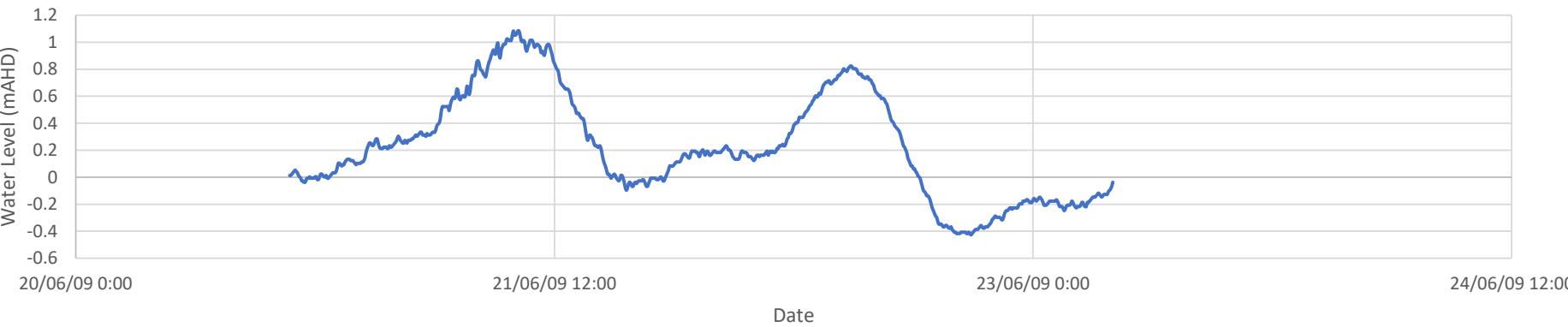
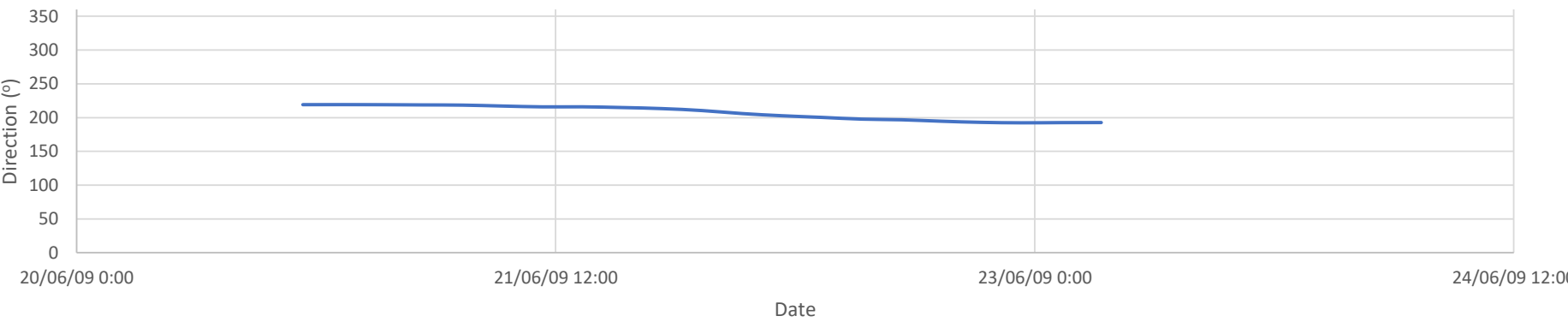
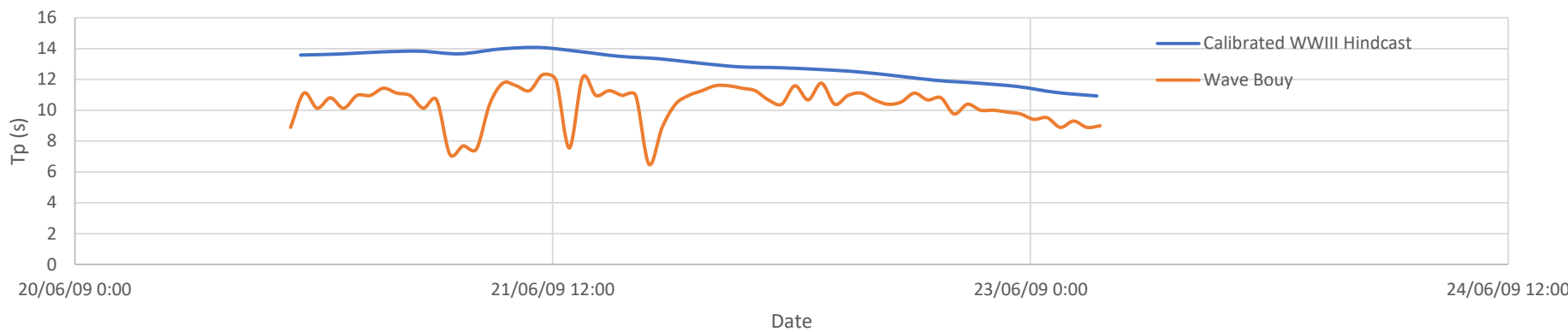
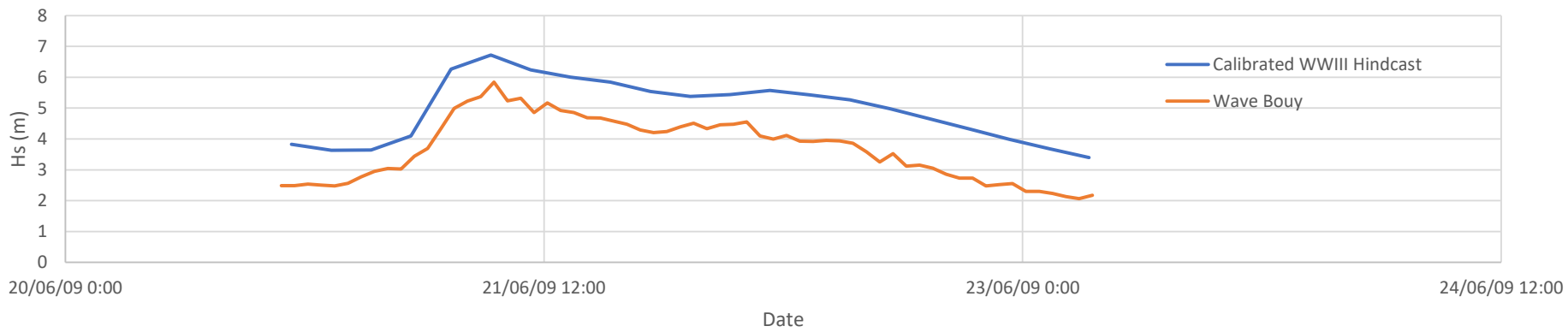
K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots

Location	Esperance
Start Date	02-07-07 23:00
End Date	05-07-07 5:00



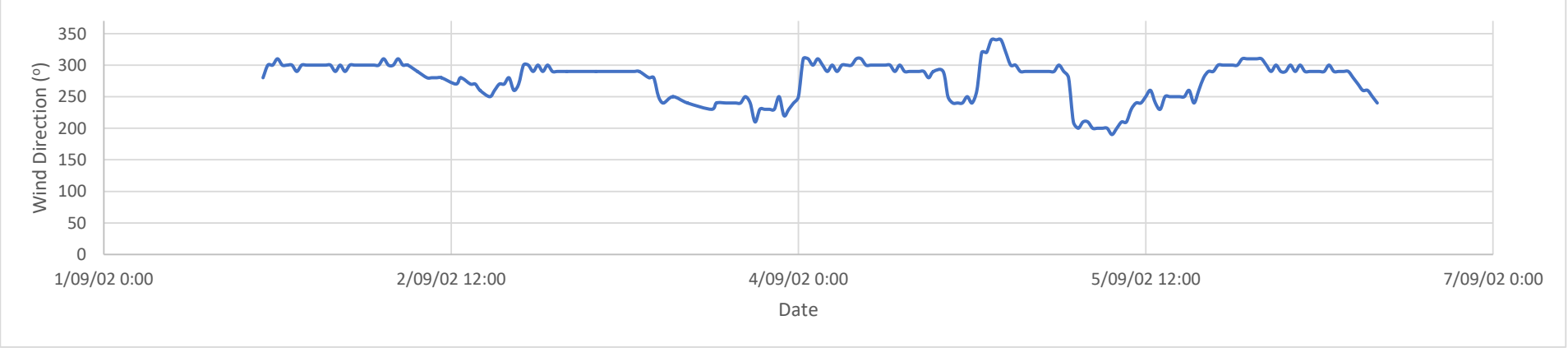
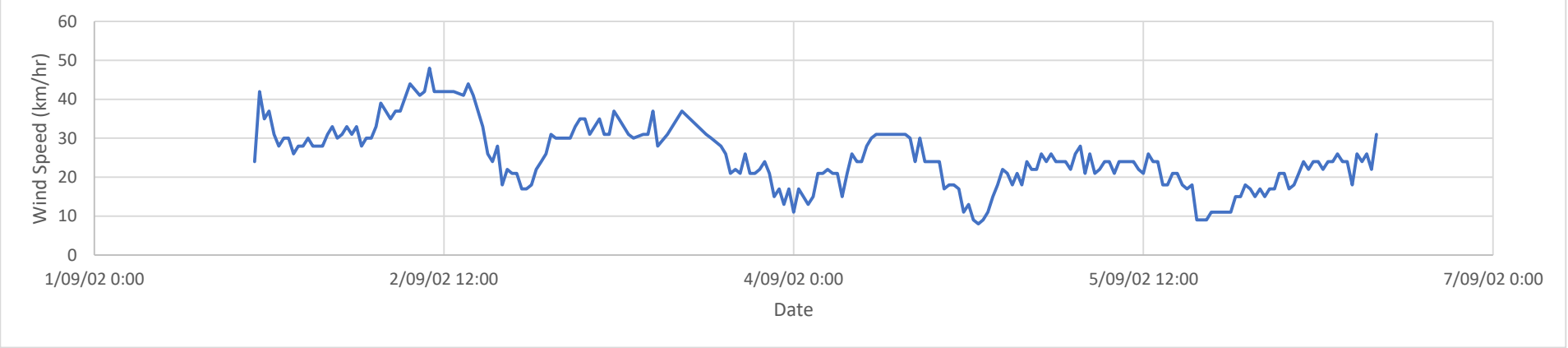
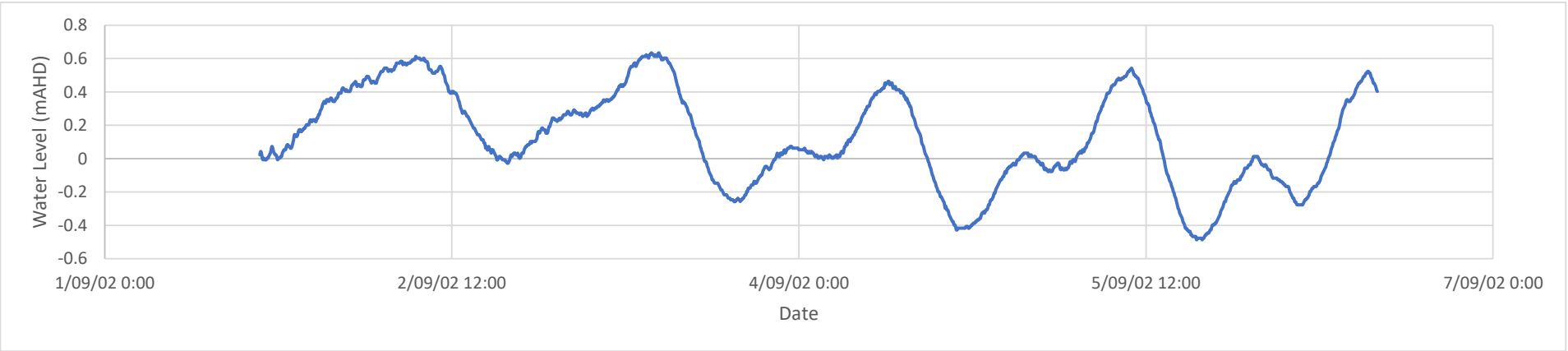
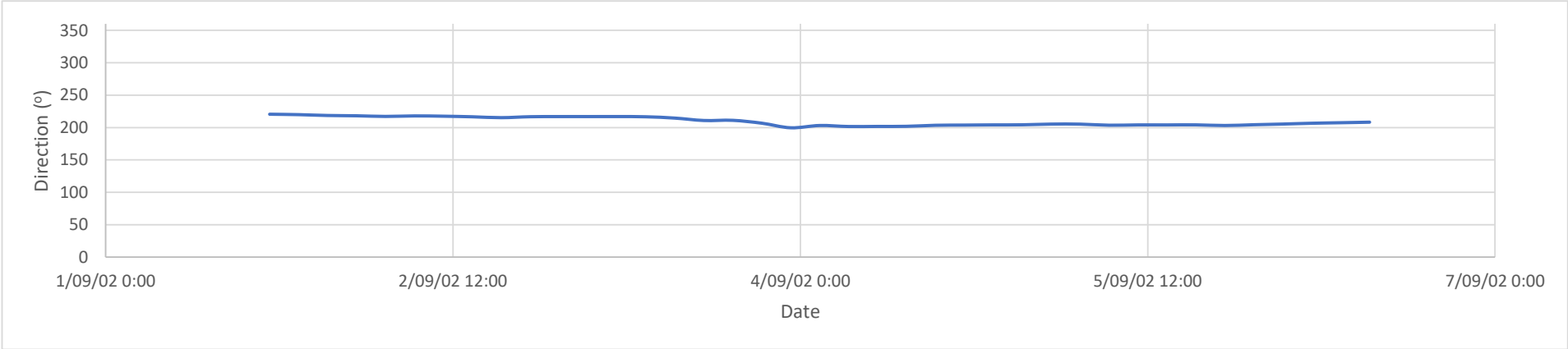
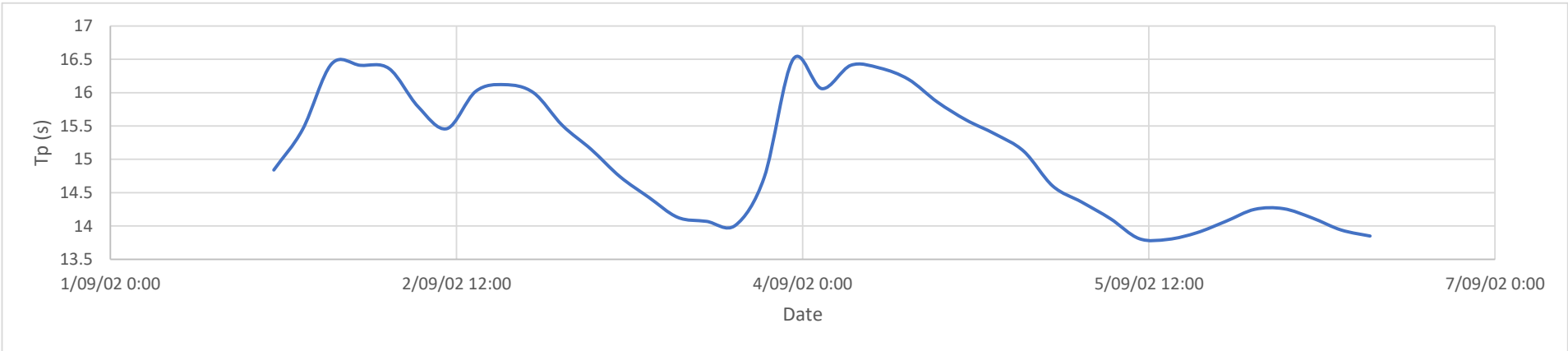
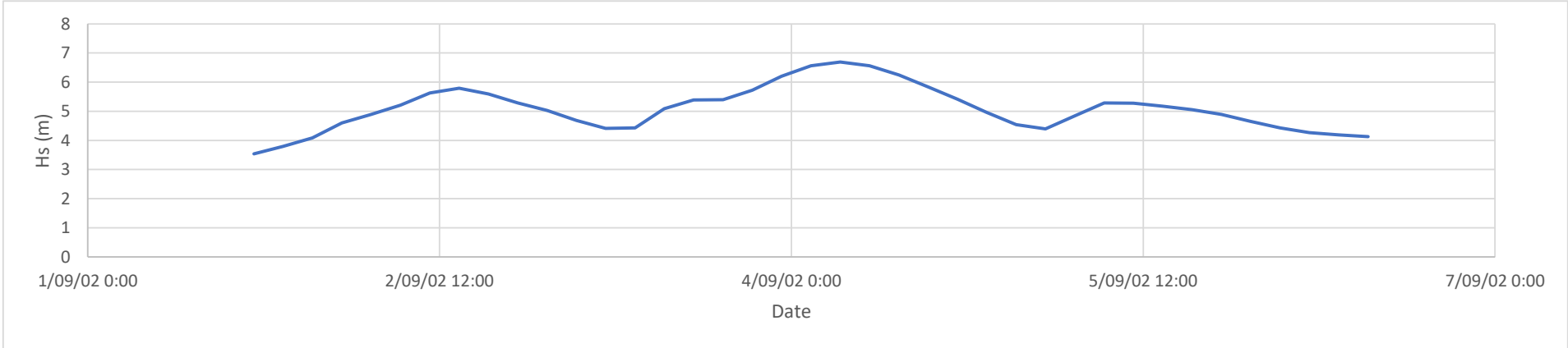
K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots

Location	Esperance
Start Date	20-06-09 17:00
End Date	23-06-09 5:00



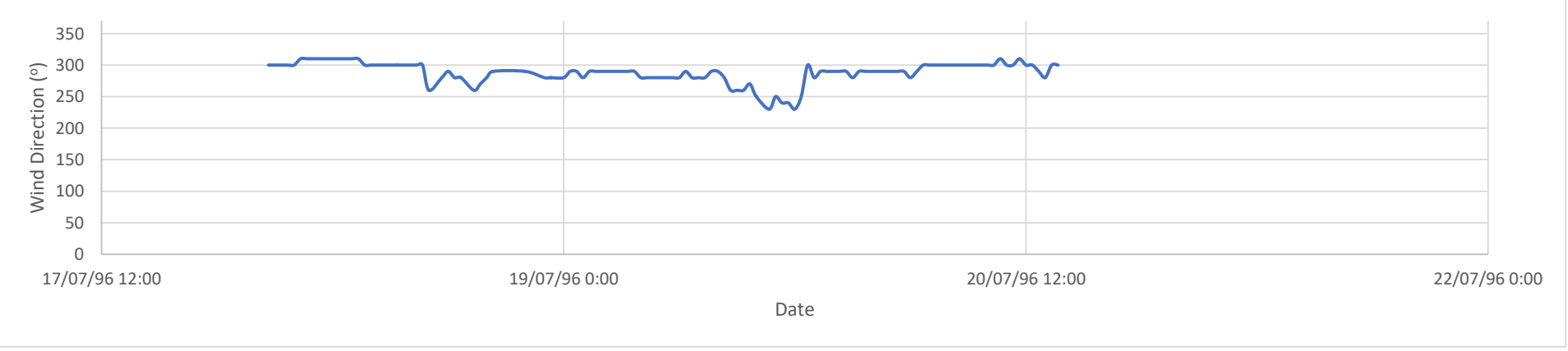
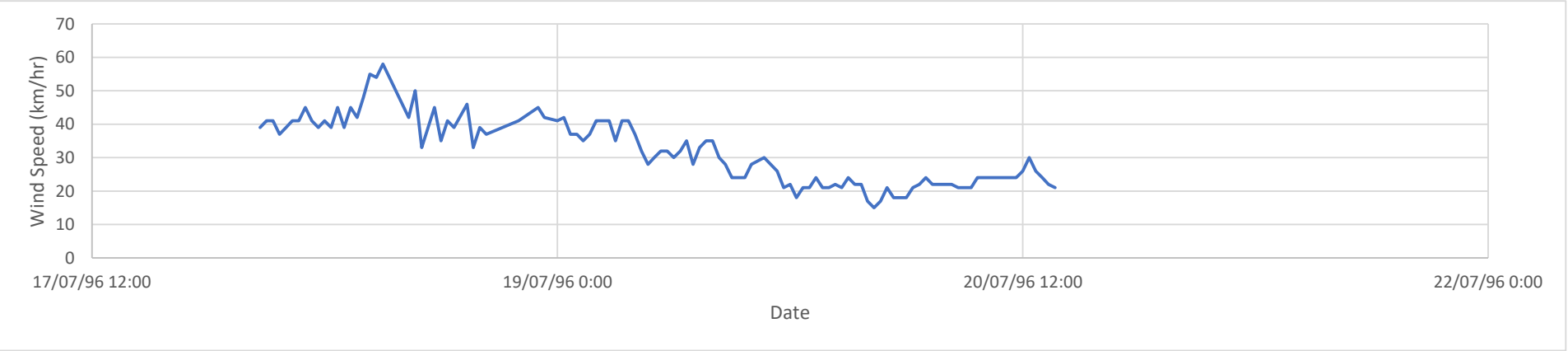
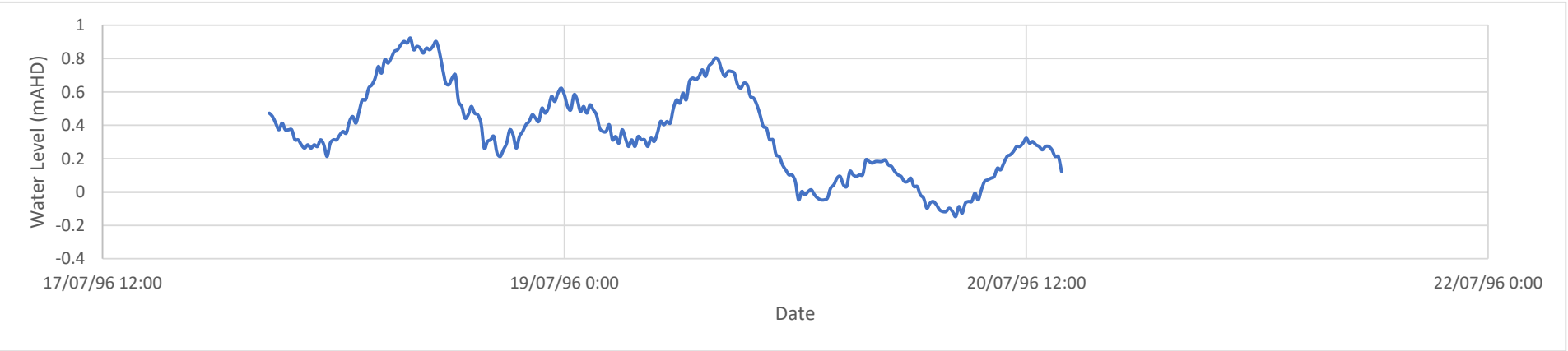
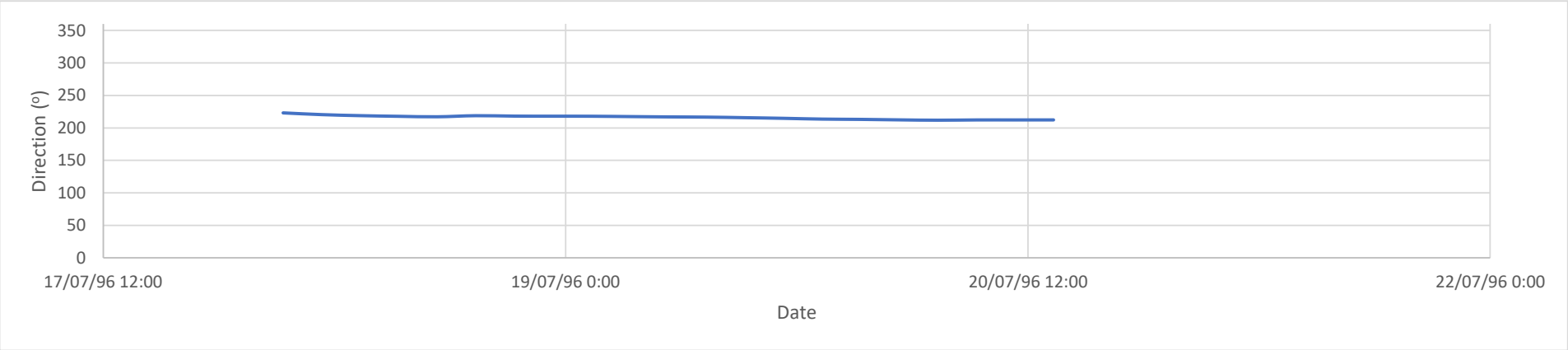
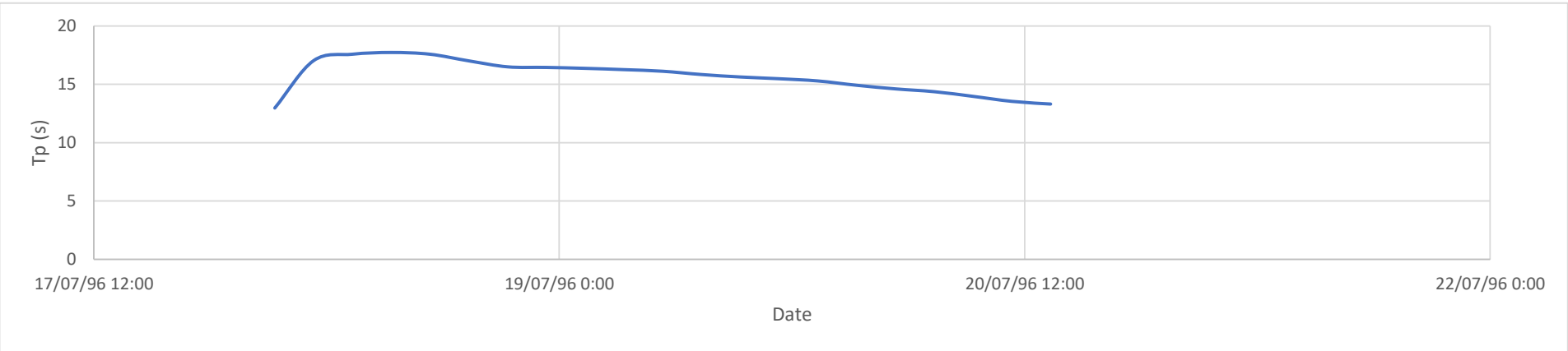
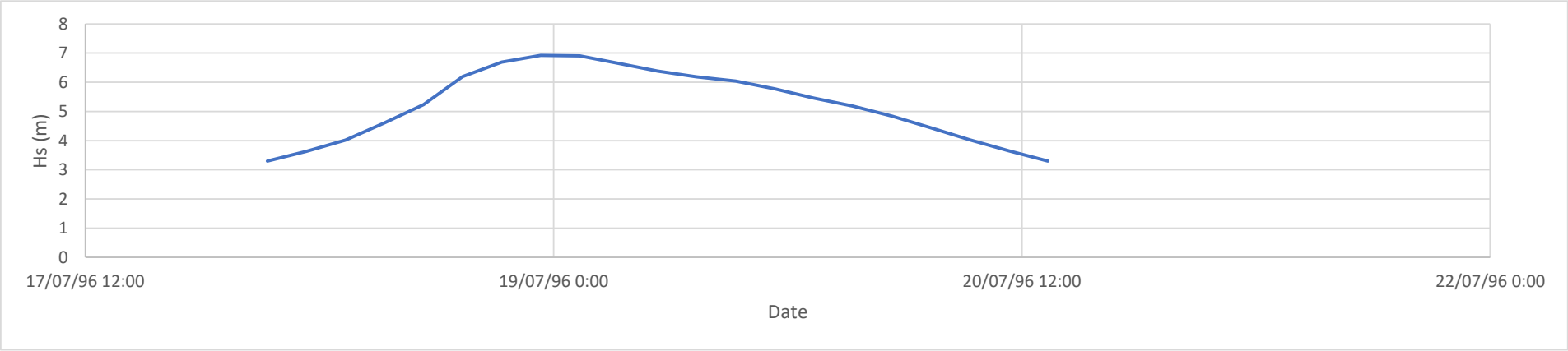
K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots

Location	Esperance
Start Date	01-09-02 17:00
End Date	06-09-02 11:00



**K1509 - South West Storm Selection
Top Great Southern (Esperance) Storm
Plots**

Location	Esperance
Start Date	18-07-96 2:00
End Date	20-07-96 14:00



Appendix D Top Storm Clusters Ranked by Net Cluster Power - All Directions

K1509 - South West Storm Selection
Top Storm Clusters

Location	Geraldton
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW)Days	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Jul96	'15-Jul-1996 23:00:00'	'02-Aug-1996 02:00:00'	17.13	4.04	14.35	6.52	4.13	7.32	228.38	-9999.00	-9999.00	0.22	0.91
2	S_2_Jul90	'12-Jul-1990 15:00:00'	'24-Jul-1990 21:00:00'	12.25	4.22	14.62	7.22	3.49	5.93	226.58	-9999.00	-9999.00	0.04	0.73
3	S_3_Jul93	'16-Jul-1993 14:00:00'	'31-Jul-1993 05:00:00'	14.63	3.22	14.95	5.92	2.48	4.43	224.52	-9999.00	-9999.00	-0.02	0.62
4	S_4_Jul07	'22-Jul-2007 02:00:00'	'07-Aug-2007 11:00:00'	16.38	3.40	14.74	5.54	2.34	5.04	227.67	-9999.00	-9999.00	0.15	0.78
5	S_5_Jun92	'21-Jun-1992 08:00:00'	'06-Jul-1992 08:00:00'	15.00	3.54	14.81	5.70	2.23	4.90	228.44	-9999.00	-9999.00	0.06	0.69
6	S_6_Aug91	'31-Jul-1991 14:00:00'	'05-Aug-1991 14:00:00'	5.00	4.70	15.72	6.43	2.10	2.79	225.00	-9999.00	-9999.00	0.07	0.62
7	S_7_Aug89	'18-Aug-1989 08:00:00'	'06-Sep-1989 08:00:00'	19.00	3.17	15.60	5.95	2.04	5.12	224.46	-9999.00	-9999.00	-0.02	0.49
8	S_8_Jul02	'01-Jul-2002 08:00:00'	'13-Jul-2002 11:00:00'	12.13	3.67	14.50	6.58	1.97	4.28	224.44	-9999.00	-9999.00	0.11	0.70
9	S_9_May95	'23-May-1995 08:00:00'	'09-Jun-1995 23:00:00'	17.63	2.95	14.38	6.83	1.89	4.54	224.78	-9999.00	-9999.00	0.11	0.77
10	S_10_Jul89	'14-Jul-1989 02:00:00'	'28-Jul-1989 17:00:00'	14.63	3.32	15.77	5.93	1.85	4.32	223.15	-9999.00	-9999.00	0.14	0.71
11	S_11_Jul00	'11-Jul-2000 02:00:00'	'24-Jul-2000 02:00:00'	13.00	3.47	14.66	5.41	1.79	4.00	224.61	-9999.00	-9999.00	0.16	0.90
12	S_12_Jul95	'08-Jul-1995 05:00:00'	'25-Jul-1995 23:00:00'	17.75	3.15	13.83	5.63	1.75	4.74	230.05	-9999.00	-9999.00	0.15	0.97
13	S_13_Jun96	'17-Jun-1996 23:00:00'	'28-Jun-1996 17:00:00'	10.75	3.36	14.36	5.47	1.60	3.20	229.17	-9999.00	-9999.00	0.25	0.73
14	S_14_Sep09	'10-Sep-2009 11:00:00'	'13-Sep-2009 17:00:00'	3.25	4.91	16.33	6.11	1.57	2.02	224.80	-9999.00	-9999.00	0.07	0.52
15	S_15_Sep03	'08-Sep-2003 02:00:00'	'24-Sep-2003 02:00:00'	16.00	3.11	13.91	5.02	1.56	4.12	223.30	-9999.00	-9999.00	-0.08	0.45
16	S_16_May97	'23-May-1997 20:00:00'	'06-Jun-1997 08:00:00'	13.50	3.31	14.49	6.45	1.56	3.97	222.27	-9999.00	-9999.00	0.10	0.55
17	S_17_Jun98	'04-Jun-1998 23:00:00'	'12-Jun-1998 02:00:00'	7.13	3.90	13.55	5.52	1.47	2.81	230.26	-9999.00	-9999.00	0.27	0.92
18	S_18_Jun09	'19-Jun-2009 14:00:00'	'30-Jun-2009 20:00:00'	11.25	3.43	12.99	6.04	1.45	3.55	224.89	-9999.00	-9999.00	0.27	1.06
19	S_19_Jun91	'25-Jun-1991 17:00:00'	'04-Jul-1991 23:00:00'	9.25	3.49	14.47	6.52	1.40	3.14	219.77	-9999.00	-9999.00	0.10	0.62
20	S_20_Jul09	'16-Jul-2009 20:00:00'	'21-Jul-2009 23:00:00'	5.13	4.02	12.77	7.00	1.30	2.37	224.39	-9999.00	-9999.00	0.15	0.84
21	S_21_Sep98	'21-Sep-1998 05:00:00'	'30-Sep-1998 05:00:00'	9.00	3.54	14.51	5.85	1.27	3.03	223.81	-9999.00	-9999.00	0.04	0.40
22	S_22_Aug04	'24-Aug-2004 02:00:00'	'26-Aug-2004 14:00:00'	2.50	5.17	15.19	6.34	1.25	1.72	227.05	-9999.00	-9999.00	0.08	0.60
23	S_23_Aug90	'02-Aug-1990 03:00:00'	'12-Aug-1990 09:00:00'	10.25	2.92	15.00	5.55	1.20	2.44	225.62	-9999.00	-9999.00	-0.01	0.64
24	S_24_Aug88	'12-Aug-1988 05:00:00'	'17-Aug-1988 05:00:00'	5.00	3.97	14.43	5.65	1.15	2.03	227.83	-9999.00	-9999.00	0.21	0.71
25	S_25_Aug05	'13-Aug-2005 23:00:00'	'18-Aug-2005 17:00:00'	4.75	3.98	14.21	5.86	1.09	1.94	224.38	-9999.00	-9999.00	0.14	0.73
26	S_26_May94	'23-May-1994 14:00:00'	'25-May-1994 11:00:00'	1.88	5.59	14.03	7.71	1.08	1.59	227.26	-9999.00	-9999.00	0.18	0.55
27	S_27_Jul88	'07-Jul-1988 14:00:00'	'16-Jul-1988 08:00:00'	8.75	3.34	14.54	5.60	1.06	2.57	224.37	-9999.00	-9999.00	0.13	0.77
28	S_28_Sep07	'16-Sep-2007 05:00:00'	'25-Sep-2007 17:00:00'	9.50	3.20	15.29	4.44	1.03	2.49	226.37	-9999.00	-9999.00	0.02	0.56
29	S_29_Sep91	'06-Sep-1991 14:00:00'	'09-Sep-1991 05:00:00'	2.63	4.38	16.90	5.23	1.01	1.29	224.72	-9999.00	-9999.00	-0.04	0.39
30	S_30_Aug98	'05-Aug-1998 17:00:00'	'07-Aug-1998 17:00:00'	2.00	4.93	15.79	5.94	0.97	1.27	227.76	-9999.00	-9999.00	0.07	0.41
31	S_31_Jul06	'21-Jul-2006 02:00:00'	'29-Jul-2006 05:00:00'	8.13	3.08	14.87	6.08	0.96	2.18	224.66	-9999.00	-9999.00	0.04	0.67
32	S_32_Jun88	'11-Jun-1988 23:00:00'	'19-Jun-1988 02:00:00'	7.13	3.07	13.54	5.67	0.95	1.83	231.37	-9999.00	-9999.00	0.14	0.66
33	S_33_Aug92	'06-Aug-1992 23:00:00'	'16-Aug-1992 14:00:00'	9.63	3.44	14.79	4.85	0.95	2.86	224.58	-9999.00	-9999.00	0.00	0.69
34	S_34_Oct97	'09-Oct-1997 05:00:00'	'11-Oct-1997 17:00:00'	2.50	4.48	14.97	4.82	0.90	1.27	225.42	-9999.00	-9999.00	-0.15	0.19
35	S_35_Aug99	'10-Aug-1999 20:00:00'	'19-Aug-1999 08:00:00'	8.50	2.86	14.55	5.68	0.88	2.03	225.81	-9999.00	-9999.00	0.11	0.47
36	S_36_Sep89	'20-Sep-1989 02:00:00'	'22-Sep-1989 08:00:00'	2.25	4.40	16.64	5.43	0.87	1.13	222.33	-9999.00	-9999.00	-0.01	0.39
37	S_37_Nov92	'19-Nov-1992 08:00:00'	'20-Nov-1992 20:00:00'	1.50	5.49	14.70	6.84	0.86	1.22	218.13	-9999.00	-9999.00	-0.11	0.14
38	S_38_Sep05	'05-Sep-2005 23:00:00'	'08-Sep-2005 14:00:00'	2.63	4.38	14.46	4.77	0.84	1.27	227.03	-9999.00	-9999.00	0.15	0.59
39	S_39_May02	'07-May-2002 08:00:00'	'12-May-2002 11:00:00'	5.13	3.58	14.15	5.57	0.82	1.75	227.33	-9999.00	-9999.00	0.26	0.59
40	S_40_Oct91	'30-Sep-1991 20:00:00'	'04-Oct-1991 11:00:00'	3.63	3.88	16.34	5.49	0.81	1.42	228.54	-9999.00	-9999.00	-0.17	0.23

K1509 - South West Storm Selection
Top Storm Clusters

Location	Jurien
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Jul96	'15-Jun-1996 20:00:00'	'02-Aug-1996 14:00:00'	47.75	3.62	14.21	6.76	8.31	16.77	247.17	-9999.00	-9999.00	0.13	0.86
2	S_2_Jul93	'16-Jul-1993 11:00:00'	'12-Aug-1993 23:00:00'	27.50	3.57	14.85	6.05	3.96	9.22	244.37	-9999.00	-9999.00	-0.11	0.55
3	S_3_Jun92	'15-Jun-1992 23:00:00'	'06-Jul-1992 14:00:00'	20.63	3.88	14.70	5.81	3.68	7.91	247.47	-9999.00	-9999.00	0.01	0.62
4	S_4_Aug17	'19-Jul-2017 12:50:00'	'15-Aug-2017 12:50:00'	27.00	3.52	14.17	6.91	3.26	8.75	-9999.00	241.39	247.54	0.09	0.71
5	S_5_Jul91	'17-Jul-1991 05:00:00'	'05-Aug-1991 17:00:00'	19.50	3.63	14.47	6.58	3.21	6.81	244.48	-9999.00	-9999.00	0.00	0.71
6	S_6_Jun82	'08-Jun-1982 08:00:00'	'05-Jul-1982 08:00:00'	27.00	3.39	15.09	5.58	2.93	8.06	242.67	-9999.00	-9999.00	-0.08	0.60
7	S_7_Sep13	'11-Sep-2013 06:13:00'	'25-Sep-2013 19:12:00'	14.54	3.92	13.59	6.34	2.62	5.71	-9999.00	242.75	249.93	0.06	0.59
8	S_8_Jun91	'24-Jun-1991 11:00:00'	'05-Jul-1991 02:00:00'	10.63	3.90	14.66	6.65	2.40	4.33	240.50	-9999.00	-9999.00	0.05	0.64
9	S_9_Jun09	'19-Jun-2009 02:15:00'	'30-Jun-2009 21:15:00'	11.79	3.83	12.59	6.78	2.22	4.57	-9999.00	-9999.00	-9999.00	0.18	0.93
10	S_10_May97	'23-May-1997 17:00:00'	'06-Jun-1997 14:00:00'	13.88	3.76	14.62	6.67	2.15	5.10	242.69	-9999.00	-9999.00	0.05	0.53
11	S_11_Jul95	'08-Jul-1995 05:00:00'	'26-Jul-1995 05:00:00'	17.88	3.42	14.49	5.83	2.14	5.52	248.60	-9999.00	-9999.00	0.03	0.89
12	S_12_May95	'23-May-1995 05:00:00'	'10-Jun-1995 02:00:00'	17.88	3.25	14.46	6.61	2.10	5.25	244.59	-9999.00	-9999.00	0.02	0.67
13	S_13_Sep05	'17-Sep-2005 06:45:00'	'10-Oct-2005 10:45:00'	23.17	3.52	14.54	5.90	2.06	7.25	-9999.00	-9999.00	-9999.00	-0.17	0.42
14	S_14_Sep05	'04-Sep-2005 23:30:00'	'09-Sep-2005 14:45:00'	4.64	5.04	15.30	6.31	2.05	2.86	-9999.00	-9999.00	-9999.00	0.08	0.41
15	S_15_Aug04	'11-Aug-2004 23:45:00'	'27-Aug-2004 04:15:00'	15.19	3.54	14.15	7.60	2.01	5.16	-9999.00	-9999.00	-9999.00	-0.12	0.56
16	S_16_Jul06	'20-Jul-2006 18:45:00'	'09-Aug-2006 06:45:00'	19.50	3.47	14.52	6.42	1.92	6.10	-9999.00	-9999.00	-9999.00	-0.06	0.54
17	S_17_Aug95	'09-Aug-1995 05:00:00'	'31-Aug-1995 02:00:00'	21.88	3.58	14.53	4.74	1.92	6.95	245.18	-9999.00	-9999.00	-0.11	0.60
18	S_18_Sep03	'08-Sep-2003 04:00:00'	'24-Sep-2003 08:00:00'	16.17	3.42	14.26	5.78	1.88	5.01	-9999.00	-9999.00	-9999.00	-0.15	0.43
19	S_19_Aug99	'10-Aug-1999 12:45:00'	'04-Sep-1999 05:45:00'	24.71	3.05	14.06	5.78	1.76	6.21	-9999.00	-9999.00	-9999.00	-0.04	0.42
20	S_20_Sep96	'06-Sep-1996 17:00:00'	'18-Sep-1996 23:00:00'	12.25	3.36	14.04	6.37	1.69	3.77	248.99	-9999.00	-9999.00	0.03	0.61
21	S_21_Jul00	'13-Jul-2000 03:00:00'	'24-Jul-2000 02:30:00'	10.98	3.69	14.68	4.92	1.63	3.74	-9999.00	-9999.00	-9999.00	0.09	0.79
22	S_22_Jun94	'21-May-1994 02:00:00'	'22-Jun-1994 11:00:00'	32.38	3.23	14.14	6.983	1.59	9.12	245.02	-9999.00	-9999.00	-0.01	0.66
23	S_23_Jul02	'01-Jul-2002 03:30:00'	'13-Jul-2002 10:30:00'	12.29	3.78	14.20	6.53	1.59	4.46	-9999.00	-9999.00	-9999.00	0.05	0.62
24	S_24_Aug92	'06-Aug-1992 20:00:00'	'16-Aug-1992 14:00:00'	9.75	3.98	14.83	5.17	1.55	3.84	245.28	-9999.00	-9999.00	-0.10	0.49
25	S_25_Oct97	'24-Sep-1997 08:00:00'	'11-Oct-1997 23:00:00'	17.63	2.92	14.52	5.28	1.55	4.17	244.46	-9999.00	-9999.00	-0.23	0.42
26	S_26_Aug07	'29-Jul-2007 23:30:00'	'07-Aug-2007 04:30:00'	8.21	3.36	14.80	5.30	1.38	2.51	-9999.00	-9999.00	-9999.00	0.00	0.69
27	S_27_Oct91	'30-Sep-1991 17:00:00'	'05-Oct-1991 02:00:00'	4.38	4.35	16.41	5.44	1.37	2.10	248.97	-9999.00	-9999.00	-0.24	0.09
28	S_28_May94	'20-May-1994 18:00:00'	'25-May-1994 06:00:00'	4.50	4.52	14.13	6.98	1.35	2.42	245.72	-9999.00	-9999.00	0.14	0.61
29	S_29_Jul09	'16-Jul-2009 13:15:00'	'21-Jul-2009 23:15:00'	5.42	4.13	12.74	7.26	1.35	2.48	-9999.00	-9999.00	-9999.00	0.06	0.78
30	S_30_Sep09	'10-Sep-2009 05:15:00'	'13-Sep-2009 04:15:00'	2.96	4.94	16.38	5.62	1.34	1.77	-9999.00	-9999.00	-9999.00	0.07	0.49
31	S_31_Jul03	'25-Jun-2003 15:30:00'	'11-Jul-2003 08:30:00'	15.71	3.16	11.96	5.10	1.34	4.18	-9999.00	-9999.00	-9999.00	0.07	0.82
32	S_32_Aug93	'25-Aug-1993 05:00:00'	'08-Sep-1993 08:00:00'	14.13	3.38	14.43	4.71	1.33	4.12	243.66	-9999.00	-9999.00	-0.19	0.32
33	S_33_Sep91	'06-Sep-1991 08:00:00'	'09-Sep-1991 11:00:00'	3.13	4.68	16.82	5.35	1.31	1.72	246.75	-9999.00	-9999.00	-0.08	0.36
34	S_34_Sep98	'13-Sep-1998 10:45:00'	'29-Sep-1998 22:45:00'	16.50	3.16	14.33	5.40	1.28	4.37	-9999.00	-9999.00	-9999.00	-0.10	0.34
35	S_35_Sep82	'14-Sep-1982 08:00:00'	'22-Sep-1982 11:00:00'	8.13	3.50	15.13	5.70	1.26	2.66	243.60	-9999.00	-9999.00	-0.13	0.60
36	S_36_Jul11	'28-Jul-2011 02:03:00'	'02-Aug-2011 07:33:00'	5.23	4.30	12.97	5.75	1.22	2.39	-9999.00	251.00	264.06	0.29	0.76
37	S_37_Jul82	'22-Jul-1982 14:00:00'	'03-Aug-1982 14:00:00'	12.00	3.70	15.79	4.59	1.13	4.06	244.50	-9999.00	-9999.00	-0.20	0.21
38	S_38_Jul99	'13-Jul-1999 23:45:00'	'17-Jul-1999 23:45:00'	4.00	4.32	14.58	5.88	1.11	1.88	-9999.00	-9999.00	-9999.00	0.13	0.58
39	S_39_Jun98	'04-Jun-1998 19:45:00'	'11-Jun-1998 19:45:00'	7.00	3.90	13.24	4.96	1.10	2.69	-9999.00	-9999.00	-9999.00	0.24	0.78
40	S_40_May02	'06-May-2002 19:30:00'	'12-May-2002 09:30:00'	5.58	3.94	13.64	5.85	1.09	2.21	-9999.00	-9999.00	-9999.00	0.20	0.62
41	S_41_Aug03	'01-Aug-2003 14:30:00'	'12-Aug-2003 12:30:00'	10.92	3.24	14.35	5.87	1.09	3.07	-9999.00	-9999.00	-9999.00	-0.03	0.68
42	S_42_Aug97	'09-Aug-1997 14:00:00'	'16-Aug-1997 14:00:00'	7.00	3.29	14.53	4.97	1.07	2.09	243.79	-9999.00	-9999.00	-0.13	0.35
43	S_43_Jun99	'11-Jun-1999 04:45:00'	'19-Jun-1999 12:45:00'	8.33	3.49	14.02	5.84	1.04	2.69	-9999.00	-9999.00	-9999.00	0.19	0.67
44	S_44_Jun05	'06-Jun-2005 23:45:00'	'13-Jun-2005 06:15:00'	6.27	4.03	11.47	5.40	1.01	2.52	-9999.00	-9999.00	-9999.00	0.12	0.89
45	S_45_Nov92	'18-Nov-1992 17:00:00'	'20-Nov-1992 20:00:00'	2.13	5.11	14.65	6.74	1.01	1.46	239.55	-9999.00	-9999.00	-0.14	0.13
46	S_46_Sep12	'21-Sep-2012 13:28:00'	'27-Sep-2012 18:28:00'	6.21	3.65	14.07	5.47	0.98	2.13	-9999.00	236.53	241.12	0.00	0.41
47	S_47_Apr12	'02-Apr-2012 06:28:00'	'05-Apr-2012 13:28:00'	3.29	4.38	16.54	6.36	0.95	1.57	-9999.00	228.74	235.14	0.25	0.48
48	S_48_Apr00	'27-Apr-2000 04:45:00'	'29-Apr-2000 07:45:00'	2.13	4.89	15.16	5.65	0.90	1.25	-9999.00	-9999.00	-9999.00	0.29	0.61
49	S_49_Aug09	'13-Aug-2009 08:15:00'	'15-Aug-2009 20:15:00'	2.50	4.50	14.87	5.49	0.88	1.25	-9999.00	-9999.00	-9999.00	0.12	0.58
50	S_50_Sep02	'01-Sep-2002 03:30:00'	'03-Sep-2002 04:30:00'	2.04	4.92	15.24	5.66	0.88	1.22	-9999.00	-9999.00	-9999.00	0.04	0.45
51	S_51_May09	'21-May-2009 03:15:00'	'23-May-2009 20:15:00'	2.71	4.63	12.81	5.46	0.87	1.43	-9999.00	-9999.00	-9999.00	0.36	0.80
52	S_52_Oct99	'27-Sep-1999 12:00:00'	'09-Oct-1999 05:30:00'	11.73	3.21	13.77	6.54	0.87	3.29	-9999.00	-9999.00	-9999.00	-0.08	0.22
53	S_53_Jul04	'29-Jun-2004 20:45:00'	'08-Jul-2004 07:45:00'	8.46	3.47	13.82	5.28	0.87	2.64	-9999.00	-9999.00	-9999.00	0.02	0.71
54	S_54_Oct13	'07-Oct-2013 14:13:00'	'12-Oct-2013 23:41:00'	5.39	3.61	15.11	5.08	0.82	1.78	-9999.00	243.49	235.92	-0.07	0.39
55	S_55_Jul07	'01-Jul-2007 05:30:00'	'03-Jul-2007 15:30:00'	2.42	4.50	13.20	5.65	0.77	1.23	-9999.00	-9999.00	-9999.00	0.37	0.82
56	S_56_Sep13	'31-Aug-2013 02:43:00'	'01-Sep-2013 21:43:00'	1.79	4.72	16.24	5.47	0.74	0.97	-9999.00	235.29	260.51	0.12	0.47
57	S_57_Jul82	'15-Jul-1982 08:00:00'	'16-Jul-1982 23:00:00'	1.63	4.46	17.71	4.75	0.63	0.84	249.62	-9999.00	-9999.00	-0.04	0.28
58	S_58_Sep01	'06-Sep-2001 12:45:00'	'10-Sep-2001 19:45:00'	4.29	3.58	14.14	5.17	0.63	1.40	-9999.00	-9999.00	-9999.00	-0.12	0.16
59	S_59_Aug82	'20-Aug-1982 11:00:00'	'24-Aug-1982 17:00:00'	4.25	3.66	16.32	4.31	0.63	1.44	244.49	-9999.00	-9999.00	-0.24	0.10
60	S_60_May16	'21-May-2016 04:51:00'	'22-May-2016 18:51:00'	1.58	5.01	13.15	6.53	0.62	0.99	-9999.00	248.34	254.88	0.22	0.75

K1509 - South West Storm Selection
Top 60 Storm Clusters

Location	Rottnest
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)
1	S_1_Jul96	'15-Jun-1996 19:00:00'	'02-Aug-1996 13:00:00'	47.75	3.70	13.28	8.31	8.05	18.10	-9999.00	-9999.00	-9999.00	0.21
2	S_2_Jul90	'12-Jul-1990 11:00:00'	'12-Aug-1990 11:00:00'	31.00	3.72	13.63	8.11	6.68	12.48	246.22	-9999.00	-9999.00	-0.02
3	S_3_Aug83	'13-Aug-1983 23:00:00'	'13-Sep-1983 02:00:00'	30.13	3.99	13.56	7.11	5.86	12.99	248.73	-9999.00	-9999.00	0.03
4	S_4_Aug81	'21-Jul-1981 17:00:00'	'20-Aug-1981 14:00:00'	29.88	4.05	13.72	6.74	5.76	12.77	245.71	-9999.00	-9999.00	0.05
5	S_5_Sep80	'17-Aug-1980 17:00:00'	'05-Oct-1980 11:00:00'	48.75	3.51	14.19	5.47	5.55	15.49	244.84	-9999.00	-9999.00	-0.08
6	S_6_Jun92	'11-Jun-1992 20:00:00'	'14-Jul-1992 23:00:00'	33.13	3.83	14.03	6.66	4.83	12.63	249.85	-9999.00	-9999.00	0.11
7	S_7_Sep89	'17-Aug-1989 20:00:00'	'22-Sep-1989 02:00:00'	35.25	3.52	14.49	6.17	4.41	11.40	245.70	-9999.00	-9999.00	-0.02
8	S_8_Jul00	'19-Jun-2000 03:00:00'	'18-Jul-2000 20:30:00'	29.73	3.55	12.89	5.94	3.87	10.03	-9999.00	-9999.00	-9999.00	0.20
9	S_9_Aug17	'19-Jul-2017 09:59:00'	'15-Aug-2017 21:59:00'	27.50	3.75	13.39	7.35	3.84	10.11	-9999.00	260.79	263.17	0.16
10	S_10_Jun88	'31-May-1988 05:00:00'	'20-Jun-1988 11:00:00'	20.25	3.86	13.09	5.97	3.82	7.91	249.50	-9999.00	-9999.00	0.20
11	S_11_Sep13	'30-Aug-2013 22:29:00'	'25-Sep-2013 13:58:00'	25.65	3.62	13.23	7.43	3.71	9.23	-9999.00	259.94	261.59	0.16
12	S_12_Jul93	'16-Jul-1993 08:00:00'	'09-Aug-1993 20:00:00'	24.50	3.59	13.96	6.40	3.65	8.52	246.94	-9999.00	-9999.00	-0.04
13	S_13_Jul91	'16-Jul-1991 20:00:00'	'05-Aug-1991 08:00:00'	19.50	3.62	13.88	7.49	3.59	7.20	246.13	-9999.00	-9999.00	0.11
14	S_14_Jun83	'17-Jun-1983 20:00:00'	'09-Jul-1983 23:00:00'	22.13	3.46	13.85	6.92	3.55	7.45	248.91	-9999.00	-9999.00	0.13
15	S_15_Sep81	'07-Sep-1981 05:00:00'	'30-Sep-1981 17:00:00'	23.50	3.59	14.80	5.70	2.94	7.80	245.97	-9999.00	-9999.00	-0.09
16	S_16_Jul80	'11-Jul-1980 14:00:00'	'10-Aug-1980 20:00:00'	30.25	3.52	14.90	5.46	2.89	9.60	247.65	-9999.00	-9999.00	-0.02
17	S_17_May98	'21-May-1998 06:40:00'	'11-Jun-1998 16:40:00'	21.42	3.35	13.29	6.27	2.67	6.65	-9999.00	-9999.00	-9999.00	0.24
18	S_18_Jul07	'21-Jul-2007 18:42:00'	'07-Aug-2007 00:12:00'	16.23	3.84	13.40	7.02	2.65	6.41	-9999.00	261.95	268.68	0.18
19	S_19_Aug88	'11-Aug-1988 20:00:00'	'30-Aug-1988 08:00:00'	18.50	3.52	14.07	5.93	2.49	6.25	251.04	-9999.00	-9999.00	0.07
20	S_20_Sep88	'19-Sep-1988 08:00:00'	'05-Oct-1988 02:00:00'	15.75	3.80	12.73	6.65	2.46	5.82	244.92	-9999.00	-9999.00	0.11
21	S_21_Jun09	'19-Jun-2009 01:10:00'	'30-Jun-2009 17:40:00'	11.69	3.97	12.36	6.88	2.39	4.95	-9999.00	258.99	278.68	0.33
22	S_22_Aug95	'12-Aug-1995 22:59:59'	'25-Aug-1995 11:59:59'	12.54	4.20	14.35	5.53	2.28	5.43	-9999.00	-9999.00	-9999.00	0.01
23	S_23_Jul11	'28-Jul-2011 01:37:00'	'03-Aug-2011 23:07:00'	6.90	4.85	13.14	6.58	2.27	3.97	-9999.00	263.94	269.41	0.35
24	S_24_Jun81	'26-May-1981 08:00:00'	'09-Jun-1981 05:00:00'	13.88	3.62	12.72	7.27	2.24	5.12	242.63	-9999.00	-9999.00	0.13
25	S_25_Jul02	'01-Jul-2002 02:00:00'	'13-Jul-2002 02:30:00'	12.02	4.12	14.22	8.37	2.19	5.29	-9999.00	-9999.00	-9999.00	0.11
26	S_26_May97	'23-May-1997 07:00:00'	'05-Jun-1997 19:00:00'	13.50	3.58	13.84	7.88	2.19	4.66	-9999.00	-9999.00	-9999.00	0.13
27	S_27_Aug04	'12-Aug-2004 02:30:00'	'27-Aug-2004 00:30:00'	14.92	3.56	13.21	7.61	2.12	5.32	-9999.00	-9999.00	-9999.00	-0.02
28	S_28_Aug14	'22-Aug-2014 15:41:00'	'10-Sep-2014 01:11:00'	18.40	3.02	13.25	7.14	2.04	4.91	-9999.00	255.01	255.02	0.12
29	S_29_Jun91	'24-Jun-1991 14:00:00'	'04-Jul-1991 20:00:00'	10.25	3.95	13.18	7.32	2.03	4.45	244.28	-9999.00	-9999.00	0.15
30	S_30_Jul89	'13-Jul-1989 17:00:00'	'28-Jul-1989 14:00:00'	14.88	3.54	15.14	6.06	2.02	4.94	243.76	-9999.00	-9999.00	0.12
31	S_31_Aug85	'18-Aug-1985 17:00:00'	'28-Aug-1985 02:00:00'	9.38	3.94	13.39	5.75	1.93	3.86	245.02	-9999.00	-9999.00	0.06
32	S_32_Sep03	'08-Sep-2003 01:30:00'	'23-Sep-2003 23:30:00'	15.92	3.53	13.83	6.34	1.91	5.36	-9999.00	-9999.00	-9999.00	-0.05
33	S_33_Jun85	'27-Jun-1985 20:00:00'	'03-Jul-1985 02:00:00'	5.25	4.60	16.15	5.90	1.89	2.78	251.83	-9999.00	-9999.00	0.18
34	S_34_Jul88	'07-Jul-1988 11:00:00'	'25-Jul-1988 05:00:00'	17.75	3.37	14.18	5.29	1.88	5.30	244.75	-9999.00	-9999.00	0.06
35	S_35_Jul95	'08-Jul-1995 04:00:00'	'29-Jul-1995 22:46:00'	21.78	3.20	12.74	7.40	1.87	6.16	-9999.00	265.65	270.45	0.10
36	S_36_Jun90	'26-May-1990 08:00:00'	'11-Jun-1990 14:00:00'	16.25	3.11	13.33	6.32	1.86	4.53	245.92	-9999.00	-9999.00	0.12
37	S_37_Jul09	'16-Jul-2009 09:10:00'	'21-Jul-2009 20:10:00'	5.46	4.61	12.63	8.94	1.82	3.15	-9999.00	254.66	264.17	0.19
38	S_38_Sep09	'10-Sep-2009 03:40:00'	'13-Sep-2009 05:10:00'	3.06	5.69	15.48	6.98	1.80	2.44	-9999.00	256.98	270.50	0.22
39	S_39_Jul03	'24-Jun-2003 21:30:00'	'11-Jul-2003 10:00:00'	16.52	3.42	11.09	6.26	1.80	5.26	-9999.00	-9999.00	-9999.00	0.21
40	S_40_Sep05	'29-Aug-2005 19:00:00'	'09-Sep-2005 10:00:00'	10.63	3.61	13.74	6.00	1.73	3.79	-9999.00	257.28	227.85	0.06
41	S_41_May95	'22-May-1995 22:30:00'	'09-Jun-1995 10:59:00'	17.52	2.76	13.38	6.25	1.63	4.06	-9999.00	258.78	256.12	0.09
42	S_42_May83	'03-May-1983 14:00:00'	'13-May-1983 11:00:00'	9.88	3.81	14.20	5.65	1.61	3.72	246.82	-9999.00	-9999.00	0.10
43	S_43_Sep96	'14-Sep-1996 04:00:00'	'18-Sep-1996 14:00:00'	4.42	4.85	13.20	6.95	1.56	2.58	-9999.00	-9999.00	-9999.00	0.22
44	S_44_Jul14	'06-Jul-2014 06:11:00'	'15-Jul-2014 18:41:00'	9.52	3.35	13.40	7.35	1.55	3.13	-9999.00	256.32	260.06	0.09
45	S_45_Aug92	'06-Aug-1992 14:00:00'	'16-Aug-1992 11:00:00'	9.88	3.97	13.68	5.36	1.55	3.93	247.94	-9999.00	-9999.00	0.00
46	S_46_Sep99	'24-Aug-1999 22:39:00'	'15-Sep-1999 12:40:00'	21.58	3.09	13.24	6.28	1.50	5.45	-9999.00	-9999.00	-9999.00	0.05
47	S_47_Jun82	'08-Jun-1982 05:00:00'	'14-Jun-1982 14:00:00'	6.38	4.10	14.70	5.39	1.46	2.72	247.81	-9999.00	-9999.00	0.21
48	S_48_Jul10	'09-Jul-2010 01:24:00'	'13-Jul-2010 10:55:00'	4.40	4.70	13.24	7.26	1.44	2.49	-9999.00	254.60	255.52	0.25
49	S_49_Jun87	'09-Jun-1987 05:00:00'	'21-Jun-1987 08:00:00'	12.13	3.11	12.58	5.49	1.39	3.30	246.74	-9999.00	-9999.00	0.11
50	S_50_Aug06	'27-Jul-2006 08:35:00'	'09-Aug-2006 02:05:00'	12.73	3.44	13.77	7.61	1.34	4.02	-9999.00	260.36	264.16	0.05
51	S_51_Jul07	'30-Jun-2007 00:13:00'	'04-Jul-2007 04:42:00'	4.19	4.66	12.73	6.71	1.30	2.29	-9999.00	260.69	269.49	0.41
52	S_52_Sep05	'17-Sep-2005 07:00:00'	'01-Oct-2005 10:36:00'	14.15	3.58	13.70	5.86	1.26	4.68	-9999.00	254.97	255.12	-0.04
53	S_53_May84	'09-May-1984 08:00:00'	'21-May-1984 14:00:00'	12.25	3.35	12.83	5.77	1.25	3.72	240.00	-9999.00	-9999.00	0.18
54	S_54_Aug16	'30-Jul-2016 20:14:00'	'09-Aug-2016 05:42:00'	9.39	3.49	13.75	7.24	1.22	3.21	-9999.00	256.62	270.62	0.09
55	S_55_Aug97	'09-Aug-1997 16:00:00'	'16-Aug-1997 10:00:00'	6.75	3.37	13.64	6.81	1.21	2.25	-9999.00	-9999.00	-9999.00	-0.04
56	S_56_Jun81	'27-Jun-1981 02:00:00'	'30-Jun-1981 17:00:00'	3.63	4.54	13.43	4.99	1.19	1.86	241.65	-9999.00	-9999.00	0.19
57	S_57_Sep08	'12-Sep-2008 18:37:00'	'20-Sep-2008 18:07:00'	7.98	3.69	14.58	5.76	1.15	2.80	-9999.00	252.48	250.33	0.11
58	S_58_May02	'06-May-2002 23:00:00'	'12-May-2002 00:15:00'	5.05	4.31	13.53	6.25	1.15	2.39	-9999.00	-9999.00	-9999.00	0.30
59	S_59_Jul99	'14-Jul-1999 04:39:00'	'18-Jul-1999 09:40:00'	4.21	4.43	13.65	6.06	1.14	2.09	-9999.00	-9999.00	-9999.00	0.20
60	S_60_Oct97	'08-Oct-1997 19:00:00'	'11-Oct-1997 13:00:00'	2.75	5.15	13.20	6.19	1.13	1.80	-9999.00	-9999.00	-9999.00	0.04

K1509 - South West Storm Selection
Top Storm Clusters

Location	Cape Nat
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Jul96	'18-Jun-1996 05:00:00'	'02-Aug-1996 11:00:00'	45.25	4.44	13.50	8.91	10.36	24.00	243.30	-9999.00	-9999.00	0.28	1.18
2	S_2_Sep13	'15-Aug-2013 09:17:00'	'25-Sep-2013 20:17:00'	41.46	4.00	13.24	9.47	8.32	19.11	-9999.00	244.77	256.05	0.17	1.31
3	S_3_Jul90	'12-Jul-1990 11:00:00'	'12-Aug-1990 11:00:00'	31.00	4.34	13.61	8.30	8.25	16.28	241.04	-9999.00	-9999.00	0.06	0.91
4	S_4_Jul93	'16-Jul-1993 02:00:00'	'11-Aug-1993 23:00:00'	26.88	4.35	14.21	7.62	5.98	13.40	238.48	-9999.00	-9999.00	0.06	0.64
5	S_5_Jul92	'20-Jun-1992 20:00:00'	'14-Jul-1992 17:00:00'	23.88	4.55	14.13	7.69	5.50	12.95	245.44	-9999.00	-9999.00	0.15	1.00
6	S_6_Sep89	'17-Aug-1989 23:00:00'	'21-Sep-1989 23:00:00'	35.00	4.26	14.63	7.03	5.14	16.27	238.51	-9999.00	-9999.00	0.07	0.68
7	S_7_Jul00	'04-Jul-2000 04:30:00'	'03-Aug-2000 07:30:00'	30.13	4.02	13.18	7.19	5.05	12.99	-9999.00	-9999.00	-9999.00	0.23	1.05
8	S_8_Jul91	'16-Jul-1991 23:00:00'	'05-Aug-1991 11:00:00'	19.50	4.13	14.33	8.37	4.91	9.45	236.35	-9999.00	-9999.00	0.20	1.06
9	S_9_Jul17	'12-Jul-2017 08:54:00'	'15-Aug-2017 23:54:00'	34.63	4.20	13.45	8.66	4.72	15.73	-9999.00	249.76	261.05	0.21	0.96
10	S_10_Jun88	'31-May-1988 02:00:00'	'20-Jun-1988 08:00:00'	20.25	4.31	13.22	7.13	4.35	9.84	245.19	-9999.00	-9999.00	0.31	1.08
11	S_11_Aug11	'28-Jul-2011 19:00:00'	'17-Aug-2011 09:00:00'	19.58	4.13	13.62	7.98	3.79	8.90	-9999.00	249.76	264.90	0.21	1.01
12	S_12_Oct88	'19-Sep-1988 08:00:00'	'21-Oct-1988 02:00:00'	31.75	4.16	13.03	6.69	3.70	13.83	239.67	-9999.00	-9999.00	0.15	1.23
13	S_13_Jun91	'23-Jun-1991 23:00:00'	'04-Jul-1991 17:00:00'	10.75	4.83	13.64	7.63	3.66	6.64	235.35	-9999.00	-9999.00	0.25	0.86
14	S_14_May98	'21-May-1998 08:00:00'	'11-Jun-1998 20:00:00'	21.50	4.04	13.66	6.94	3.52	9.47	241.81	-9999.00	-9999.00	0.31	1.15
15	S_15_Jul89	'13-Jul-1989 08:00:00'	'30-Jul-1989 20:00:00'	17.50	4.34	15.38	6.98	3.29	8.48	235.52	-9999.00	-9999.00	0.18	0.88
16	S_16_May97	'23-May-1997 05:00:00'	'06-Jun-1997 05:00:00'	14.00	4.68	13.53	8.77	3.27	7.98	239.56	-9999.00	-9999.00	0.19	0.95
17	S_17_Sep96	'03-Sep-1996 08:00:00'	'18-Sep-1996 20:00:00'	15.50	4.16	13.13	7.95	3.22	7.40	243.95	-9999.00	-9999.00	0.15	0.76
18	S_18_Sep09	'01-Sep-2009 20:30:00'	'13-Sep-2009 07:30:00'	11.46	4.61	13.85	7.64	3.19	6.39	-9999.00	-9999.00	-9999.00	0.08	0.82
19	S_19_Aug85	'12-Aug-1985 14:00:00'	'27-Aug-1985 23:00:00'	15.38	4.12	14.12	7.13	2.98	6.96	237.92	-9999.00	-9999.00	0.06	0.69
20	S_20_Jul07	'24-Jul-2007 18:15:00'	'06-Aug-2007 22:15:00'	13.17	4.40	13.45	7.18	2.93	6.70	-9999.00	-9999.00	-9999.00	0.19	1.04
21	S_21_Aug88	'11-Aug-1988 23:00:00'	'30-Aug-1988 02:00:00'	18.13	3.90	14.36	6.70	2.82	7.55	244.34	-9999.00	-9999.00	0.16	1.00
22	S_22_Jun09	'18-Jun-2009 22:30:00'	'30-Jun-2009 14:30:00'	11.67	4.45	12.16	7.08	2.67	6.18	-9999.00	-9999.00	-9999.00	0.36	1.06
23	S_23_Sep98	'21-Sep-1998 17:00:00'	'02-Oct-1998 17:00:00'	11.00	4.64	14.03	6.23	2.62	6.03	238.77	-9999.00	-9999.00	0.11	0.59
24	S_24_Jul02	'30-Jun-2002 23:30:00'	'13-Jul-2002 01:30:00'	12.08	4.74	13.96	8.40	2.57	6.89	-9999.00	-9999.00	-9999.00	0.19	1.04
25	S_25_Jun85	'27-Jun-1985 17:00:00'	'02-Jul-1985 20:00:00'	5.13	5.37	16.20	7.12	2.48	3.71	246.02	-9999.00	-9999.00	0.24	0.83
26	S_26_Aug07	'26-Aug-2007 03:15:00'	'02-Sep-2007 11:15:00'	7.33	4.98	14.89	7.07	2.39	4.55	-9999.00	-9999.00	-9999.00	0.08	0.97
27	S_27_Sep05	'17-Sep-2005 16:00:00'	'10-Oct-2005 11:00:00'	22.79	3.99	14.11	7.05	2.39	9.29	-9999.00	-9999.00	-9999.00	-0.03	0.48
28	S_28_Sep03	'07-Sep-2003 23:15:00'	'23-Sep-2003 21:15:00'	15.92	4.13	13.96	6.70	2.32	7.14	-9999.00	-9999.00	-9999.00	0.02	0.86
29	S_29_Aug92	'06-Aug-1992 11:00:00'	'16-Aug-1992 08:00:00'	9.88	4.76	14.01	6.62	2.32	5.63	239.92	-9999.00	-9999.00	0.08	0.71
30	S_30_May95	'22-May-1995 23:00:00'	'09-Jun-1995 17:00:00'	17.75	3.71	13.85	6.70	2.21	6.60	238.01	-9999.00	-9999.00	0.16	0.99
31	S_31_Aug95	'13-Aug-1995 02:00:00'	'30-Aug-1995 14:00:00'	17.50	4.41	14.46	6.19	2.21	8.44	237.05	-9999.00	-9999.00	0.06	0.51
32	S_32_Jun87	'08-Jun-1987 23:00:00'	'27-Jun-1987 11:00:00'	18.50	3.85	13.65	6.05	2.14	7.24	238.61	-9999.00	-9999.00	0.14	0.72
33	S_33_Jul95	'08-Jul-1995 14:00:00'	'25-Jul-1995 20:00:00'	17.25	3.85	13.83	7.63	2.13	6.82	246.32	-9999.00	-9999.00	0.20	1.13
34	S_34_Apr12	'01-Apr-2012 14:19:00'	'05-Apr-2012 06:49:00'	3.69	5.68	16.09	7.64	2.12	2.90	-9999.00	236.06	256.59	0.34	0.60
35	S_35_May02	'06-May-2002 17:30:00'	'11-May-2002 23:30:00'	5.25	5.46	13.95	7.64	2.10	3.96	-9999.00	-9999.00	-9999.00	0.43	0.92
36	S_36_Jun99	'11-Jun-1999 00:45:00'	'29-Jun-1999 06:45:00'	18.25	3.96	13.52	7.08	2.06	7.42	-9999.00	-9999.00	-9999.00	0.33	0.90
37	S_37_Jul14	'26-Jun-2014 14:33:00'	'16-Jul-2014 04:42:00'	19.59	3.61	13.64	7.06	2.05	6.86	-9999.00	244.65	273.89	0.16	0.95
38	S_38_Sep02	'31-Aug-2002 16:15:00'	'03-Sep-2002 07:15:00'	2.63	6.49	15.29	8.46	2.04	2.76	-9999.00	-9999.00	-9999.00	0.25	0.81
39	S_39_Aug16	'30-Jul-2016 14:27:00'	'09-Aug-2016 01:57:00'	9.48	4.28	13.92	8.22	2.02	4.70	-9999.00	249.37	266.06	0.14	0.71
40	S_40_Jun90	'27-May-1990 20:00:00'	'11-Jun-1990 08:00:00'	14.50	3.56	13.44	7.60	2.01	5.22	238.38	-9999.00	-9999.00	0.17	0.89
41	S_41_Oct97	'24-Sep-1997 05:00:00'	'11-Oct-1997 14:00:00'	17.38	3.37	14.14	7.17	1.97	5.58	236.42	-9999.00	-9999.00	-0.07	0.59
42	S_42_Sep08	'12-Sep-2008 11:45:00'	'20-Sep-2008 13:45:00'	8.08	4.57	14.50	6.31	1.93	4.31	-9999.00	-9999.00	-9999.00	0.12	0.54
43	S_43_Jul09	'16-Jul-2009 06:45:00'	'21-Jul-2009 17:45:00'	5.46	4.85	12.40	8.20	1.84	3.39	-9999.00	-9999.00	-9999.00	0.22	0.90
44	S_44_Aug99	'11-Aug-1999 02:45:00'	'04-Sep-1999 02:45:00'	24.00	3.49	13.58	6.74	1.84	7.88	-9999.00	-9999.00	-9999.00	0.14	0.74
45	S_45_Aug86	'18-Aug-1986 17:00:00'	'04-Sep-1986 23:00:00'	17.25	3.83	13.66	6.23	1.84	6.61	233.20	-9999.00	-9999.00	-0.05	0.53
46	S_46_Jun94	'01-Jun-1994 11:00:00'	'22-Jun-1994 05:00:00'	20.75	3.59	13.92	6.18	1.82	7.11	238.63	-9999.00	-9999.00	0.09	0.82
47	S_47_Jul88	'07-Jul-1988 14:00:00'	'16-Jul-1988 02:00:00'	8.50	4.24	14.29	7.28	1.78	4.06	235.70	-9999.00	-9999.00	0.13	0.67
48	S_48_Aug04	'24-Aug-2004 17:45:00'	'27-Aug-2004 09:30:00'	2.66	6.13	15.18	7.68	1.71	2.45	-9999.00	-9999.00	-9999.00	0.23	0.94
49	S_49_May94	'20-May-1994 14:00:00'	'25-May-1994 08:00:00'	4.75	5.16	13.96	7.11	1.65	3.24	240.64	-9999.00	-9999.00	0.26	0.76
50	S_50_May16	'15-May-2016 16:57:00'	'25-May-2016 10:57:00'	9.75	4.45	13.48	7.78	1.64	5.00	-9999.00	247.56	250.77	0.23	1.01

K1509 - South West Storm Selection
Top Storm Clusters

Location	Albany
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Sep80	'18-Aug-1980 05:00:00'	'05-Oct-1980 20:00:00'	48.63	4.38	14.63	8.88	9.04	24.38	213.78	-9999.00	-9999.00	-0.03	0.57
2	S_2_Aug81	'23-Jul-1981 02:00:00'	'20-Aug-1981 17:00:00'	28.63	4.78	14.34	7.97	8.18	16.86	213.33	-9999.00	-9999.00	0.11	0.65
3	S_3_Sep89	'18-Aug-1989 08:00:00'	'15-Oct-1989 14:00:00'	58.25	4.11	14.73	7.26	6.91	25.23	213.72	-9999.00	-9999.00	0.06	0.70
4	S_4_Aug84	'02-Aug-1984 20:00:00'	'03-Sep-1984 14:00:00'	31.75	4.59	14.13	8.24	6.59	17.43	205.54	-9999.00	-9999.00	0.04	0.54
5	S_5_Jul02	'24-Jun-2002 05:00:00'	'27-Jul-2002 20:00:00'	33.63	4.31	14.36	6.80	6.50	16.23	214.08	-9999.00	-9999.00	0.13	0.81
6	S_6_Sep09	'01-Sep-2009 15:29:00'	'25-Sep-2009 07:00:00'	23.65	4.42	13.70	9.01	5.38	12.16	-9999.00	217.64	237.91	0.08	0.68
7	S_7_Sep81	'28-Aug-1981 23:00:00'	'30-Sep-1981 08:00:00'	32.38	3.83	14.74	6.93	4.51	12.74	214.04	-9999.00	-9999.00	-0.01	0.43
8	S_8_Jul89	'30-Jun-1989 05:00:00'	'03-Aug-1989 14:00:00'	34.38	4.15	14.83	7.52	4.36	15.27	209.71	-9999.00	-9999.00	0.09	0.82
9	S_9_Aug83	'07-Aug-1983 20:00:00'	'03-Sep-1983 08:00:00'	26.50	4.20	14.68	6.81	4.31	12.21	213.96	-9999.00	-9999.00	0.12	0.78
10	S_10_Jun82	'10-Jun-1982 11:00:00'	'04-Jul-1982 23:00:00'	24.50	4.20	14.79	7.88	4.11	11.47	210.94	-9999.00	-9999.00	0.02	0.64
11	S_11_Jun81	'11-Jun-1981 17:00:00'	'01-Jul-1981 05:00:00'	19.50	4.31	14.43	7.86	4.04	9.75	208.69	-9999.00	-9999.00	0.14	0.71
12	S_12_Aug85	'27-Jul-1985 17:00:00'	'27-Aug-1985 23:00:00'	31.25	3.78	14.24	6.81	3.93	11.92	212.33	-9999.00	-9999.00	0.09	0.71
13	S_13_Jul93	'16-Jul-1993 05:00:00'	'10-Aug-1993 02:00:00'	24.88	4.09	14.40	6.97	3.89	10.94	213.61	-9999.00	-9999.00	0.06	0.75
14	S_14_Jun97	'27-May-1997 08:00:00'	'12-Jun-1997 08:00:00'	16.00	4.19	14.30	7.98	3.81	7.73	211.97	-9999.00	-9999.00	0.15	0.84
15	S_15_Jul00	'04-Jul-2000 23:00:00'	'03-Aug-2000 08:00:00'	29.38	3.97	13.76	7.90	3.73	12.36	213.24	-9999.00	-9999.00	0.23	0.86
16	S_16_May83	'03-May-1983 11:00:00'	'28-May-1983 20:00:00'	25.38	4.03	14.87	7.45	3.69	10.86	213.32	-9999.00	-9999.00	0.10	0.71
17	S_17_Jul96	'17-Jul-1996 08:00:00'	'03-Aug-1996 08:00:00'	17.00	4.53	14.04	8.16	3.58	9.08	217.70	-9999.00	-9999.00	0.23	0.93
18	S_18_Aug91	'19-Aug-1991 08:00:00'	'07-Sep-1991 23:00:00'	19.63	4.19	14.17	6.22	3.53	8.88	211.96	-9999.00	-9999.00	-0.01	0.57
19	S_19_Jun80	'07-Jun-1980 08:00:00'	'03-Jul-1980 08:00:00'	26.50	3.70	14.08	8.49	3.52	10.11	209.47	-9999.00	-9999.00	0.07	0.74
20	S_20_Jul79	'30-Jun-1979 05:00:00'	'24-Jul-1979 02:00:00'	23.88	4.17	15.15	6.81	3.47	10.82	211.28	-9999.00	-9999.00	0.01	0.61
21	S_21_Aug05	'13-Aug-2005 16:30:00'	'09-Sep-2005 17:30:00'	27.04	4.01	14.08	8.82	3.36	11.57	-9999.00	-9999.00	-9999.00	0.05	0.77
22	S_22_Sep08	'11-Sep-2008 17:20:00'	'20-Sep-2008 17:50:00'	9.02	4.98	14.62	8.23	3.27	5.80	-9999.00	217.35	235.31	0.18	0.69
23	S_23_Jun91	'23-Jun-1991 23:00:00'	'04-Jul-1991 14:00:00'	10.63	4.56	14.41	6.82	3.23	5.82	211.04	-9999.00	-9999.00	0.22	0.94
24	S_24_Oct05	'27-Sep-2005 07:30:00'	'10-Oct-2005 19:30:00'	13.50	4.58	14.35	7.24	3.22	7.24	-9999.00	-9999.00	-9999.00	-0.03	0.45
25	S_25_Jul91	'17-Jul-1991 11:00:00'	'05-Aug-1991 14:00:00'	19.13	4.07	14.04	7.60	3.06	8.62	204.07	-9999.00	-9999.00	0.13	0.57
26	S_26_Jul92	'30-Jun-1992 08:00:00'	'06-Jul-1992 02:00:00'	5.75	5.57	14.25	7.48	2.93	4.58	219.09	-9999.00	-9999.00	0.14	0.83
27	S_27_Jul03	'21-Jul-2003 17:00:00'	'05-Aug-2003 08:00:00'	14.63	4.40	14.65	7.47	2.92	7.46	212.12	-9999.00	-9999.00	0.05	0.64
28	S_28_Aug95	'21-Aug-1995 20:00:00'	'31-Aug-1995 23:00:00'	10.13	4.74	14.52	6.03	2.84	5.74	210.45	-9999.00	-9999.00	0.02	0.61
29	S_29_Jun81	'26-May-1981 14:00:00'	'09-Jun-1981 17:00:00'	14.13	4.15	13.41	7.64	2.82	6.80	215.17	-9999.00	-9999.00	0.17	0.74
30	S_30_Jul87	'12-Jul-1987 23:00:00'	'15-Jul-1987 23:00:00'	3.00	6.66	16.02	7.83	2.64	3.39	204.96	-9999.00	-9999.00	0.06	0.59
31	S_31_Jul90	'13-Jul-1990 02:00:00'	'24-Jul-1990 14:00:00'	11.50	4.59	13.57	6.79	2.48	6.19	221.27	-9999.00	-9999.00	0.20	0.86
32	S_32_Aug86	'18-Aug-1986 17:00:00'	'05-Sep-1986 05:00:00'	17.50	3.94	13.74	6.80	2.42	7.12	213.89	-9999.00	-9999.00	NaN	0.53
33	S_33_Aug90	'10-Aug-1990 11:00:00'	'14-Aug-1990 11:00:00'	4.00	5.91	14.64	7.79	2.40	3.56	212.43	-9999.00	-9999.00	0.04	0.35
34	S_34_Jun09	'20-Jun-2009 17:59:00'	'01-Jul-2009 10:59:00'	10.71	4.00	13.02	7.24	2.38	4.89	-9999.00	214.15	215.55	0.32	0.89
35	S_35_Jun79	'13-Jun-1979 17:00:00'	'18-Jun-1979 05:00:00'	4.50	5.40	16.02	8.58	2.36	3.53	208.47	-9999.00	-9999.00	0.03	0.39
36	S_36_Sep02	'01-Sep-2002 08:00:00'	'05-Sep-2002 17:00:00'	4.38	5.65	14.75	6.66	2.34	3.49	207.51	-9999.00	-9999.00	0.12	0.57
37	S_37_Sep79	'03-Sep-1979 05:00:00'	'17-Sep-1979 08:00:00'	14.13	4.29	14.51	7.06	2.31	6.77	209.76	-9999.00	-9999.00	-0.03	0.39
38	S_38_Aug13	'15-Aug-2013 08:41:00'	'01-Sep-2013 20:41:00'	17.50	3.37	12.99	8.35	2.26	5.95	-9999.00	212.49	206.13	NaN	0.61
39	S_39_Aug92	'06-Aug-1992 14:00:00'	'12-Aug-1992 20:00:00'	6.25	4.94	14.00	7.60	2.22	4.09	216.42	-9999.00	-9999.00	0.11	0.62
40	S_40_Sep90	'09-Sep-1990 23:00:00'	'26-Sep-1990 17:00:00'	16.75	3.75	15.14	6.52	2.20	6.53	211.49	-9999.00	-9999.00	-0.05	0.55
41	S_41_Jun87	'09-Jun-1987 08:00:00'	'27-Jun-1987 11:00:00'	18.13	3.39	14.16	6.35	2.19	5.87	213.20	-9999.00	-9999.00	NaN	0.72
42	S_42_Sep03	'09-Sep-2003 02:00:00'	'25-Sep-2003 05:00:00'	16.13	4.16	13.56	6.46	2.18	7.28	212.73	-9999.00	-9999.00	0.04	0.57
43	S_43_Oct79	'25-Sep-1979 14:00:00'	'11-Oct-1979 05:00:00'	15.63	3.85	14.41	6.92	2.17	6.28	215.48	-9999.00	-9999.00	-0.06	0.43
44	S_44_Aug87	'21-Aug-1987 17:00:00'	'29-Aug-1987 02:00:00'	7.38	4.68	16.01	6.36	2.14	4.14	208.50	-9999.00	-9999.00	-0.06	0.54
45	S_45_May84	'09-May-1984 14:00:00'	'22-May-1984 02:00:00'	12.50	4.21	13.33	6.51	2.10	5.80	213.72	-9999.00	-9999.00	0.27	0.93
46	S_46_Jun90	'23-Jun-1990 05:00:00'	'30-Jun-1990 02:00:00'	6.88	4.73	14.98	7.17	2.05	4.02	206.94	-9999.00	-9999.00	0.03	0.71
47	S_47_Jun08	'11-Jun-2008 22:45:00'	'30-Jun-2008 11:00:00'	18.51	3.87	13.73	6.88	2.05	7.55	-9999.00	-9999.00	-9999.00	0.21	0.80
48	S_48_Jul86	'02-Jul-1986 17:00:00'	'15-Jul-1986 14:00:00'	12.88	4.09	14.82	5.99	2.02	5.64	209.62	-9999.00	-9999.00	0.02	0.55
49	S_49_Aug07	'24-Jul-2007 20:30:00'	'08-Aug-2007 20:30:00'	15.00	3.92	13.79	6.48	2.02	6.00	-9999.00	-9999.00	-9999.00	0.20	0.94
50	S_50_Jun03	'03-Jun-2003 11:00:00'	'12-Jun-2003 02:00:00'	8.63	4.55	13.81	7.20	2.01	4.68	206.29	-9999.00	-9999.00	0.09	0.74
51	S_51_Sep96	'15-Sep-1996 05:00:00'	'24-Sep-1996 02:00:00'	8.88	4.34	12.79	7.34	2.01	4.51	220.79	-9999.00	-9999.00	0.15	0.63
52	S_52_Jun02	'05-Jun-2002 20:00:00'	'15-Jun-2002 02:00:00'	9.25	4.19	12.77	7.70	2.01	4.54	212.42	-9999.00	-9999.00	0.17	0.98
53	S_53_Apr80	'12-Apr-1980 23:00:00'	'25-Apr-1980 02:00:00'	12.13	4.06	13.25	6.23	1.98	5.17	210.64	-9999.00	-9999.00	0.19	0.70
54	S_54_Sep98	'22-Sep-1998 05:00:00'	'02-Oct-1998 17:00:00'	10.50	4.37	14.21	6.89	1.85	5.21	216.27	-9999.00	-9999.00	0.12	0.59
55	S_55_Jul98	'19-Jul-1998 05:00:00'	'07-Aug-1998 11:00:00'	19.25	3.57	13.74	5.67	1.80	6.49	212.17	-9999.00	-9999.00	0.08	0.72
56	S_56_Sep82	'01-Sep-1982 23:00:00'	'09-Sep-1982 08:00:00'	7.38	4.43	15.16	6.84	1.75	3.75	204.58	-9999.00	-9999.00	-0.15	0.43
57	S_57_Sep86	'24-Sep-1986 17:00:00'	'26-Sep-1986 23:00:00'	2.25	6.05	17.57	7.21	1.75	2.11	202.75	-9999.00	-9999.00	-0.09	0.31
58	S_58_Jul88	'14-Jul-1988 02:00:00'	'16-Jul-1988 02:00:00'	2.00	6.57	16.08	8.32	1.71	2.24	213.89	-9999.00	-9999.00	0.22	0.73
59	S_59_Jun98	'04-Jun-1998 23:00:00'	'14-Jun-1998 11:00:00'	9.50	4.09	13.28	6.25	1.71	4.25	215.97	-9999.00	-9999.00	0.24	0.97
60	S_60_Jul14	'26-Jun-2014 08:14:00'	'09-Jul-2014 09:14:00'	13.04	4.13	13.33	7.22	1.63	6.00	-9999.00	208.58	215.62	0.20	0.72

K1509 - South West Storm Selection
Top Storm Clusters

Location	Hopetoun
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Aug09	'15-Aug-2009 23:00:00'	'04-Sep-2009 02:00:00'	19.13	3.89	13.87	6.95	3.28	7.73	201.81	-9999.00	-9999.00	-0.10	0.55
2	S_2_Aug03	'21-Jul-2003 23:00:00'	'14-Aug-2003 17:00:00'	23.75	3.44	14.42	6.75	2.93	7.68	205.76	-9999.00	-9999.00	-0.14	0.52
3	S_3_Jun03	'01-Jun-2003 08:00:00'	'13-Jun-2003 23:00:00'	12.63	4.20	13.55	6.92	2.59	5.75	201.11	-9999.00	-9999.00	-0.04	0.67
4	S_4_Sep08	'30-Aug-2008 02:00:00'	'20-Sep-2008 23:00:00'	21.88	3.52	14.21	6.87	2.46	7.19	205.21	-9999.00	-9999.00	-0.08	0.60
5	S_5_Sep02	'02-Sep-2002 05:00:00'	'07-Sep-2002 17:00:00'	5.50	4.72	14.79	6.32	1.95	3.06	202.17	-9999.00	-9999.00	-0.11	0.45
6	S_6_Oct05	'27-Sep-2005 17:00:00'	'13-Oct-2005 14:00:00'	15.88	3.57	14.20	5.87	1.91	5.26	205.86	-9999.00	-9999.00	-0.19	0.35
7	S_7_Jul00	'07-Jul-2000 08:00:00'	'24-Jul-2000 23:00:00'	17.63	3.40	13.96	6.59	1.62	5.54	208.12	-9999.00	-9999.00	0.14	0.73
8	S_8_Sep09	'12-Sep-2009 20:00:00'	'25-Sep-2009 14:00:00'	12.75	3.46	13.64	6.27	1.47	4.07	206.96	-9999.00	-9999.00	-0.07	0.44
9	S_9_Aug05	'29-Aug-2005 17:00:00'	'31-Aug-2005 17:00:00'	2.00	6.14	14.45	8.18	1.42	2.02	203.26	-9999.00	-9999.00	-0.10	0.46
10	S_10_Jul02	'10-Jul-2002 23:00:00'	'16-Jul-2002 17:00:00'	5.75	4.07	14.46	5.22	1.27	2.42	206.93	-9999.00	-9999.00	-0.03	0.71
11	S_11_Jun09	'21-Jun-2009 02:00:00'	'22-Jun-2009 17:00:00'	1.63	5.16	12.82	6.18	1.20	1.13	199.14	-9999.00	-9999.00	0.17	0.88
12	S_12_Jun02	'06-Jun-2002 08:00:00'	'08-Jun-2002 08:00:00'	2.00	5.74	14.23	7.18	1.19	1.74	202.15	-9999.00	-9999.00	0.03	0.42
13	S_13_Jun05	'11-Jun-2005 20:00:00'	'14-Jun-2005 11:00:00'	2.63	5.31	13.05	6.37	1.19	1.89	199.92	-9999.00	-9999.00	-0.05	0.52
14	S_14_Apr06	'11-Apr-2006 11:00:00'	'20-Apr-2006 20:00:00'	9.38	3.70	13.57	5.77	1.19	3.42	201.82	-9999.00	-9999.00	-0.09	0.50
15	S_15_Oct07	'27-Oct-2007 08:00:00'	'29-Oct-2007 08:00:00'	2.00	5.41	12.81	6.64	0.96	1.53	203.39	-9999.00	-9999.00	-0.03	0.67
16	S_16_Sep01	'02-Sep-2001 23:00:00'	'10-Sep-2001 14:00:00'	7.63	3.46	13.78	5.09	0.95	2.43	206.42	-9999.00	-9999.00	-0.12	0.29
17	S_17_Jul04	'29-Jun-2004 14:00:00'	'01-Jul-2004 23:00:00'	2.38	4.66	15.01	5.93	0.80	1.33	204.79	-9999.00	-9999.00	-0.10	0.51
18	S_18_Jul04	'25-Jul-2004 02:00:00'	'02-Aug-2004 17:00:00'	8.63	2.87	13.89	5.65	0.72	2.01	207.09	-9999.00	-9999.00	-0.09	0.56
19	S_19_Mar07	'22-Mar-2007 23:00:00'	'28-Mar-2007 20:00:00'	5.88	3.38	12.44	4.89	0.71	1.82	205.02	-9999.00	-9999.00	0.00	0.00
20	S_20_Aug03	'29-Aug-2003 02:00:00'	'30-Aug-2003 17:00:00'	1.63	4.93	13.29	5.51	0.64	1.03	199.64	-9999.00	-9999.00	-0.21	0.30
21	S_21_Sep06	'21-Sep-2006 11:00:00'	'22-Sep-2006 20:00:00'	1.38	4.99	15.99	5.89	0.63	0.92	206.91	-9999.00	-9999.00	0.01	0.43
22	S_22_Jul05	'05-Jul-2005 02:00:00'	'06-Jul-2005 23:00:00'	1.88	4.65	13.08	4.92	0.63	1.04	198.73	-9999.00	-9999.00	-0.01	0.61
23	S_23_Jul99	'17-Jul-1999 11:00:00'	'19-Jul-1999 05:00:00'	1.75	4.71	13.42	5.34	0.62	1.00	207.49	-9999.00	-9999.00	0.00	0.00
24	S_24_Jun08	'29-Jun-2008 05:00:00'	'30-Jun-2008 11:00:00'	1.25	5.23	14.78	5.99	0.62	0.92	206.19	-9999.00	-9999.00	0.21	0.62
25	S_25_May00	'25-May-2000 14:00:00'	'27-May-2000 08:00:00'	1.75	4.68	13.87	5.41	0.61	1.00	190.62	-9999.00	-9999.00	0.03	0.42
26	S_26_Sep04	'09-Sep-2004 11:00:00'	'10-Sep-2004 23:00:00'	1.50	4.72	14.44	5.15	0.58	0.87	205.66	-9999.00	-9999.00	-0.43	-0.07
27	S_27_Aug00	'20-Aug-2000 17:00:00'	'22-Aug-2000 02:00:00'	1.38	5.14	12.60	6.23	0.57	0.97	203.54	-9999.00	-9999.00	-0.09	0.23
28	S_28_Aug01	'15-Aug-2001 23:00:00'	'17-Aug-2001 05:00:00'	1.25	5.17	14.02	5.73	0.57	0.89	205.09	-9999.00	-9999.00	-0.23	0.36
29	S_29_Sep07	'01-Sep-2007 08:00:00'	'02-Sep-2007 14:00:00'	1.25	4.66	17.43	4.92	0.55	0.72	209.60	-9999.00	-9999.00	-0.22	0.16
30	S_30_May09	'22-May-2009 23:00:00'	'24-May-2009 02:00:00'	1.13	5.07	13.20	5.97	0.54	0.78	205.84	-9999.00	-9999.00	0.33	0.96
31	S_31_Sep99	'03-Sep-1999 17:00:00'	'04-Sep-1999 23:00:00'	1.25	5.10	13.16	5.76	0.53	0.87	194.58	-9999.00	-9999.00	-0.14	0.24
32	S_32_Jun08	'11-Jun-2008 20:00:00'	'17-Jun-2008 11:00:00'	5.63	3.23	14.20	4.67	0.52	1.58	205.56	-9999.00	-9999.00	0.07	0.72
33	S_33_Mar99	'25-Mar-1999 08:00:00'	'27-Mar-1999 23:00:00'	2.63	4.20	13.90	4.96	0.52	1.19	202.32	-9999.00	-9999.00	0.04	0.38
34	S_34_Jul08	'06-Jul-2008 08:00:00'	'12-Jul-2008 11:00:00'	6.13	3.25	13.92	5.76	0.52	1.76	208.86	-9999.00	-9999.00	-0.02	0.45
35	S_35_Oct06	'13-Oct-2006 17:00:00'	'14-Oct-2006 20:00:00'	1.13	4.87	16.29	5.38	0.52	0.72	206.13	-9999.00	-9999.00	-0.32	0.06
36	S_36_May00	'11-May-2000 14:00:00'	'13-May-2000 05:00:00'	1.63	4.71	12.19	5.66	0.50	0.97	200.47	-9999.00	-9999.00	0.16	0.50
37	S_37_Apr03	'12-Apr-2003 05:00:00'	'13-Apr-2003 14:00:00'	1.38	5.06	12.08	5.76	0.50	0.93	202.03	-9999.00	-9999.00	0.14	0.56
38	S_38_Jun06	'26-Jun-2006 08:00:00'	'28-Jun-2006 23:00:00'	2.63	4.01	15.26	4.80	0.49	1.08	209.00	-9999.00	-9999.00	0.01	0.55
39	S_39_Sep05	'09-Sep-2005 02:00:00'	'10-Sep-2005 20:00:00'	1.75	4.58	11.57	5.12	0.49	0.95	200.92	-9999.00	-9999.00	-0.15	0.36
40	S_40_Jun00	'20-Jun-2000 08:00:00'	'26-Jun-2000 02:00:00'	5.75	3.62	14.08	5.39	0.47	1.92	208.50	-9999.00	-9999.00	0.13	0.84

K1509 - South West Storm Selection
Top Storm Clusters

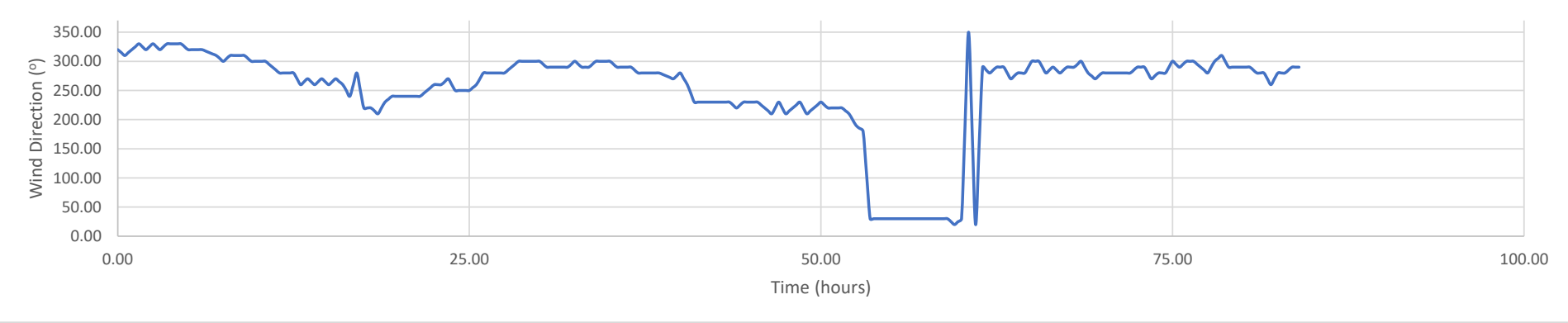
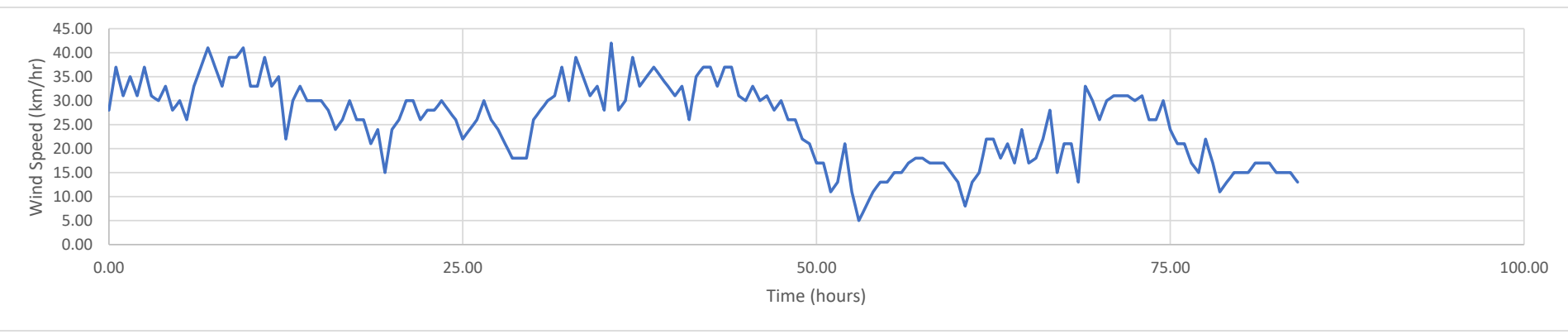
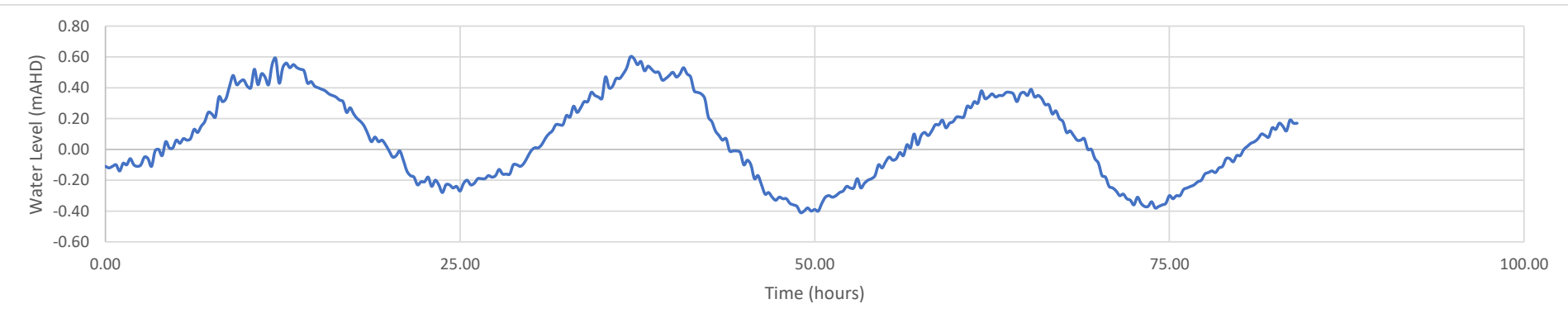
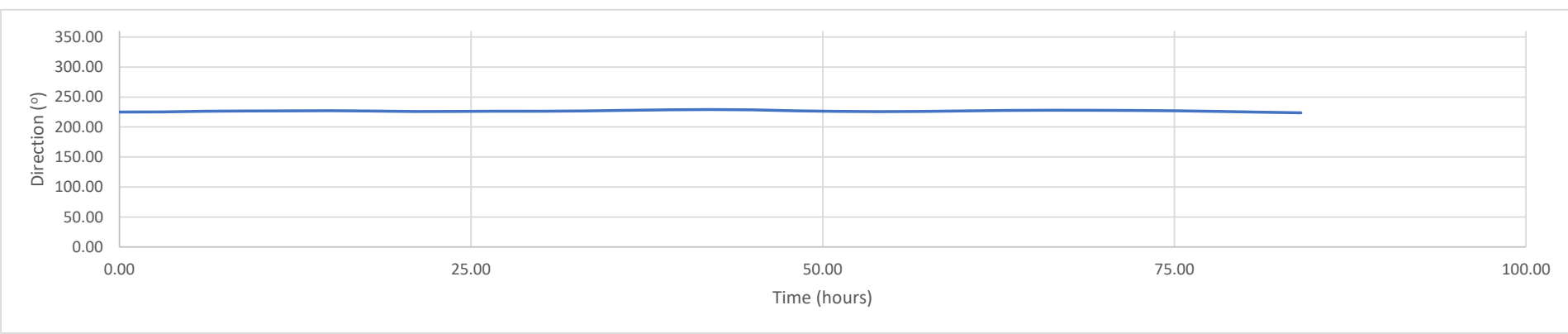
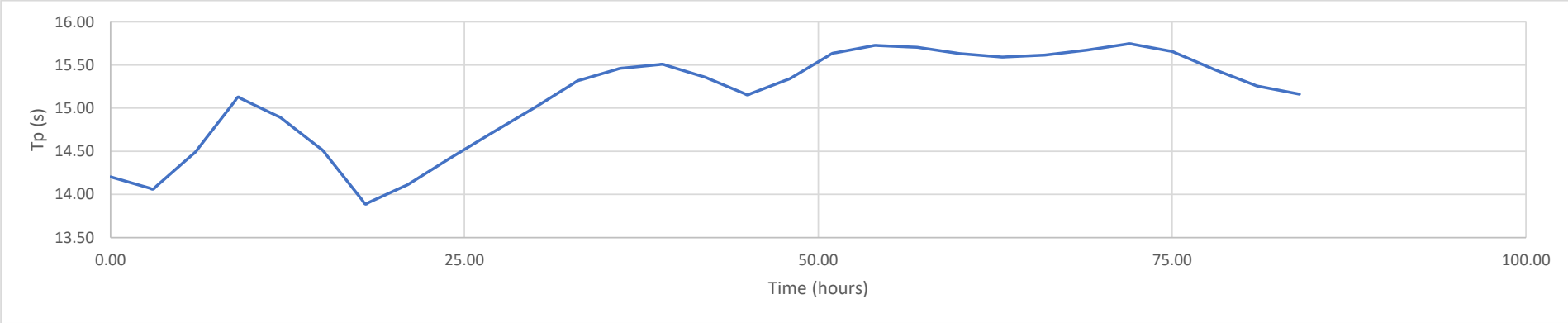
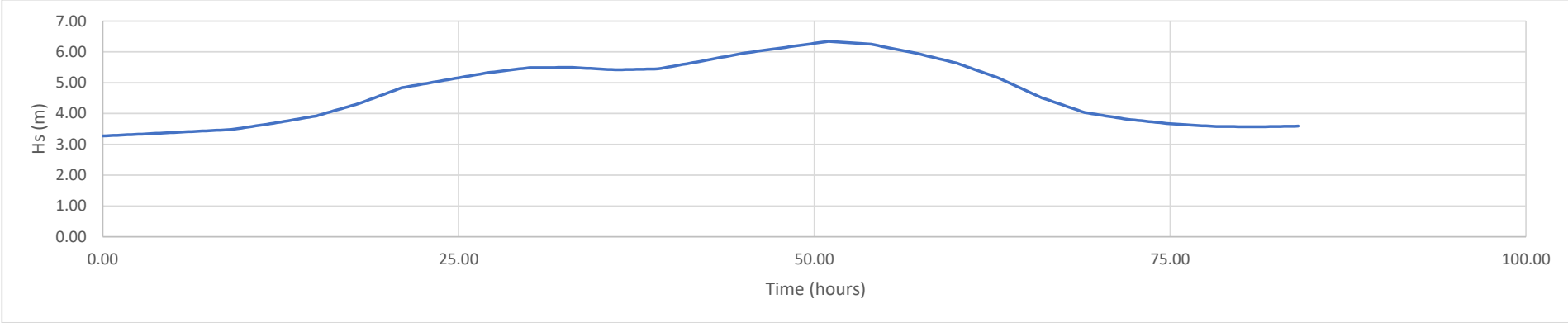
Location	Esperance
Method	Storm Cluster Analysis

Rank	Reference	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	S_1_Sep09	'15-Aug-2009 20:00:00'	'25-Sep-2009 17:00:00'	40.88	3.91	14.05	7.40	6.05	16.67	211.36	-9999.00	-9999.00	0.02	0.67
2	S_2_Jun90	'23-Jun-1990 11:00:00'	'06-Jul-1990 05:00:00'	12.75	4.52	14.08	7.05	3.54	6.69	202.93	-9999.00	-9999.00	-0.06	0.79
3	S_3_Aug91	'04-Aug-1991 20:00:00'	'29-Aug-1991 23:00:00'	25.13	3.83	14.67	6.88	3.27	9.78	213.49	-9999.00	-9999.00	-0.13	0.51
4	S_4_Aug03	'22-Jul-2003 02:00:00'	'14-Aug-2003 14:00:00'	23.50	3.69	14.71	7.05	3.03	8.74	212.29	-9999.00	-9999.00	-0.04	0.70
5	S_5_Jul89	'30-Jun-1989 20:00:00'	'31-Jul-1989 11:00:00'	30.63	3.73	14.91	6.69	2.95	11.08	213.41	-9999.00	-9999.00	0.02	0.83
6	S_6_Sep08	'30-Aug-2008 05:00:00'	'20-Sep-2008 23:00:00'	21.75	3.75	14.52	7.50	2.71	8.22	211.63	-9999.00	-9999.00	0.03	0.85
7	S_7_Jun03	'01-Jun-2003 23:00:00'	'13-Jun-2003 20:00:00'	11.88	4.45	13.77	7.16	2.64	6.07	207.70	-9999.00	-9999.00	0.10	0.84
8	S_8_Sep02	'02-Sep-2002 02:00:00'	'16-Sep-2002 11:00:00'	14.38	4.02	14.46	6.70	2.55	6.23	211.30	-9999.00	-9999.00	-0.06	0.63
9	S_9_Jun97	'27-May-1997 14:00:00'	'06-Jun-1997 14:00:00'	10.00	3.87	15.02	6.64	2.40	4.32	212.63	-9999.00	-9999.00	0.11	0.89
10	S_10_Jul87	'13-Jul-1987 08:00:00'	'16-Jul-1987 08:00:00'	3.00	6.23	16.05	7.51	2.28	2.97	208.52	-9999.00	-9999.00	0.12	0.65
11	S_11_Oct05	'27-Sep-2005 20:00:00'	'13-Oct-2005 11:00:00'	15.63	3.87	14.38	6.39	2.17	6.09	212.68	-9999.00	-9999.00	-0.10	0.51
12	S_12_Sep89	'27-Aug-1989 20:00:00'	'11-Sep-1989 14:00:00'	14.75	3.65	15.39	6.73	2.16	5.50	217.50	-9999.00	-9999.00	0.02	0.58
13	S_13_May87	'01-May-1987 11:00:00'	'13-May-1987 11:00:00'	12.00	3.62	13.60	7.88	1.99	4.85	209.41	-9999.00	-9999.00	-0.04	0.71
14	S_14_Jul00	'07-Jul-2000 11:00:00'	'24-Jul-2000 20:00:00'	17.38	3.75	14.53	7.13	1.85	6.63	215.64	-9999.00	-9999.00	0.25	0.99
15	S_15_Jul94	'27-Jul-1994 17:00:00'	'30-Jul-1994 14:00:00'	2.88	5.56	14.72	6.77	1.57	2.26	208.61	-9999.00	-9999.00	0.01	0.30
16	S_16_Aug92	'06-Aug-1992 23:00:00'	'12-Aug-1992 23:00:00'	6.00	4.24	14.64	7.19	1.56	3.03	216.46	-9999.00	-9999.00	0.07	0.63
17	S_17_Jul08	'29-Jun-2008 05:00:00'	'12-Jul-2008 14:00:00'	13.38	3.60	14.30	6.67	1.53	4.69	214.27	-9999.00	-9999.00	0.09	0.81
18	S_18_Aug05	'29-Aug-2005 20:00:00'	31-Aug-2005 14:00:00'	1.75	6.76	14.74	8.73	1.52	2.14	210.09	-9999.00	-9999.00	0.12	0.67
19	S_19_Aug90	'11-Aug-1990 11:00:00'	'14-Aug-1990 17:00:00'	3.25	5.41	15.14	6.83	1.49	2.44	214.99	-9999.00	-9999.00	0.06	0.62
20	S_20_Jun09	'21-Jun-2009 05:00:00'	'01-Jul-2009 05:00:00'	10.00	3.40	13.82	6.72	1.41	3.38	211.25	-9999.00	-9999.00	0.26	1.08
21	S_21_Aug95	'22-Aug-1995 20:00:00'	'01-Sep-1995 05:00:00'	9.38	4.18	14.83	5.60	1.41	4.20	212.60	-9999.00	-9999.00	-0.05	0.60
22	S_22_Jun92	'03-Jun-1992 11:00:00'	'05-Jun-1992 23:00:00'	2.50	5.39	15.55	6.23	1.34	1.85	206.01	-9999.00	-9999.00	0.04	0.68
23	S_23_Nov92	'08-Nov-1992 05:00:00'	'21-Nov-1992 14:00:00'	13.38	3.43	13.96	7.02	1.32	4.38	212.02	-9999.00	-9999.00	-0.12	0.48
24	S_24_Jul02	'12-Jul-2002 05:00:00'	'16-Jul-2002 17:00:00'	4.50	4.52	14.50	5.68	1.28	2.37	213.66	-9999.00	-9999.00	0.10	0.88
25	S_25_Jul92	'02-Jul-1992 02:00:00'	'06-Jul-1992 05:00:00'	4.13	4.56	15.15	6.30	1.27	2.24	219.17	-9999.00	-9999.00	0.15	0.83
26	S_26_Jun02	'06-Jun-2002 08:00:00'	'08-Jun-2002 08:00:00'	2.00	6.05	14.26	7.63	1.26	1.93	209.42	-9999.00	-9999.00	0.25	0.59
27	S_27_Sep96	'15-Sep-1996 20:00:00'	'24-Sep-1996 11:00:00'	8.63	3.66	13.36	5.61	1.25	3.17	216.84	-9999.00	-9999.00	0.12	0.65
28	S_28_Sep01	'03-Sep-2001 02:00:00'	'10-Sep-2001 20:00:00'	7.75	3.78	14.29	5.66	1.19	2.96	213.72	-9999.00	-9999.00	0.02	0.59
29	S_29_May97	'29-Apr-1997 08:00:00'	'07-May-1997 05:00:00'	7.88	3.82	13.58	5.86	1.15	3.05	209.71	-9999.00	-9999.00	0.05	0.46
30	S_30_Sep90	'19-Sep-1990 23:00:00'	'26-Sep-1990 23:00:00'	7.00	4.21	16.16	6.26	1.12	3.19	213.90	-9999.00	-9999.00	-0.06	0.47
31	S_31_Jul96	'18-Jul-1996 08:00:00'	'20-Jul-1996 02:00:00'	1.75	5.81	16.22	6.92	1.12	1.55	216.47	-9999.00	-9999.00	0.44	0.92
32	S_32_Jun05	'12-Jun-2005 08:00:00'	'14-Jun-2005 08:00:00'	2.00	5.82	13.46	6.64	1.12	1.75	207.84	-9999.00	-9999.00	0.17	0.75
33	S_33_Aug87	'21-Aug-1987 20:00:00'	'26-Aug-1987 23:00:00'	5.13	4.35	15.44	5.90	1.10	2.51	210.84	-9999.00	-9999.00	-0.08	0.51
34	S_34_Oct97	'10-Oct-1997 08:00:00'	'11-Oct-1997 20:00:00'	1.50	5.97	16.20	7.02	1.05	1.41	216.01	-9999.00	-9999.00	0.06	0.38
35	S_35_Jul95	'20-Jul-1995 23:00:00'	'30-Jul-1995 23:00:00'	10.00	3.55	13.87	6.56	1.05	3.46	213.62	-9999.00	-9999.00	0.04	0.66
36	S_36_May93	'24-May-1993 17:00:00'	'30-May-1993 11:00:00'	5.75	4.03	15.19	6.47	1.04	2.52	213.18	-9999.00	-9999.00	-0.05	0.46
37	S_37_Oct89	'07-Oct-1989 02:00:00'	'15-Oct-1989 11:00:00'	8.38	3.90	14.38	6.13	1.03	3.34	216.40	-9999.00	-9999.00	0.01	0.60
38	S_38_Jun89	'14-Jun-1989 05:00:00'	'17-Jun-1989 11:00:00'	3.25	5.12	10.59	5.72	1.01	2.13	165.19	-9999.00	-9999.00	0.09	0.63
39	S_39_Apr06	'16-Apr-2006 23:00:00'	'20-Apr-2006 17:00:00'	3.75	4.67	14.06	5.97	1.00	2.11	205.71	-9999.00	-9999.00	0.02	0.59
40	S_40_Jun95	'25-Jun-1995 20:00:00'	'27-Jun-1995 17:00:00'	1.88	5.73	12.34	7.26	1.00	1.61	215.28	-9999.00	-9999.00	0.34	0.72
41	S_41_Apr98	'24-Apr-1998 11:00:00'	'01-May-1998 08:00:00'	6.88	3.62	14.64	5.91	1.00	2.45	210.20	-9999.00	-9999.00	-0.06	0.49
42	S_42_Jun91	'25-Jun-1991 05:00:00'	'29-Jun-1991 05:00:00'	4.00	4.57	15.06	6.26	0.99	2.15	214.04	-9999.00	-9999.00	0.28	1.03
43	S_43_Oct07	'27-Oct-2007 11:00:00'	'29-Oct-2007 02:00:00'	1.63	5.98	13.05	7.14	0.97	1.53	213.38	-9999.00	-9999.00	0.24	1.01
44	S_44_Oct93	'08-Oct-1993 11:00:00'	'10-Oct-1993 02:00:00'	1.63	5.75	14.54	6.43	0.95	1.40	212.27	-9999.00	-9999.00	-0.13	0.22
45	S_45_Jul88	'14-Jul-1988 08:00:00'	'16-Jul-1988 05:00:00'	1.88	5.32	16.39	6.60	0.94	1.38	216.49	-9999.00	-9999.00	0.14	0.67
46	S_46_Aug96	'01-Aug-1996 11:00:00'	'03-Aug-1996 14:00:00'	2.13	5.36	13.82	6.25	0.92	1.56	213.57	-9999.00	-9999.00	0.36	0.93
47	S_47_Jun87	'20-Jun-1987 17:00:00'	'23-Jun-1987 02:00:00'	2.38	4.95	16.16	5.82	0.91	1.49	213.71	-9999.00	-9999.00	0.12	0.53
48	S_48_Jul99	'17-Jul-1999 11:00:00'	'19-Jul-1999 05:00:00'	1.75	5.48	14.25	6.25	0.90	1.36	215.30	-9999.00	-9999.00	0.32	0.79
49	S_49_Jun93	'18-Jun-1993 08:00:00'	'20-Jun-1993 02:00:00'	1.75	5.21	16.04	5.73	0.90	1.22	210.23	-9999.00	-9999.00	0.08	0.72
50	S_50_Sep07	'15-Sep-2007 23:00:00'	'19-Sep-2007 11:00:00'	3.50	4.41	16.58	5.95	0.89	1.79	216.55	-9999.00	-9999.00	0.09	0.68

Appendix E Time Histories of Design Storm Sequences– All Directions

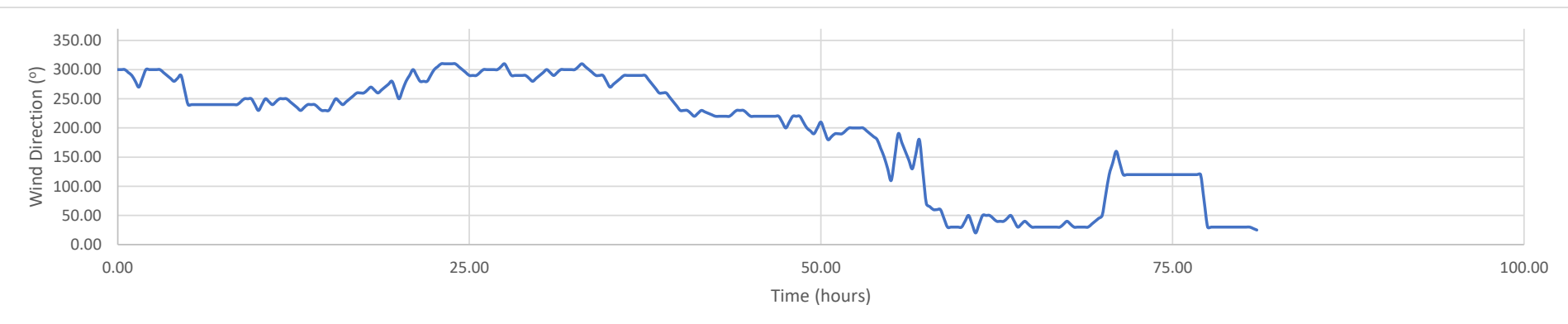
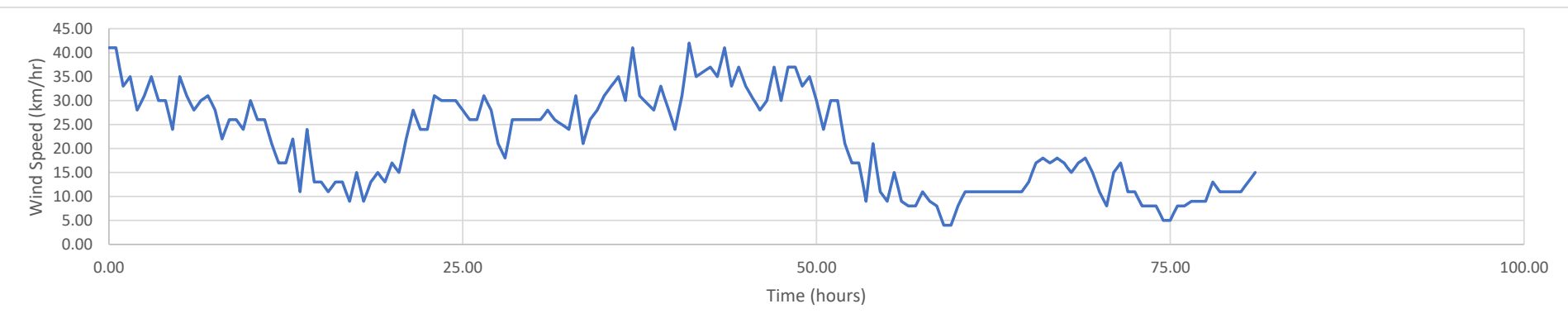
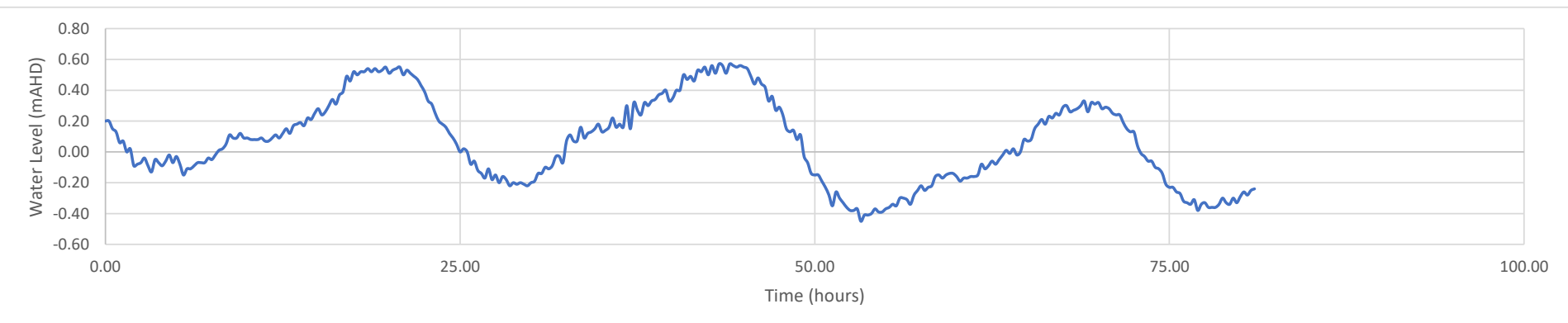
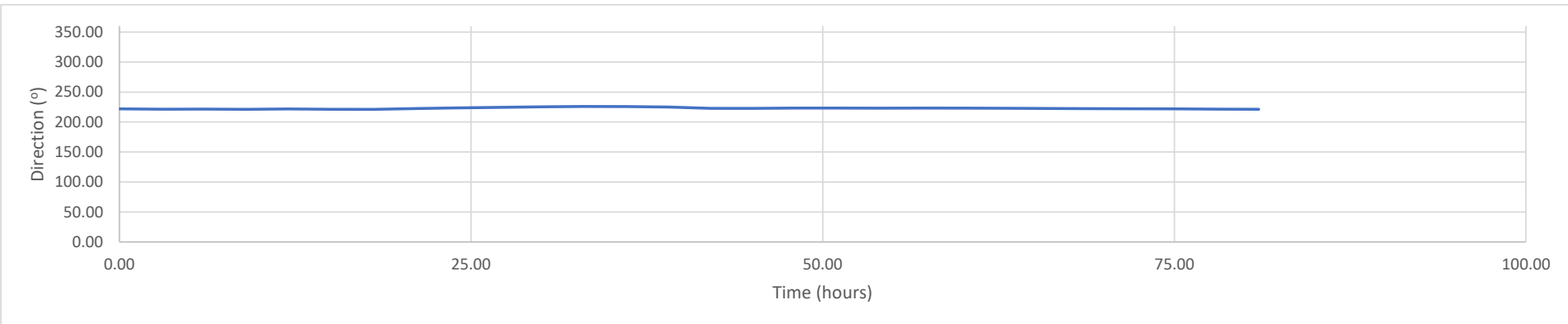
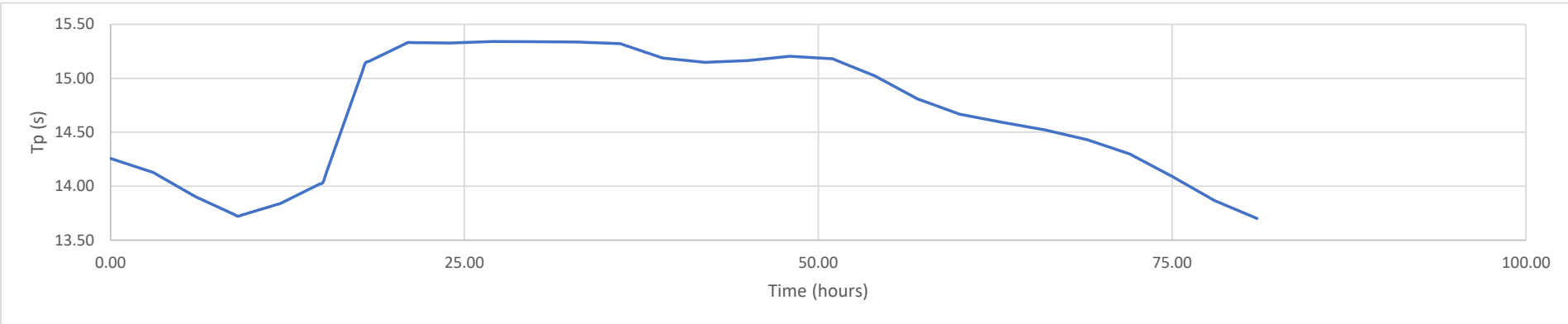
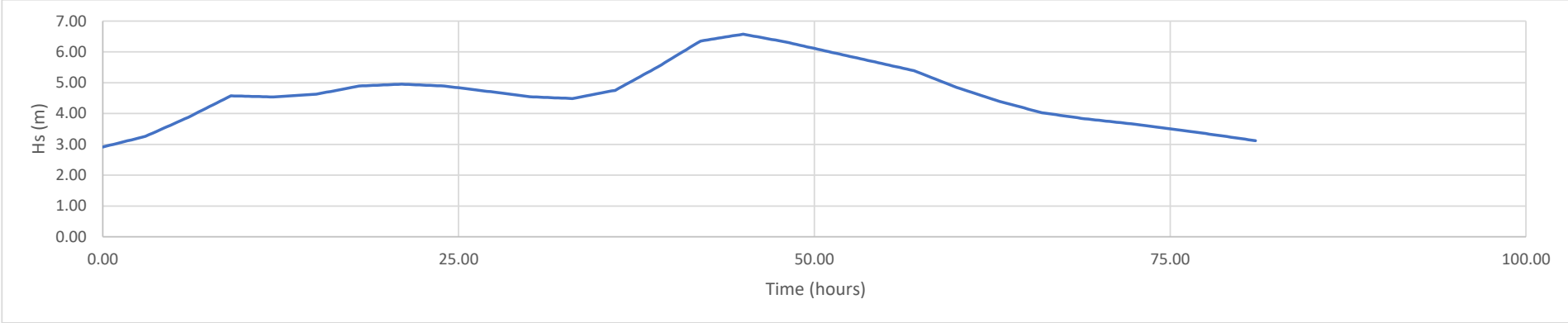
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	1 Year
Storm Sequence	G6



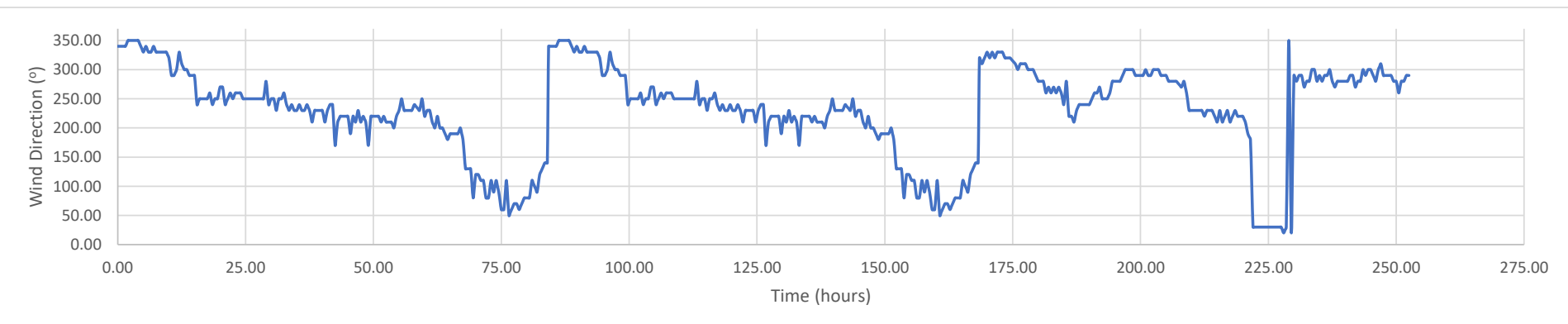
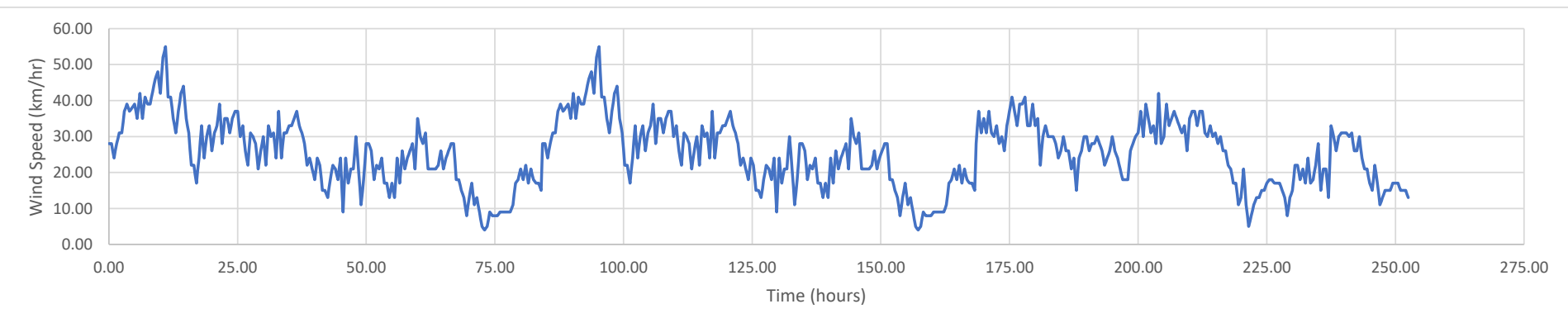
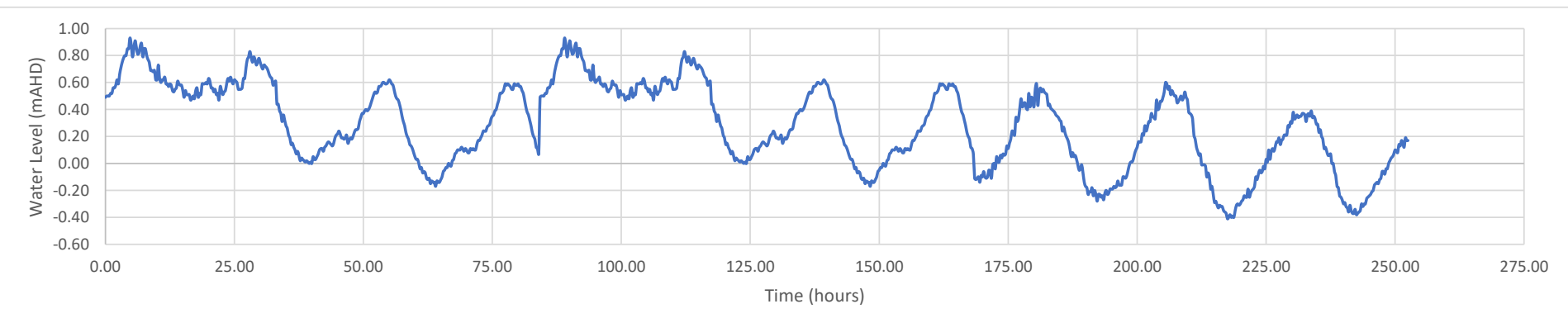
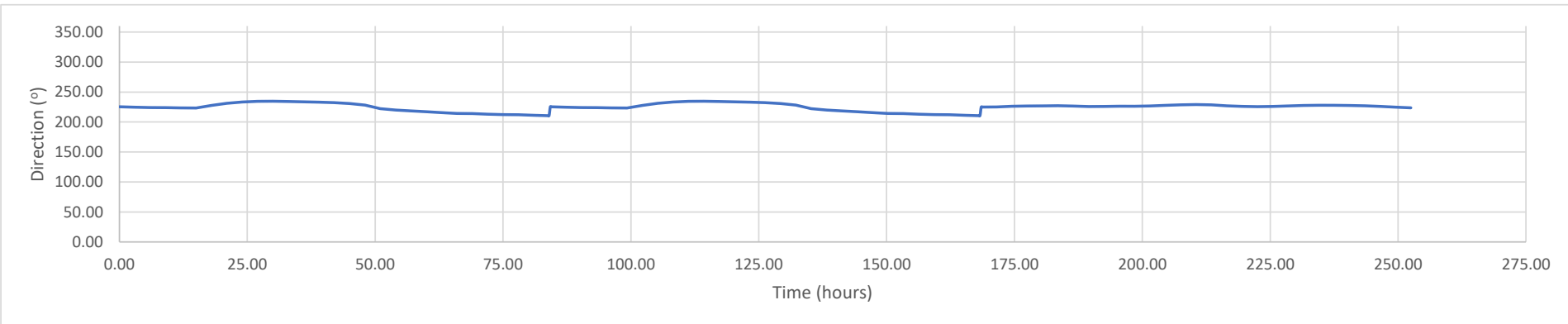
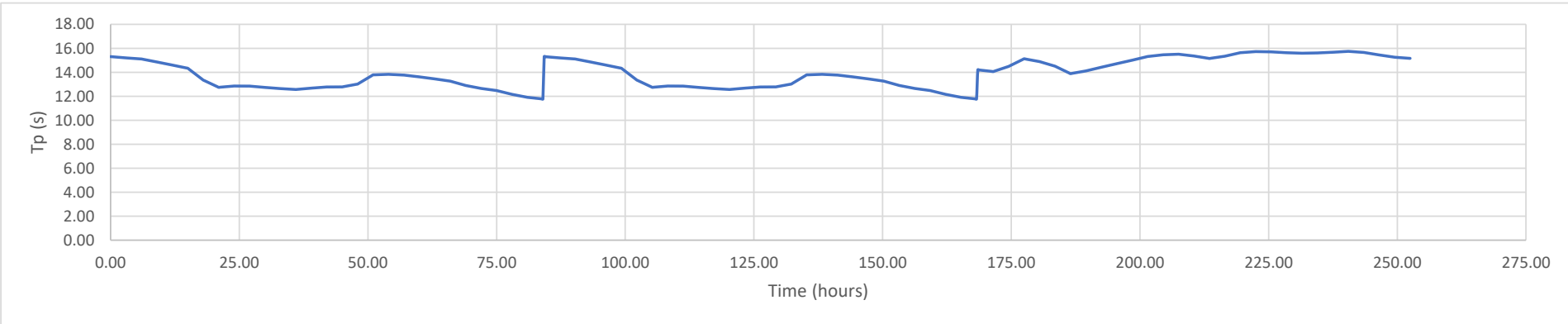
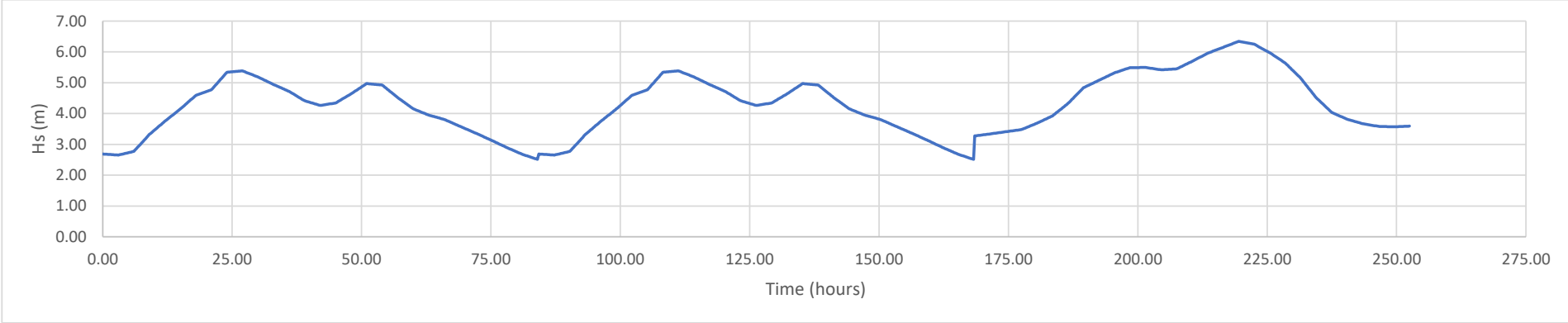
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	1 Year
Storm Sequence	G5



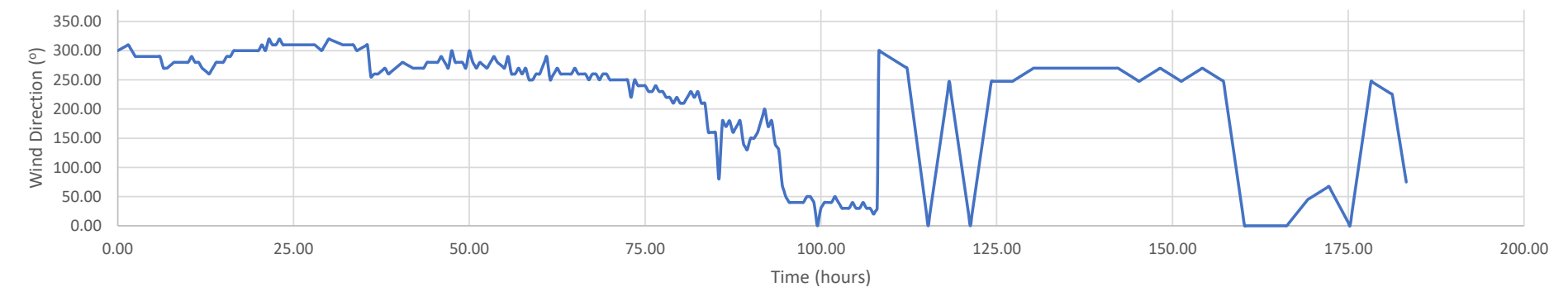
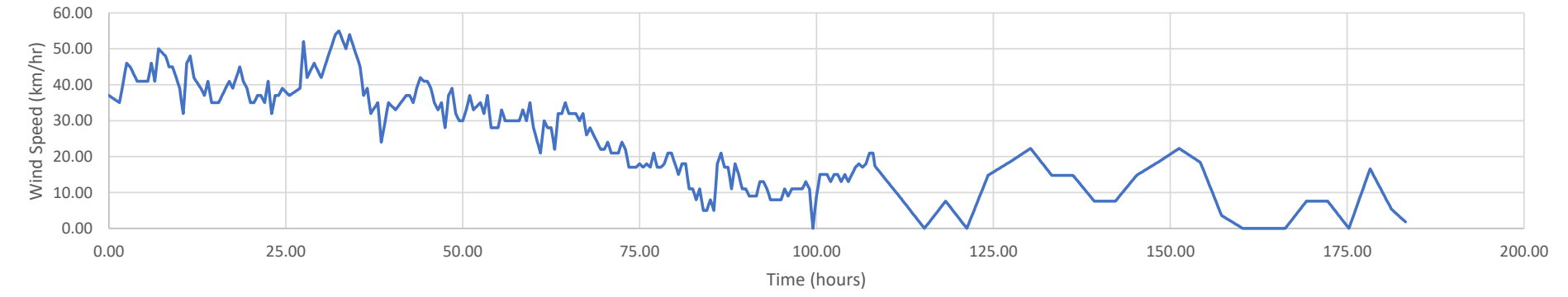
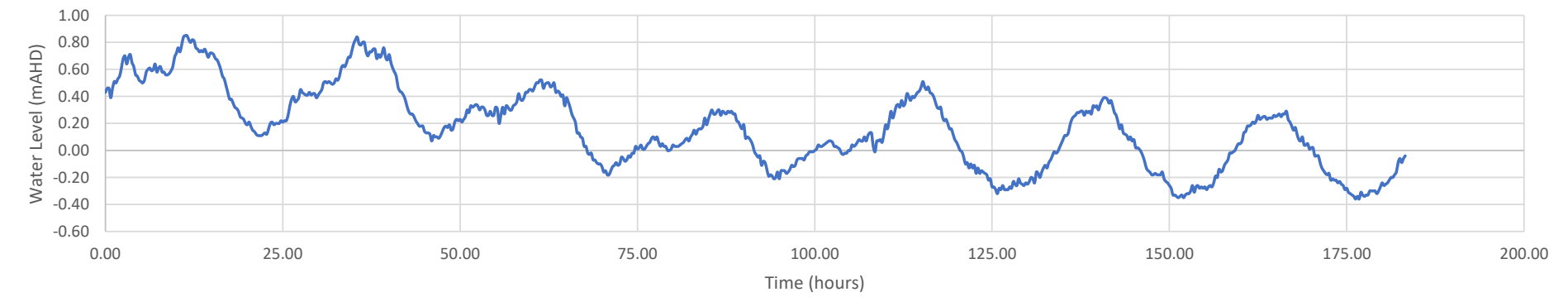
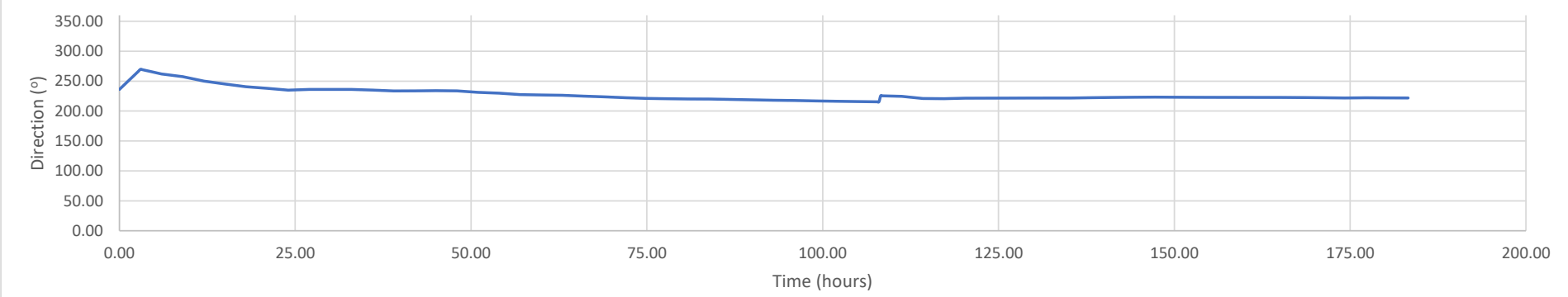
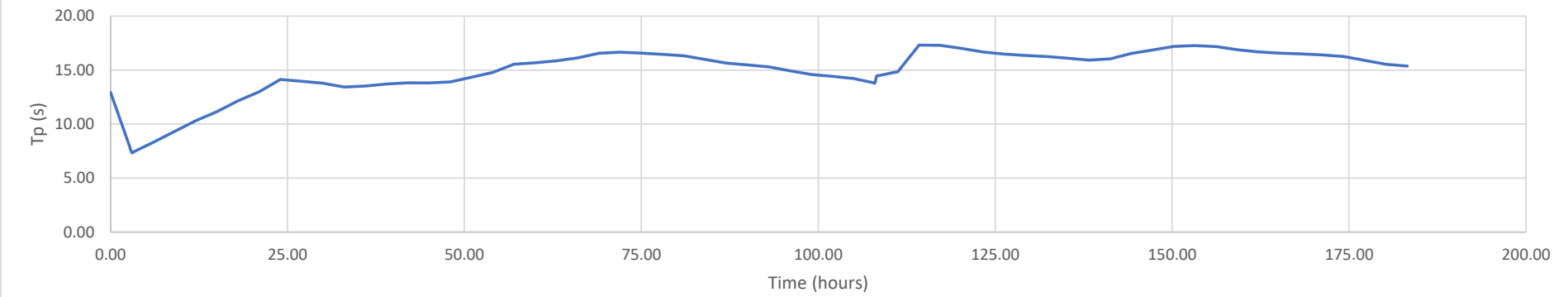
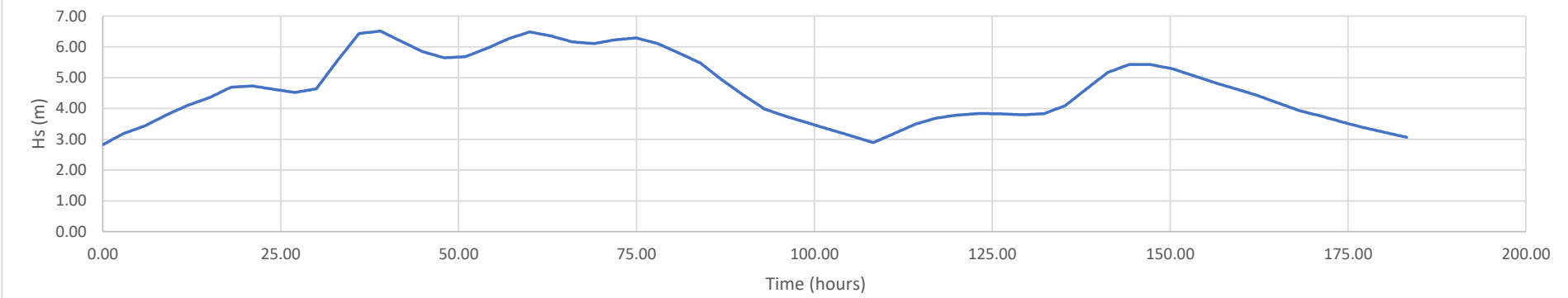
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	10 Year
Storm Sequence	2xG2 + G6



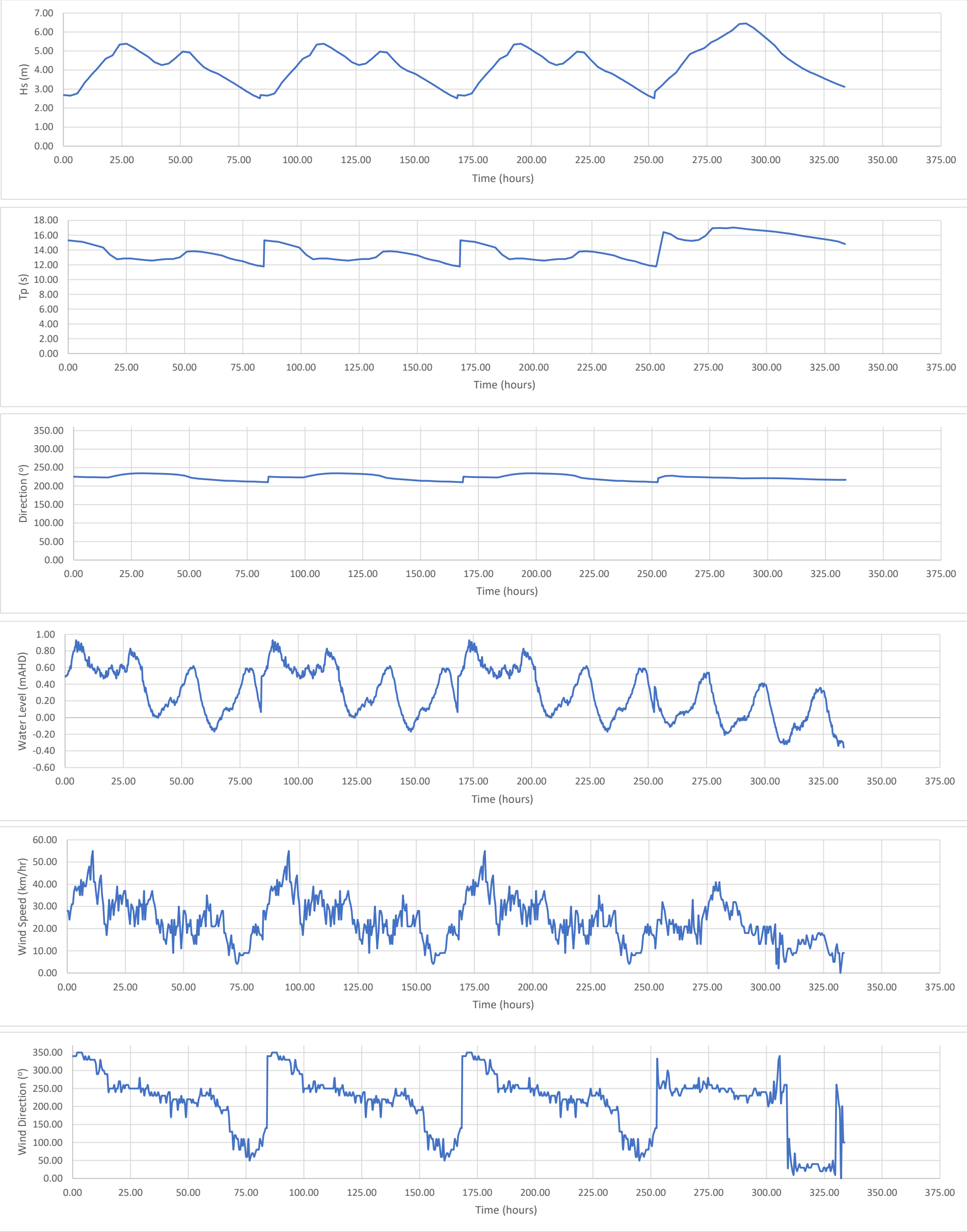
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	10 Year
Storm Sequence	G8 + G3



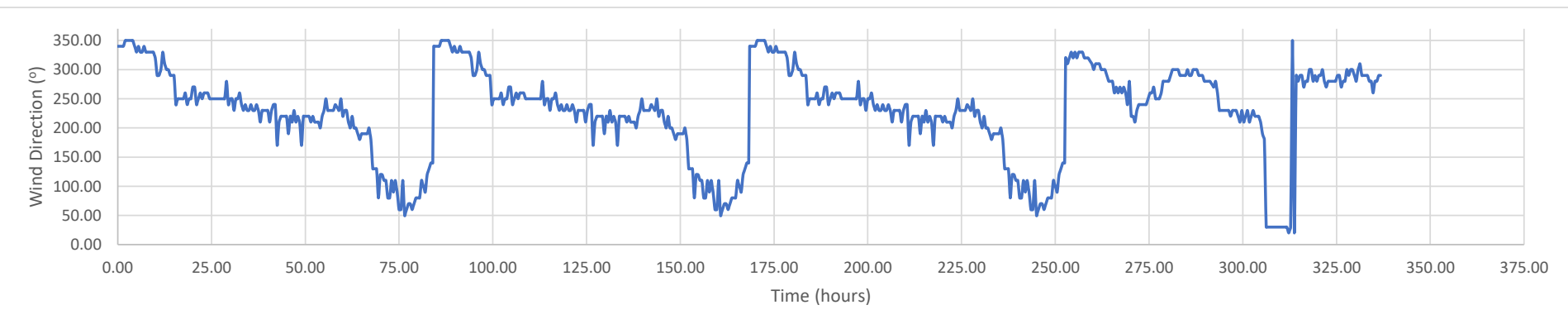
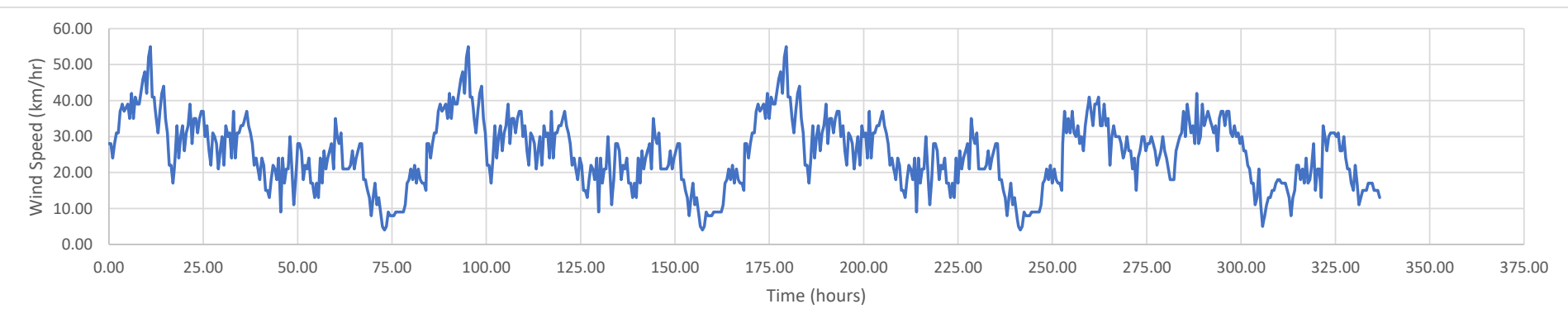
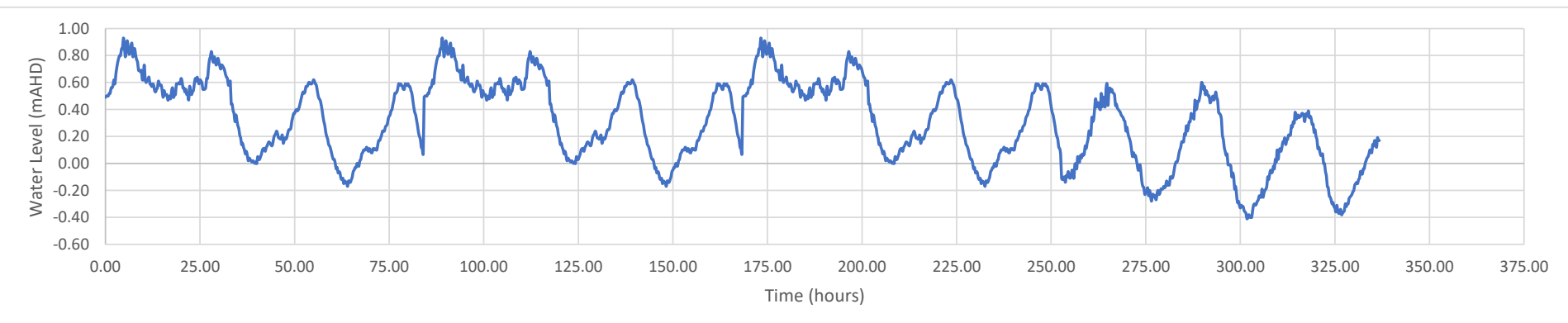
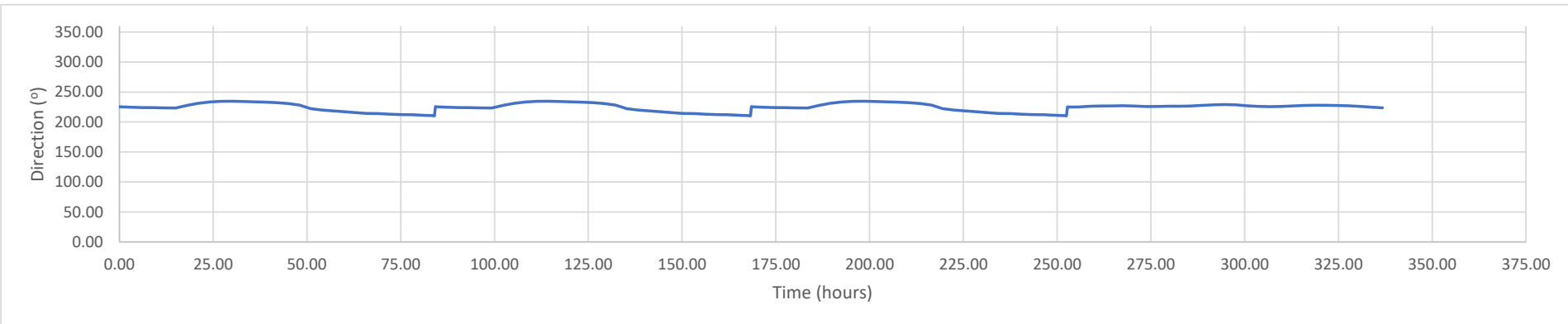
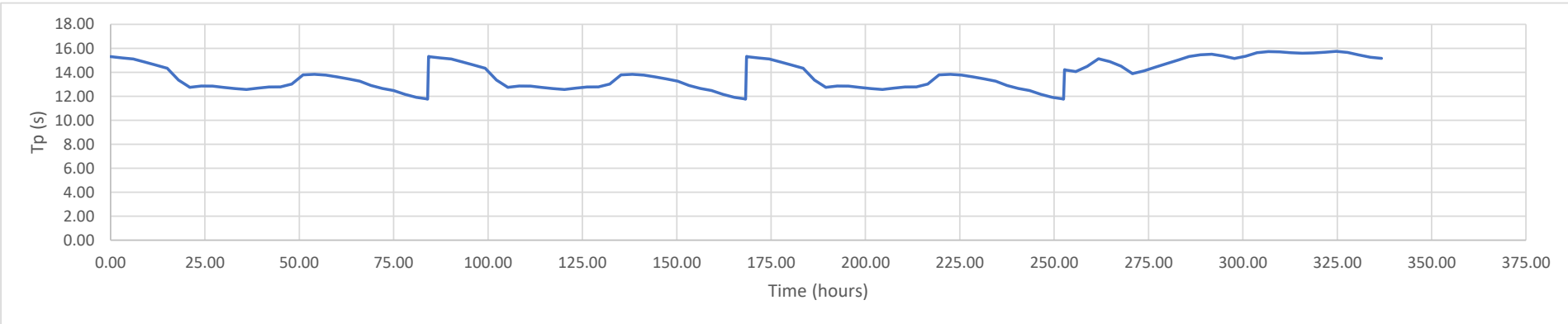
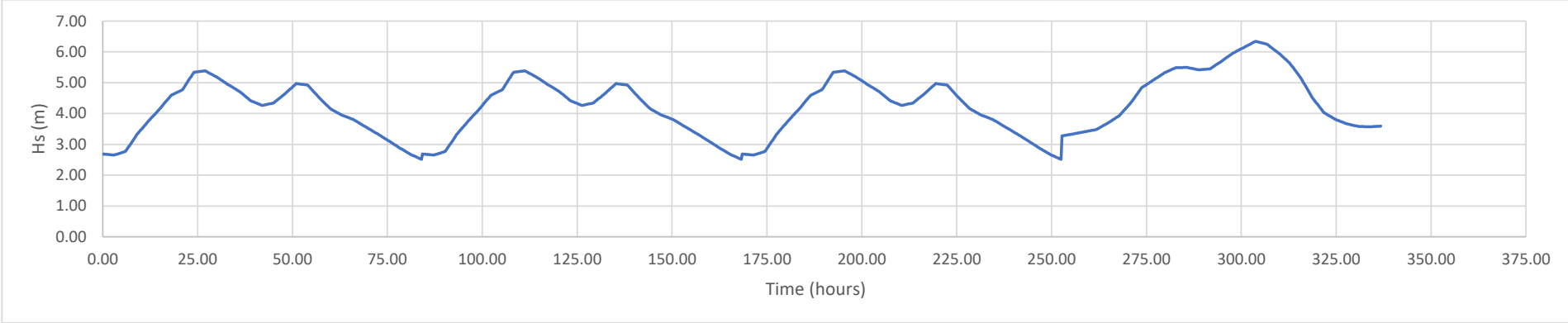
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	25 Year
Storm Sequence	3xG2 + G7



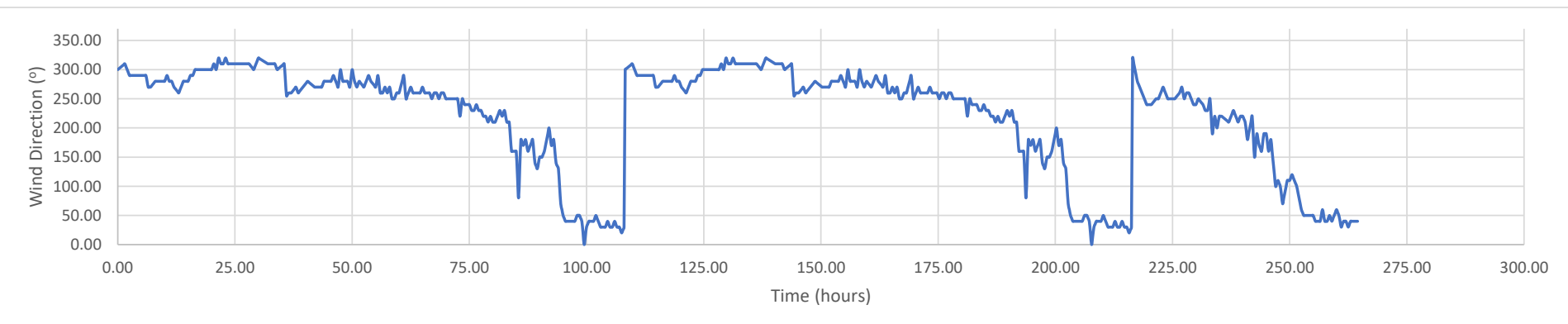
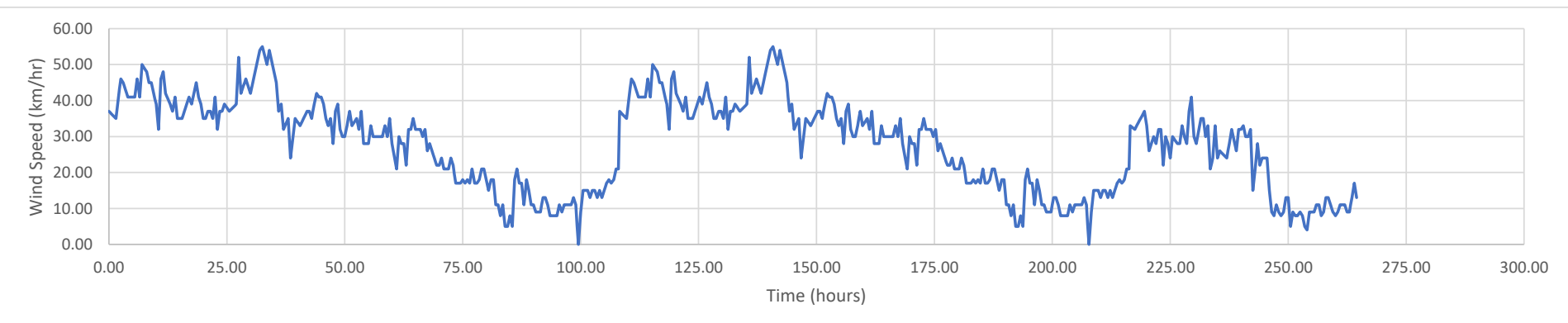
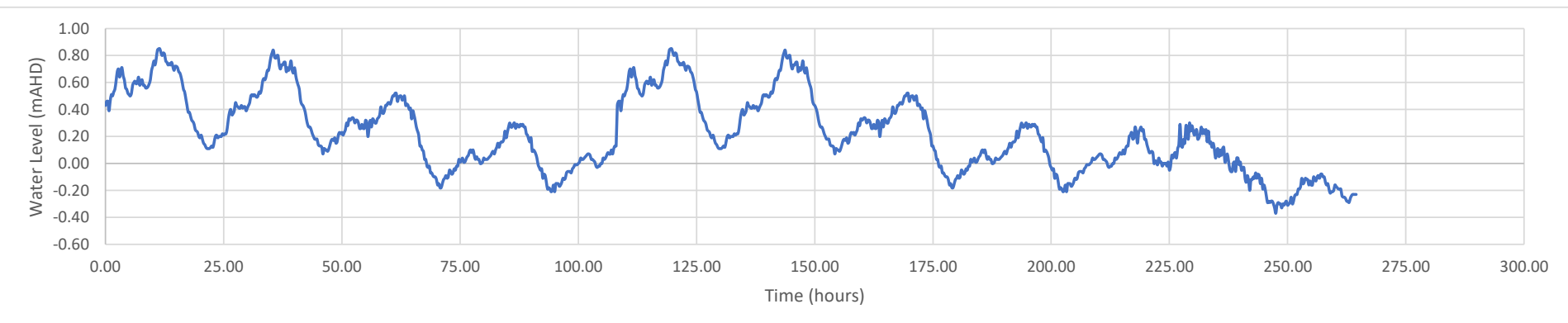
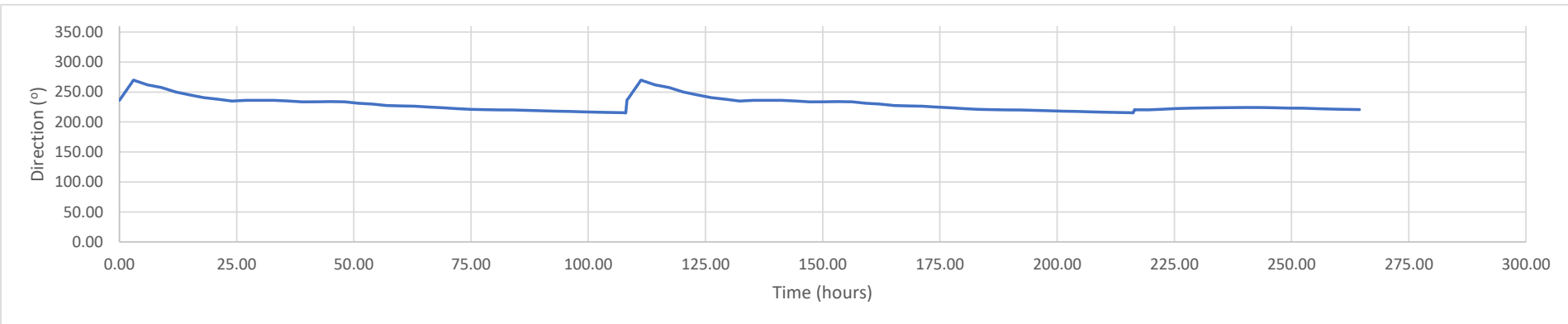
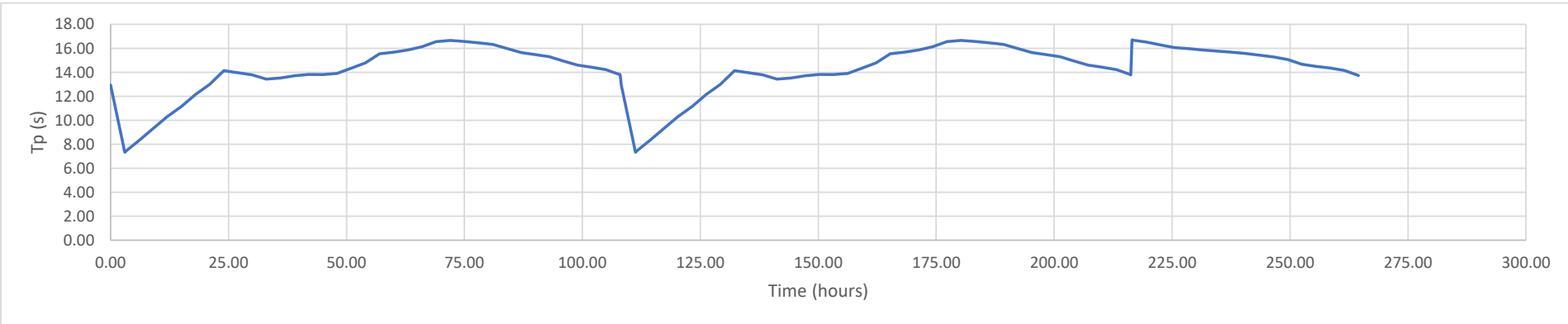
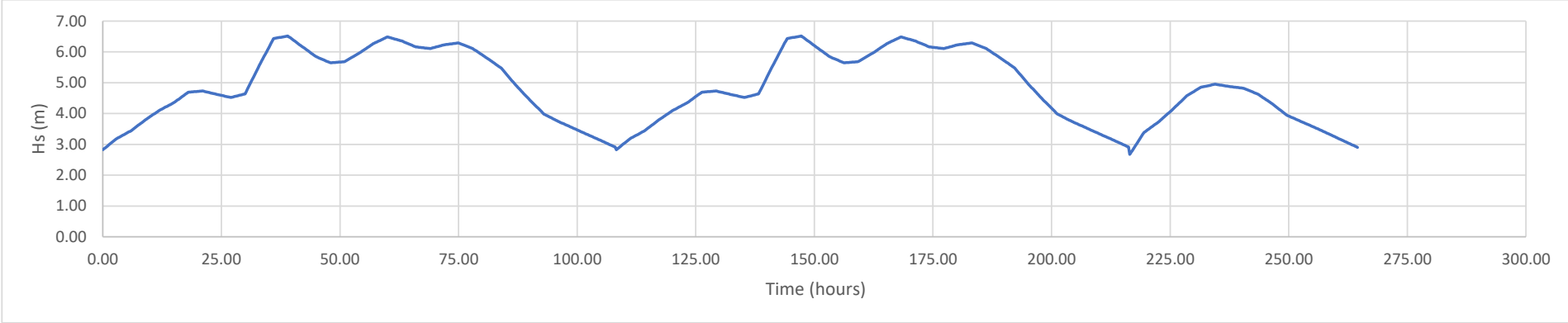
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	25 Year
Storm Sequence	3xG2 + G6



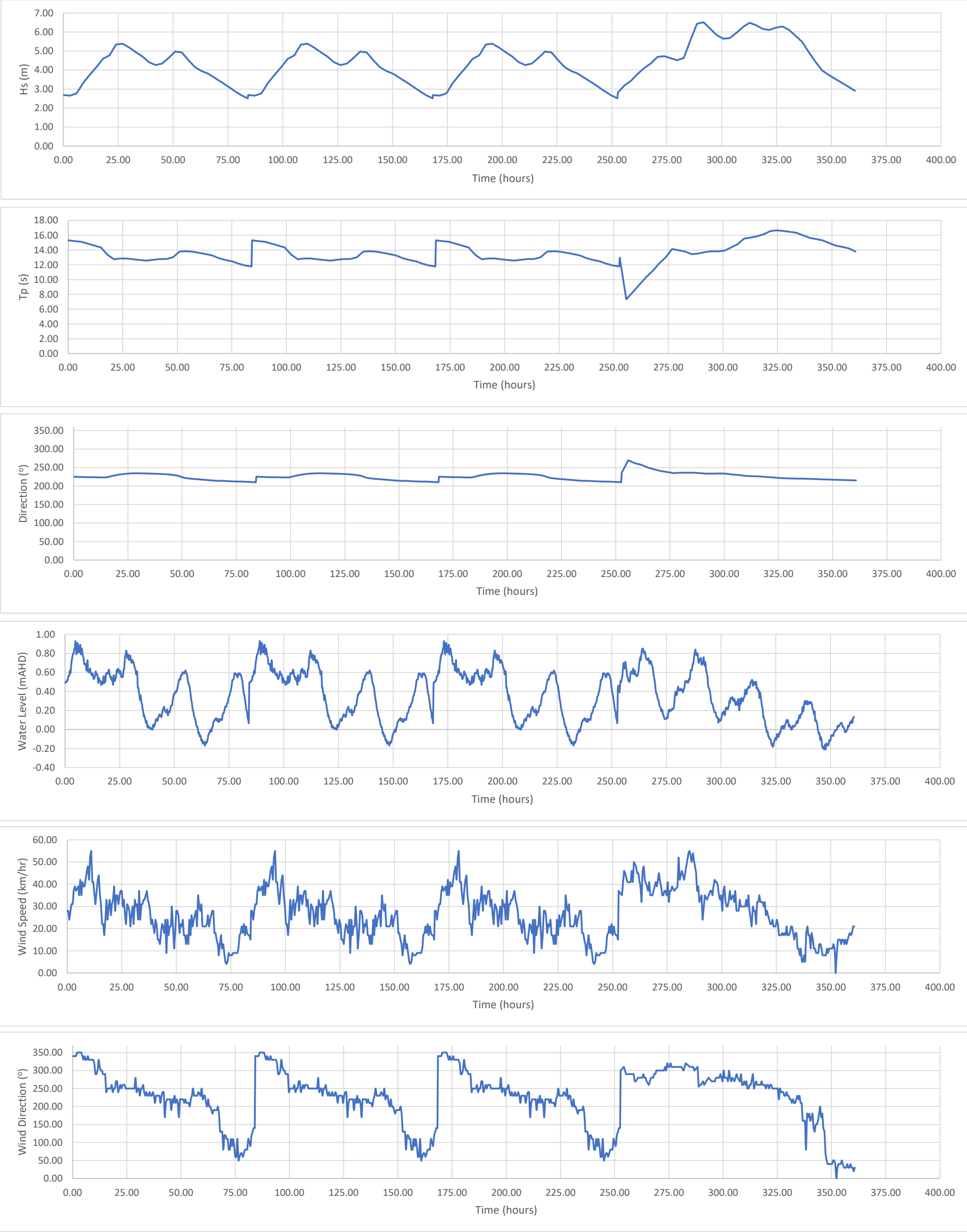
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	50 Year
Storm Sequence	2xG8 + G1



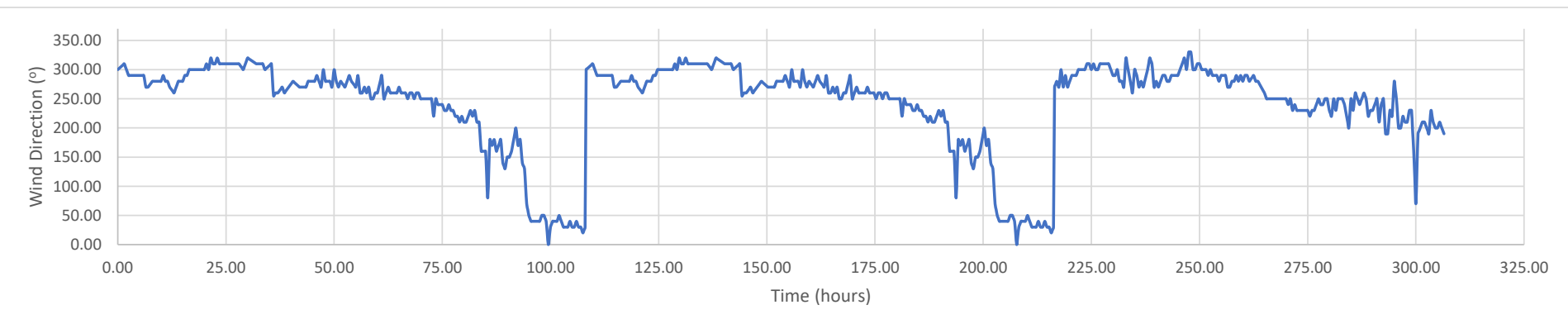
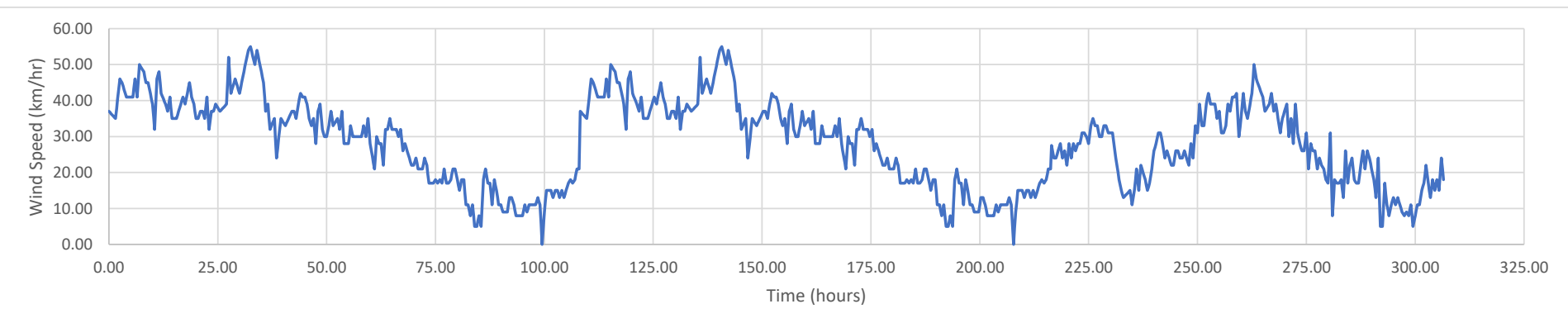
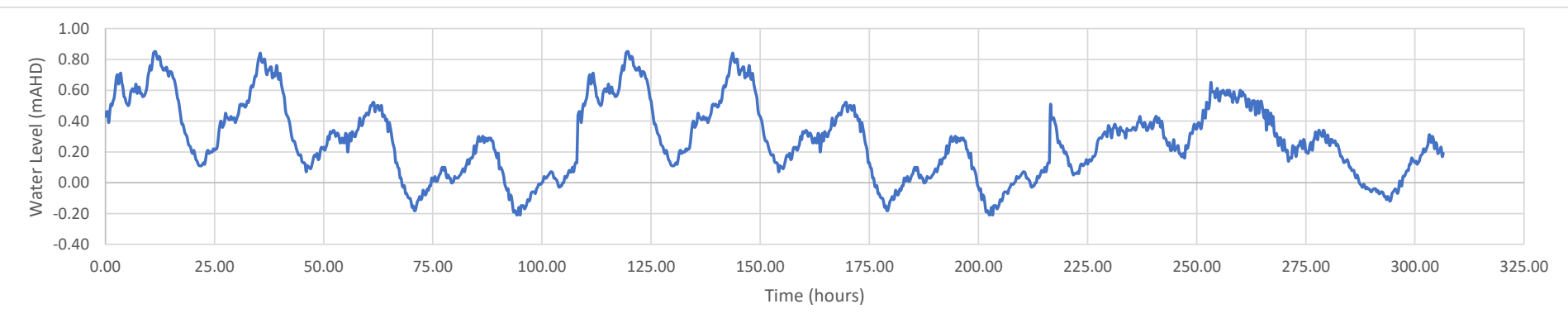
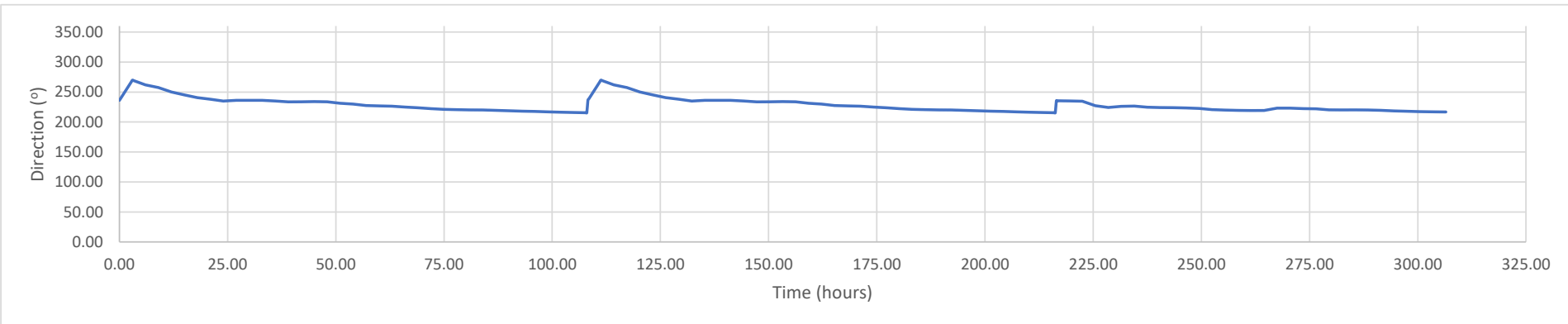
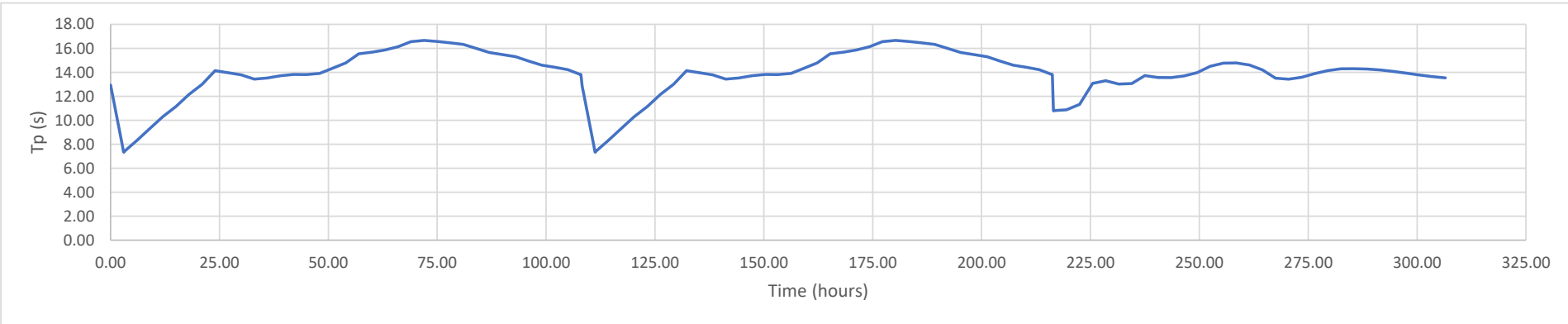
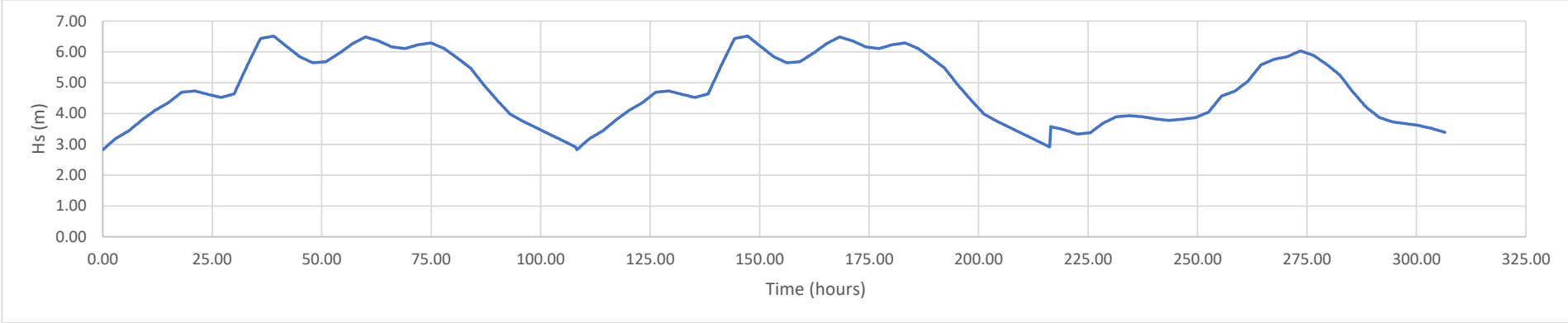
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	50 Year
Storm Sequence	3xG2 + G8



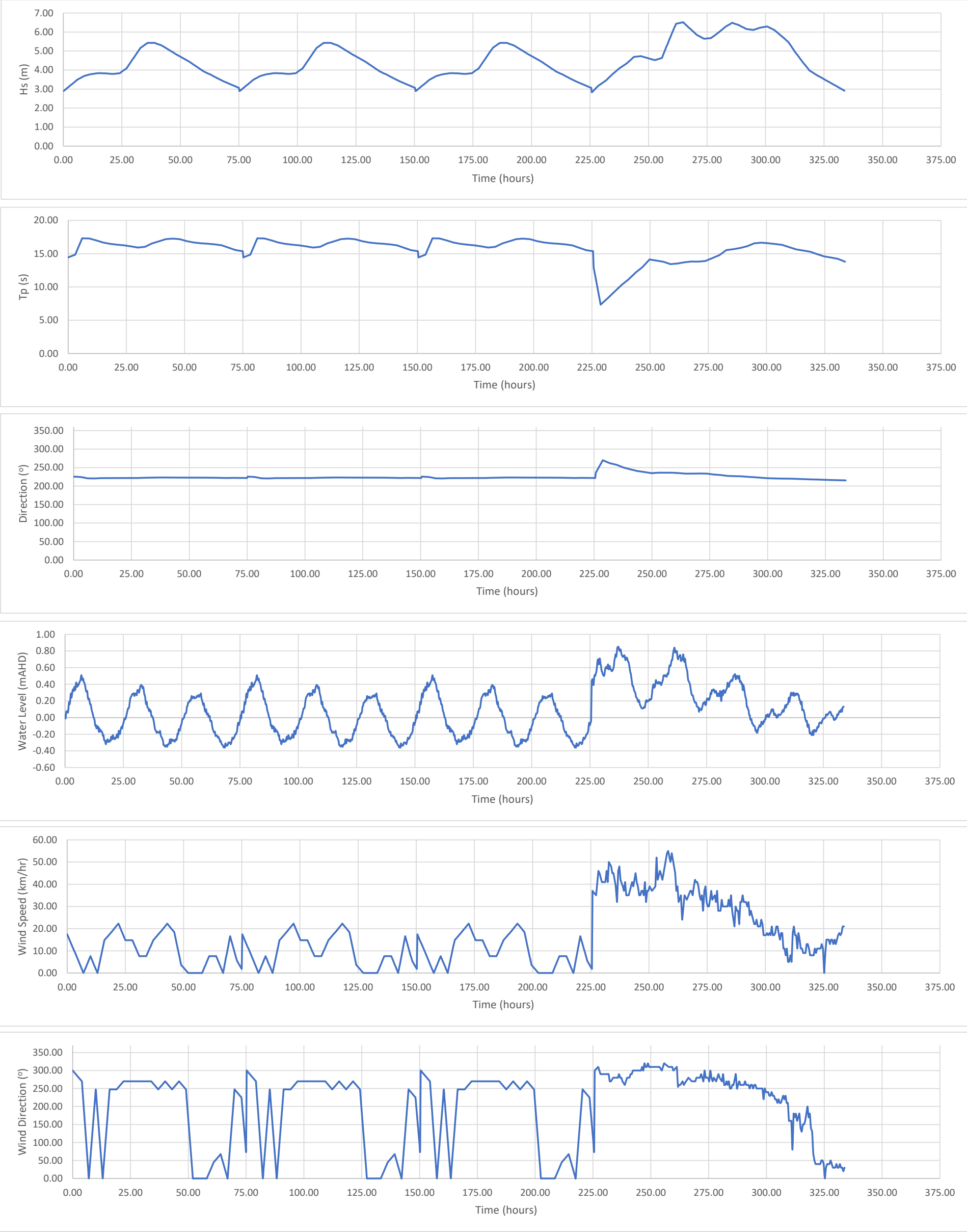
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	100 Year
Storm Sequence	2xG8 + G4



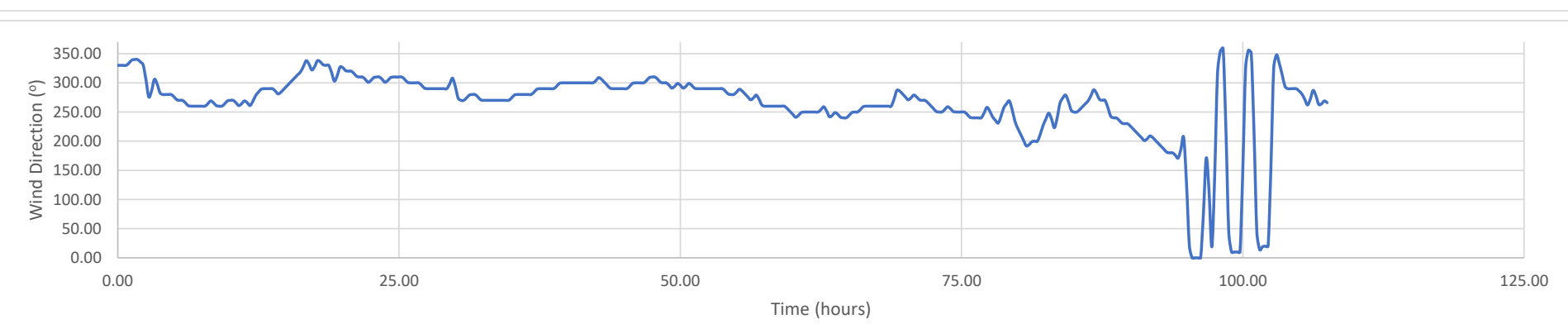
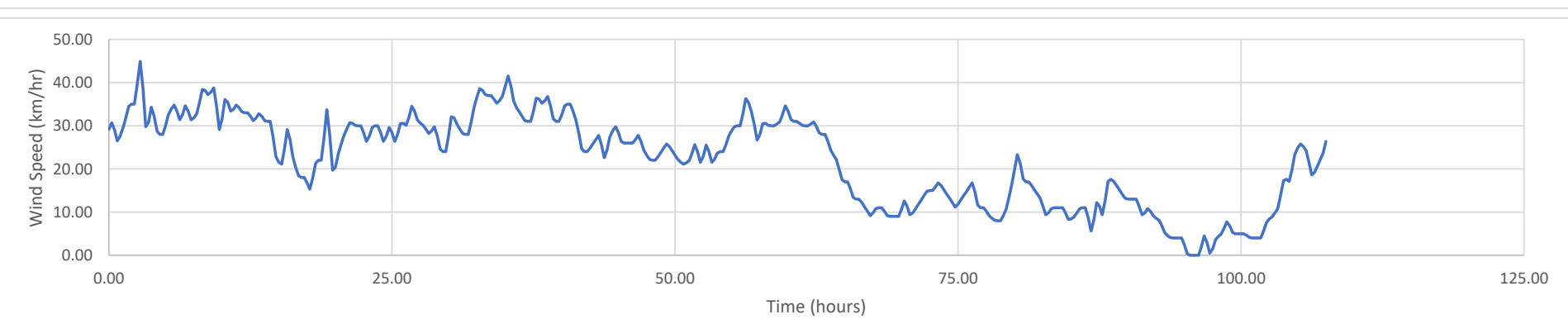
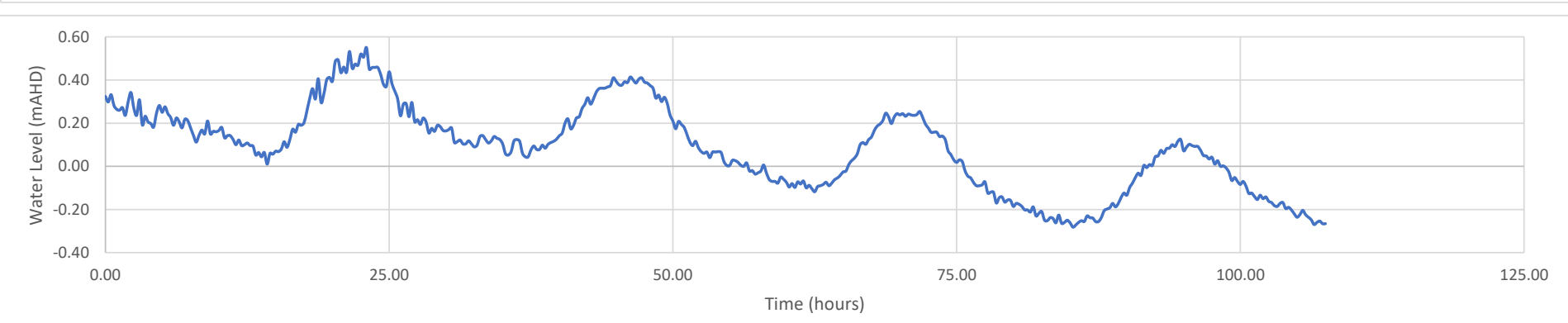
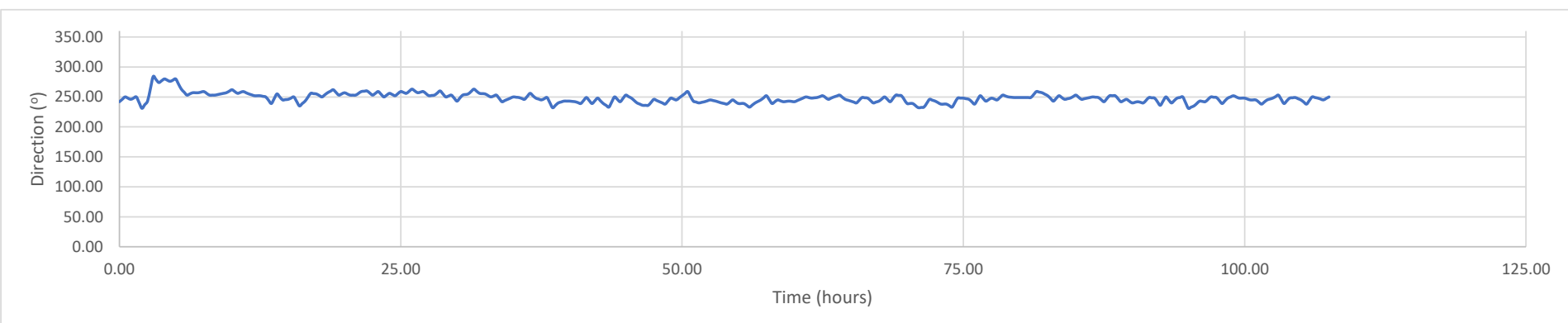
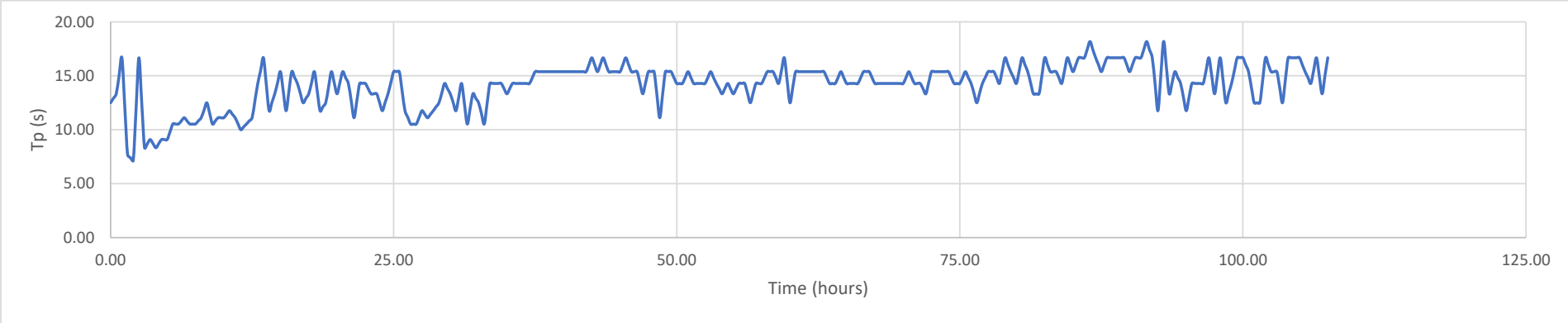
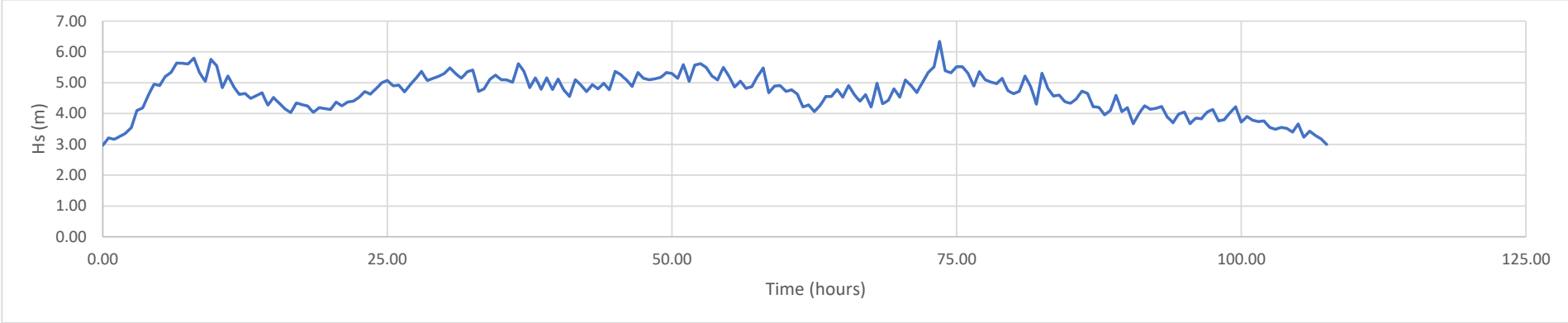
K1509 - South West Storm Selection
Design Storm Sequences

Location	Geraldton
ARI Storm Sequence	100 Year
Storm Sequence	3xG3 + G8



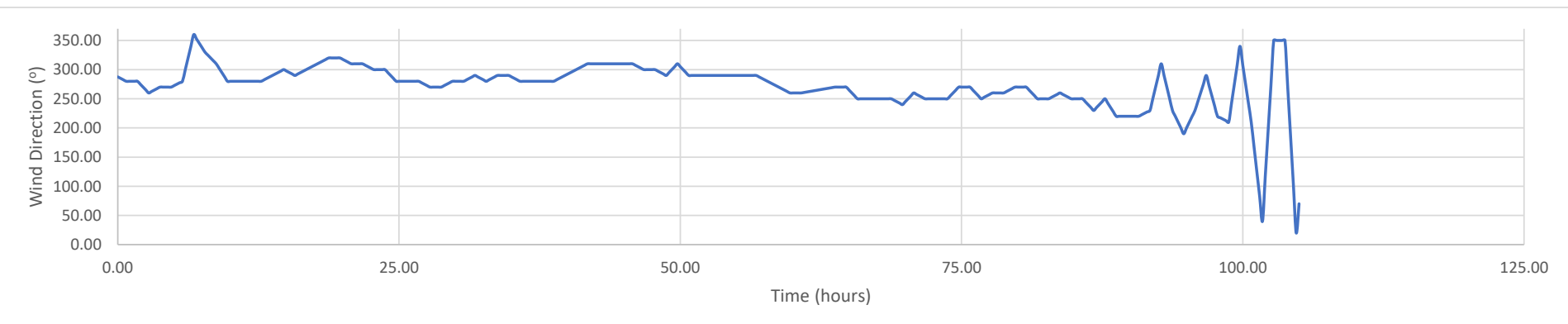
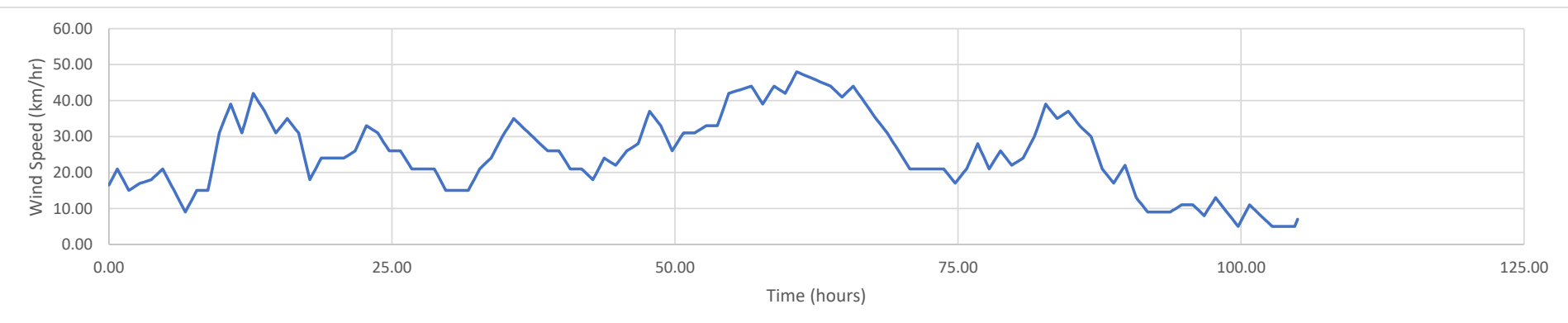
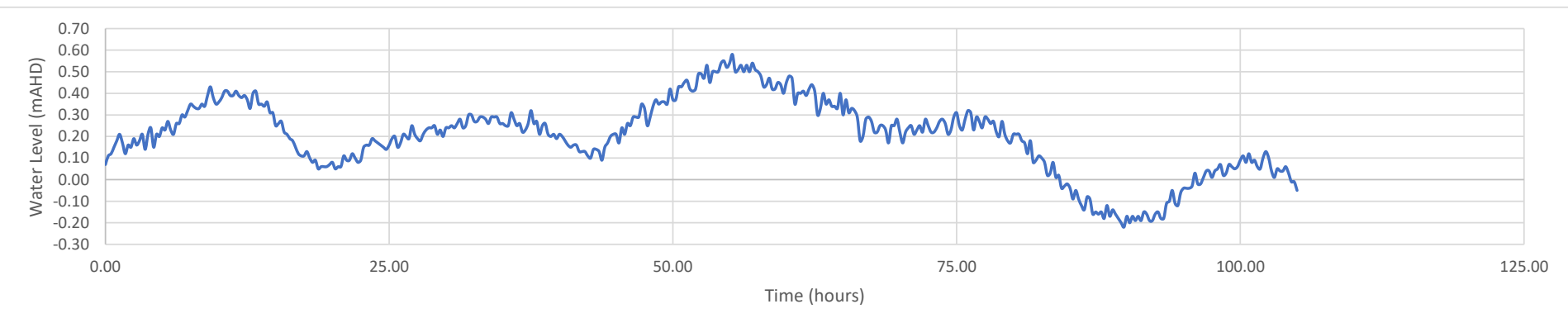
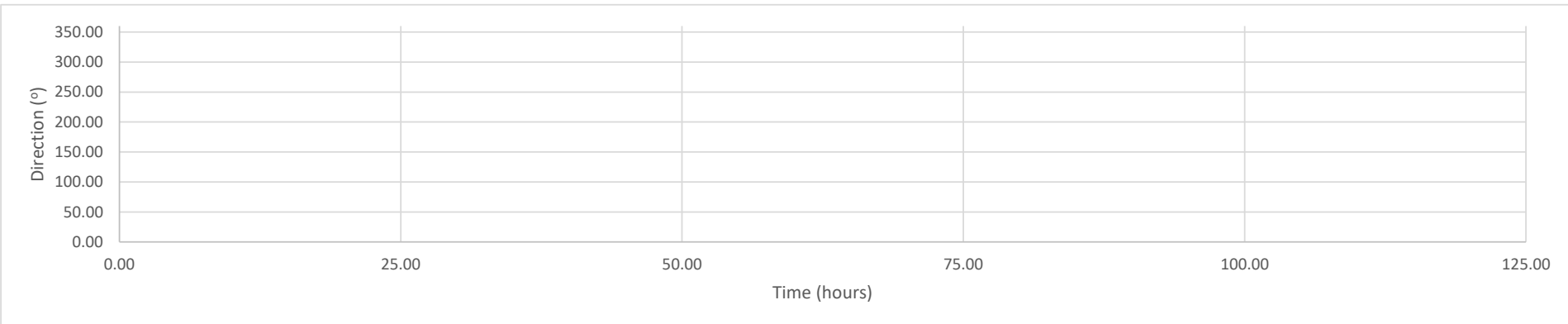
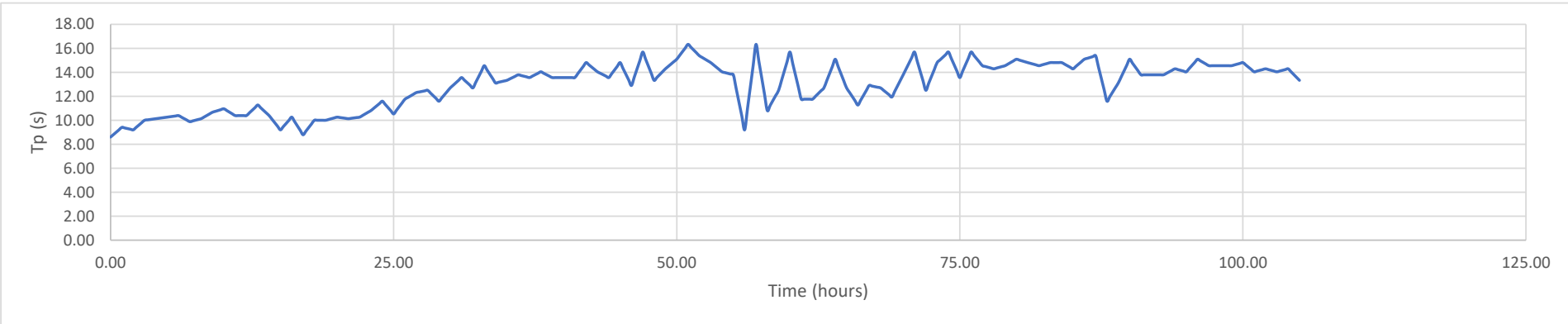
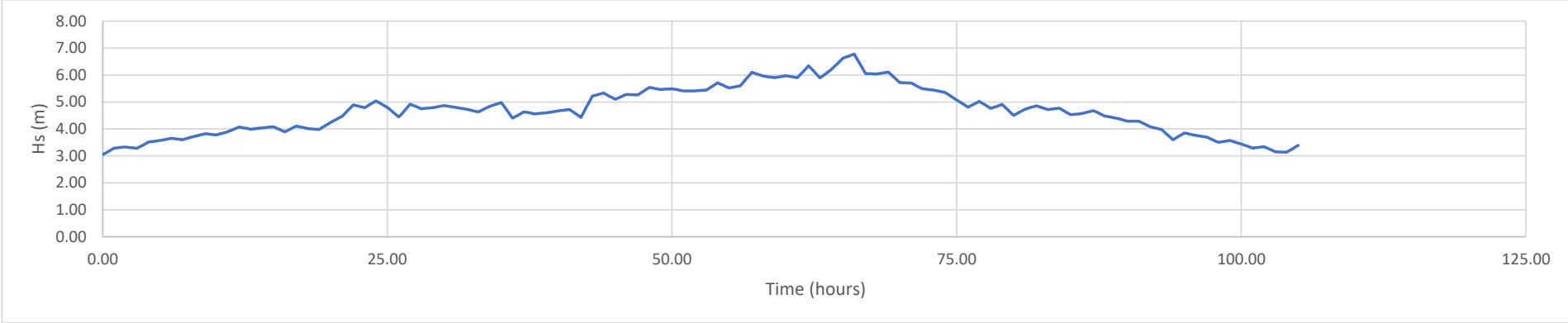
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	1 Year
Storm Sequence	J6



K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	1 Year
Storm Sequence	J5



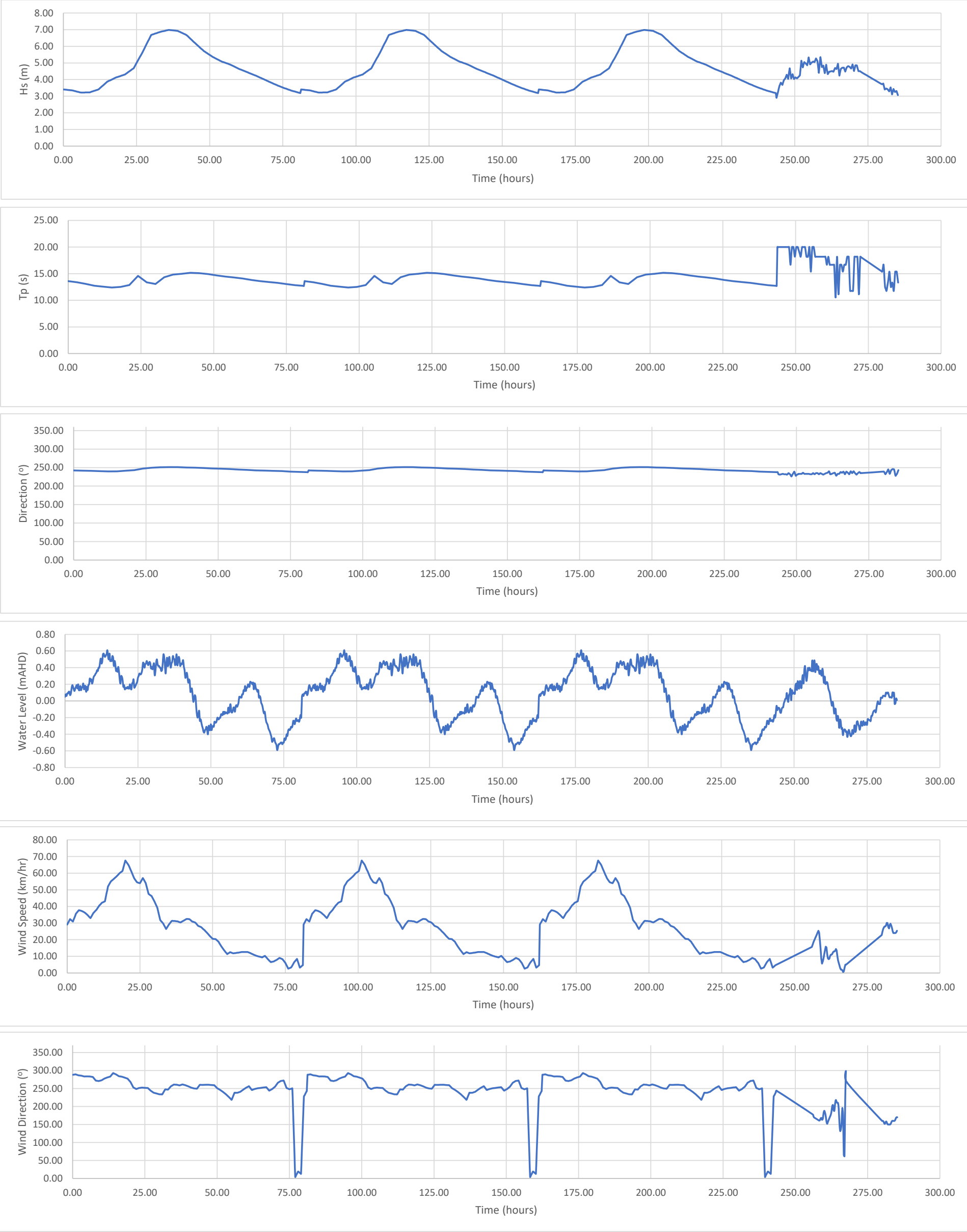
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	10 Year
Storm Sequence	2x J8 + J1



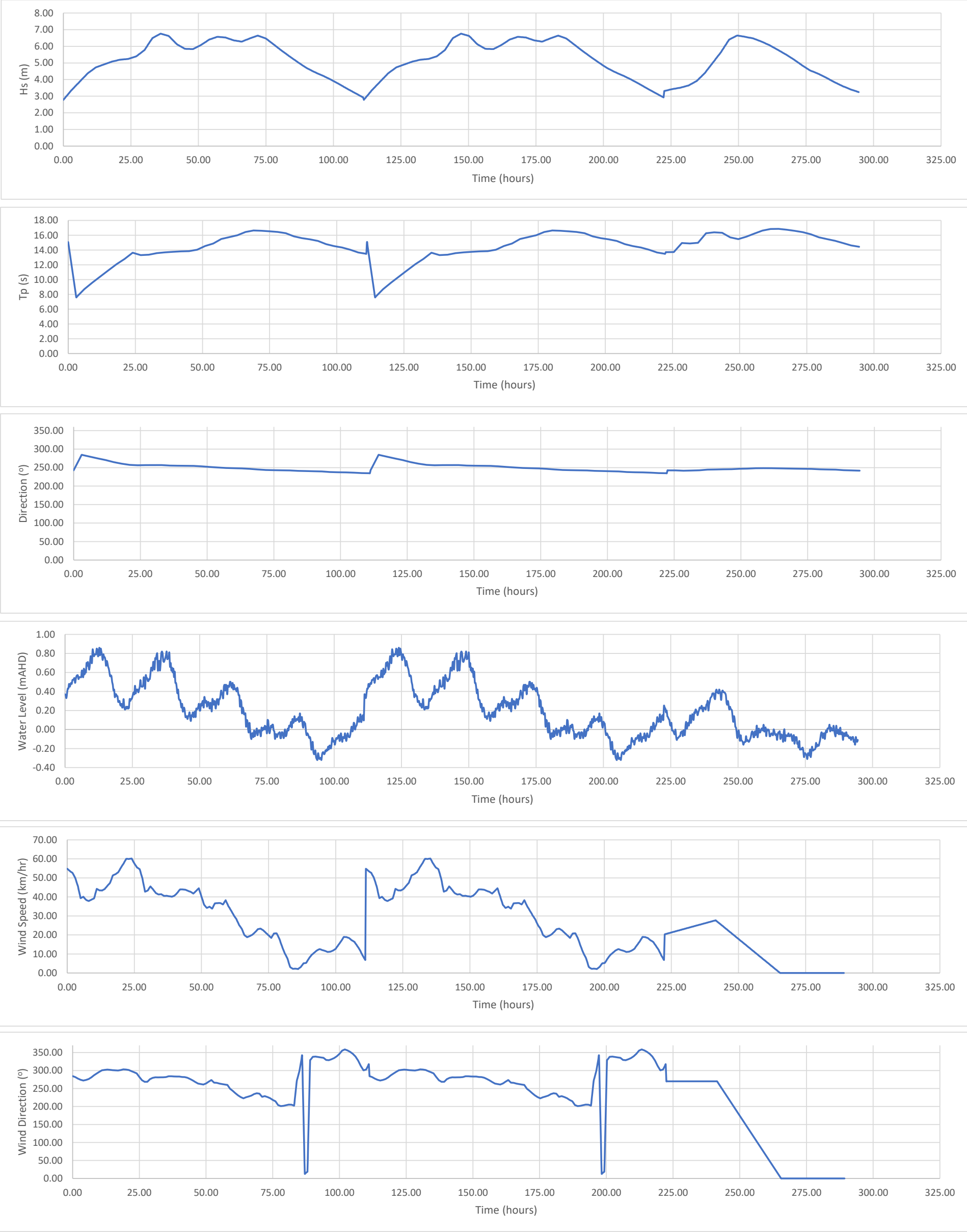
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	10 Year
Storm Sequence	3x J4 + J1



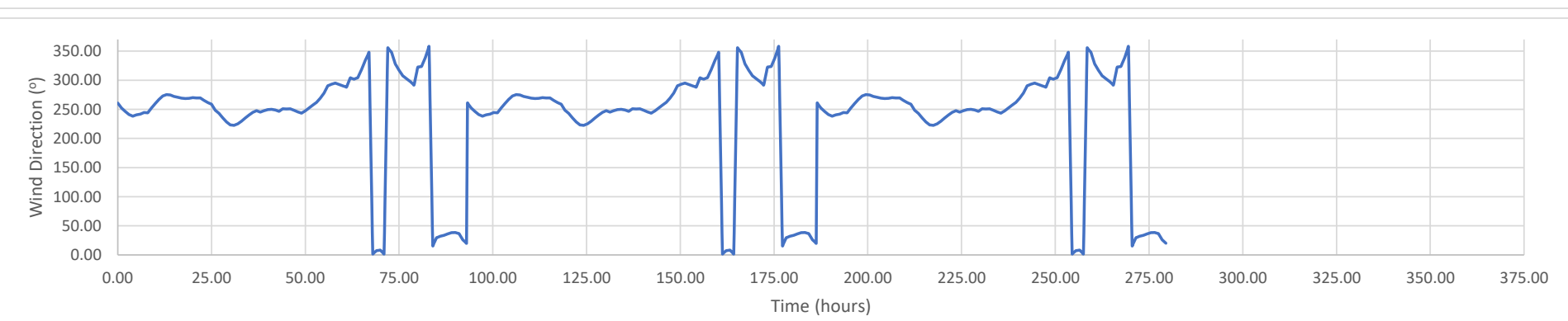
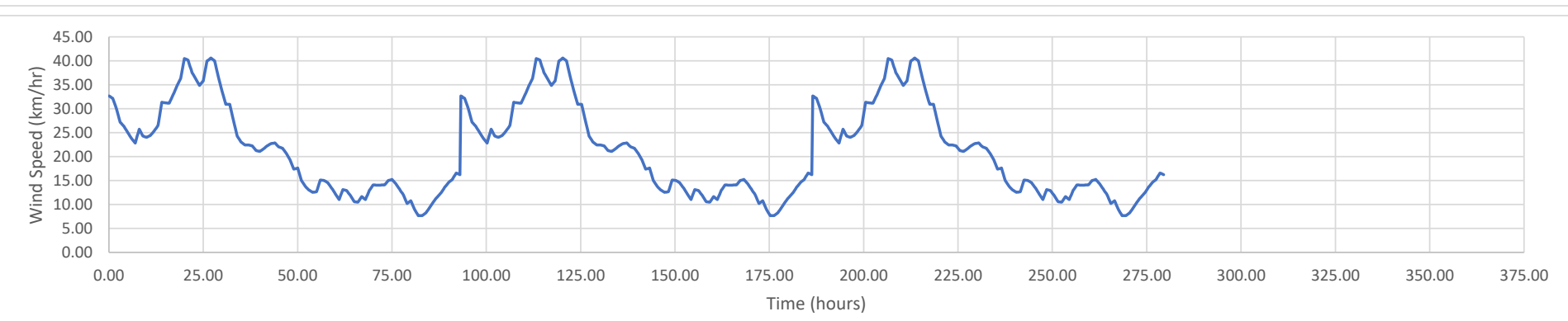
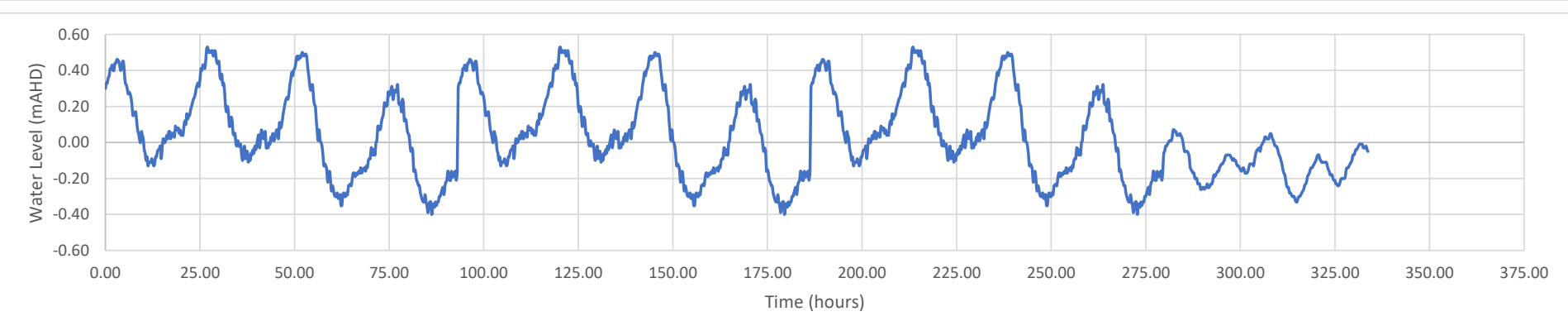
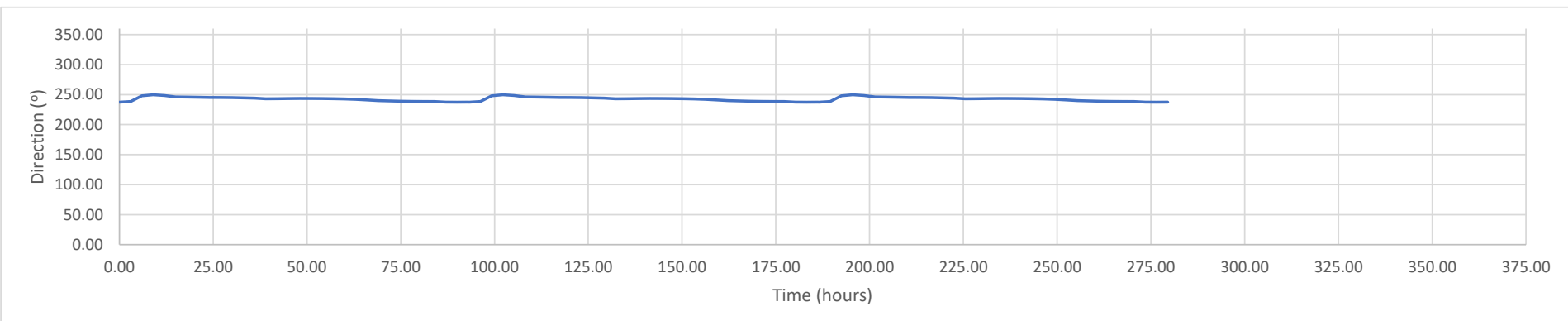
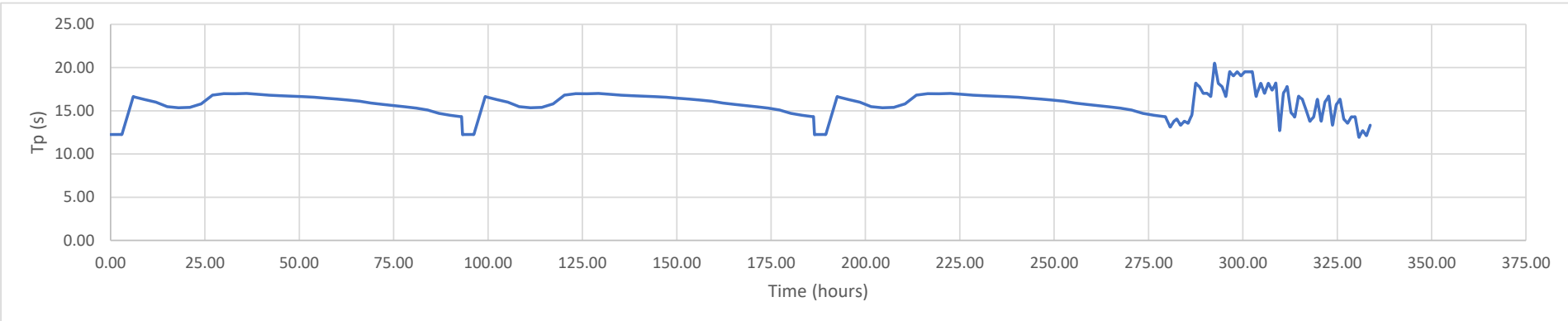
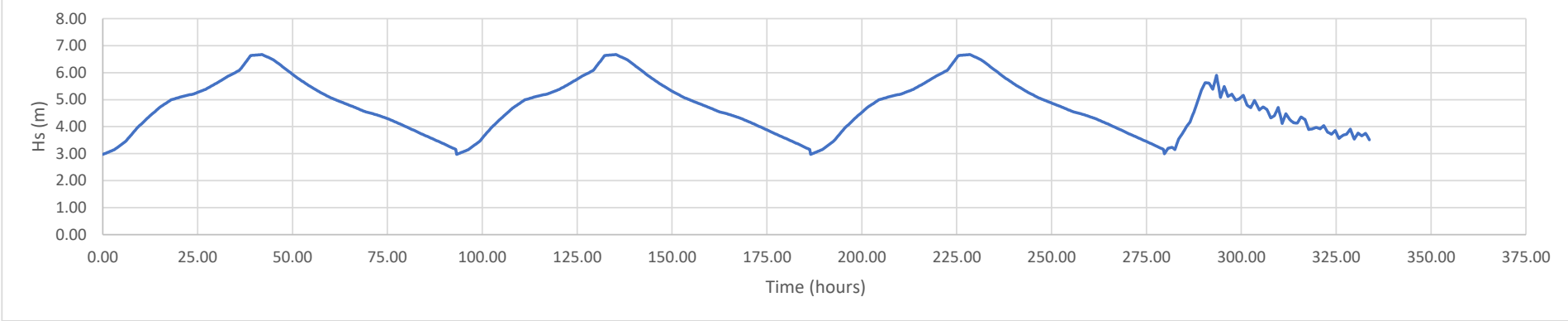
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	25 Year
Storm Sequence	2x J10 + J3



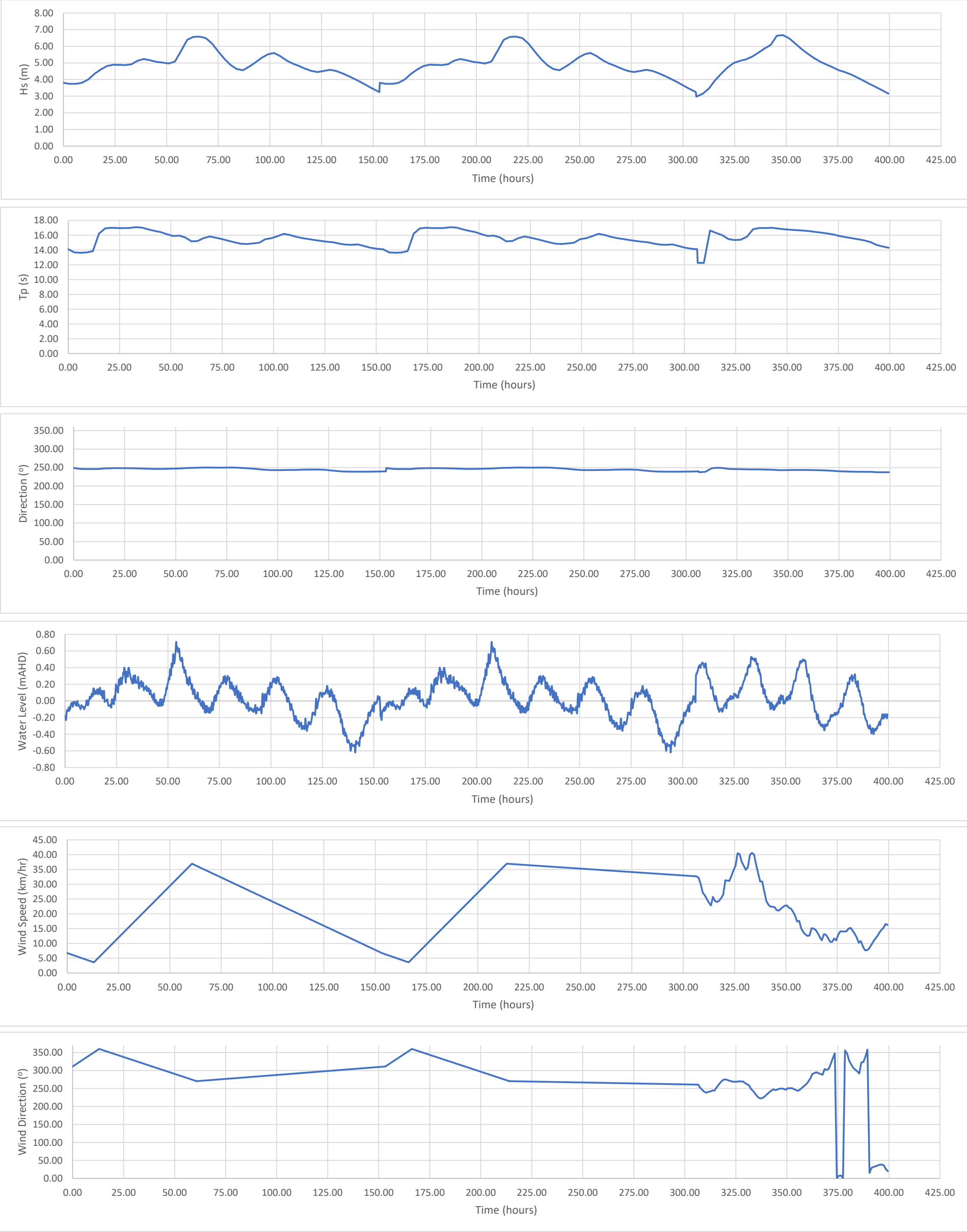
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	25 Year
Storm Sequence	3x J7 + J2



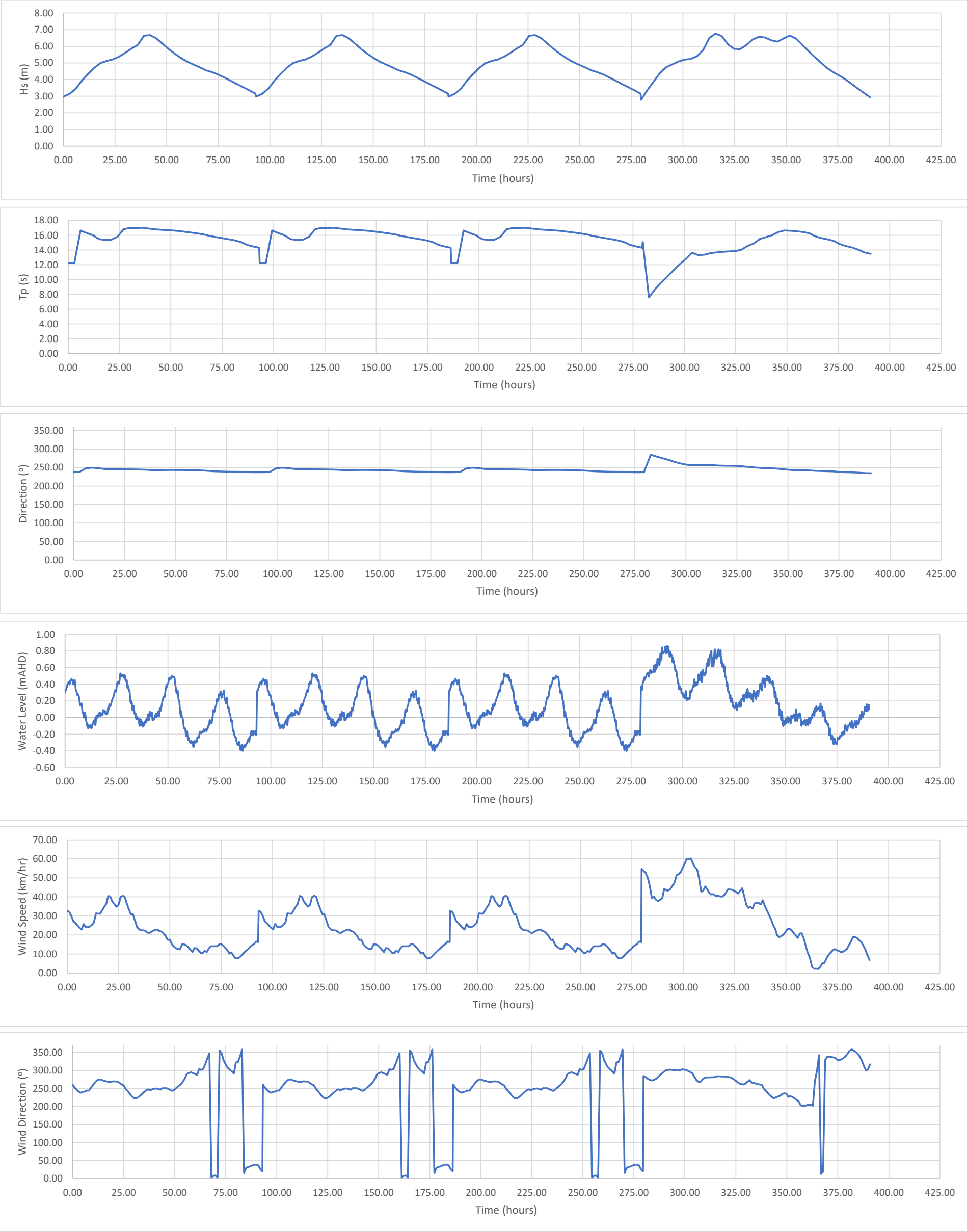
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	50 Year
Storm Sequence	2x J11 + J7



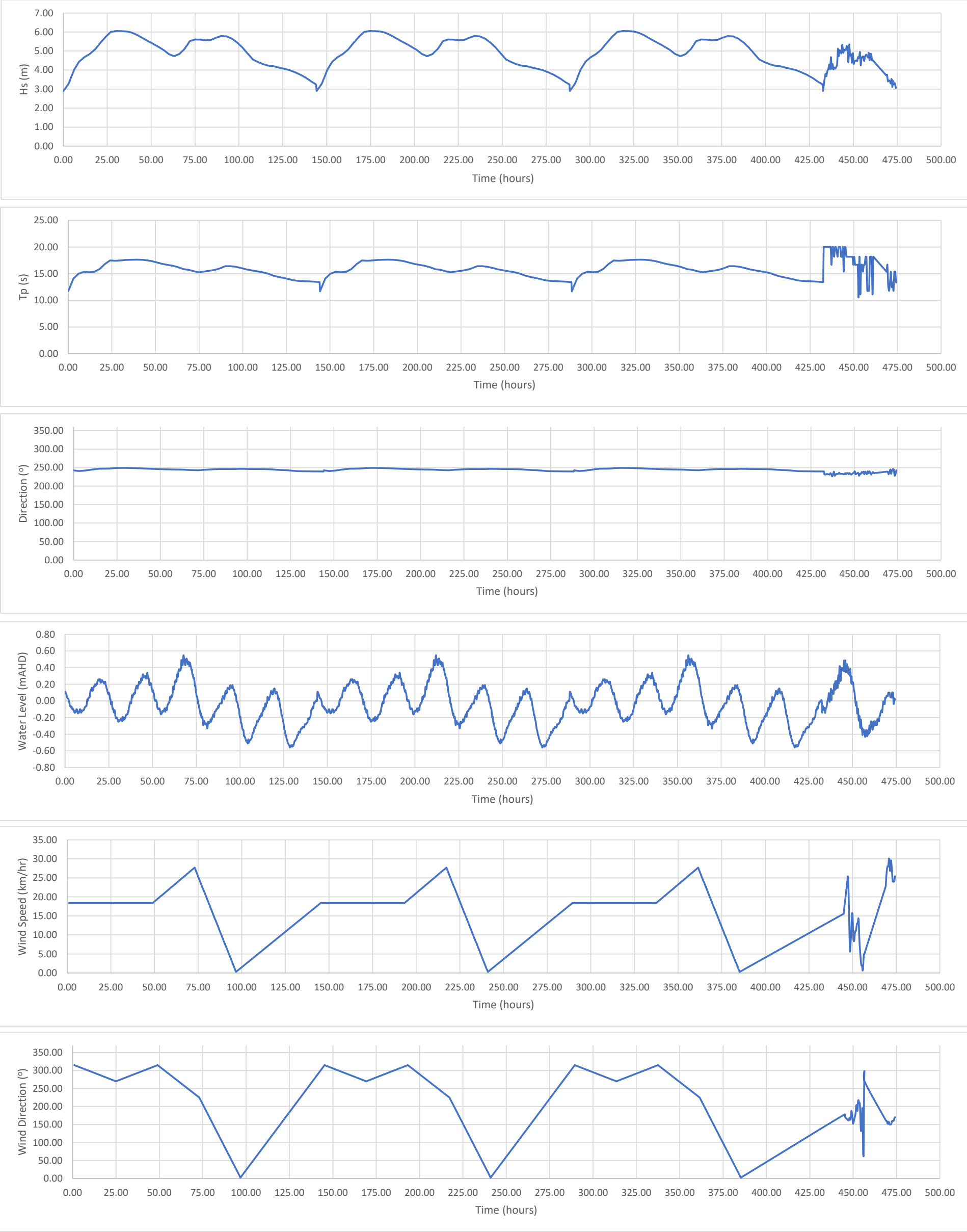
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	50 Year
Storm Sequence	3x J7 + J10



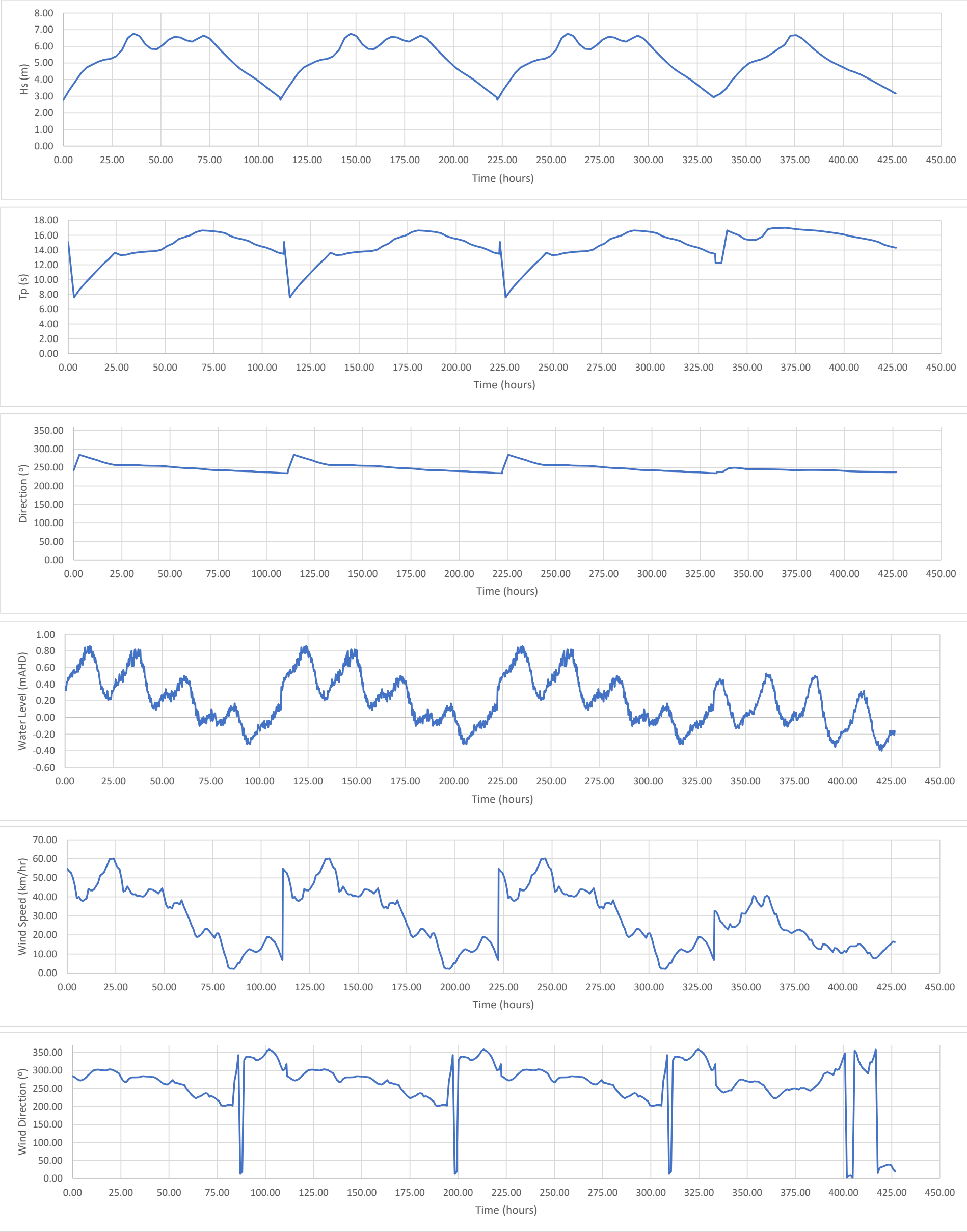
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	100 Year
Storm Sequence	3x J12 + J1



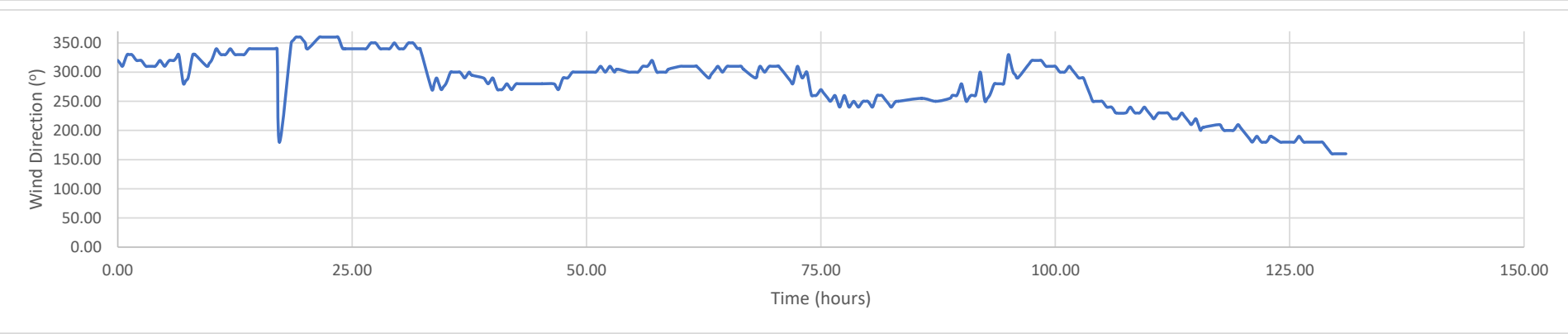
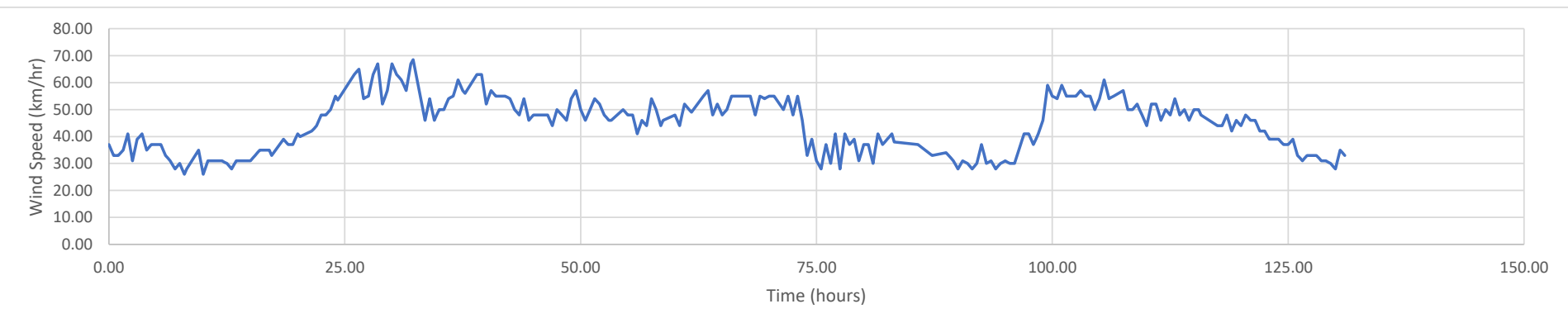
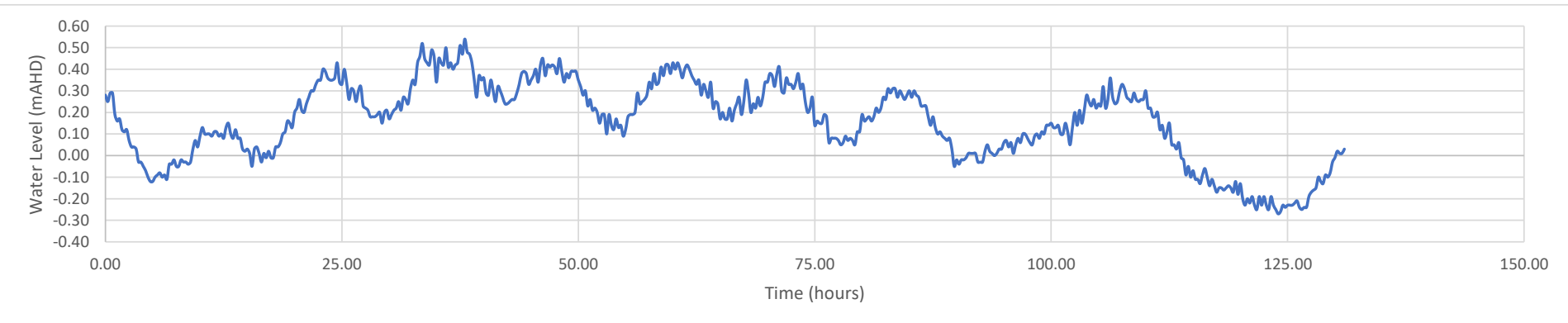
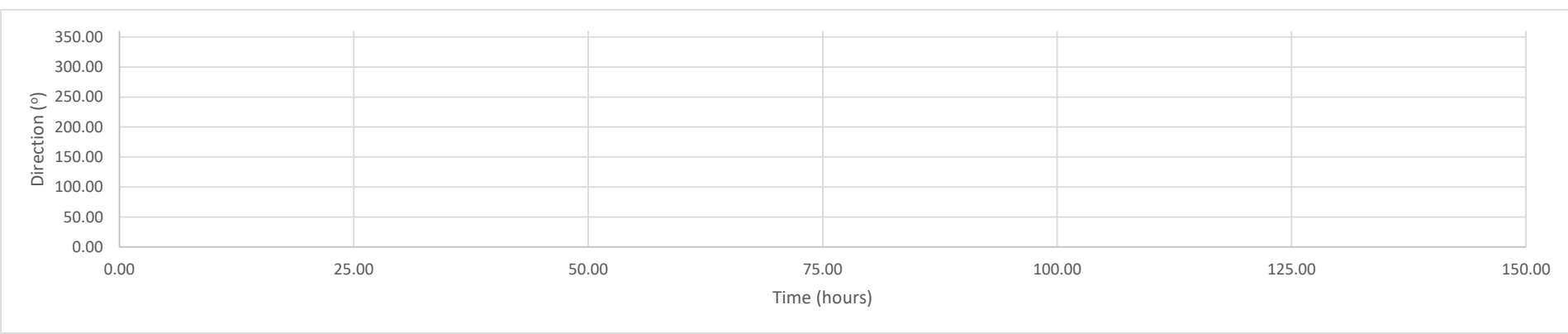
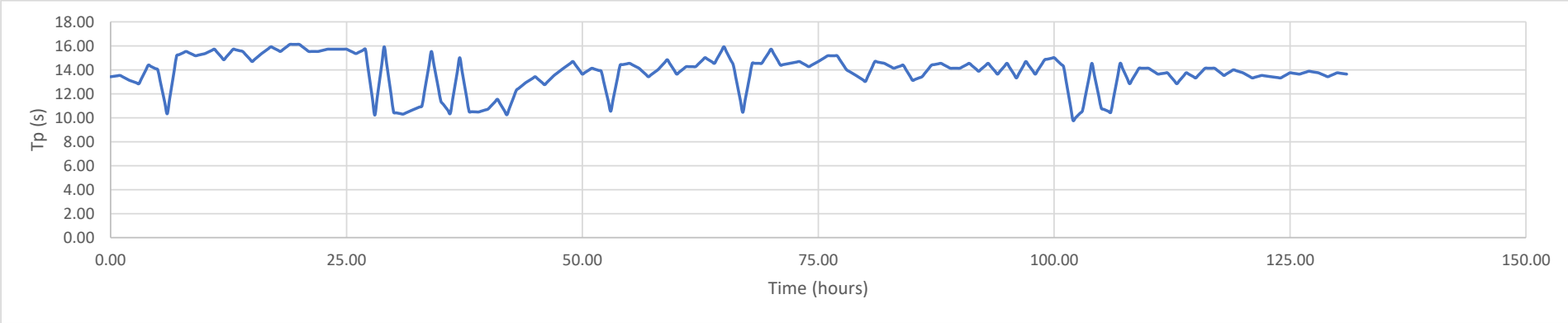
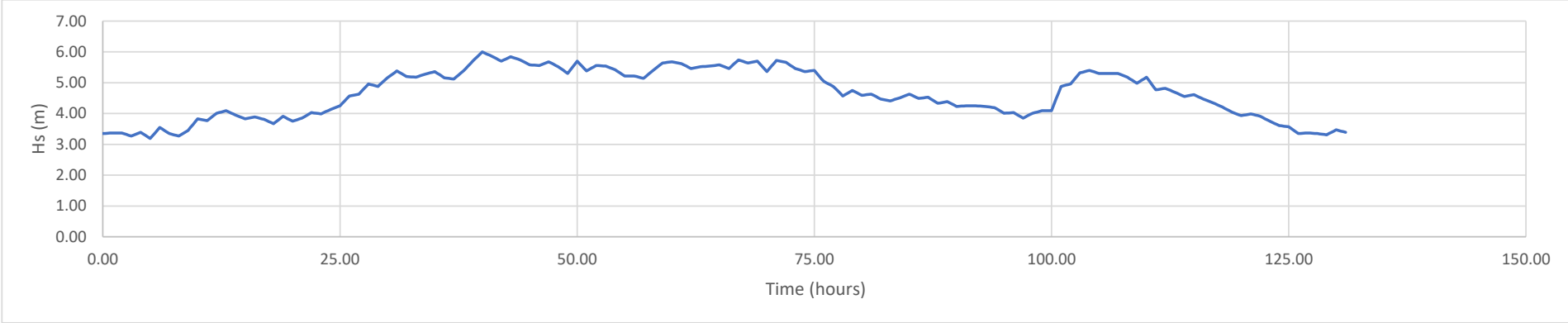
K1509 - South West Storm Selection
Design Storm Sequences

Location	Jurien
ARI Storm Sequence	100 Year
Storm Sequence	3x J10 + J7



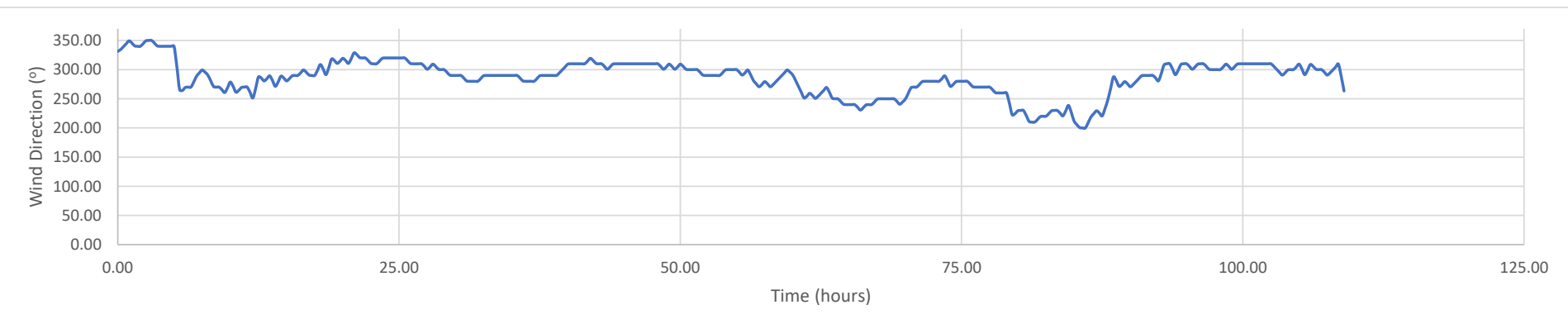
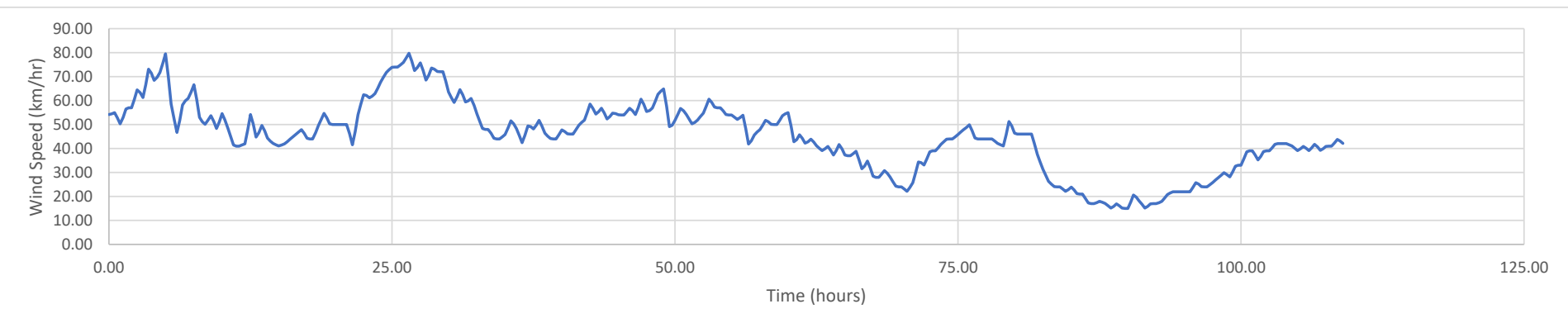
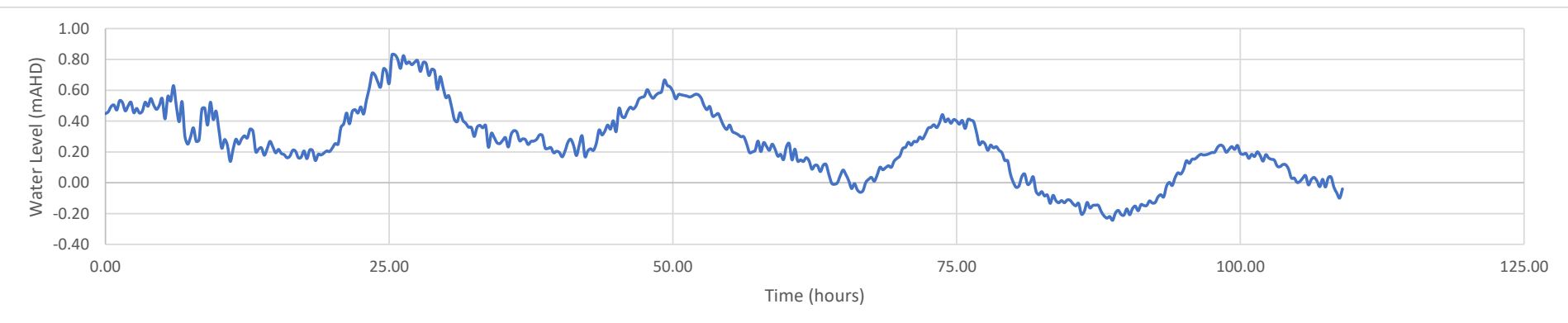
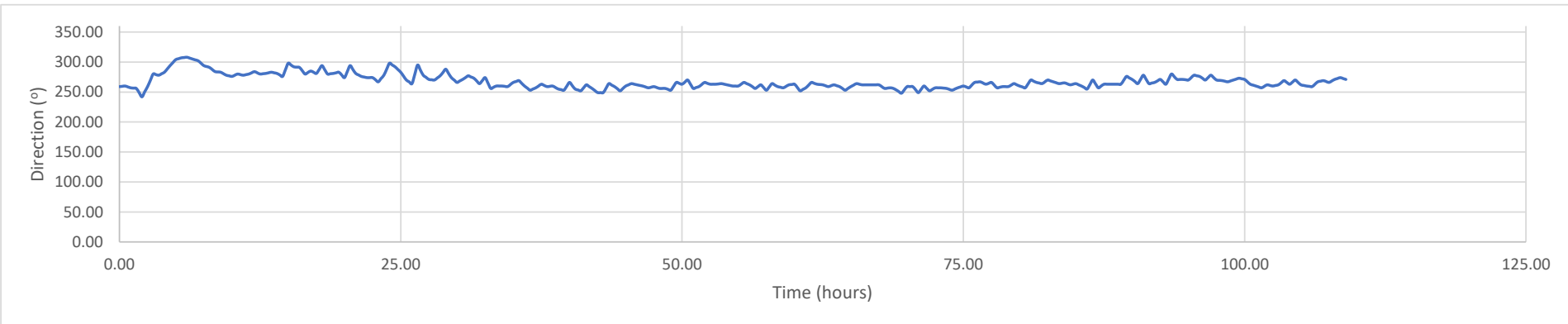
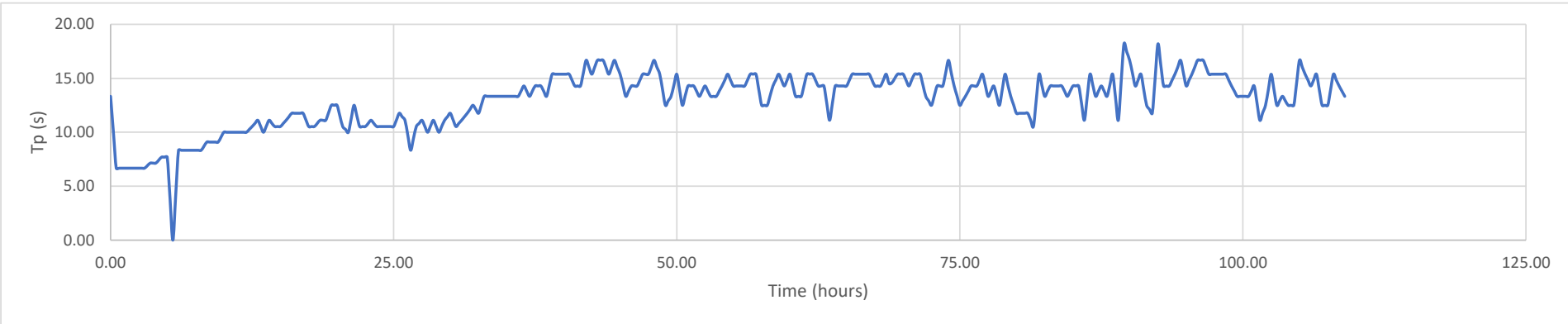
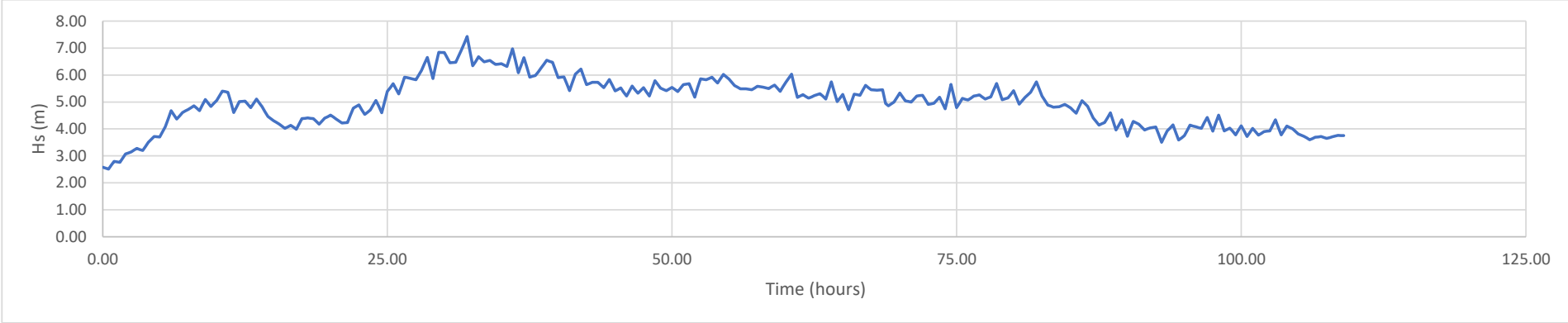
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	1 Year
Storm Sequence	M5



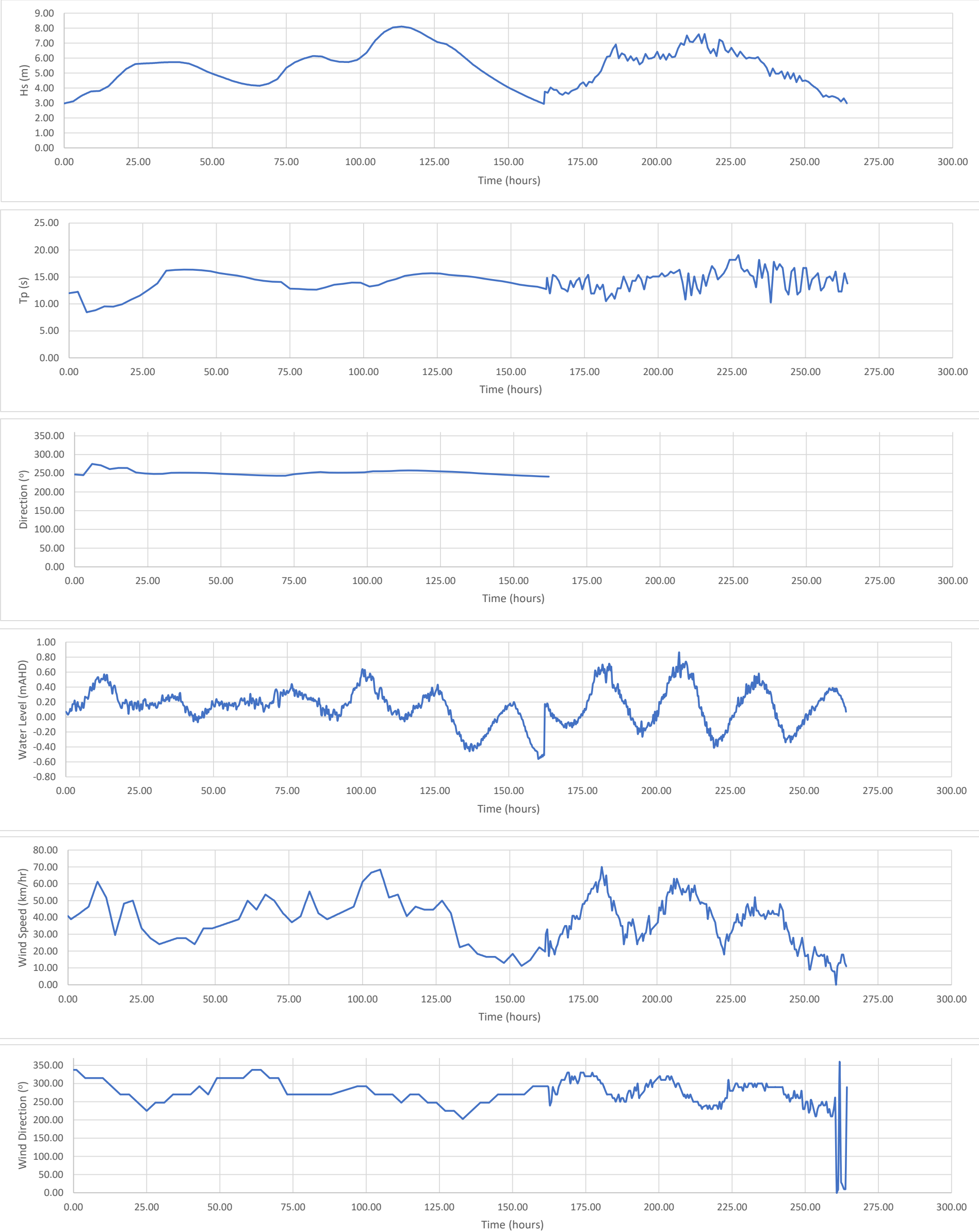
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	1 Year
Storm Sequence	M4



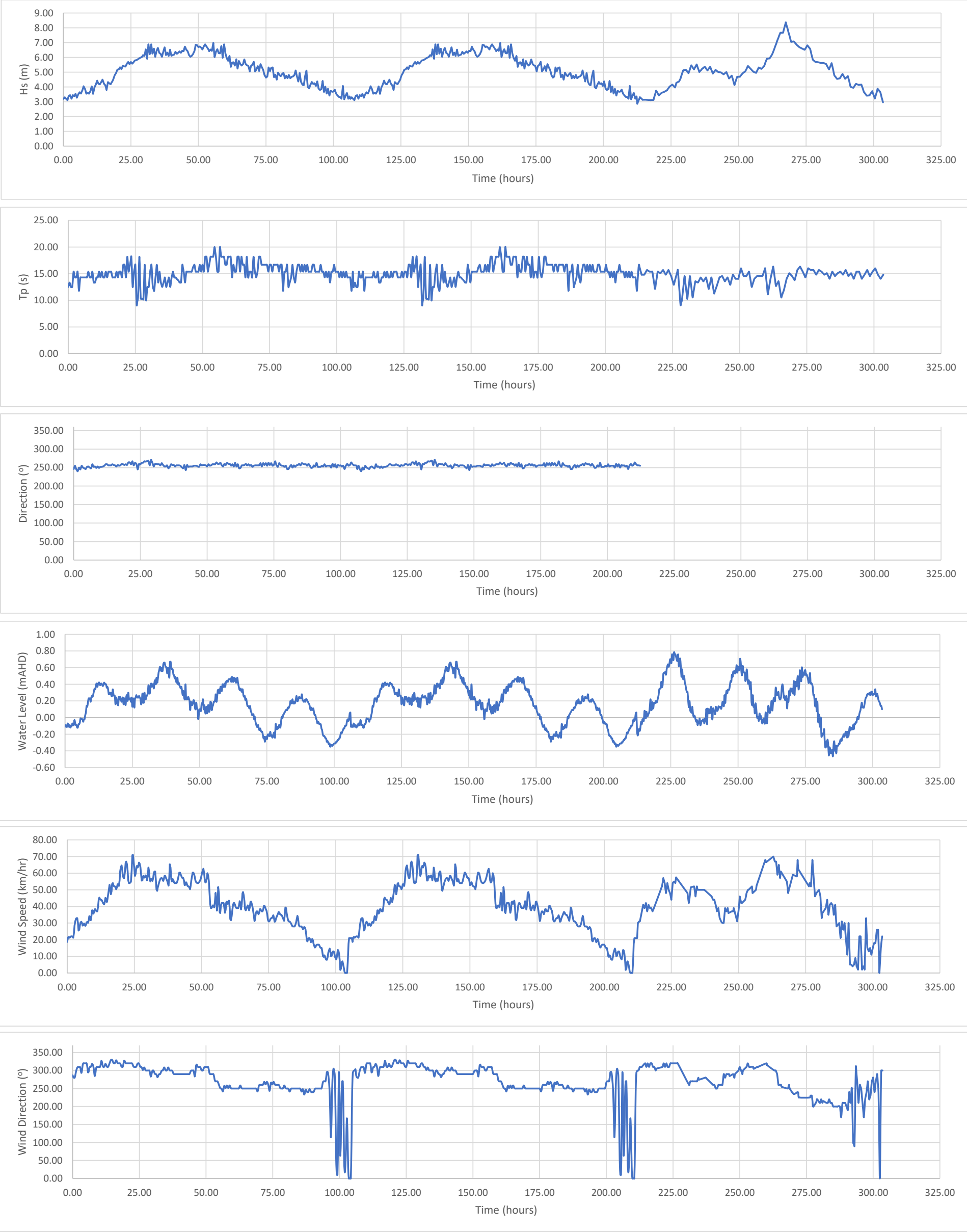
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	10 Year
Storm Sequence	M11 + M8



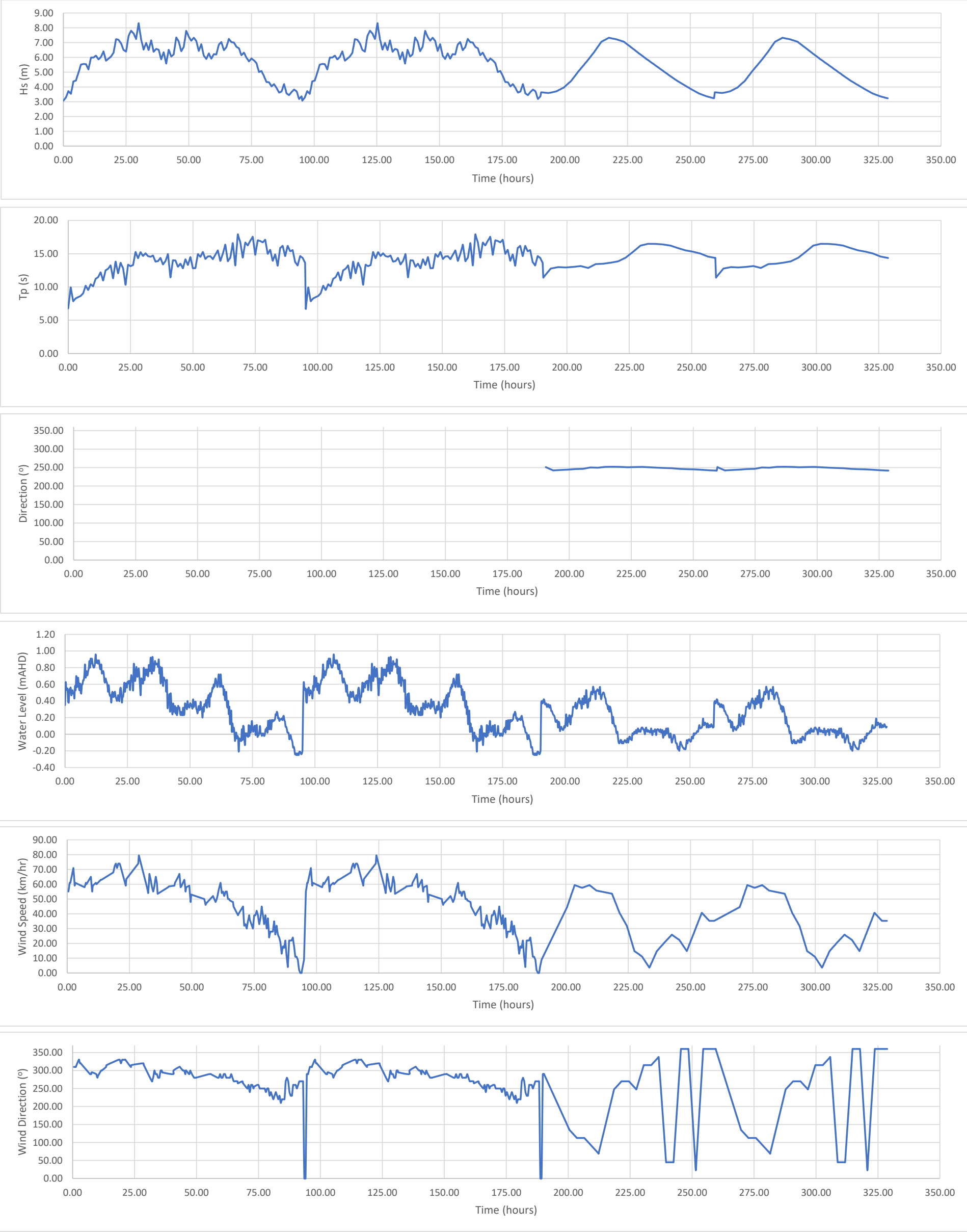
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	10 Year
Storm Sequence	2x M7 + M3



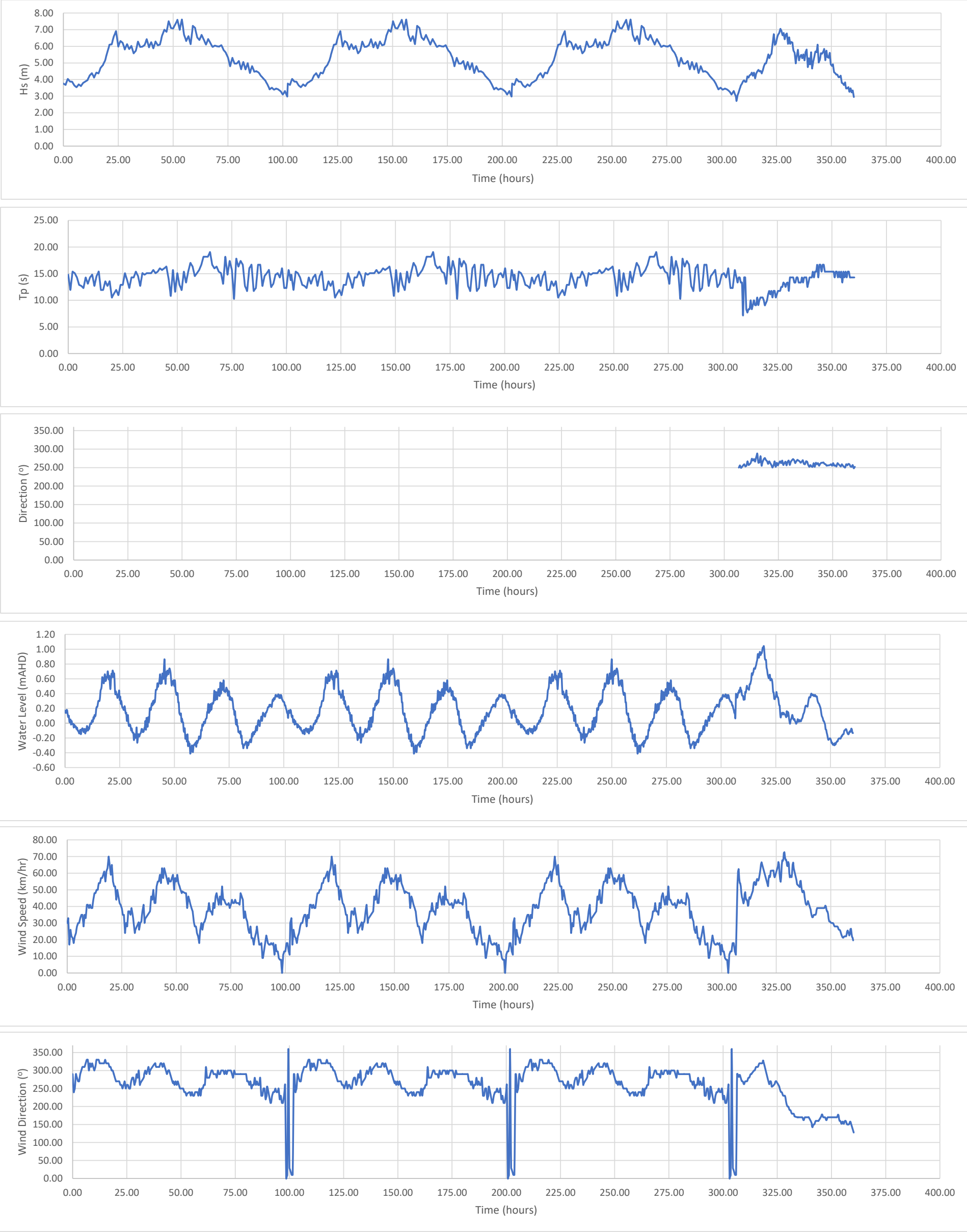
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	25 Year
Storm Sequence	2x M9 + 2x M2



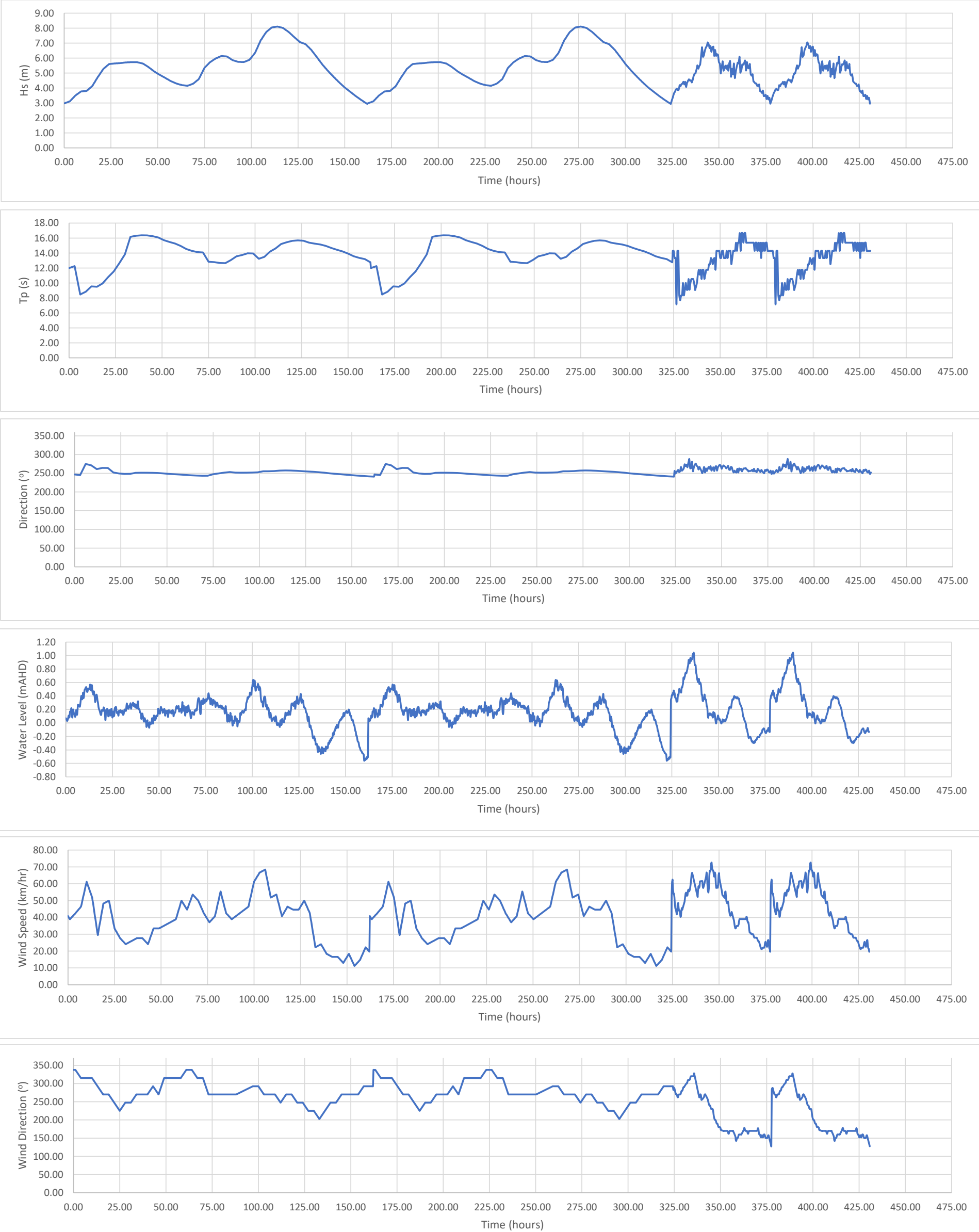
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	25 Year
Storm Sequence	3x M8 + M1



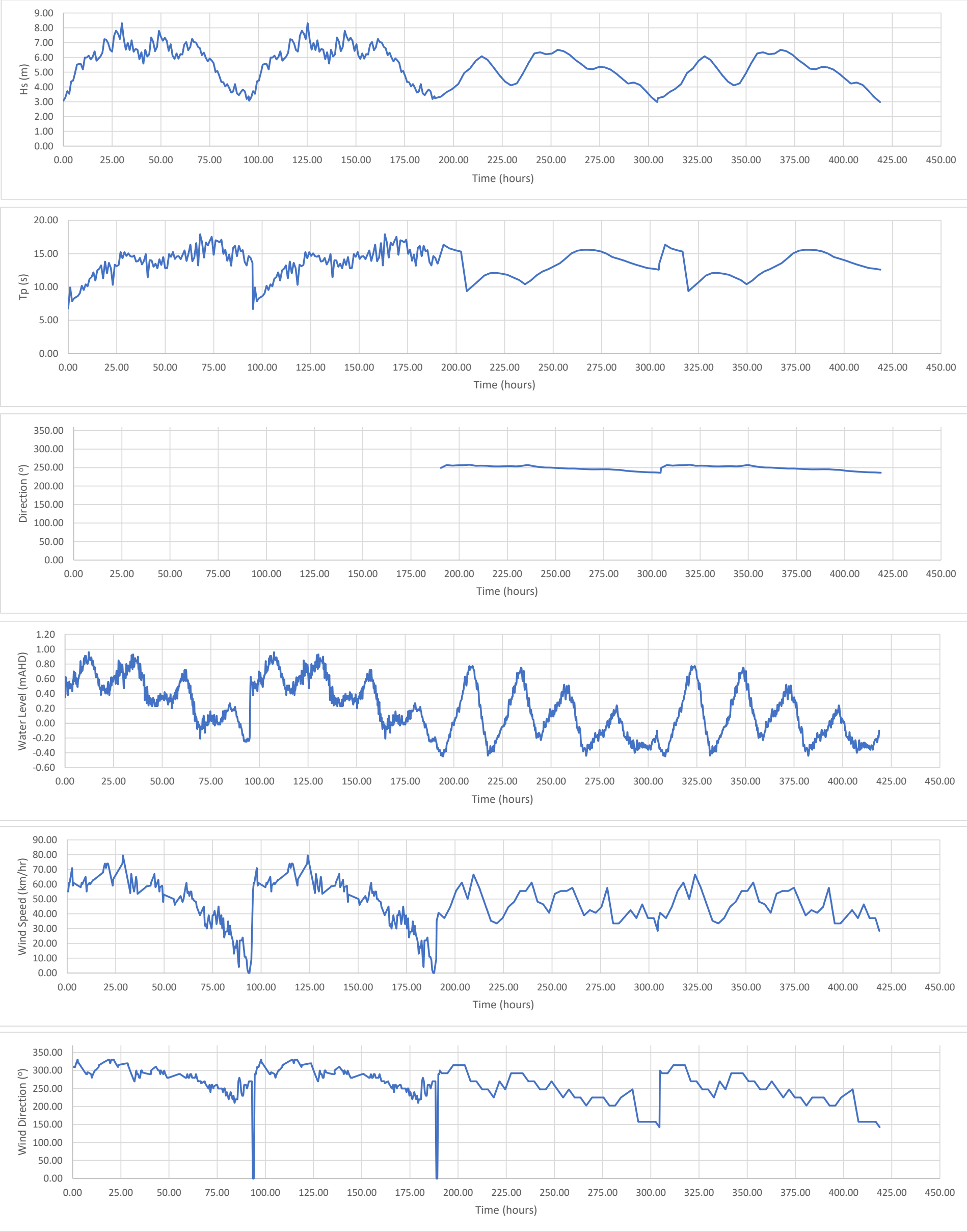
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	50 Year
Storm Sequence	2x M11+ 2x M1



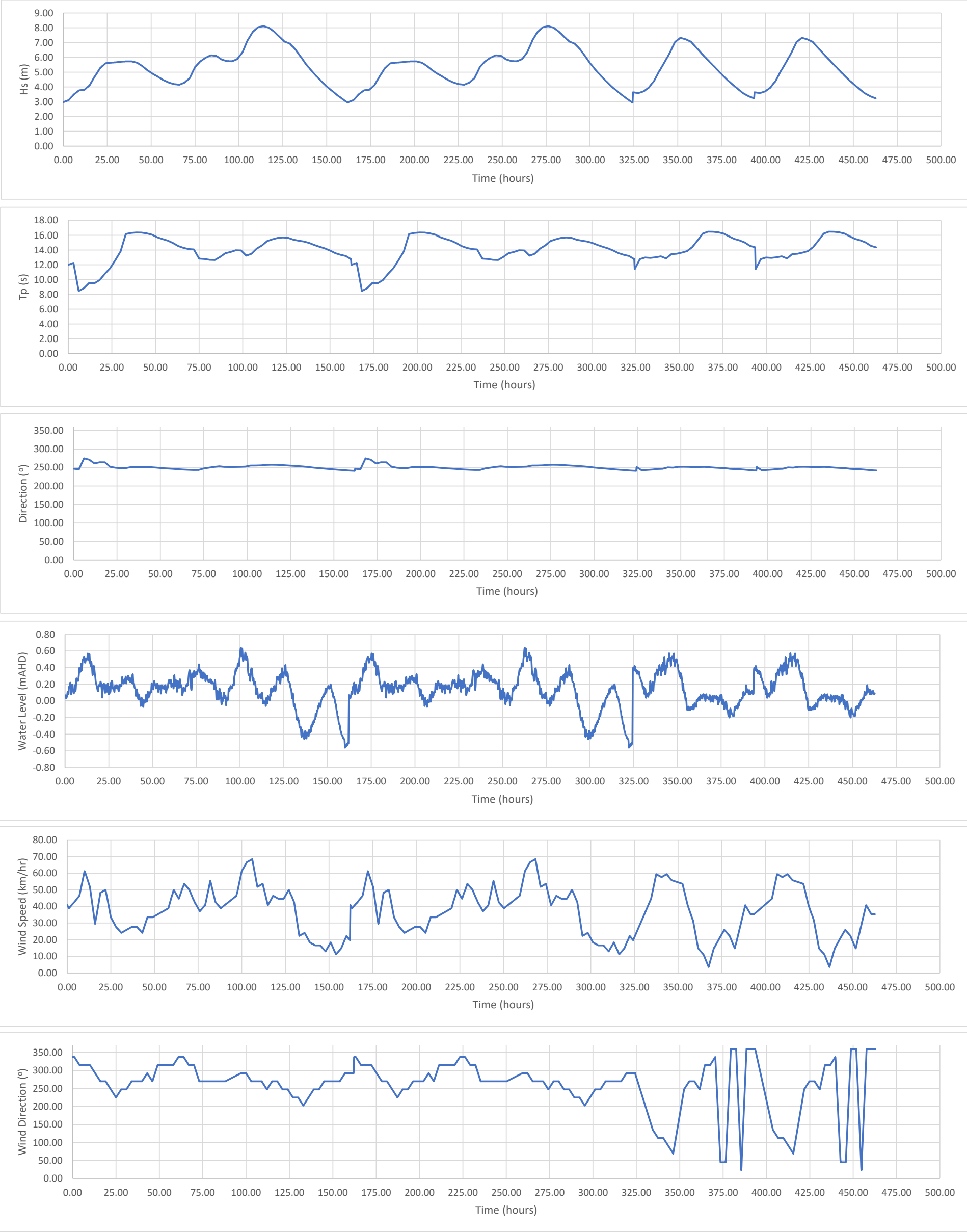
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	50 Year
Storm Sequence	2x M9 + 2x M6



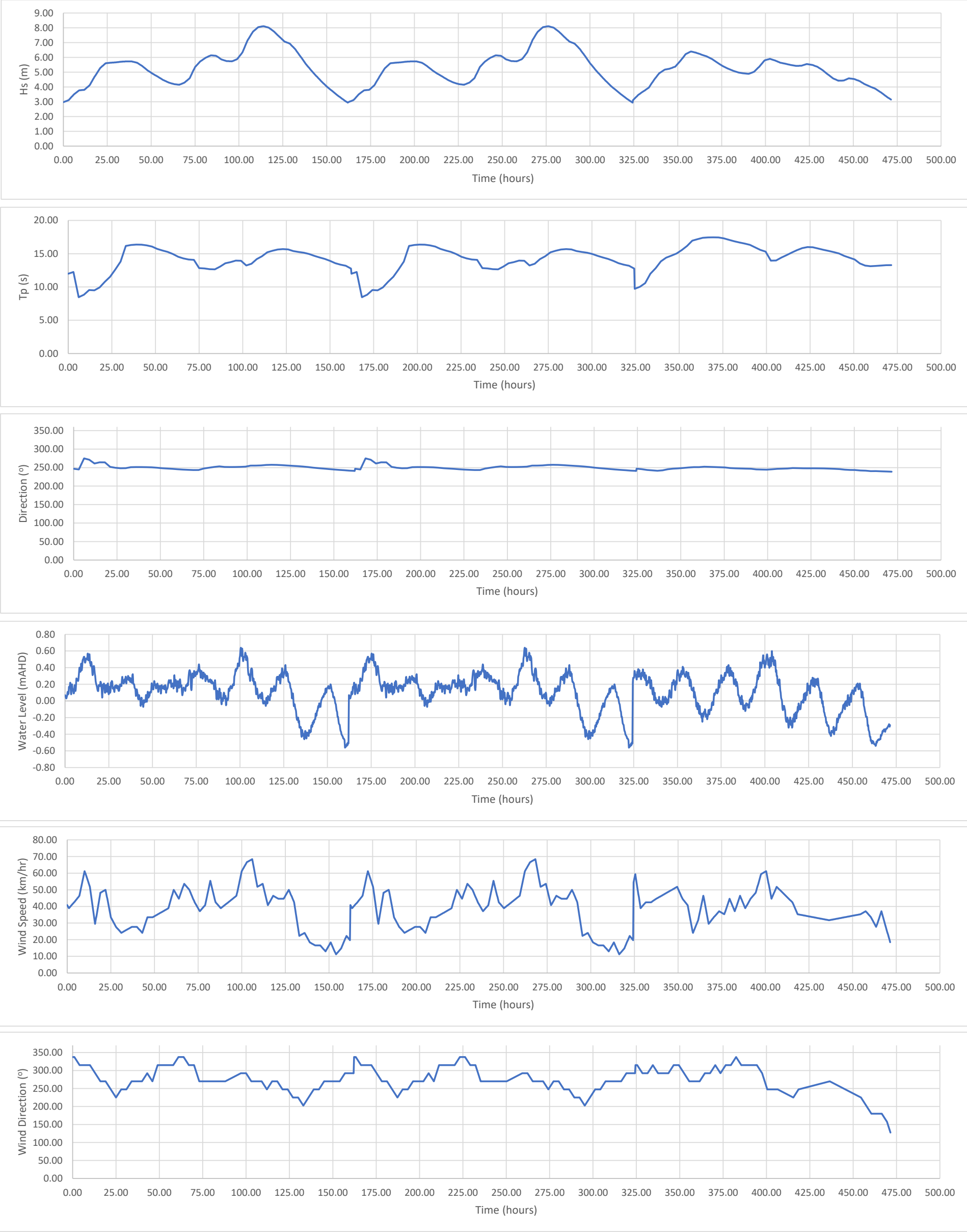
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	100 Year
Storm Sequence	2x M11 + 2x M2



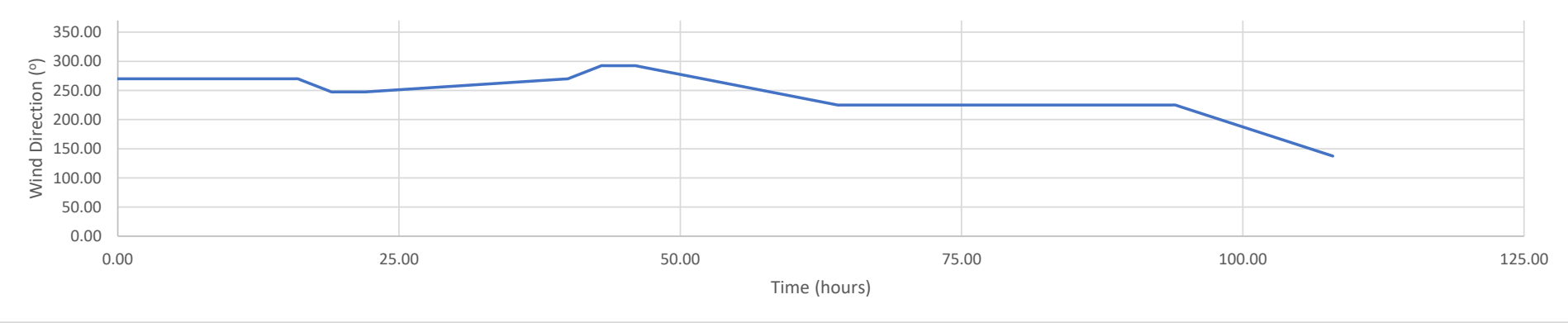
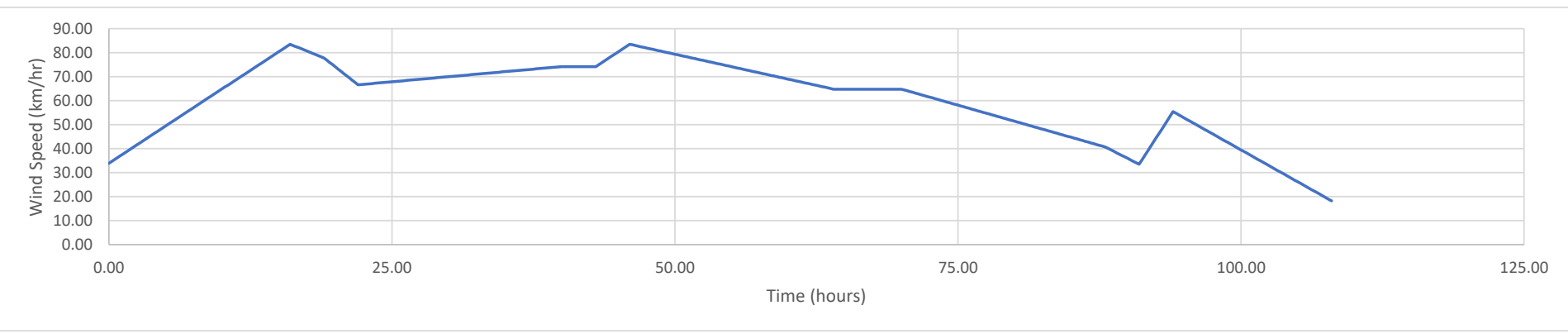
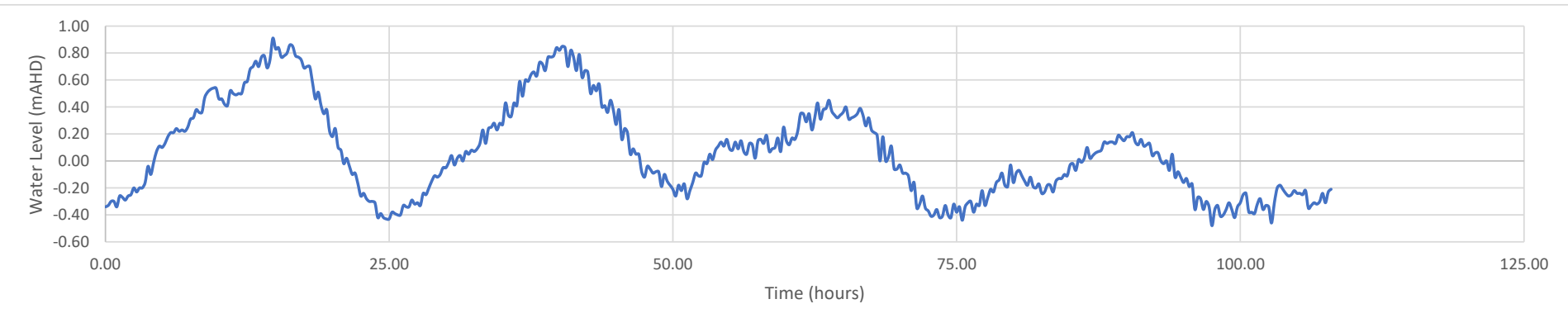
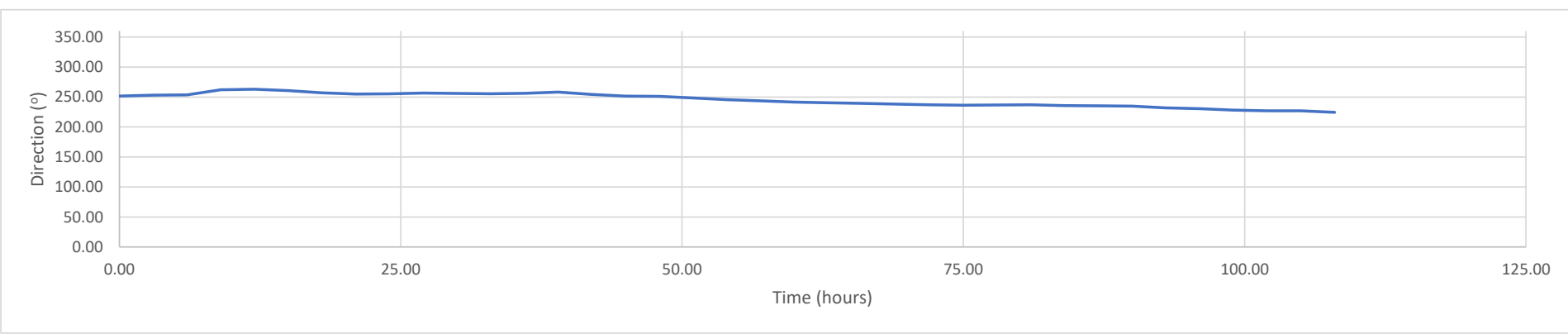
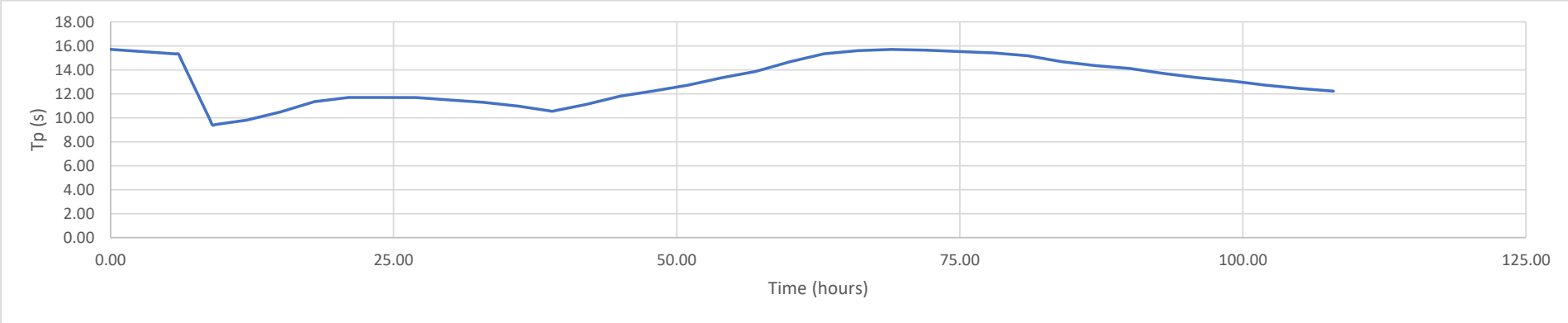
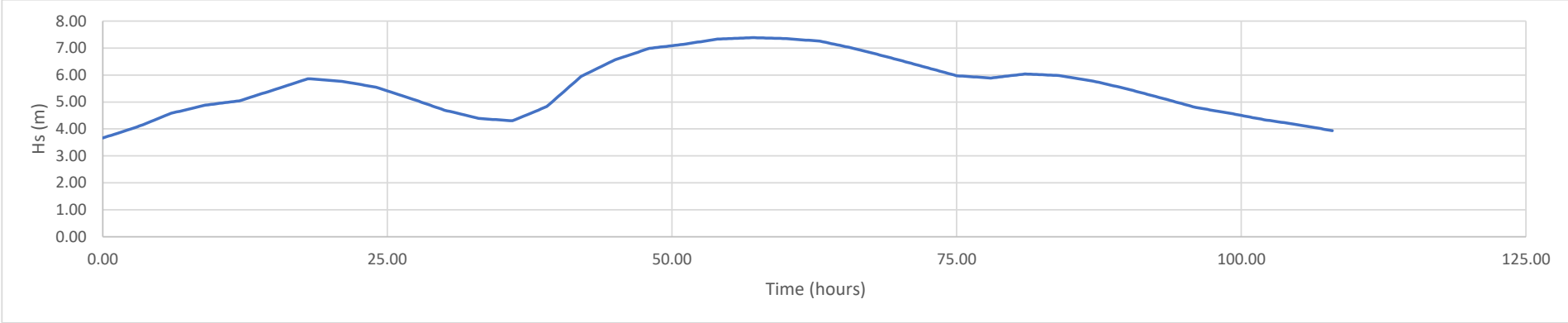
K1509 - South West Storm Selection
Design Storm Sequences

Location	Metropolitan
ARI Storm Sequence	100 Year
Storm Sequence	2x M11 + M10



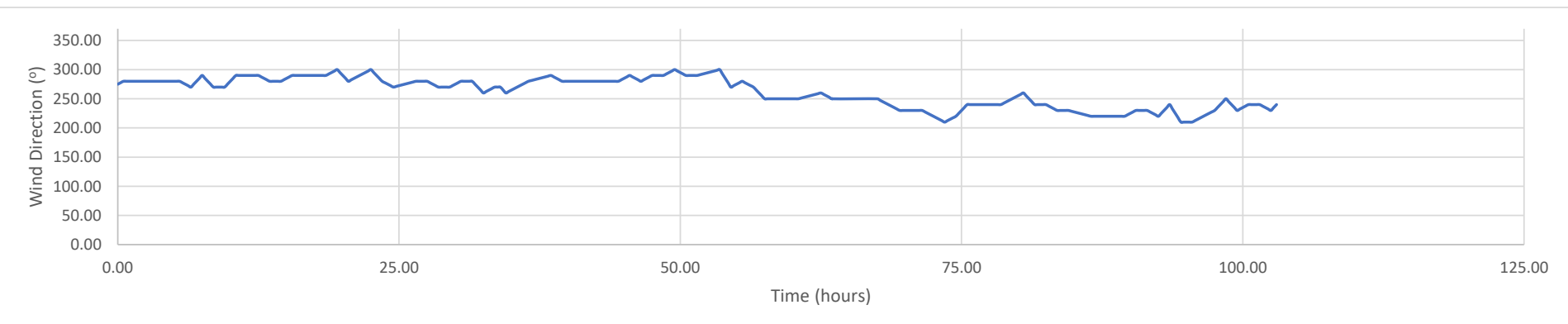
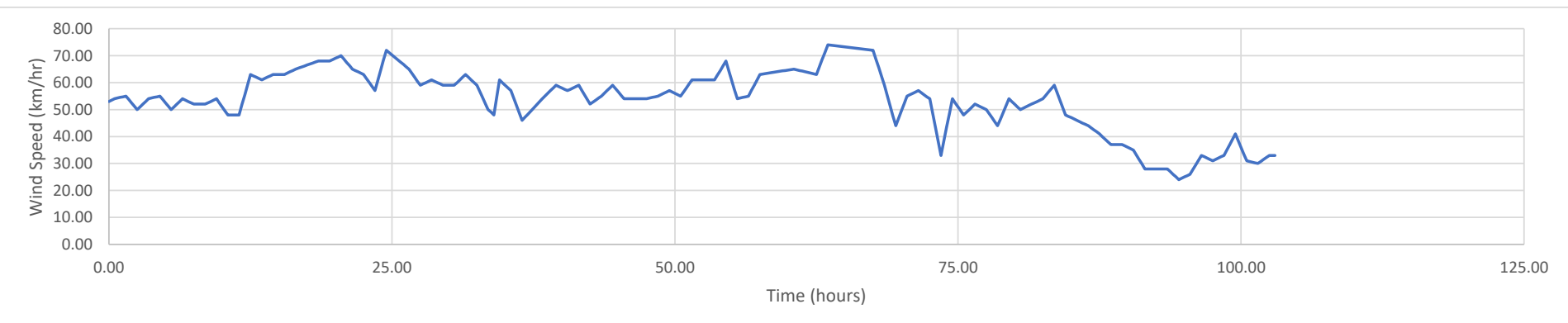
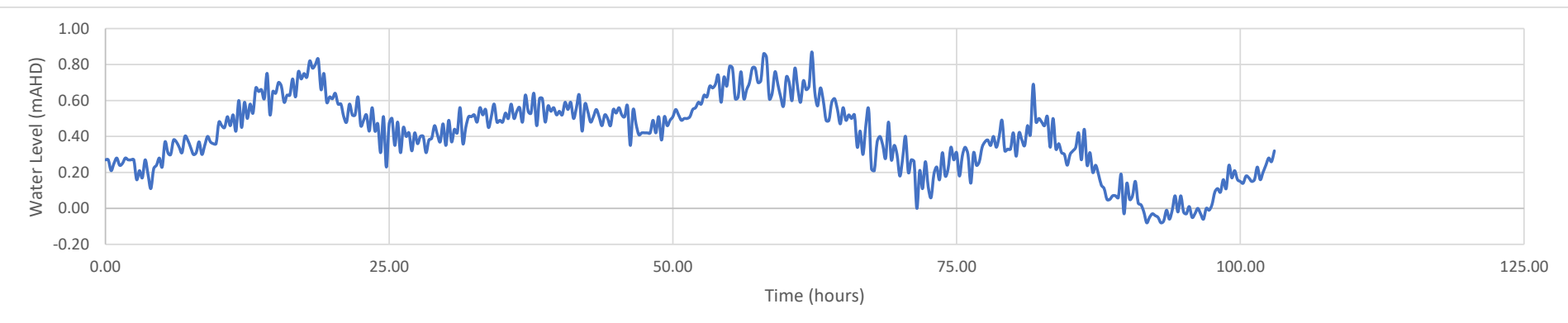
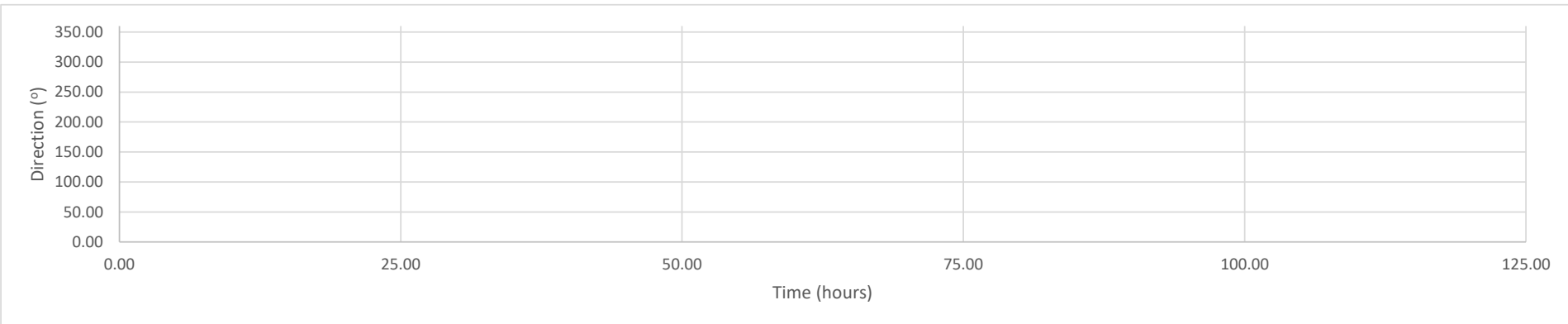
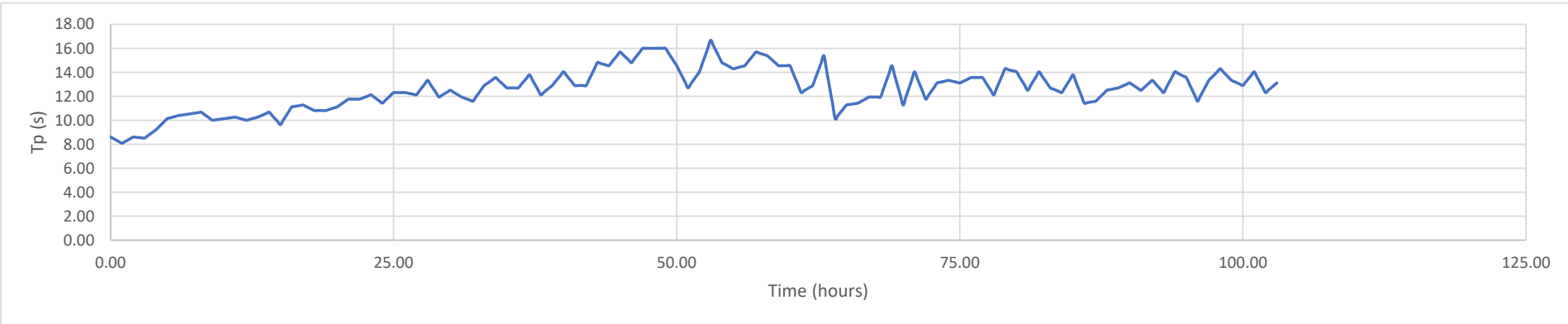
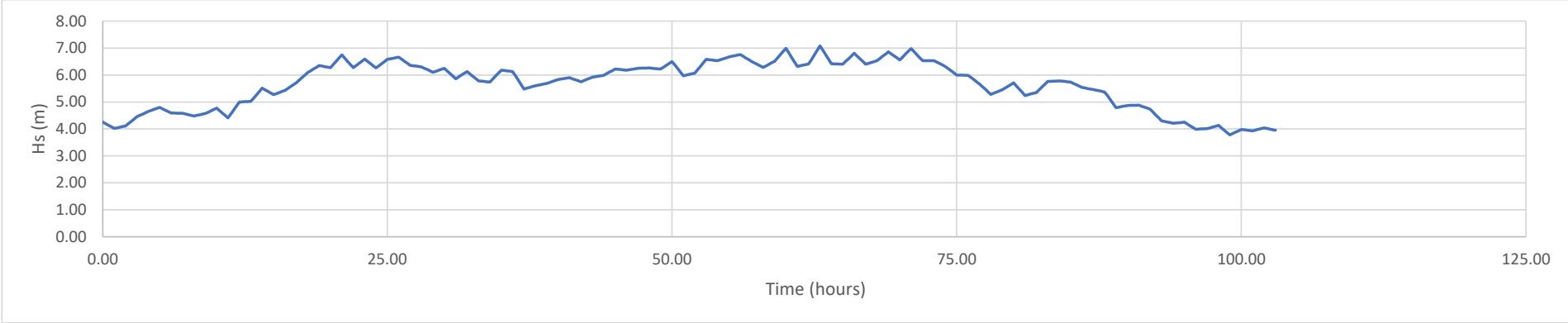
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	1 Year
Storm Sequence	C5



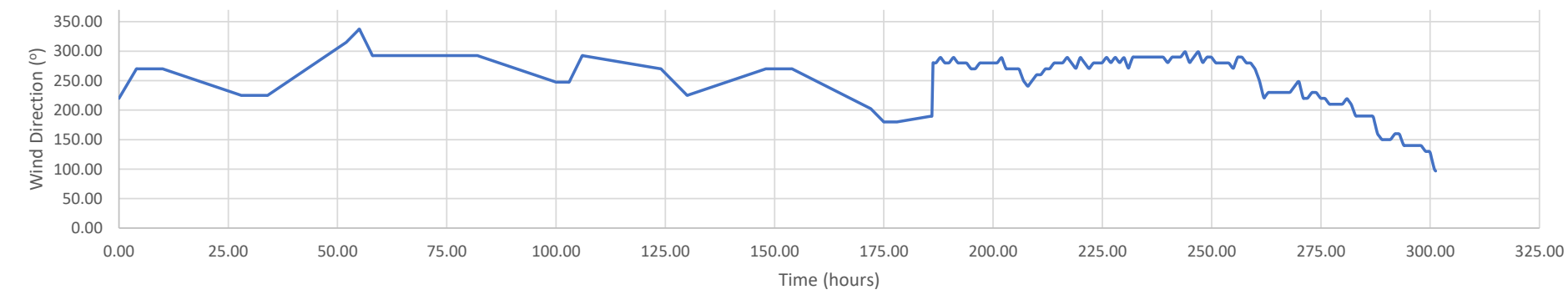
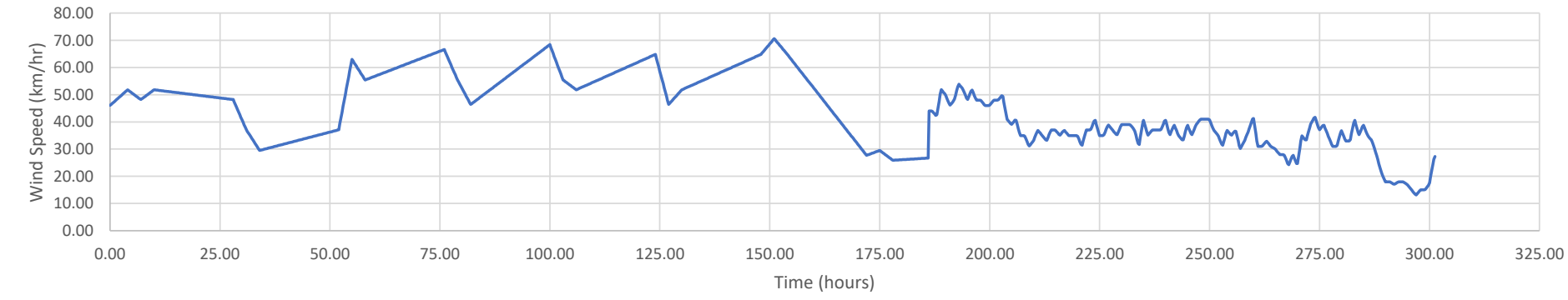
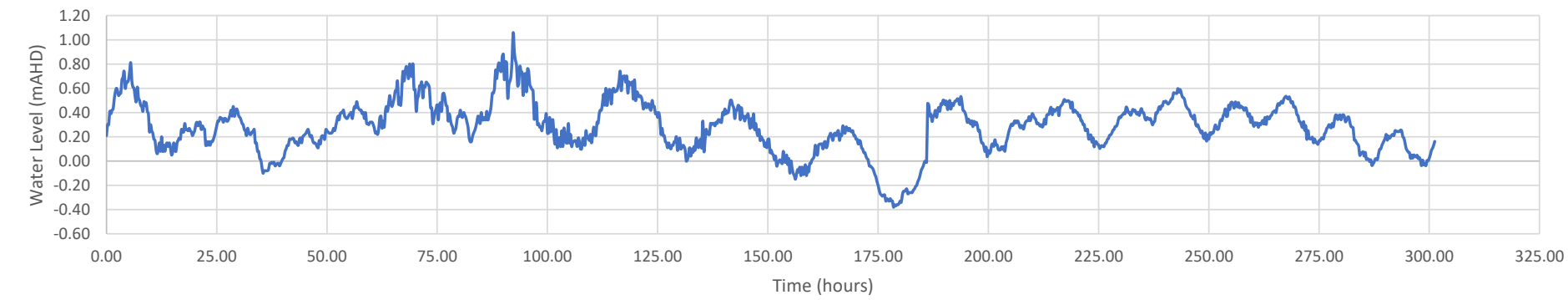
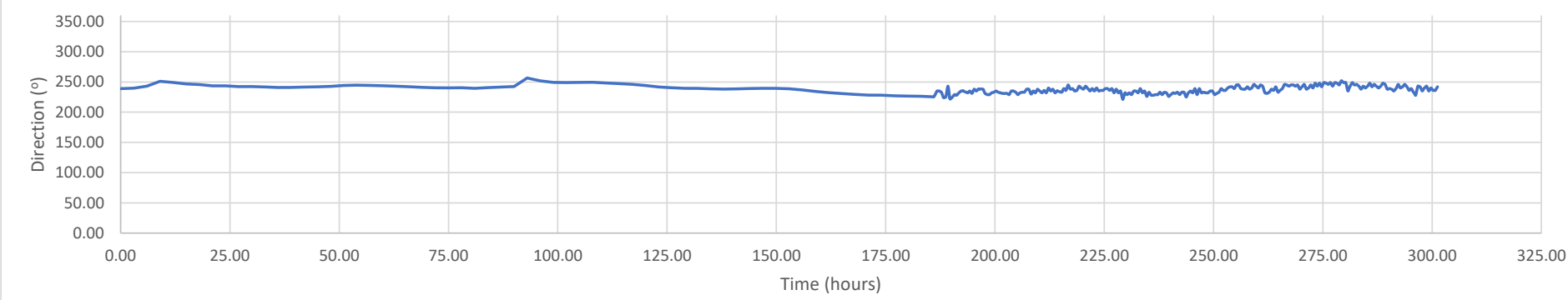
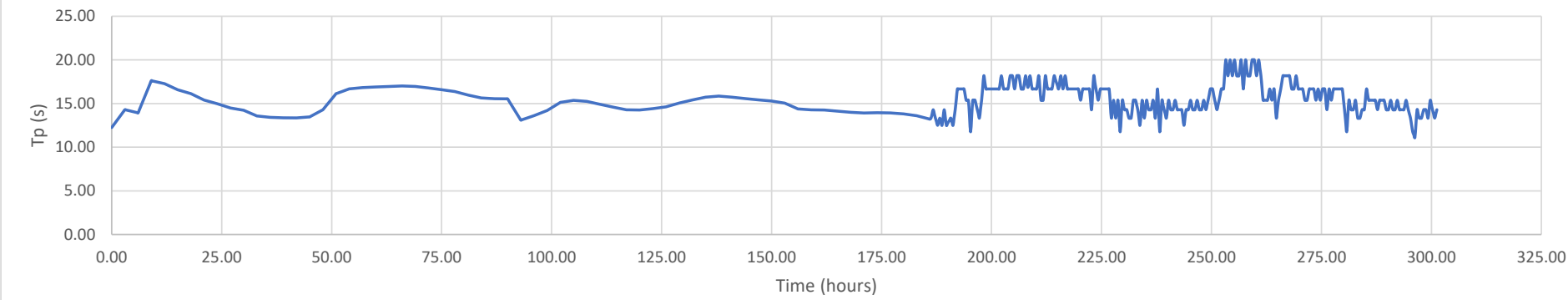
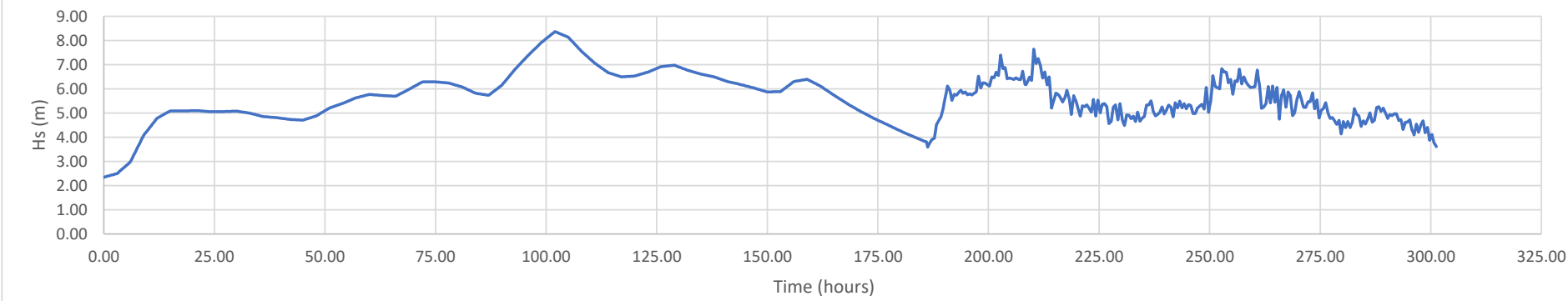
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	1 Year
Storm Sequence	C4



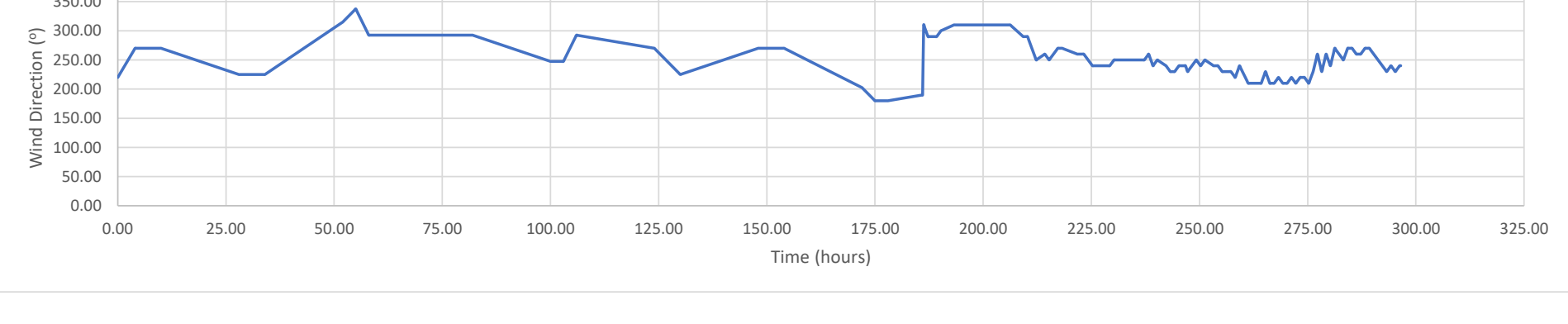
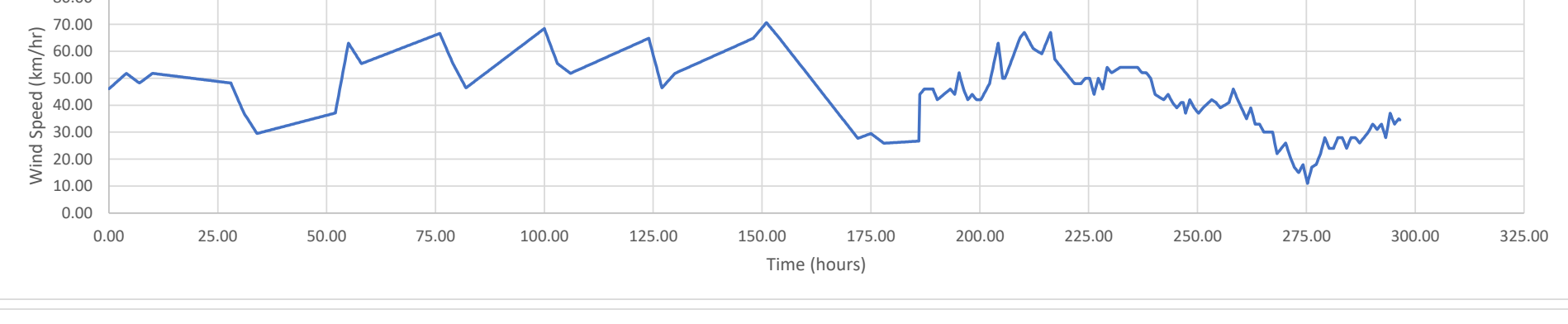
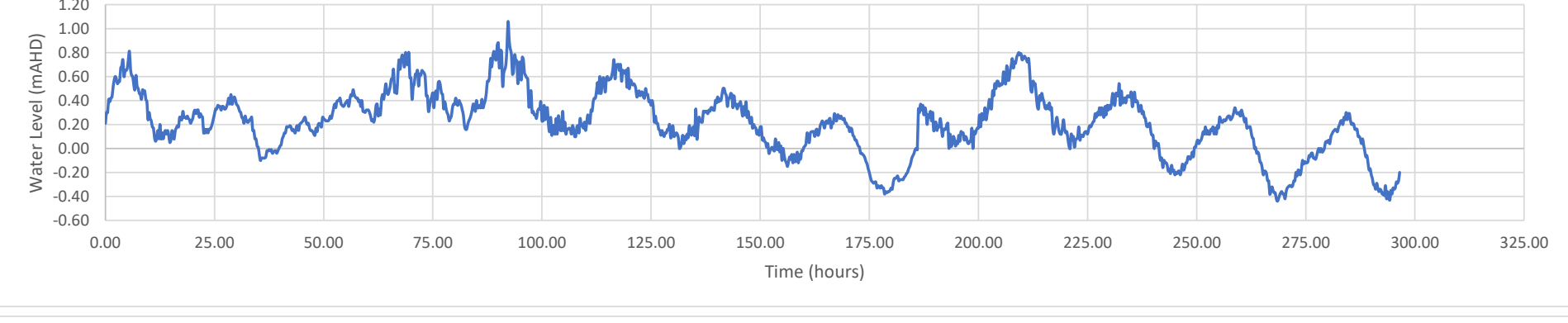
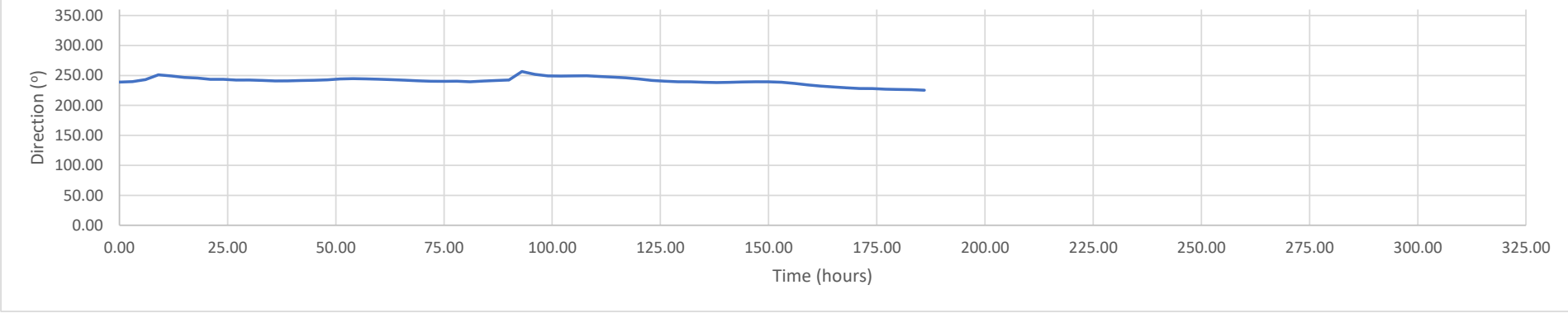
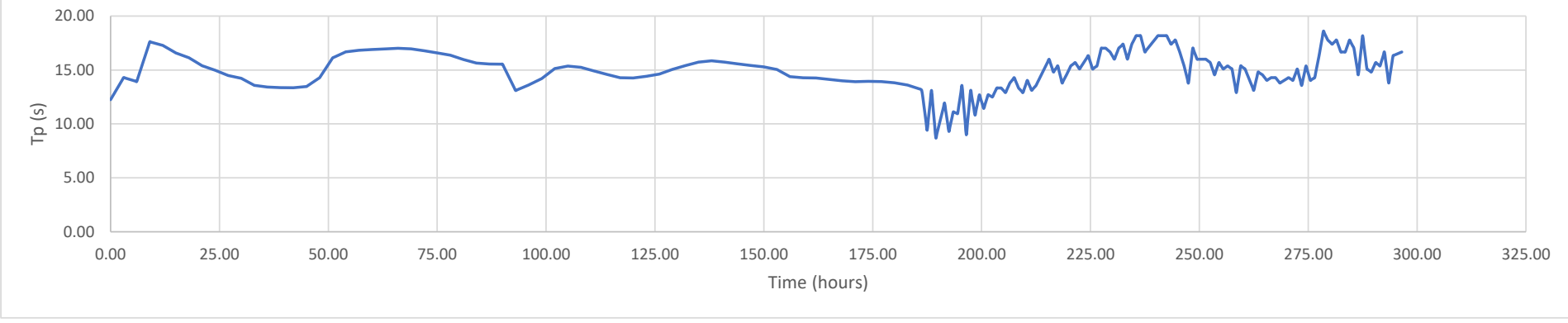
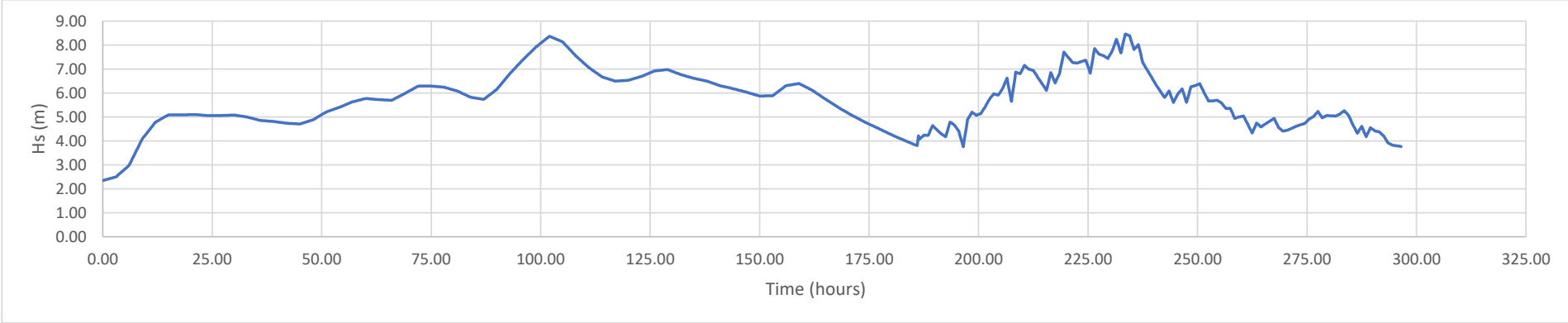
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	10 Year
Storm Sequence	C9 + C7



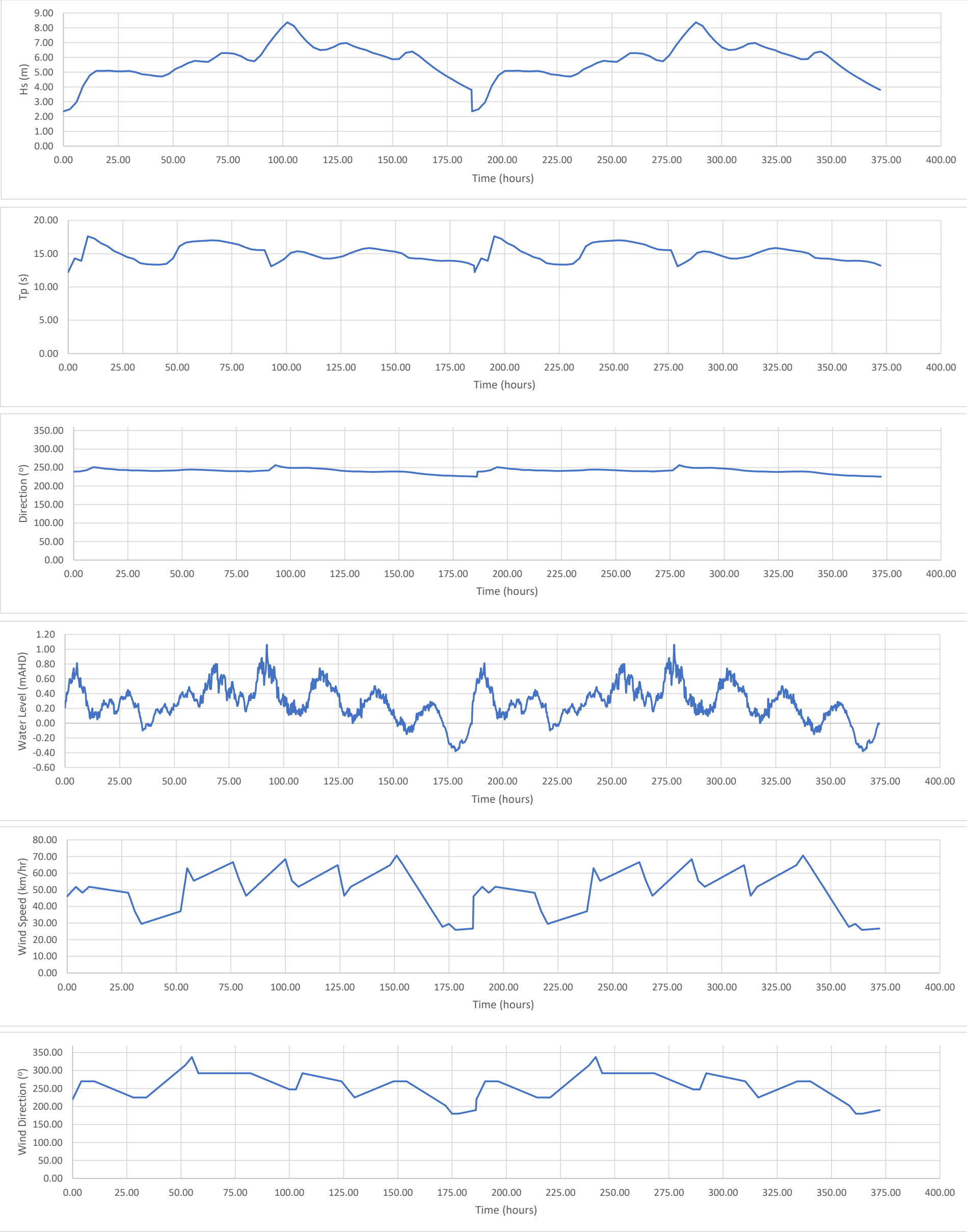
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	10 Year
Storm Sequence	C9 + C6



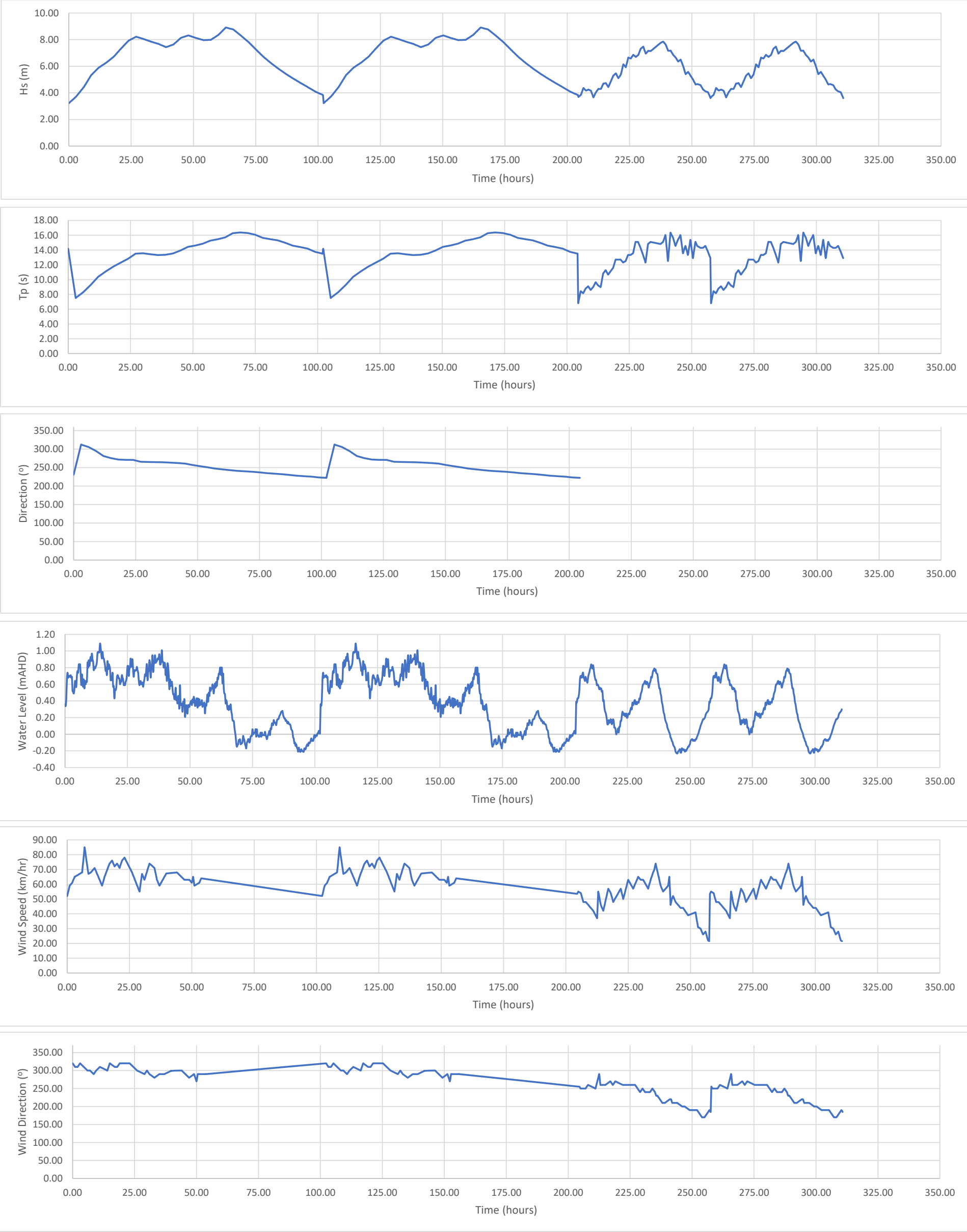
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	25 Year
Storm Sequence	2x C9



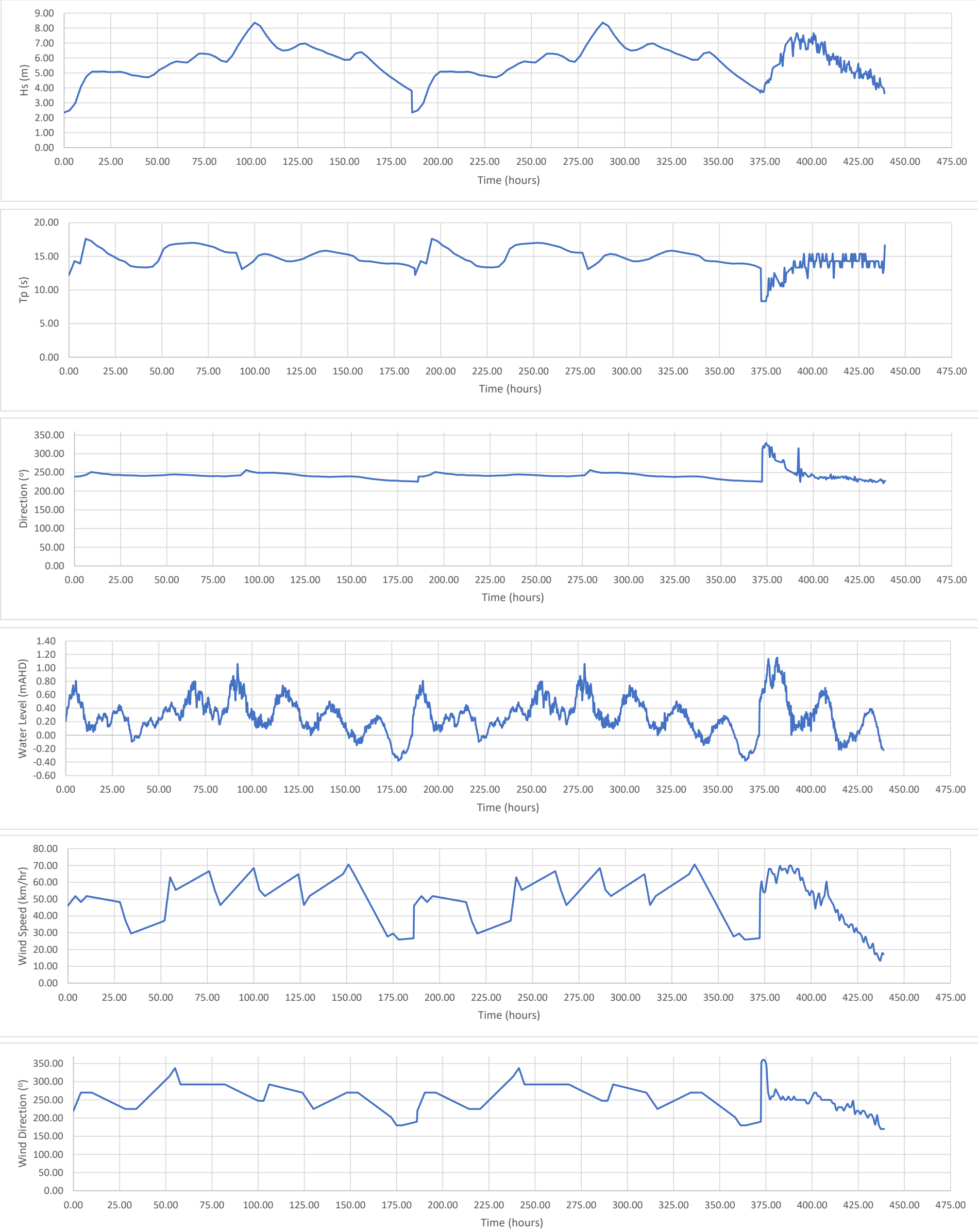
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	25 Year
Storm Sequence	2x C8 + 2x C1



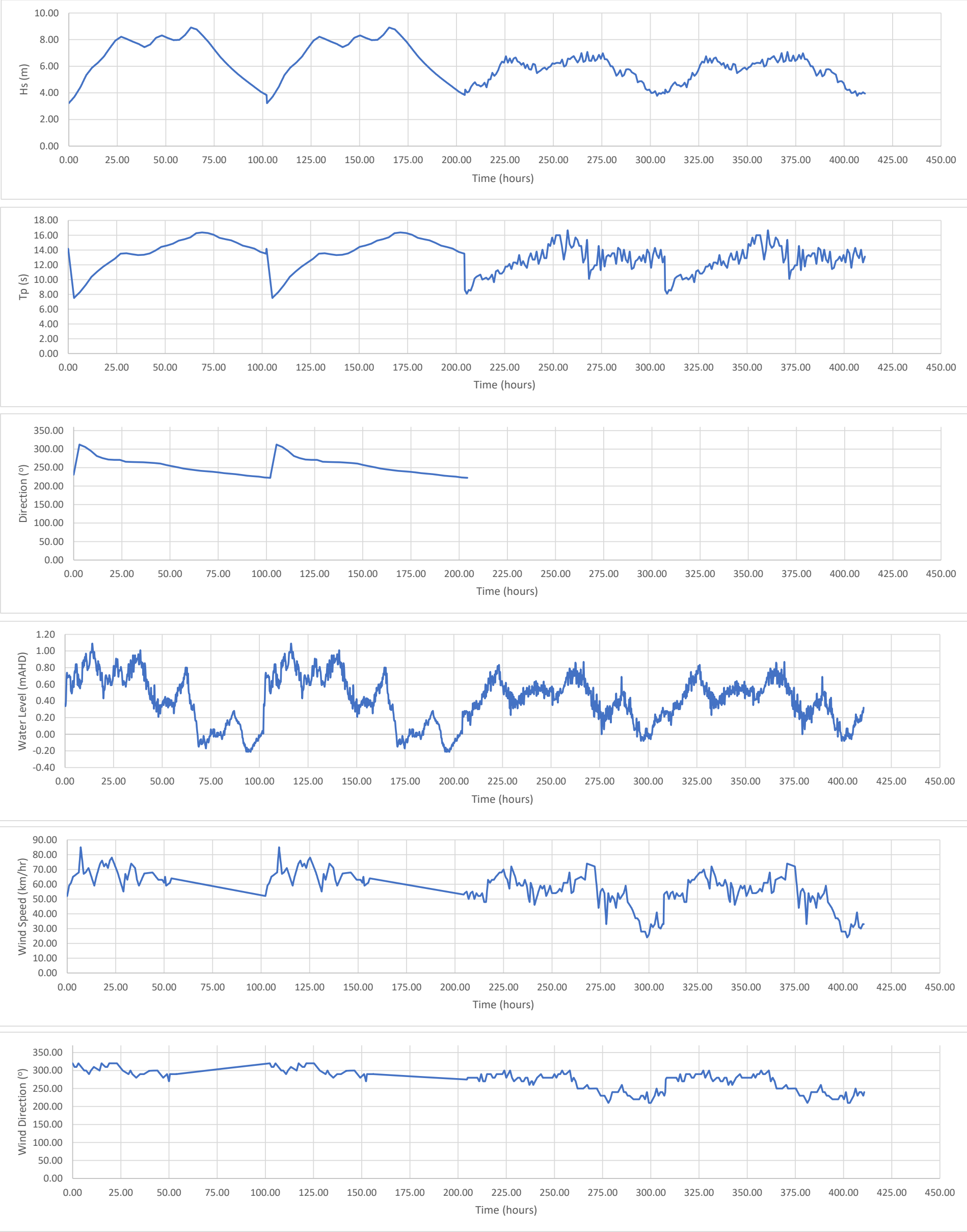
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	50 Year
Storm Sequence	2x C9 + C2



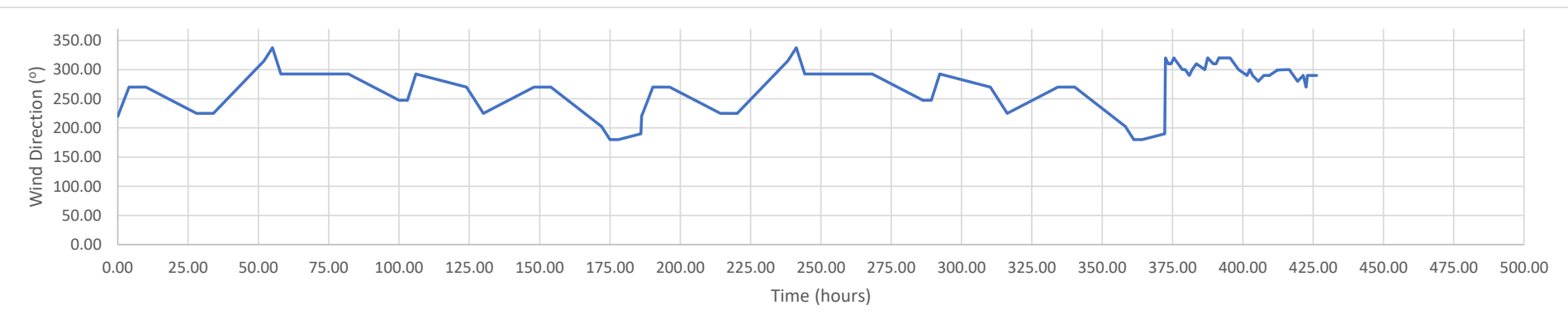
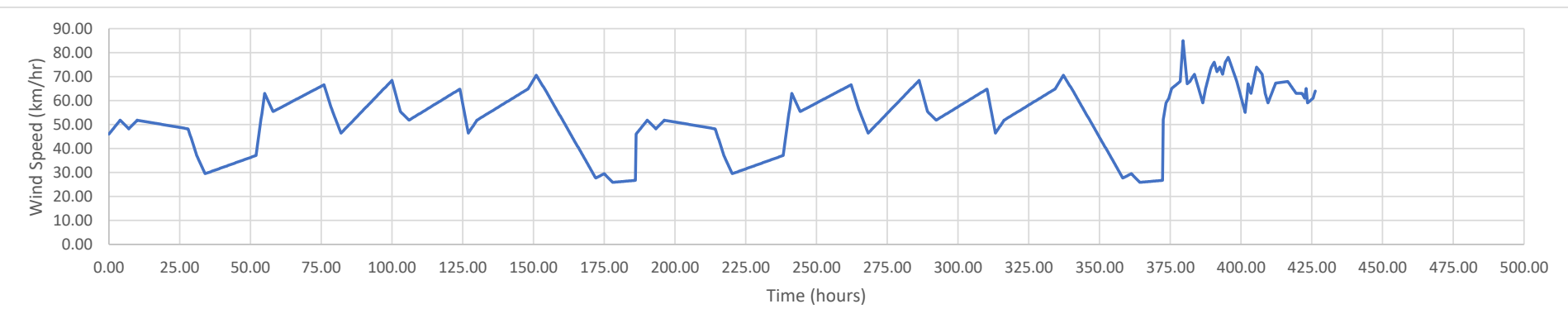
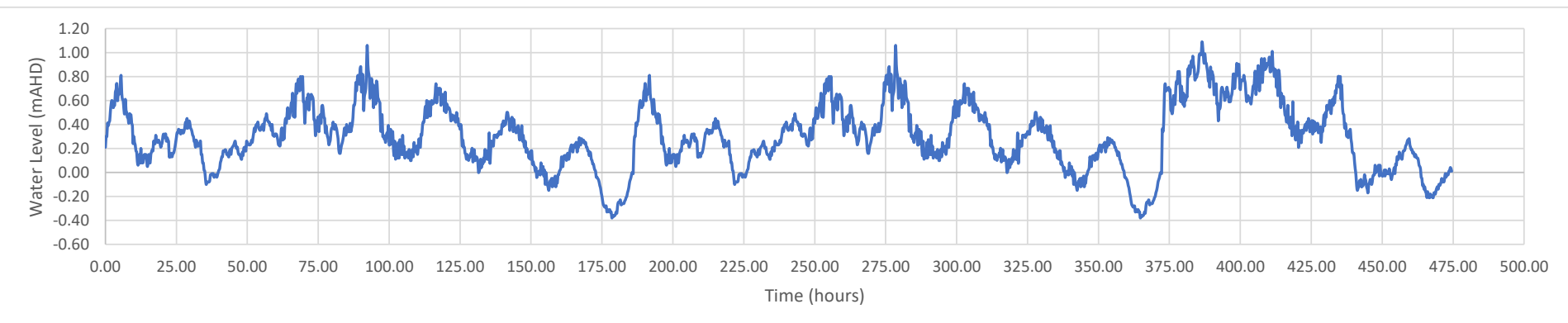
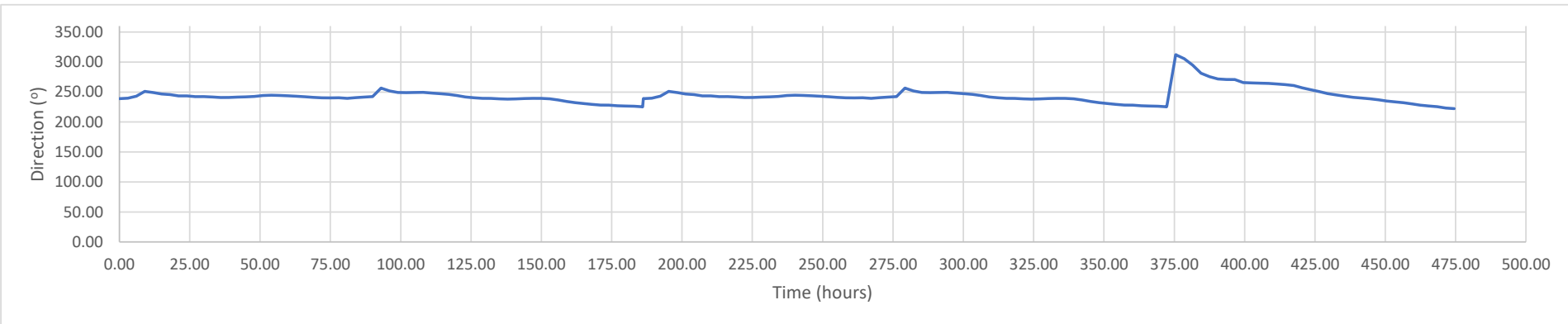
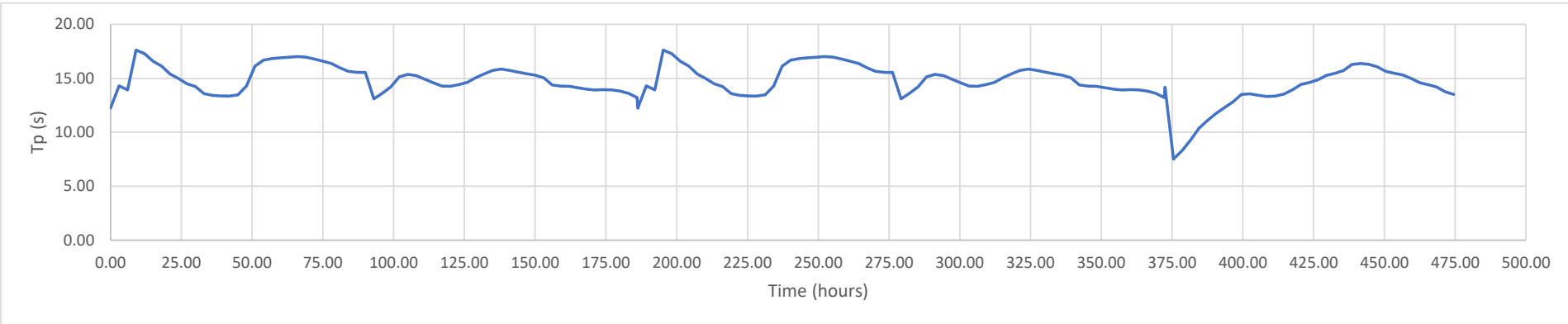
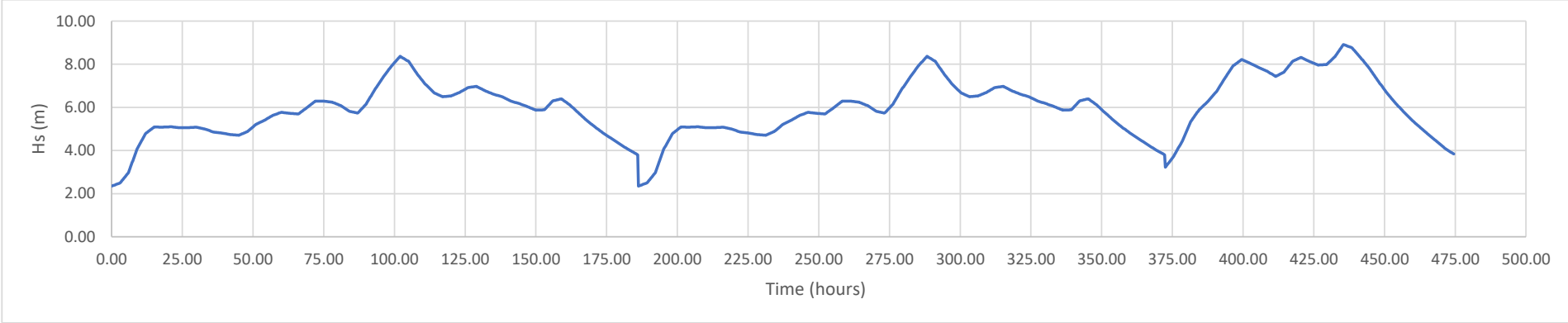
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	50 Year
Storm Sequence	2x C8 + 2x C4



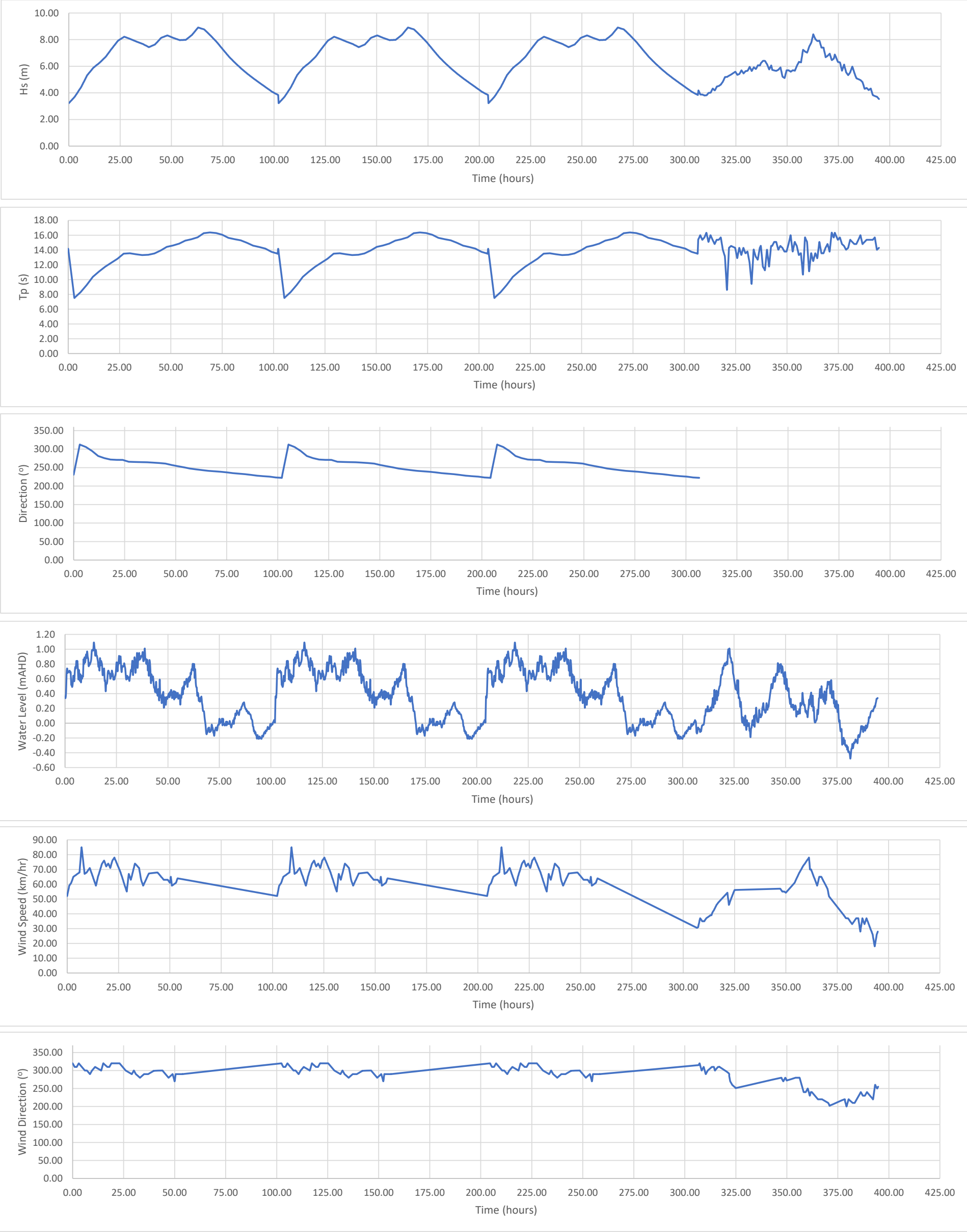
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	100 Year
Storm Sequence	2x C9 + C8



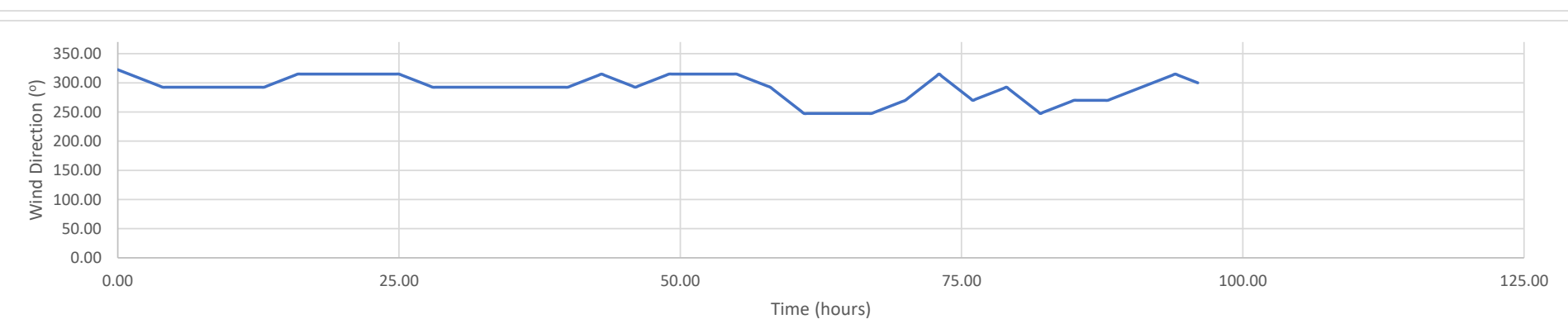
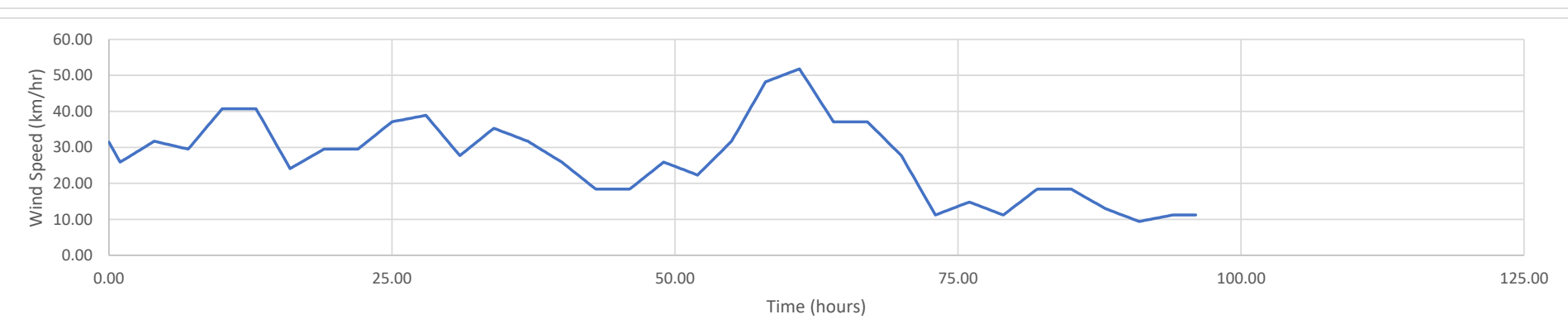
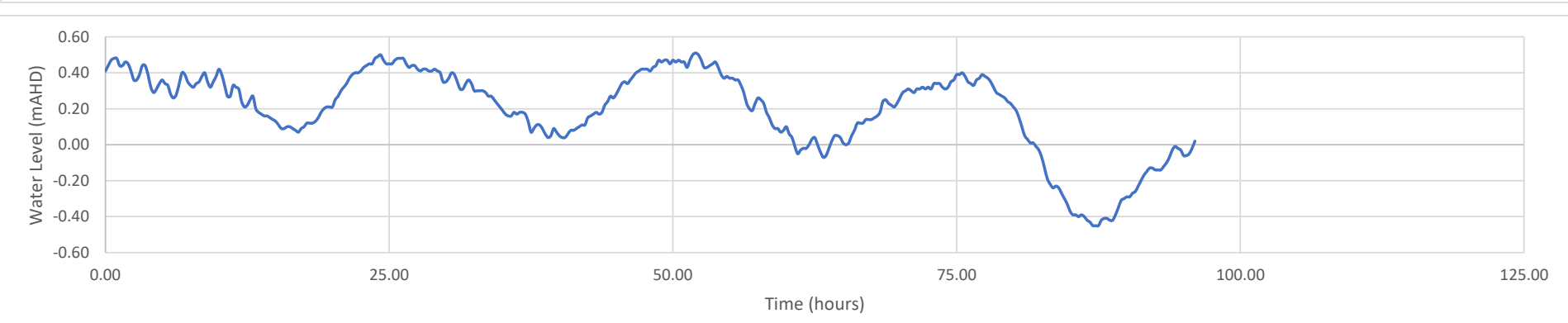
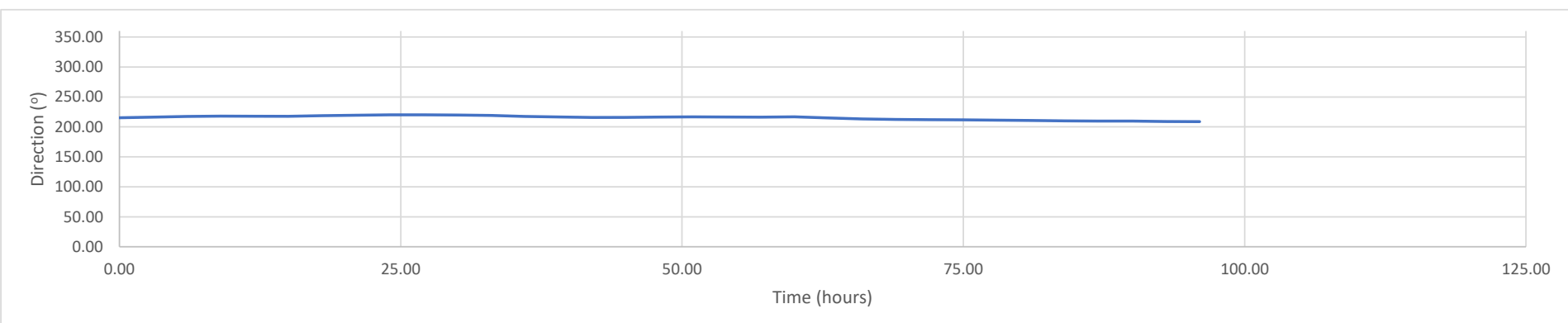
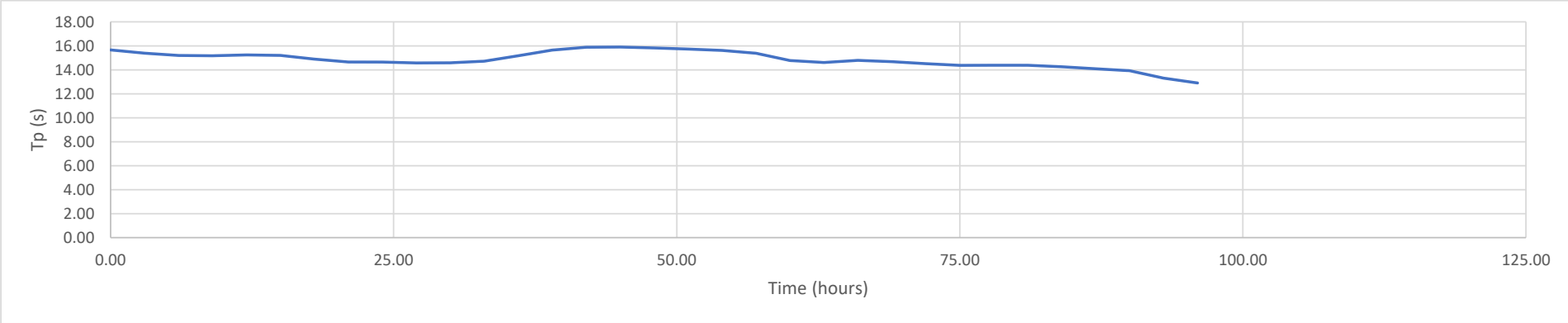
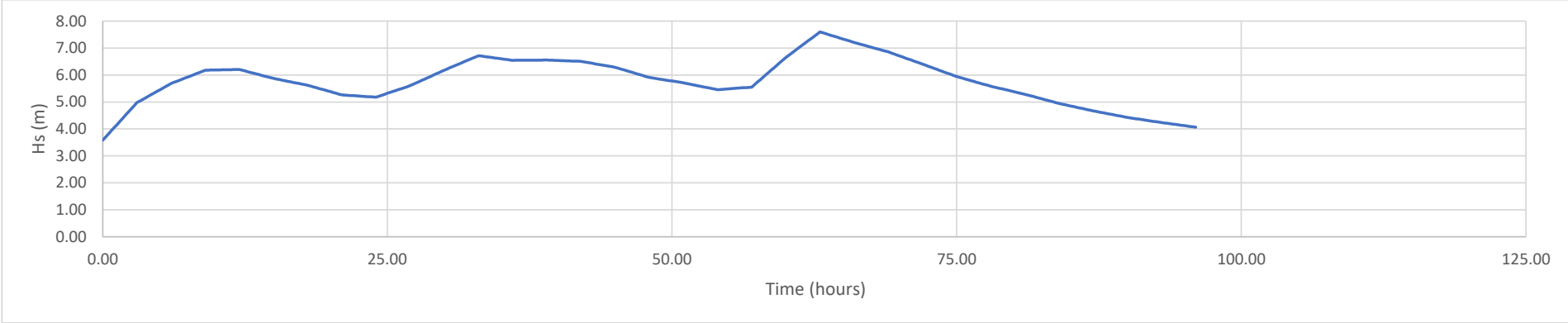
K1509 - South West Storm Selection
Design Storm Sequences

Location	Cape Naturaliste
ARI Storm Sequence	100 Year
Storm Sequence	3x C8 + C3



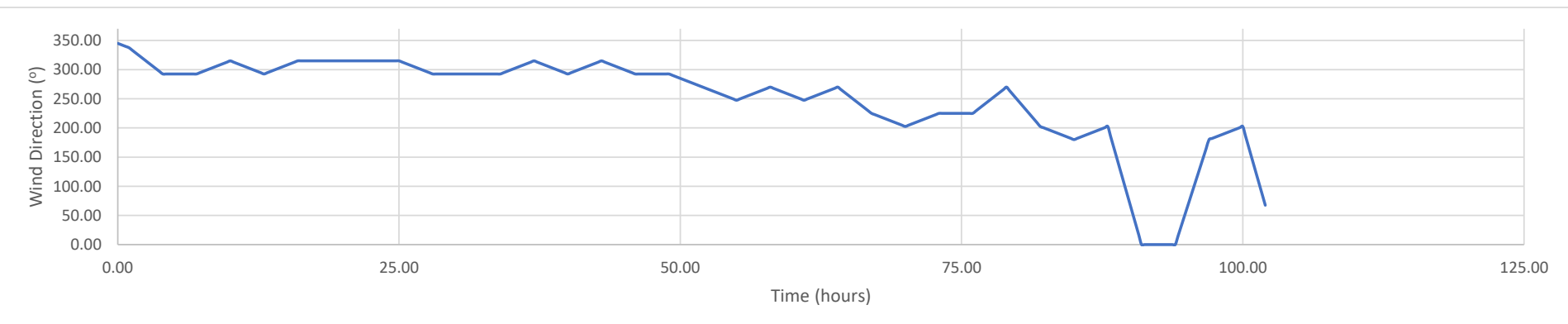
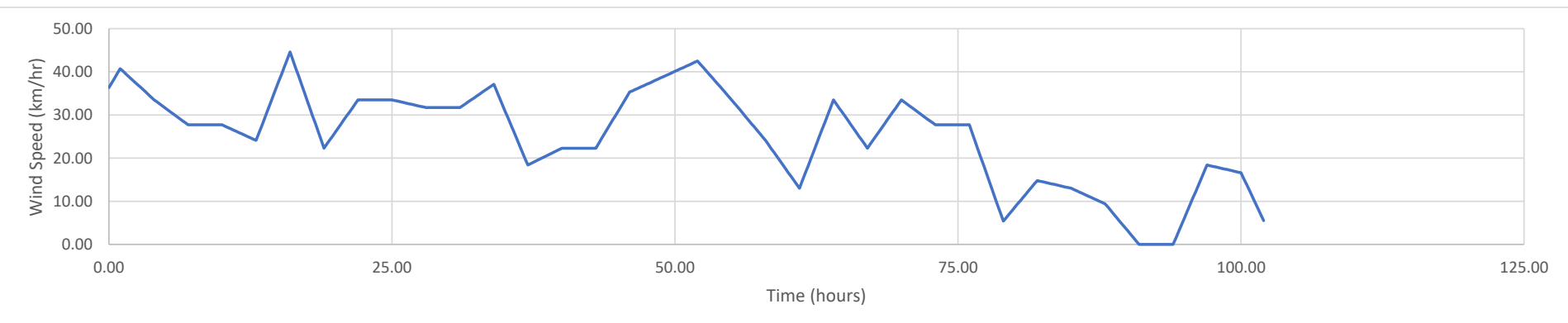
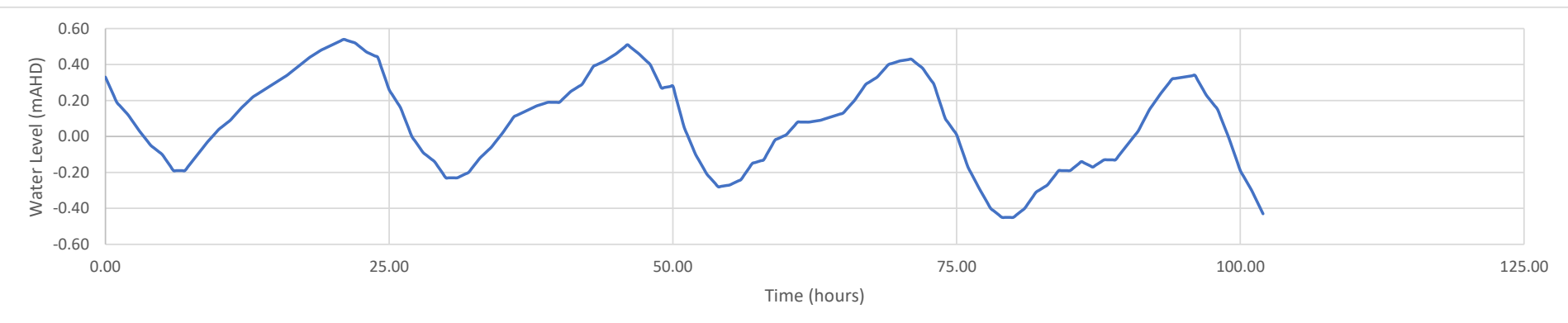
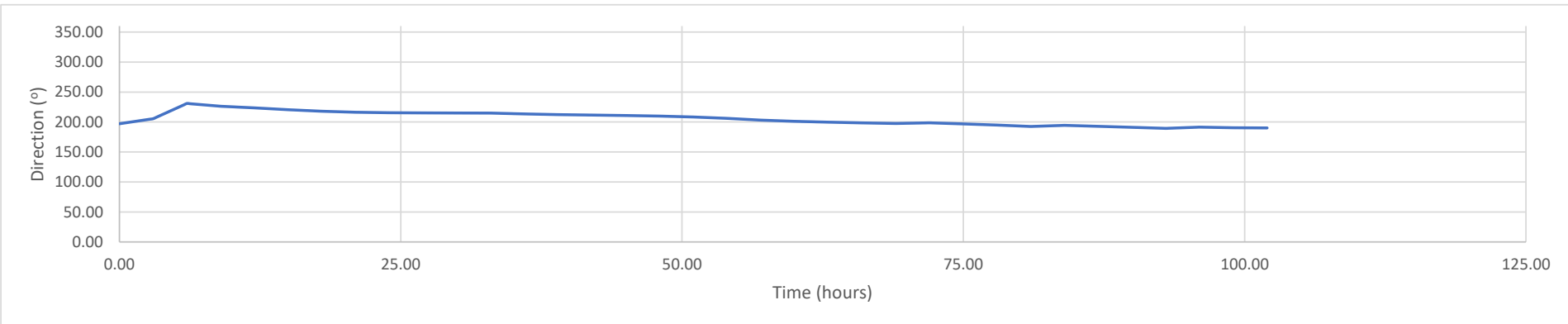
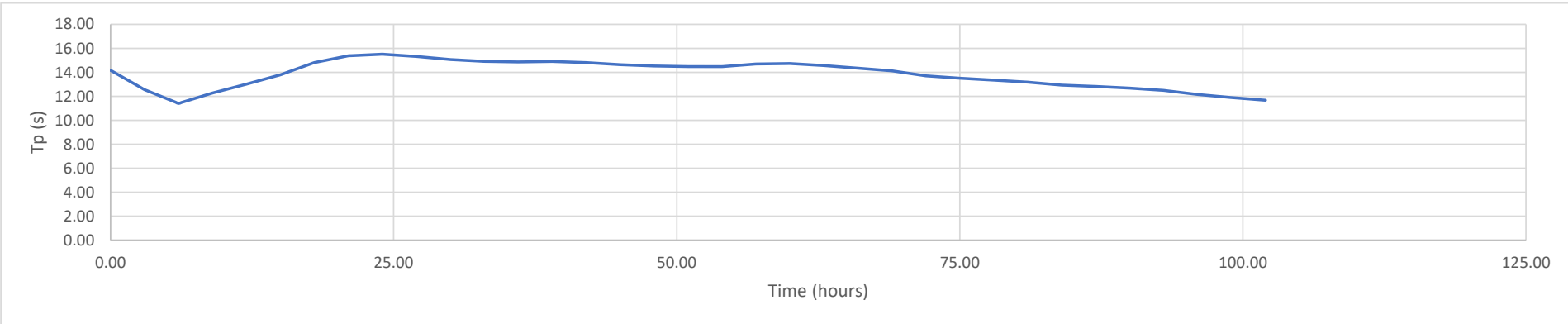
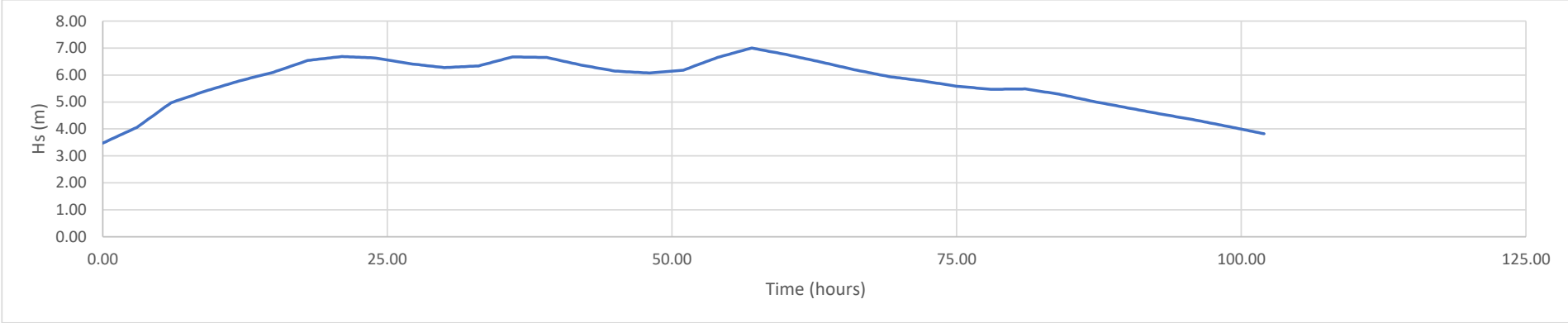
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	1 Year
Storm Sequence	A8



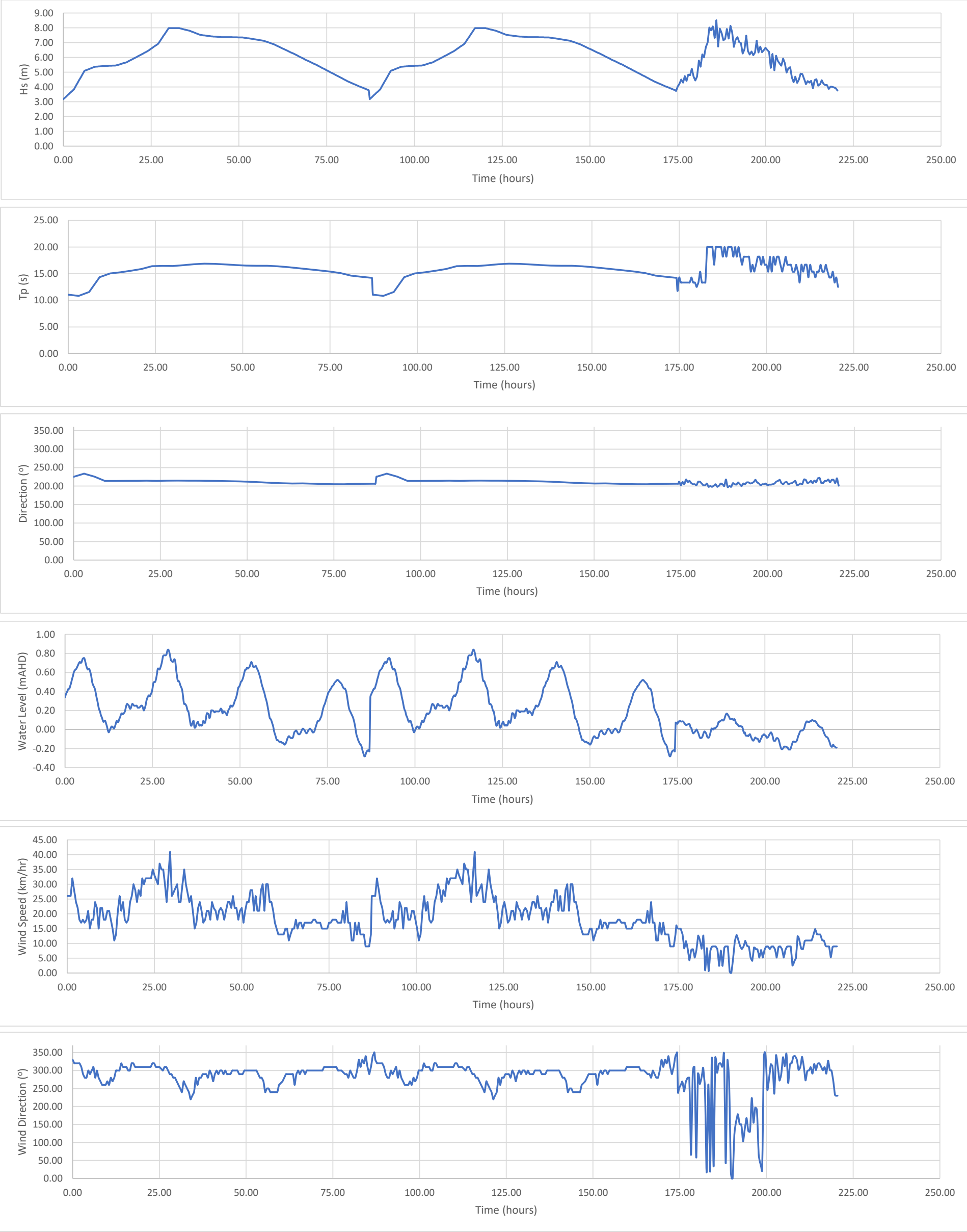
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	1 Year
Storm Sequence	A7



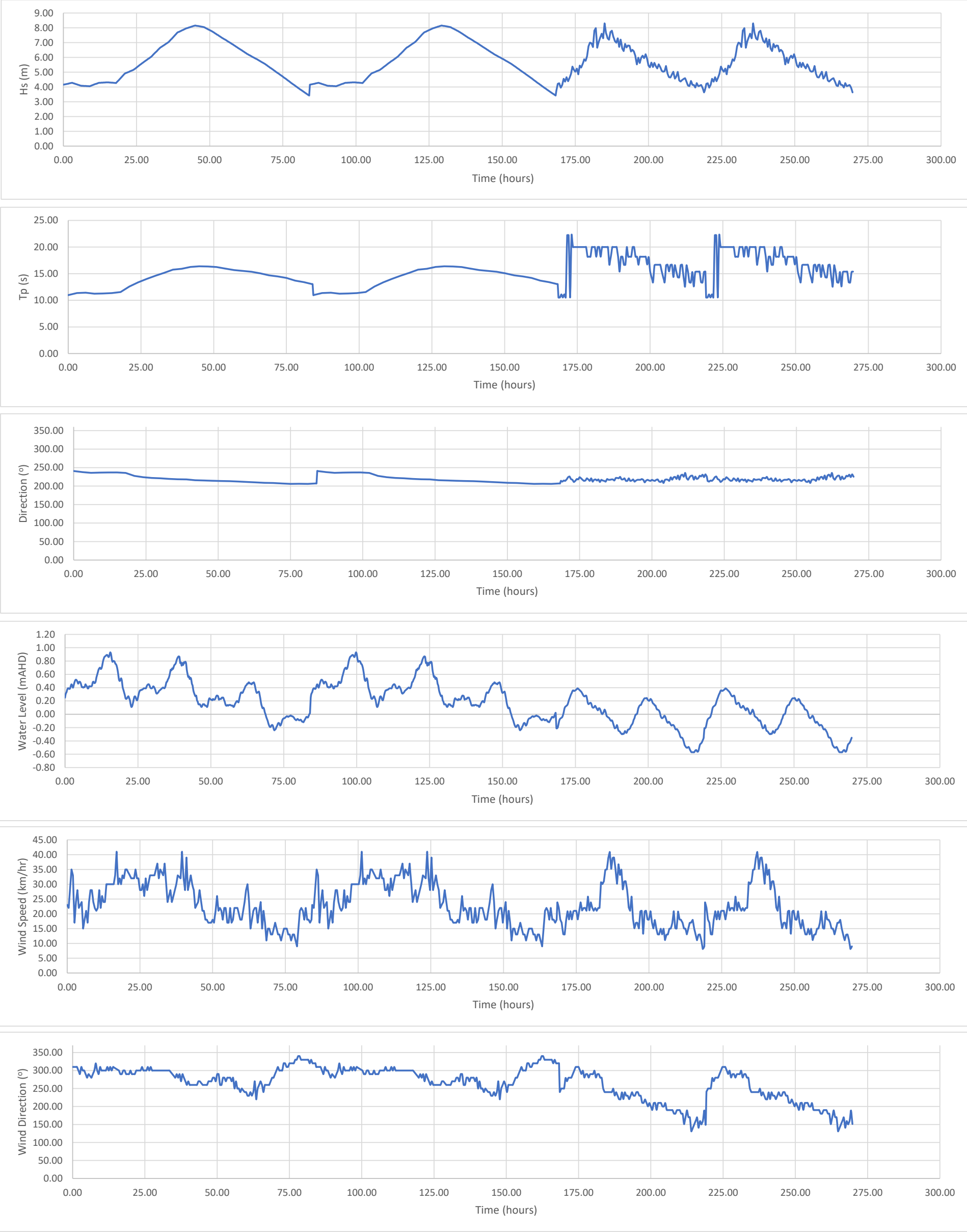
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	10 Year
Storm Sequence	2x A9 + A1



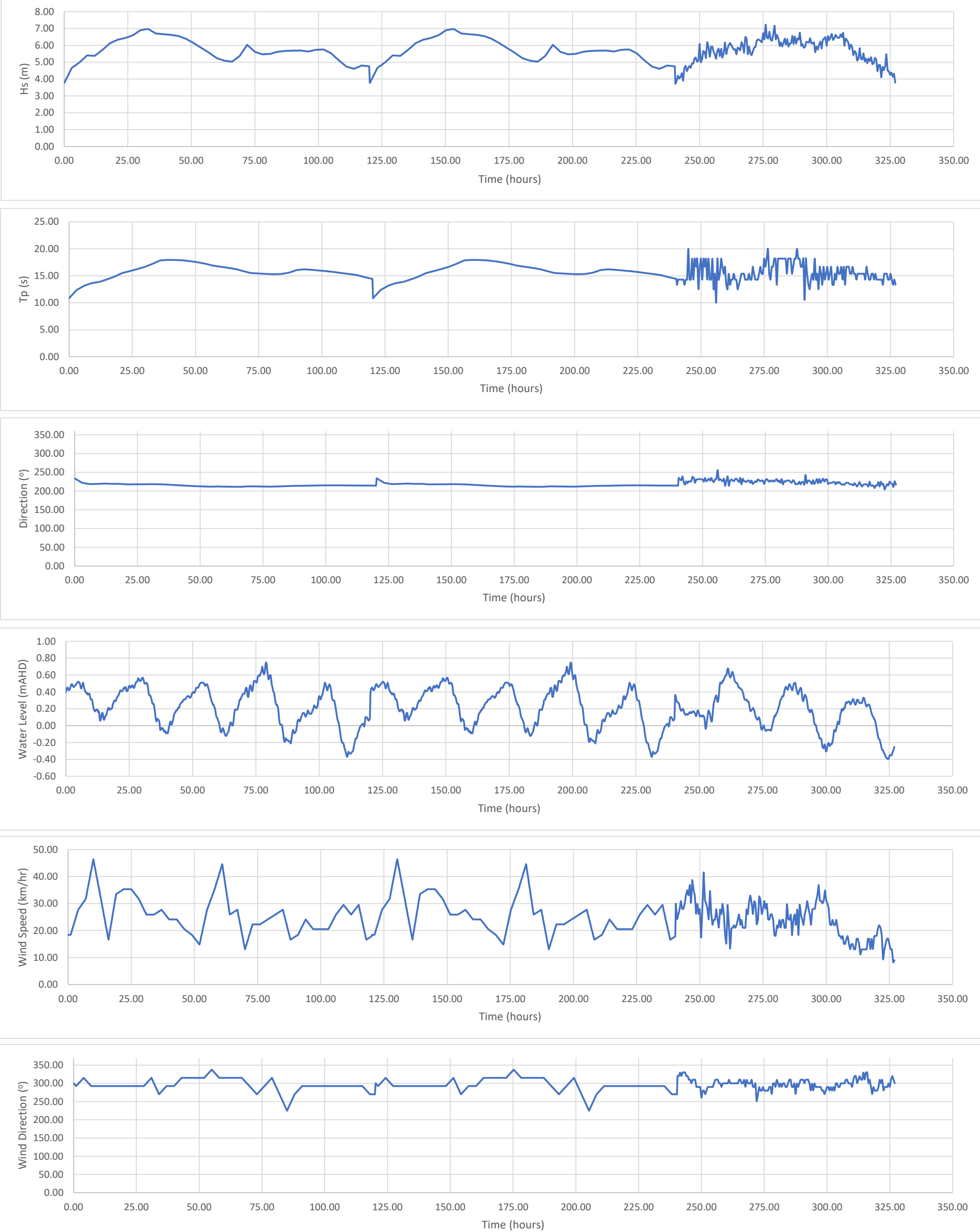
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	10 Year
Storm Sequence	2x A5 + 2x A3



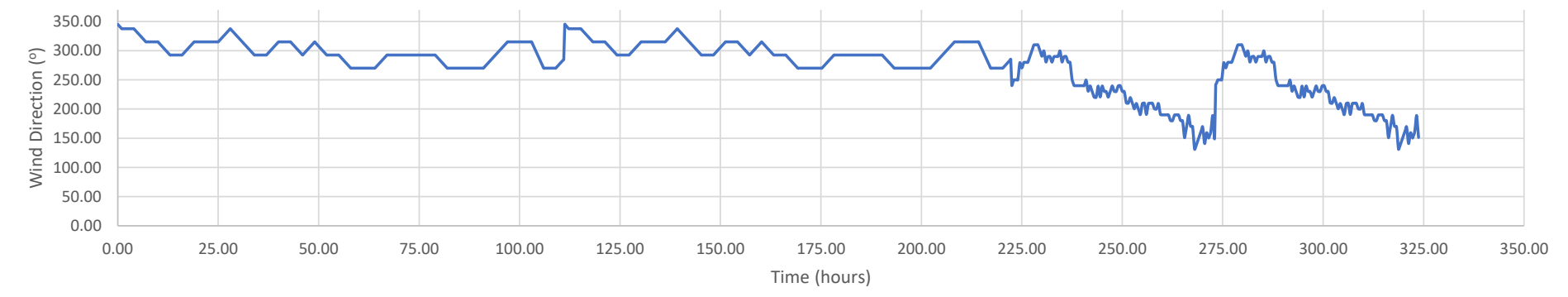
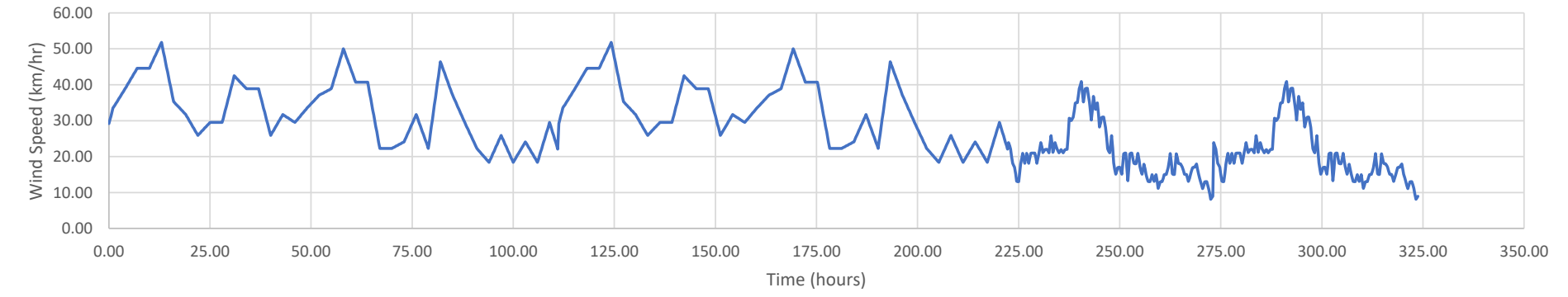
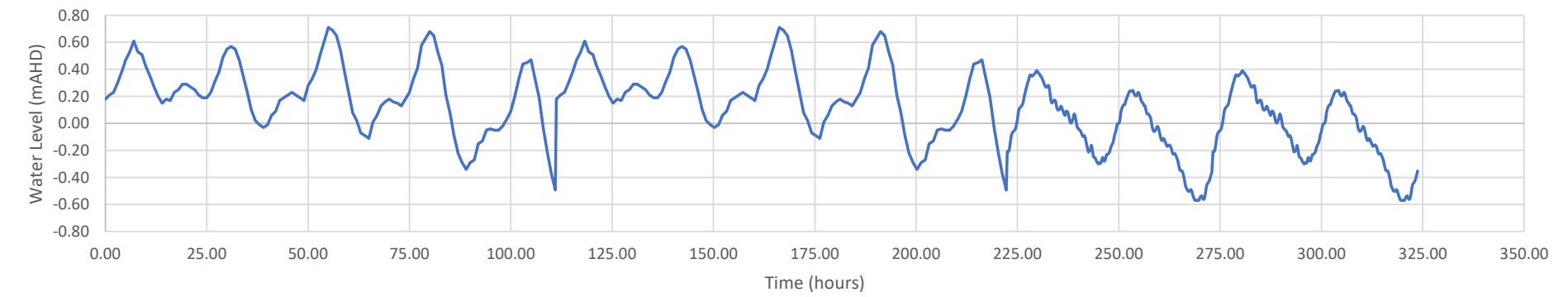
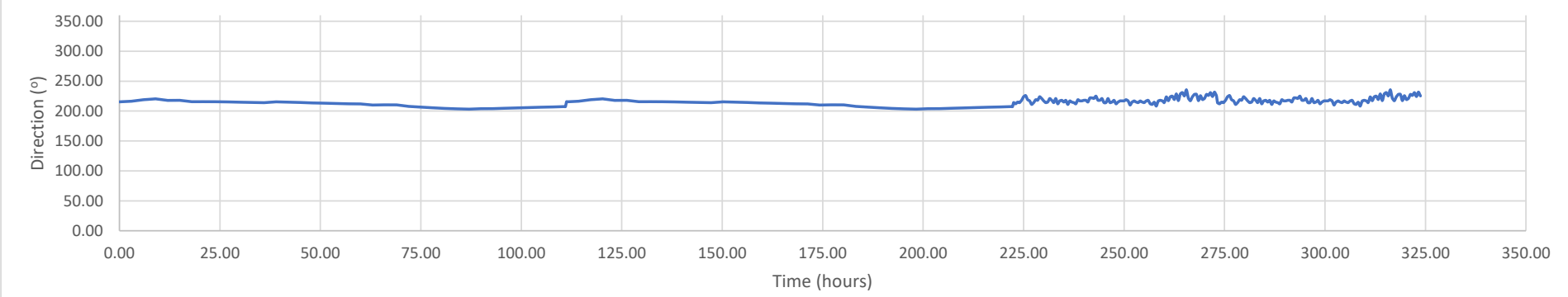
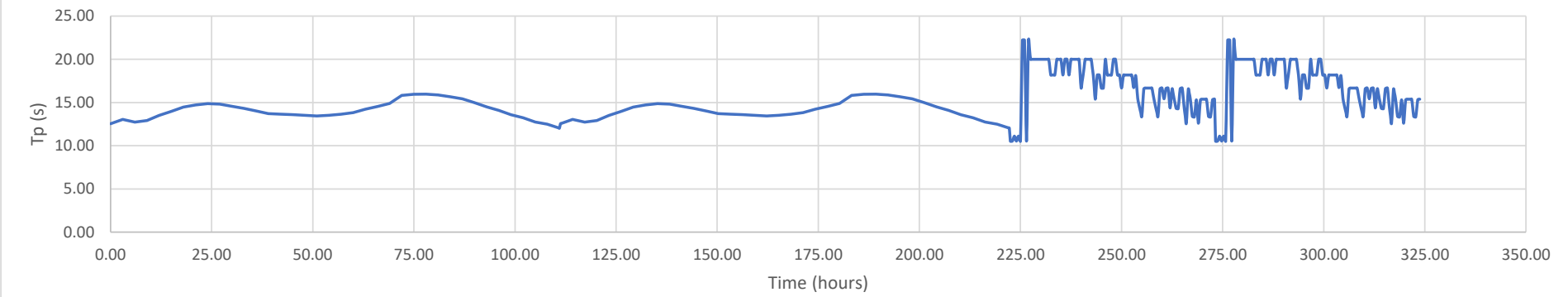
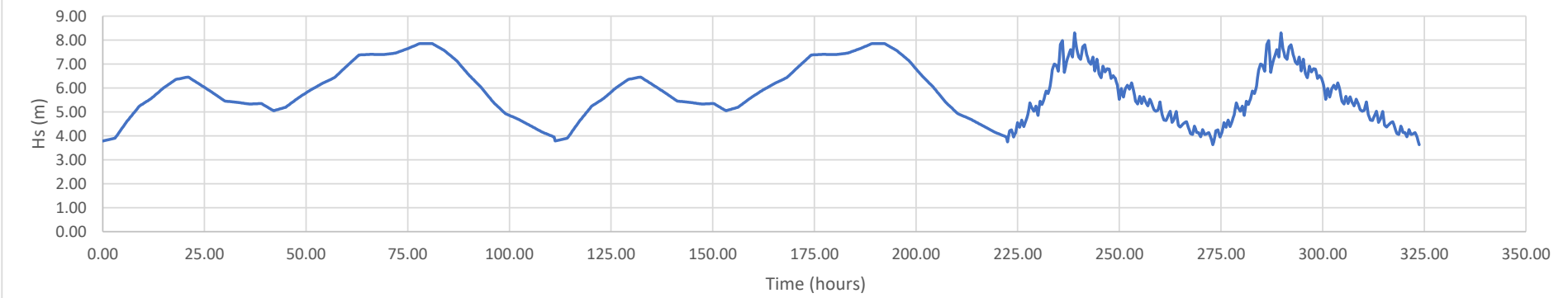
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	25 Year
Storm Sequence	2x A12 + A6



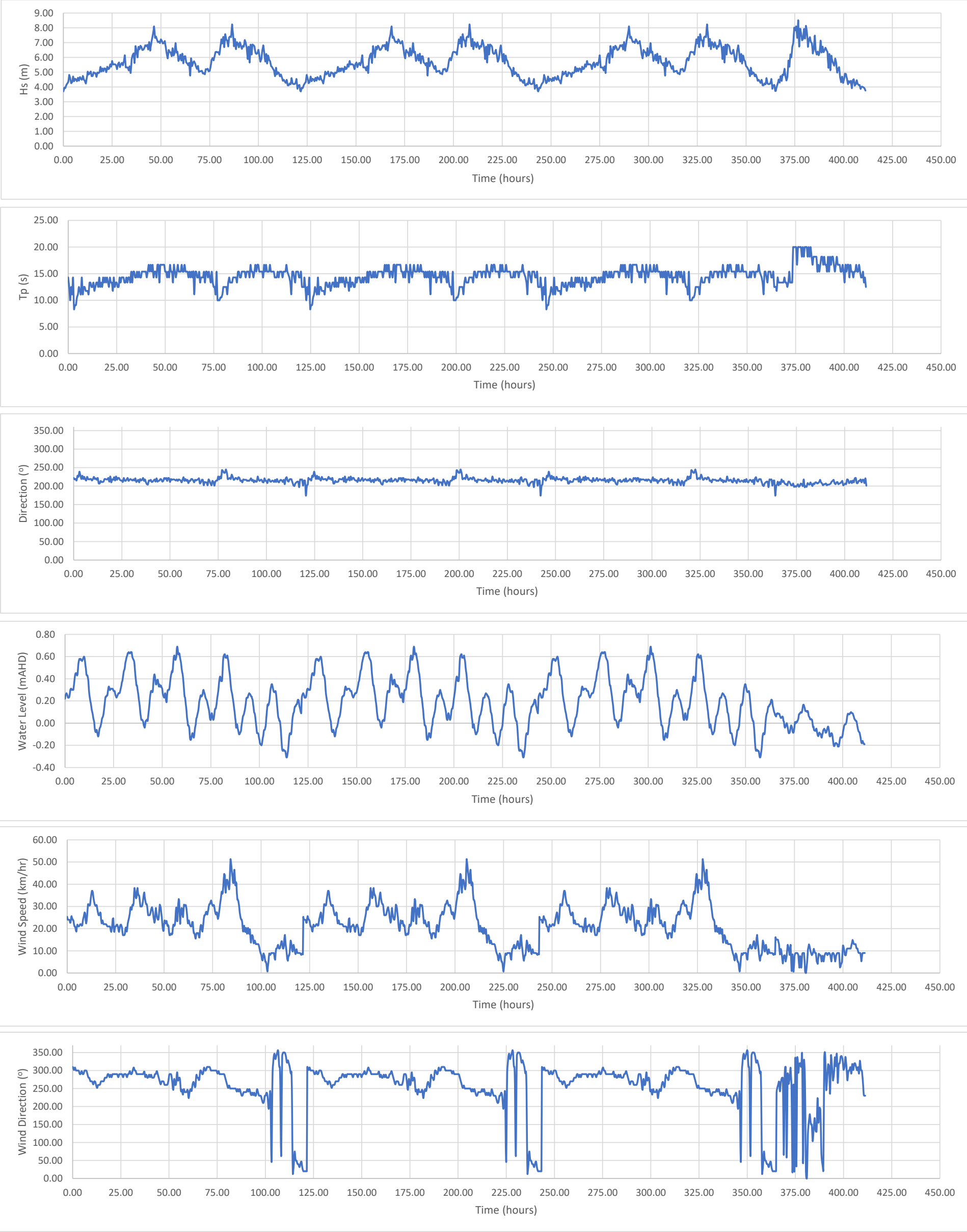
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	25 Year
Storm Sequence	2x A11 + 2x A3



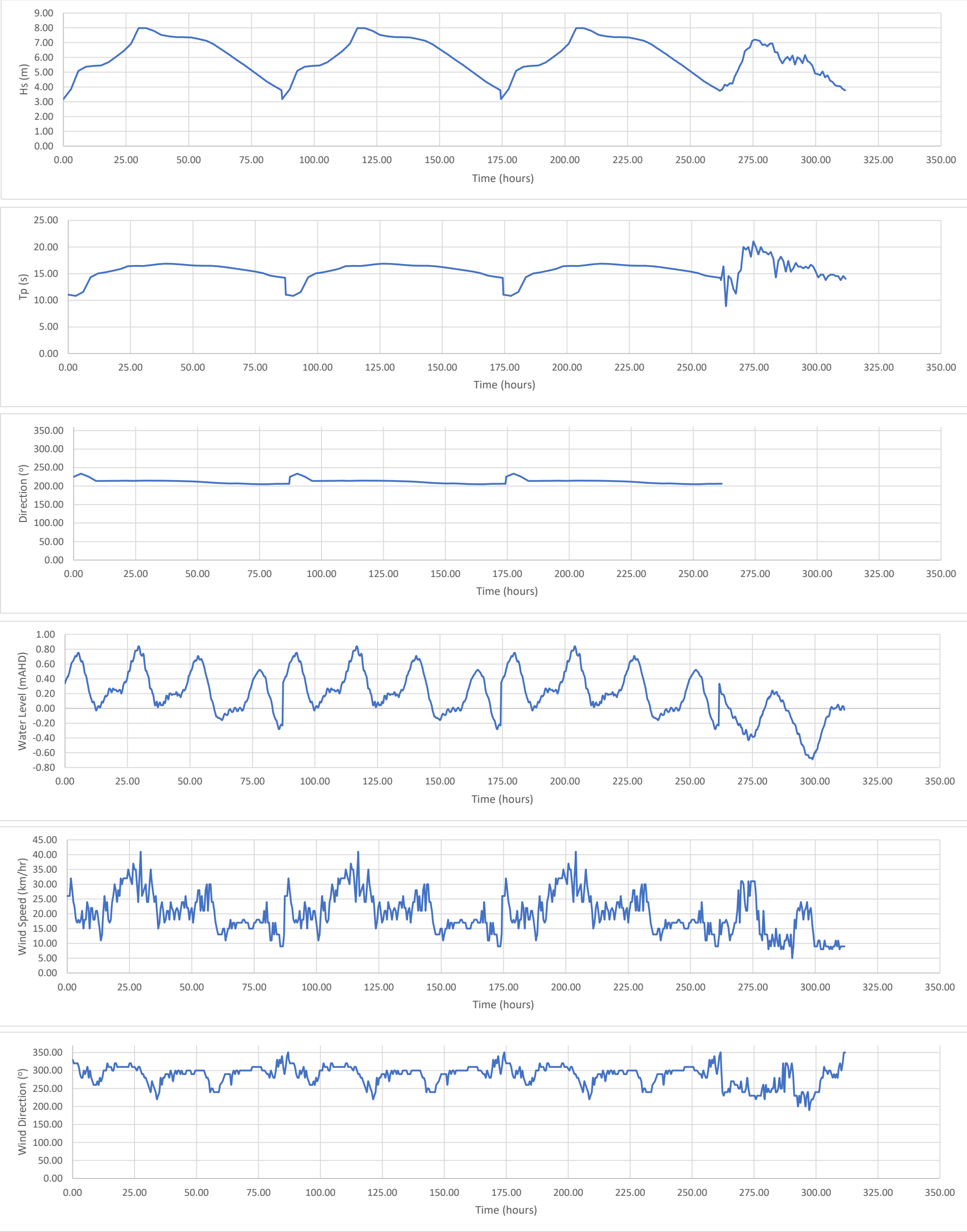
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	50 Year
Storm Sequence	3x A10 + A1



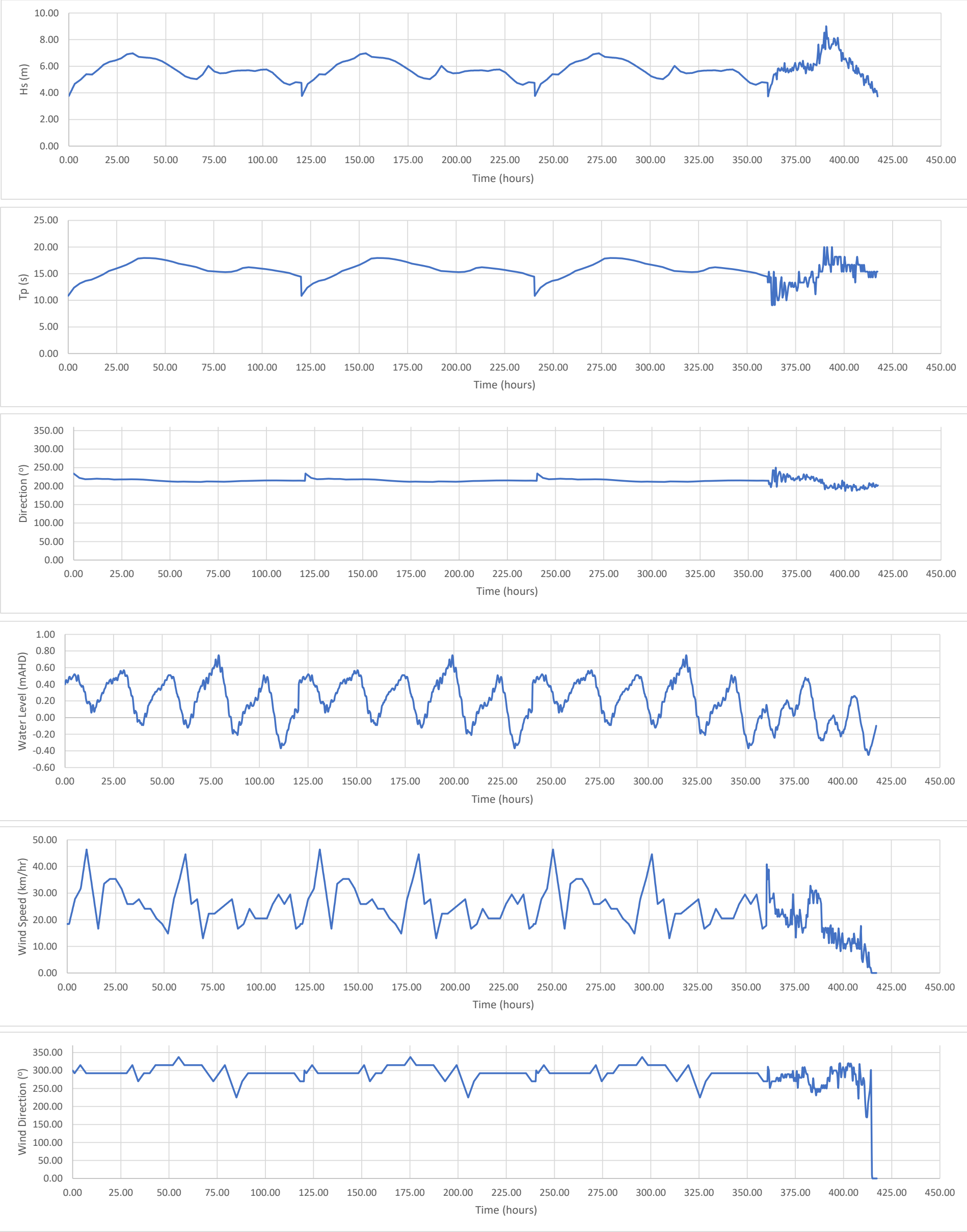
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	50 Year
Storm Sequence	3x A9 + A2



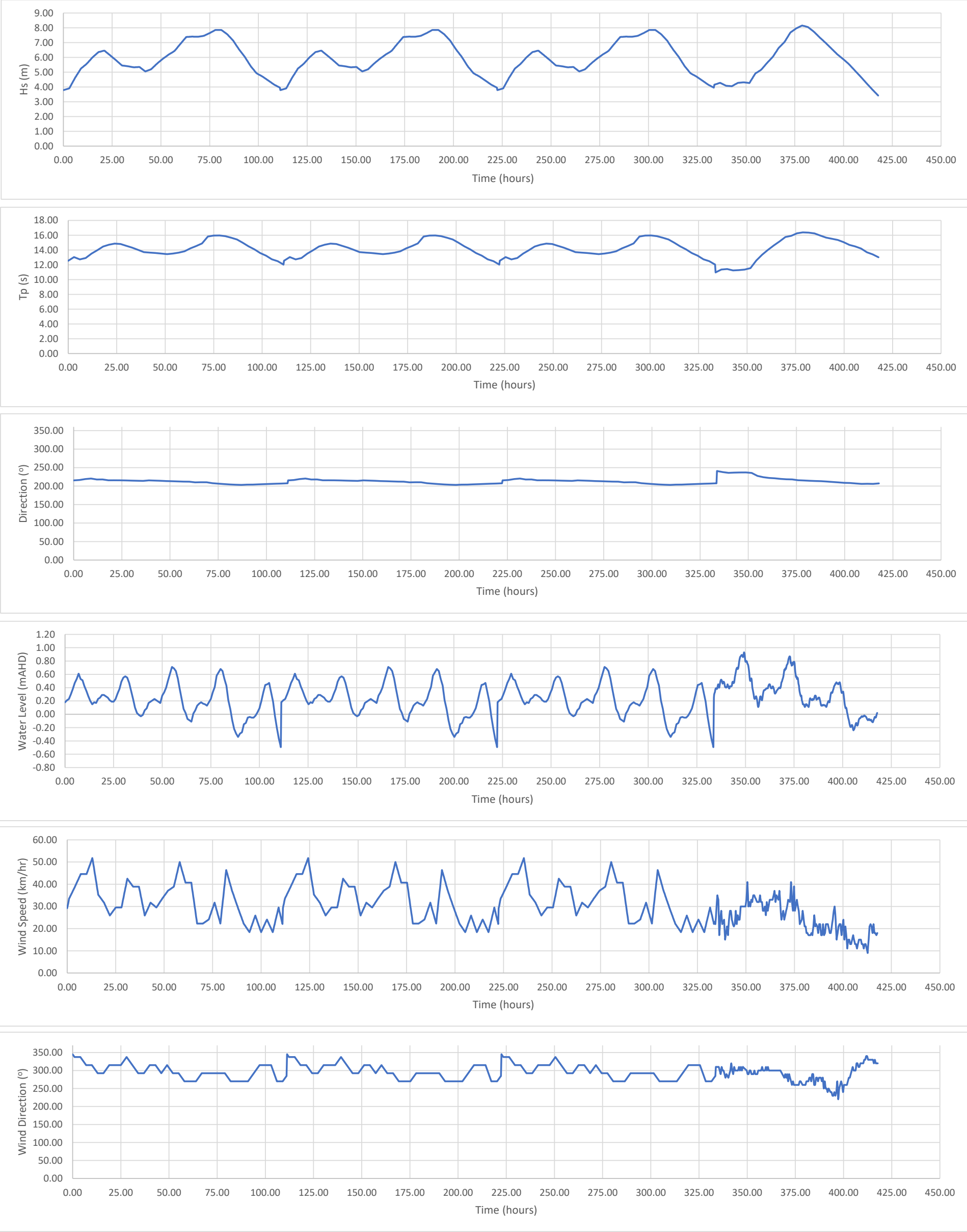
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	100 Year
Storm Sequence	3x A12 + A4



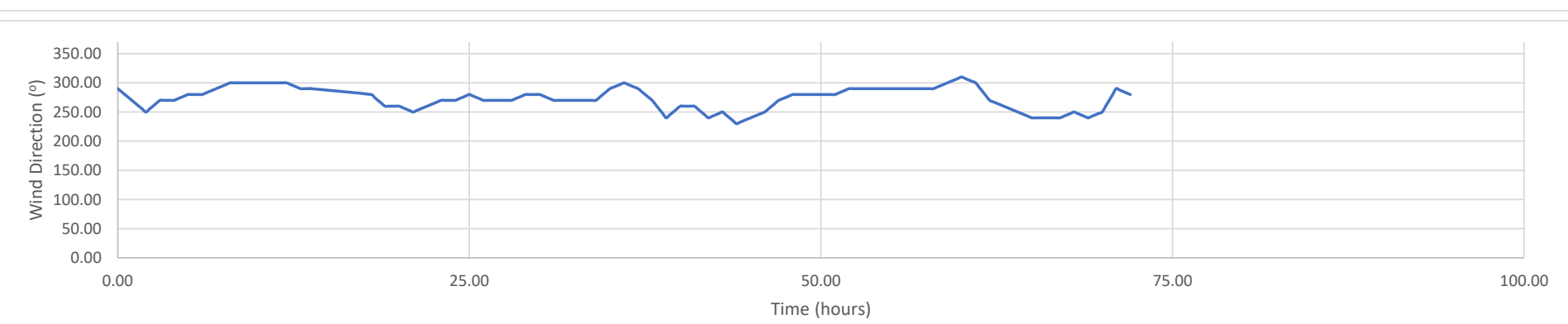
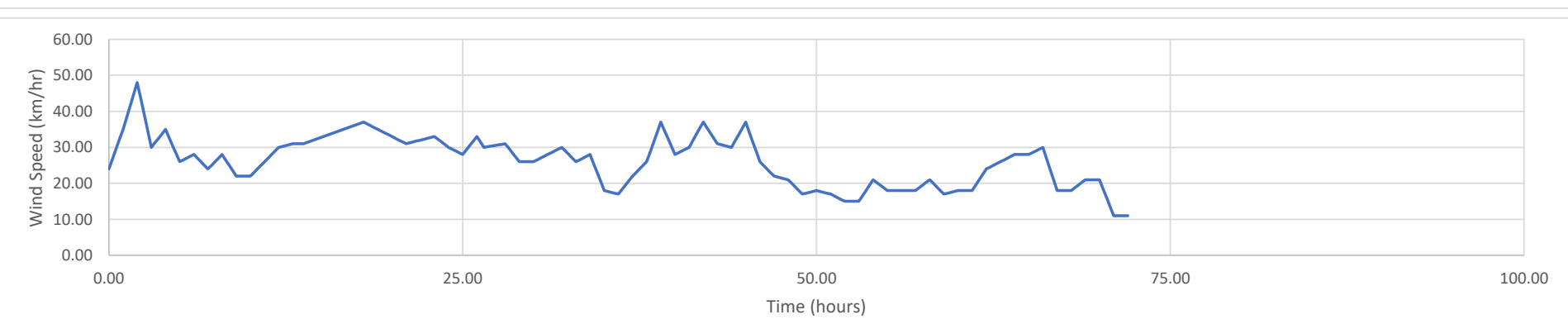
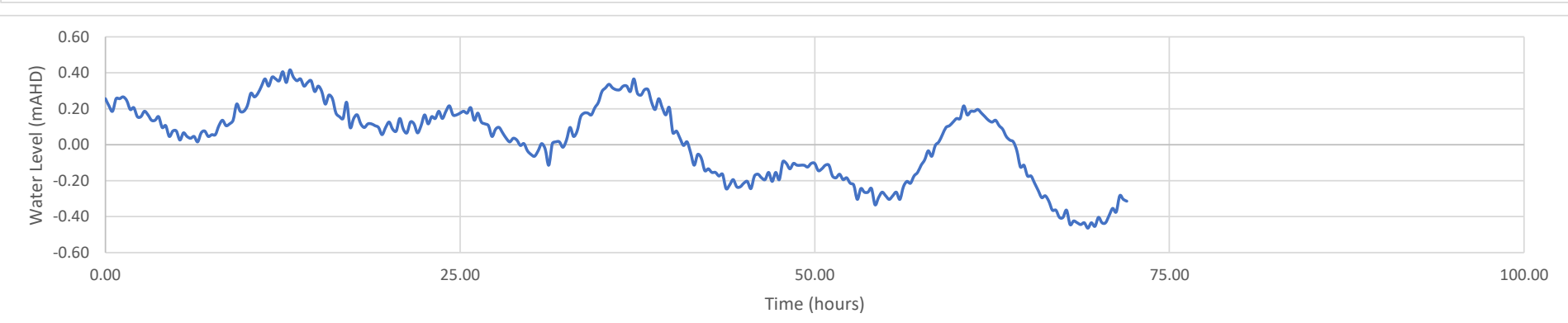
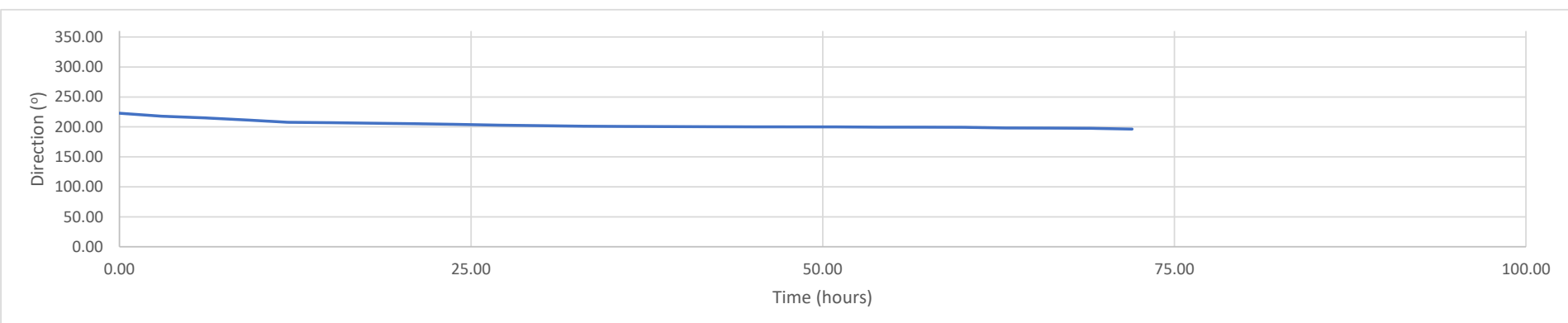
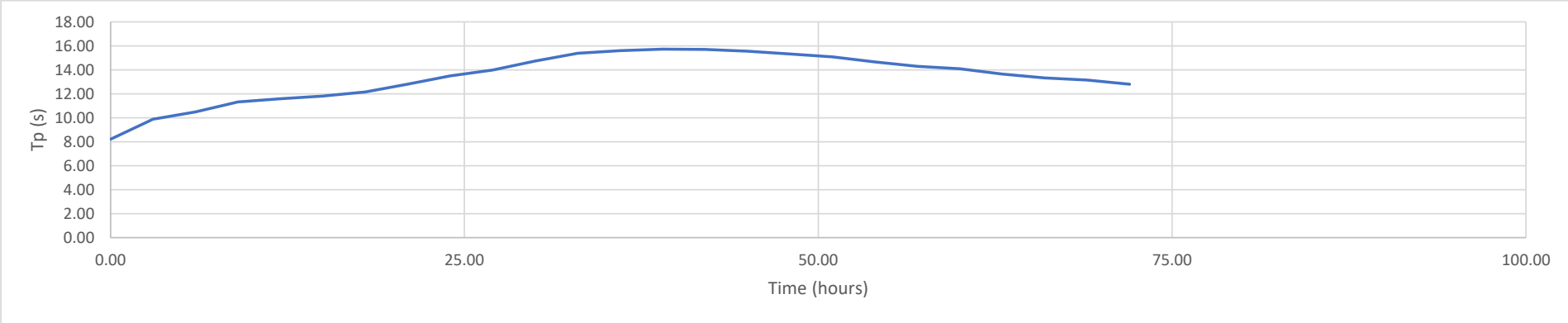
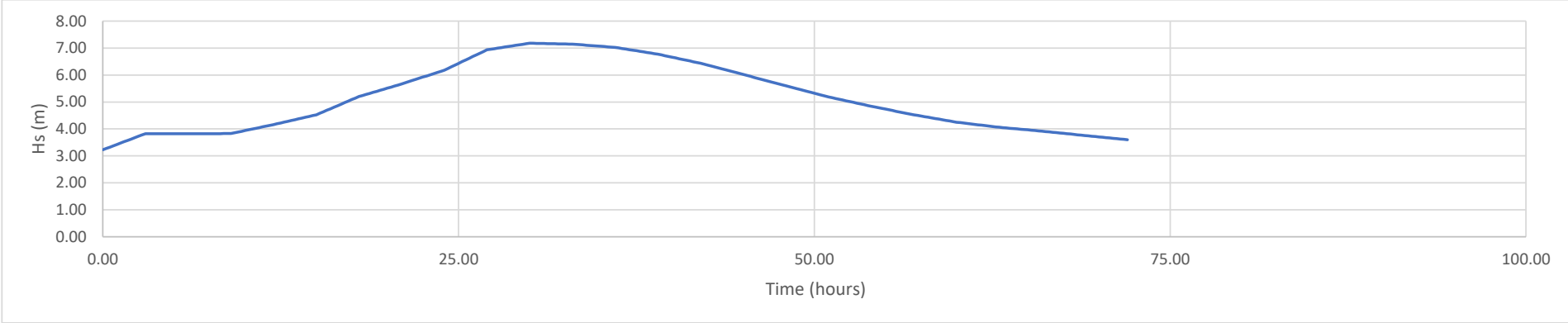
K1509 - South West Storm Selection
Design Storm Sequences

Location	Albany
ARI Storm Sequence	100 Year
Storm Sequence	3x A11 + A5



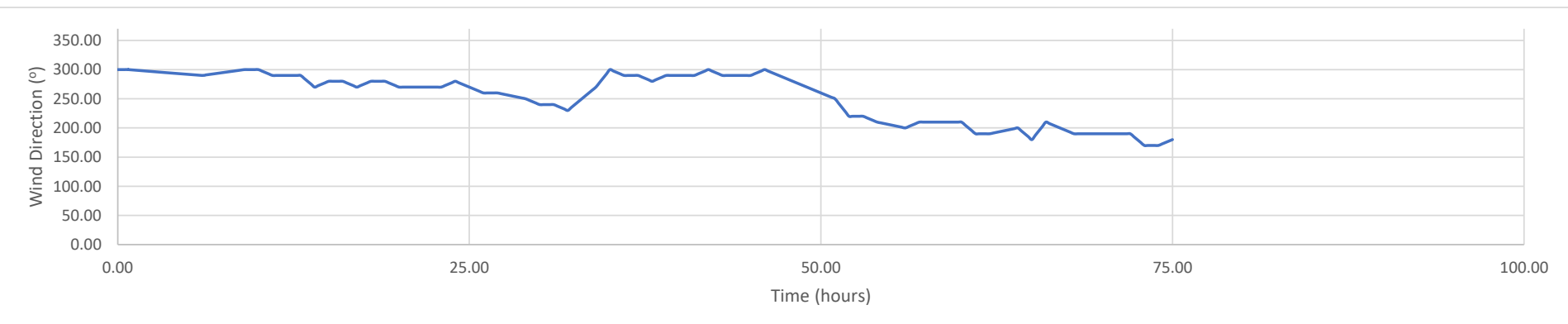
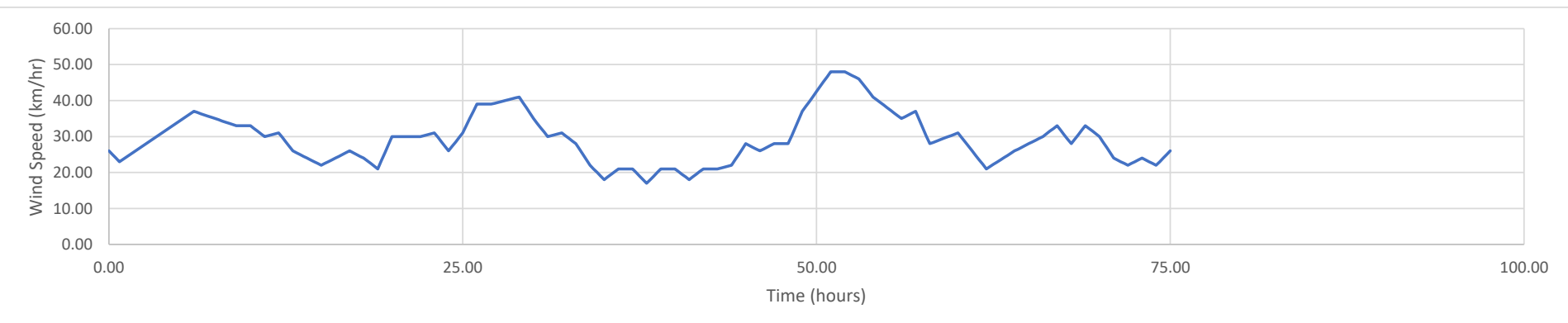
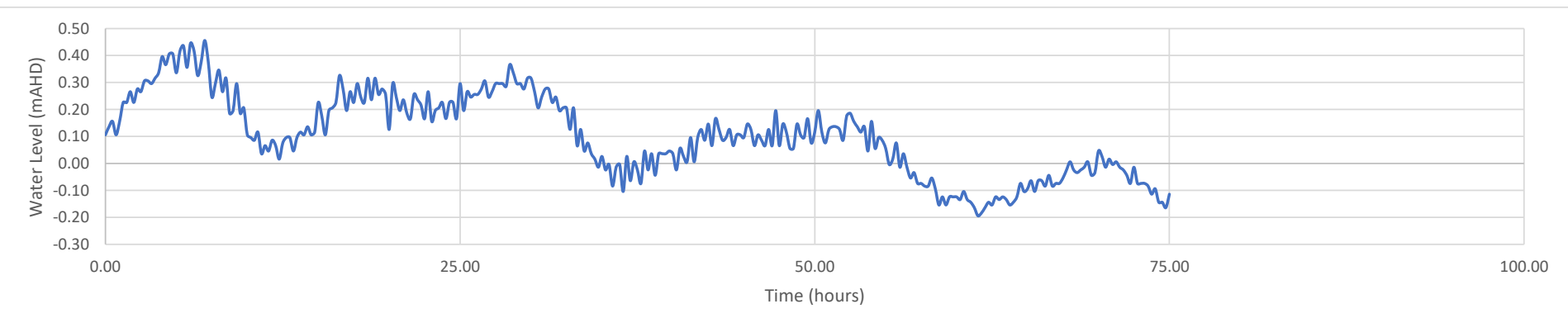
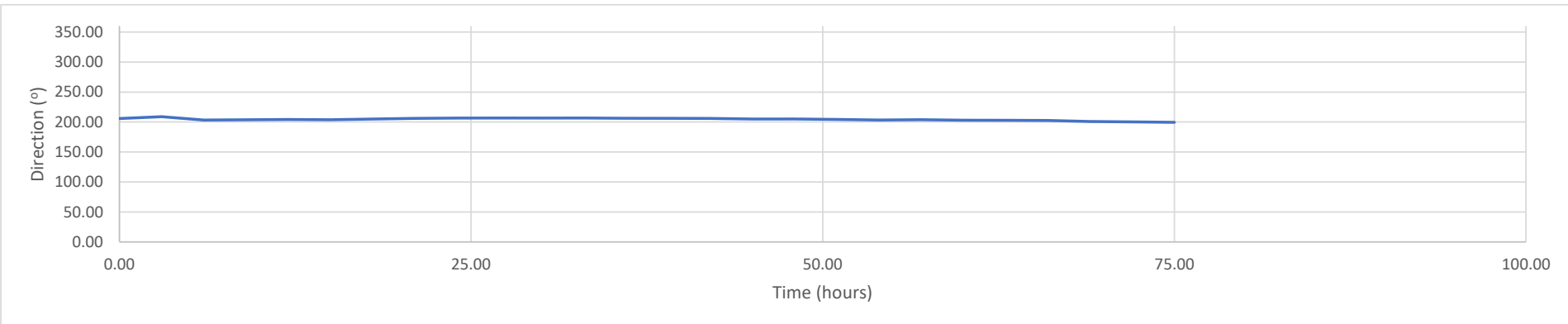
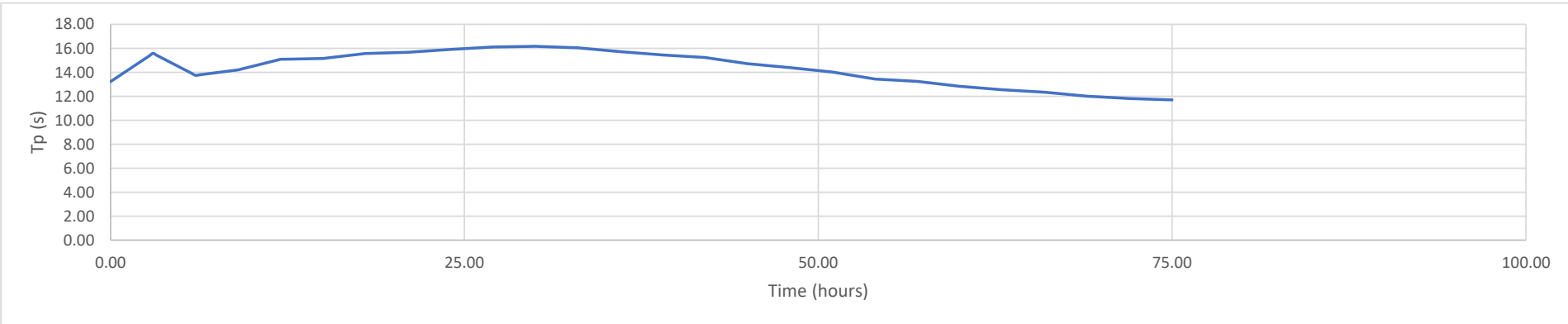
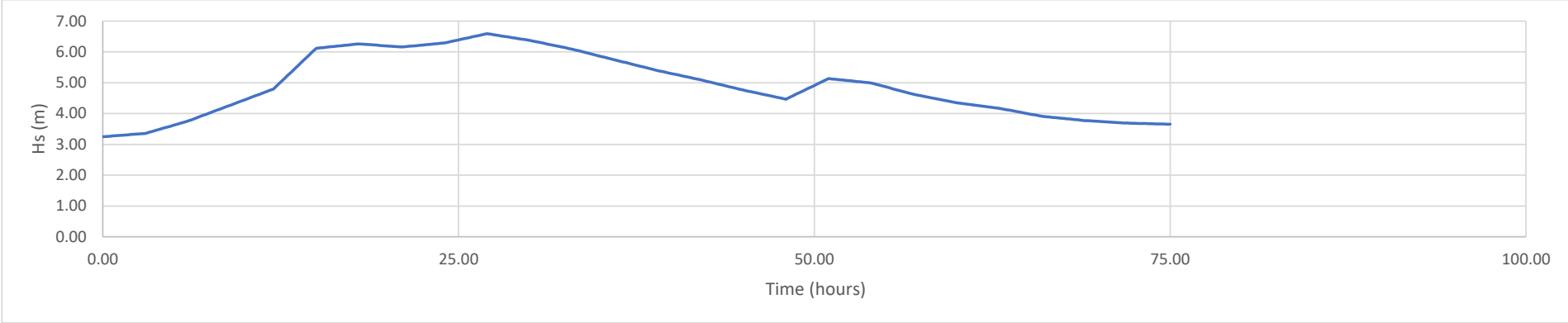
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	1 Year
Storm Sequence	BH7



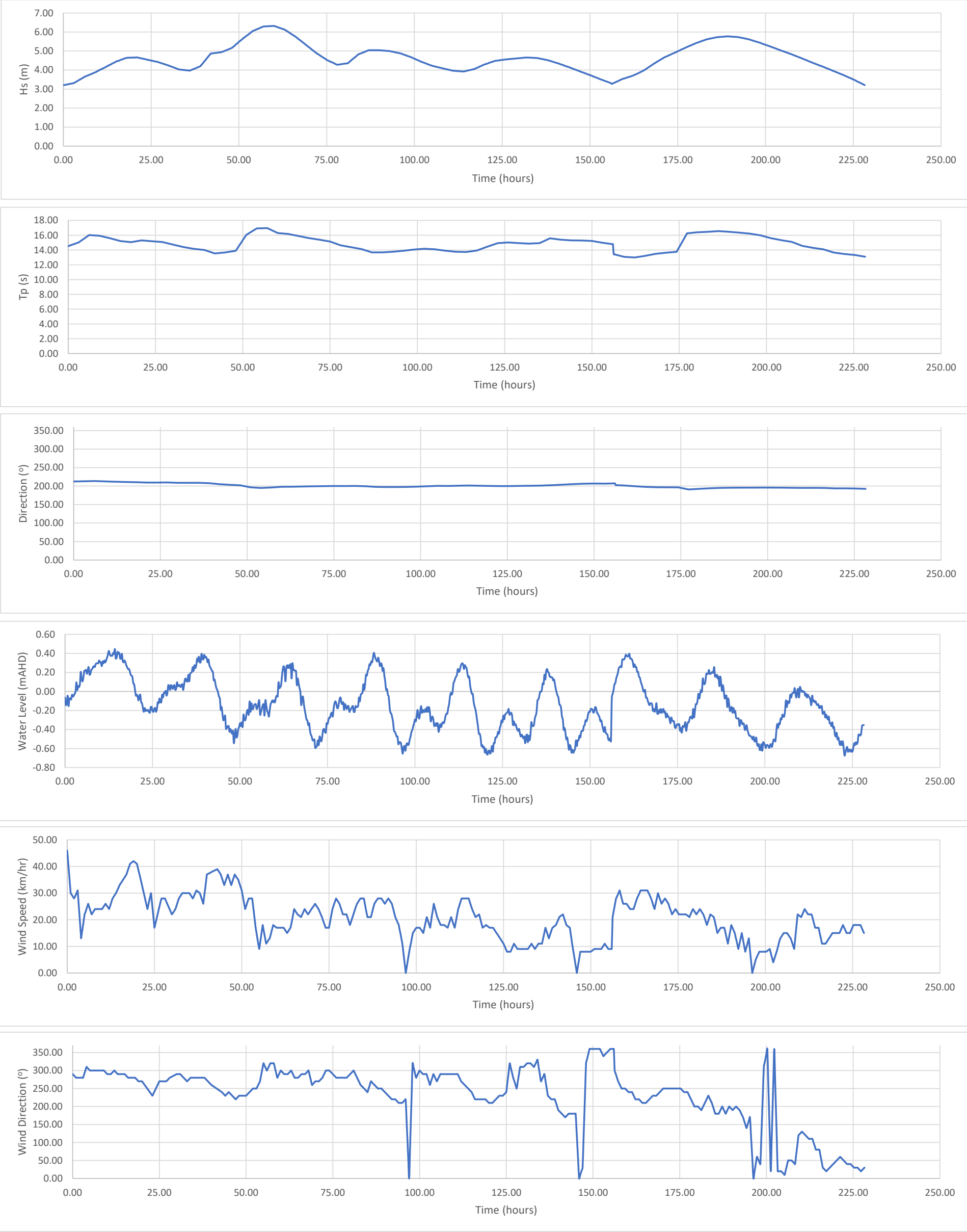
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	1 Year
Storm Sequence	BH6



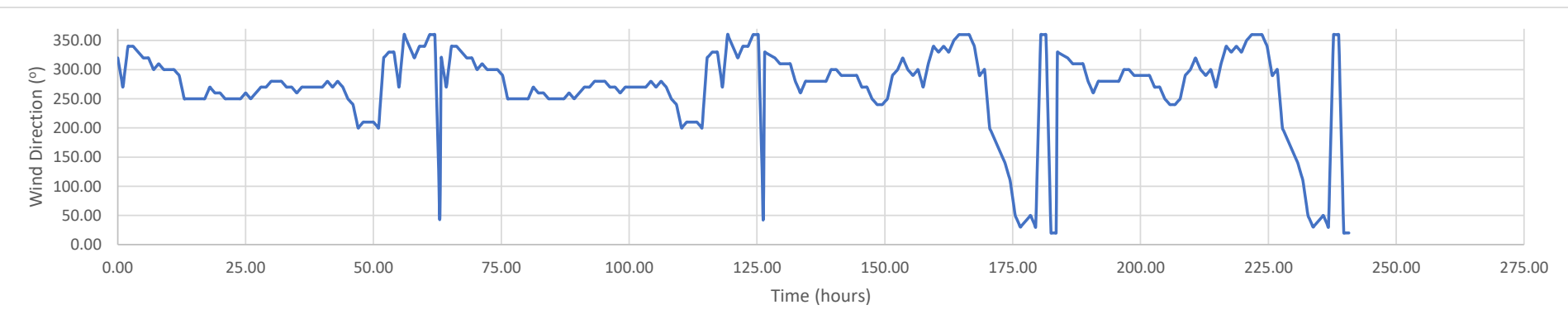
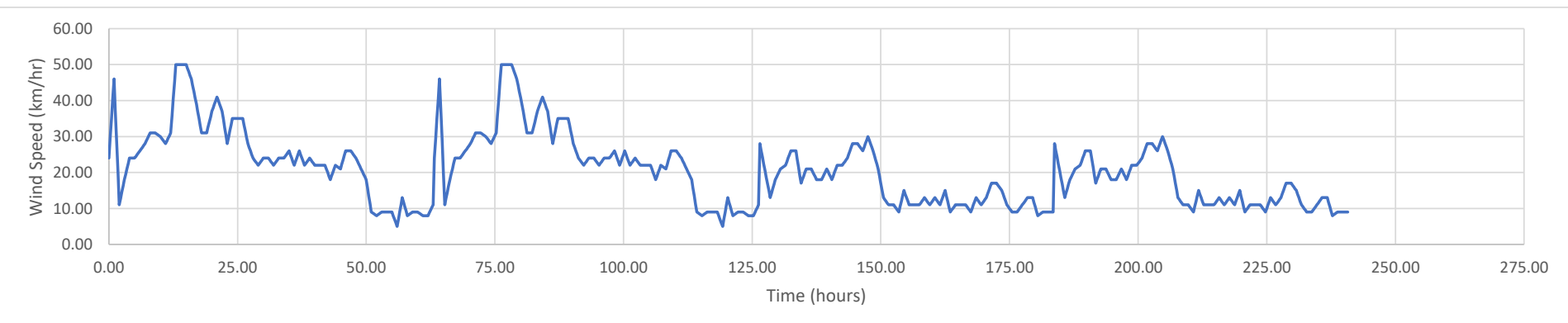
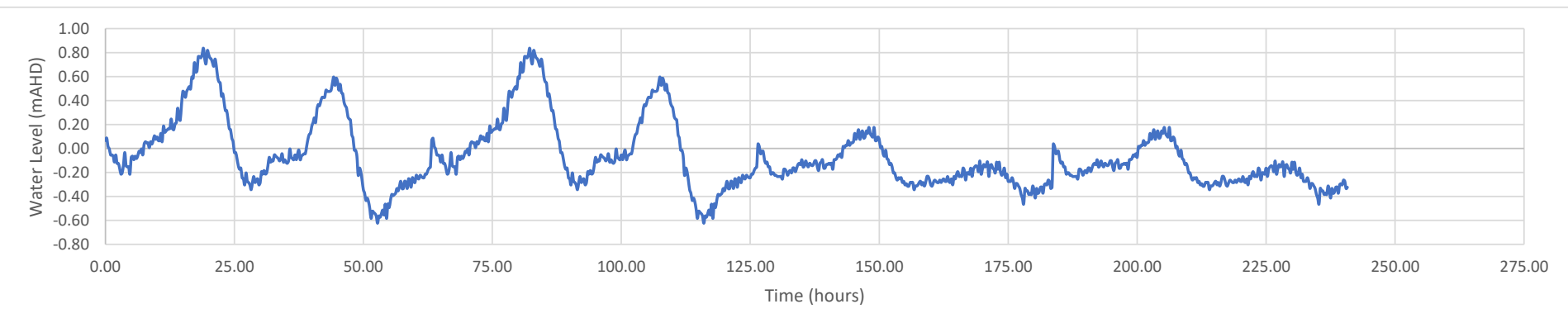
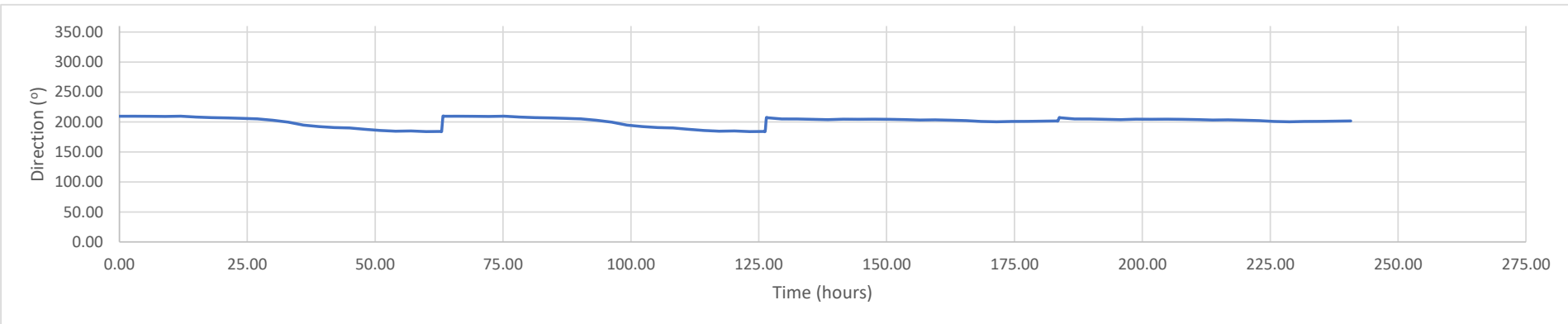
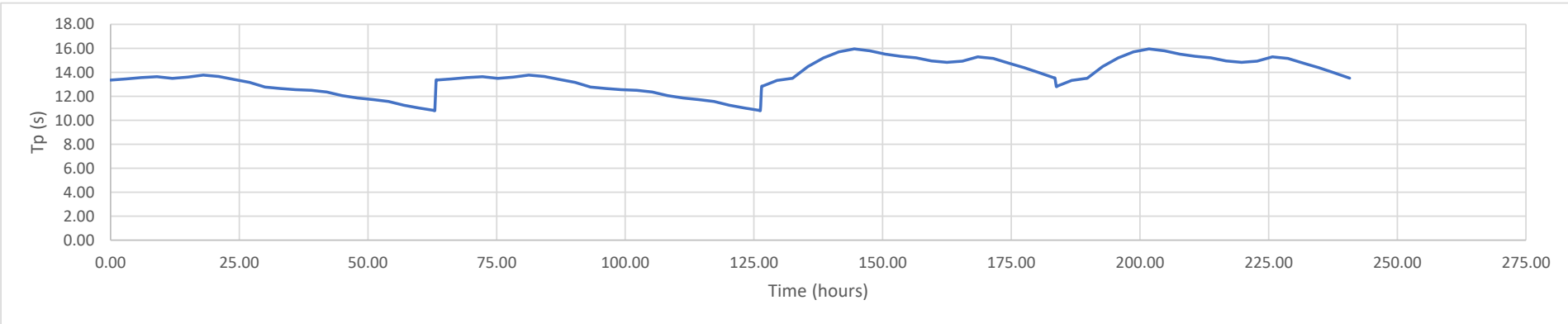
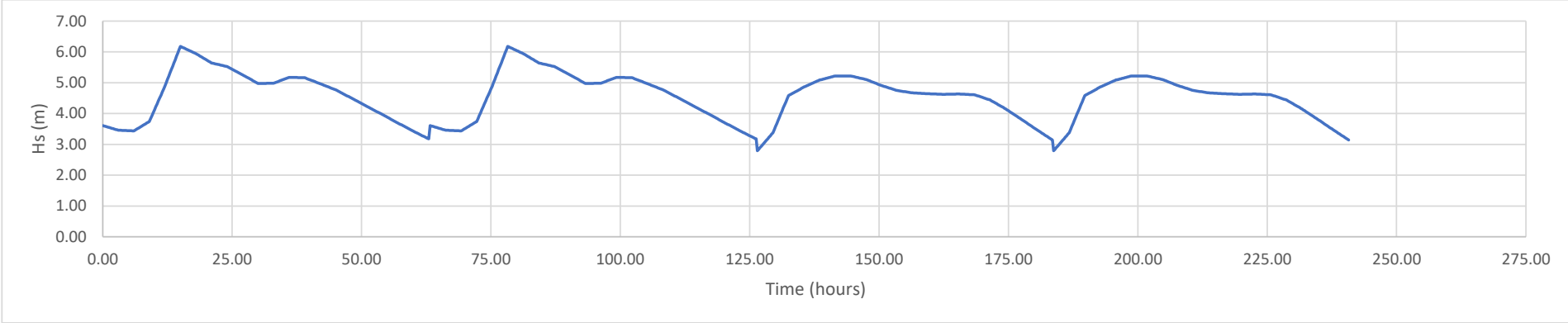
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	10 Year
Storm Sequence	BH10 + BH5



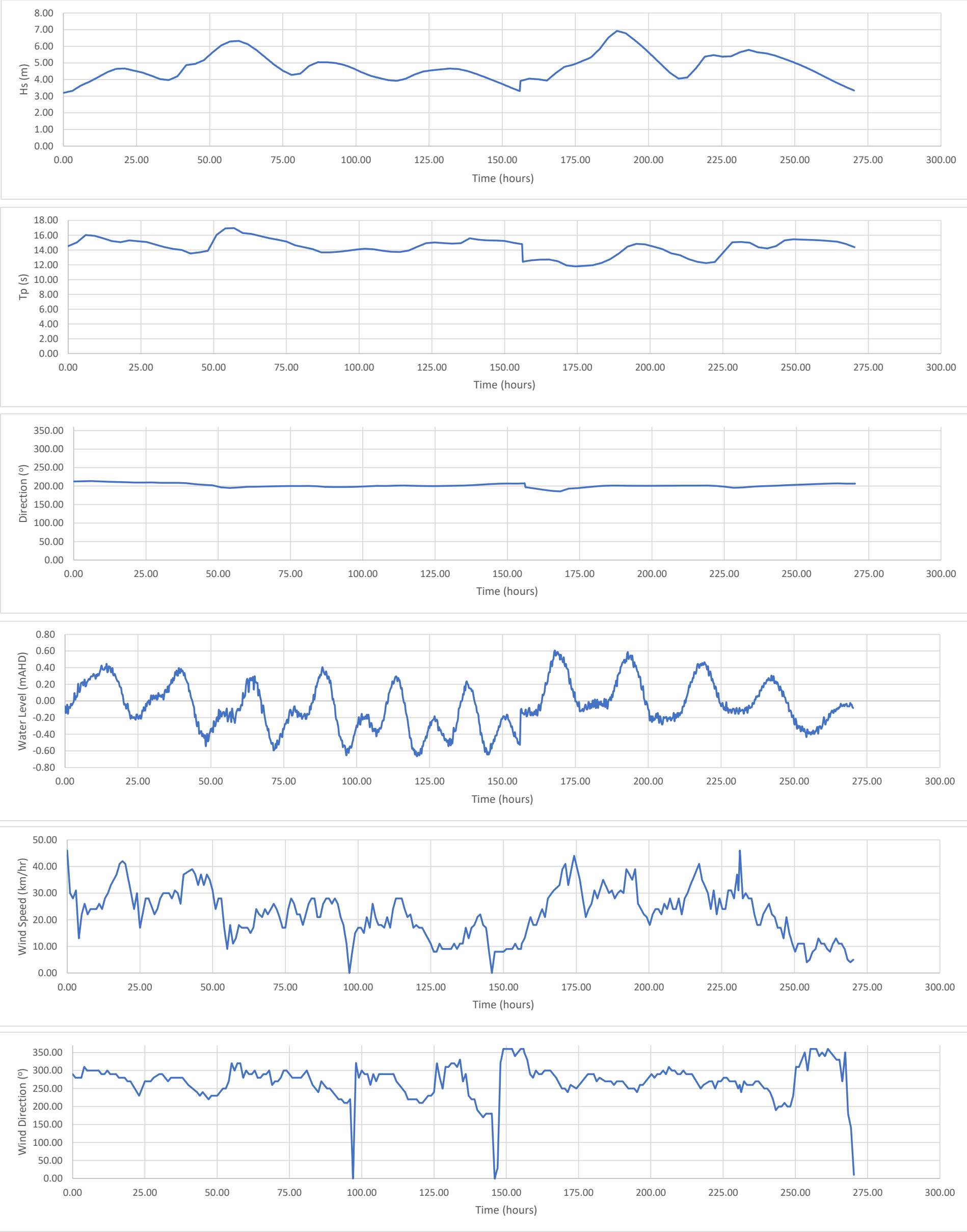
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	10 Year
Storm Sequence	2x BH3 + 2xBH2



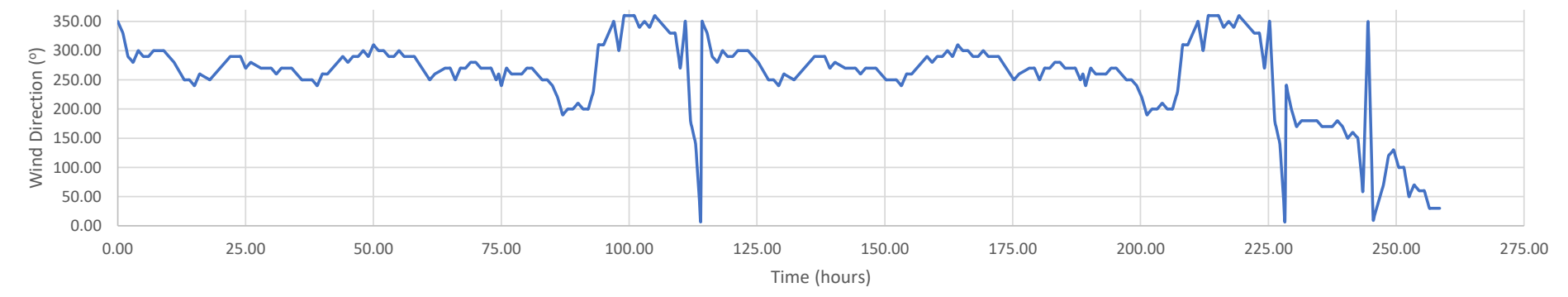
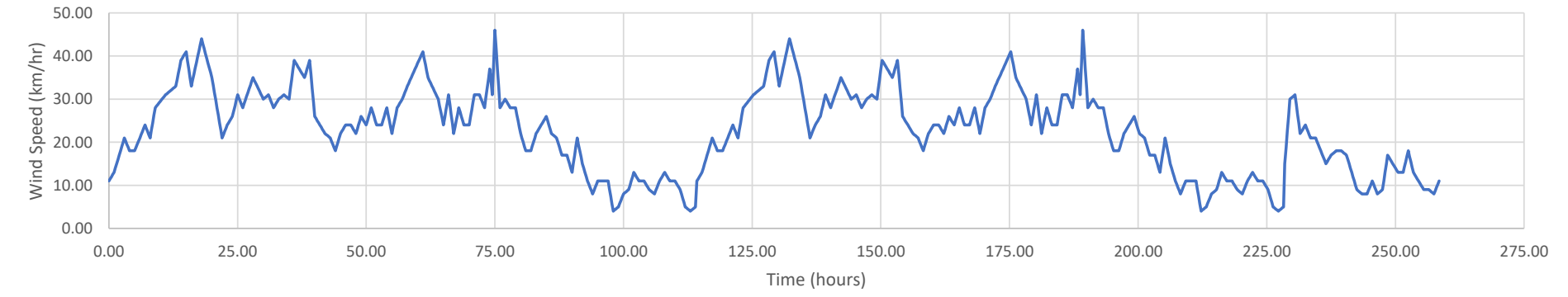
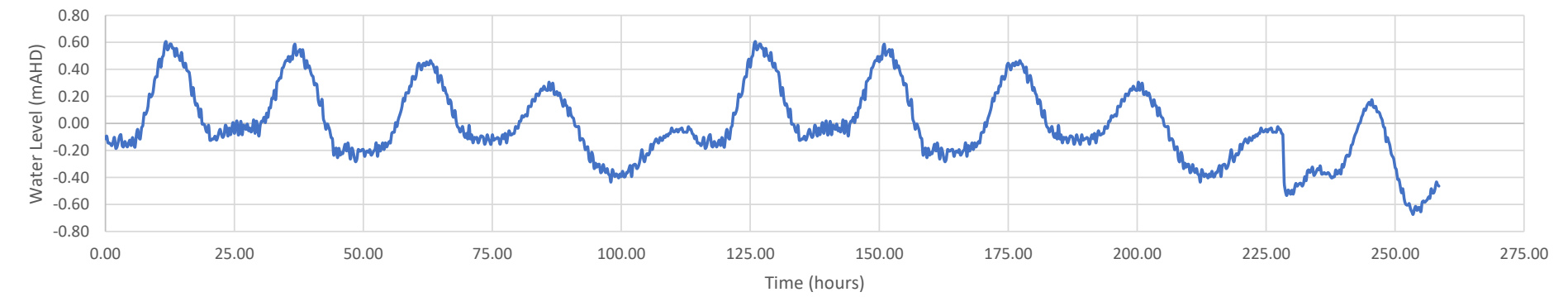
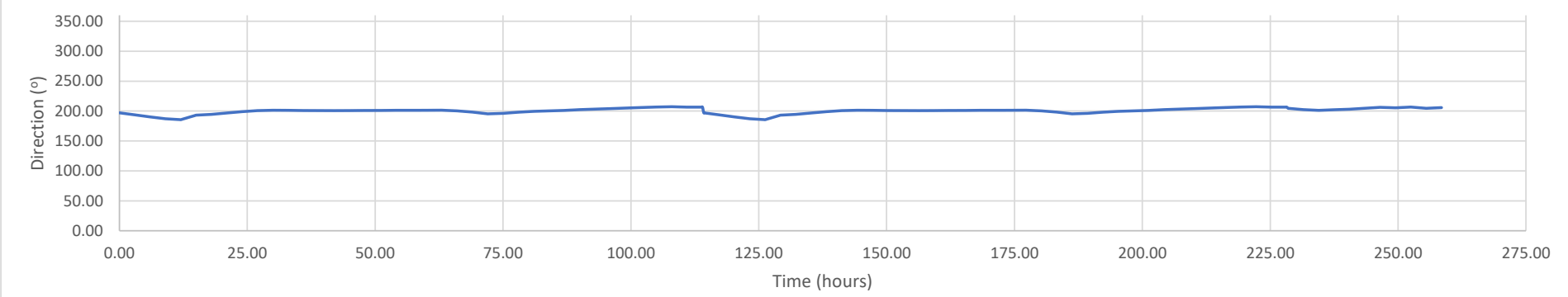
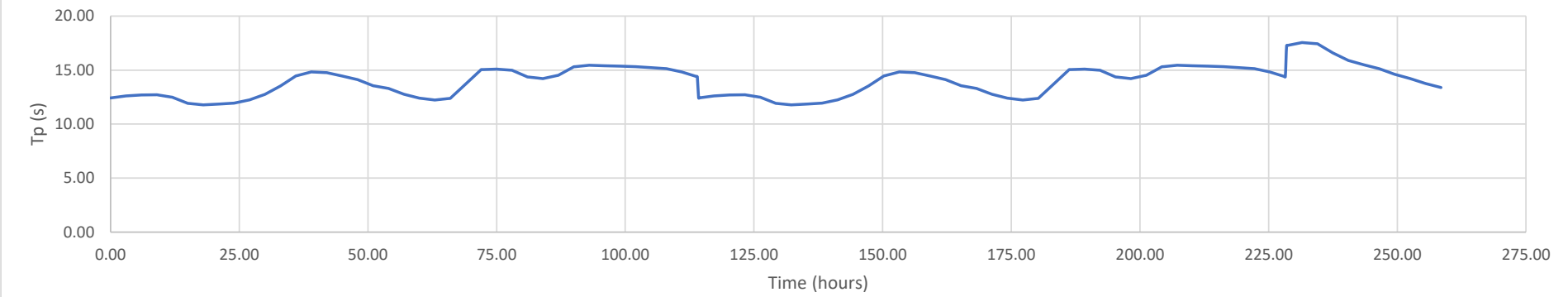
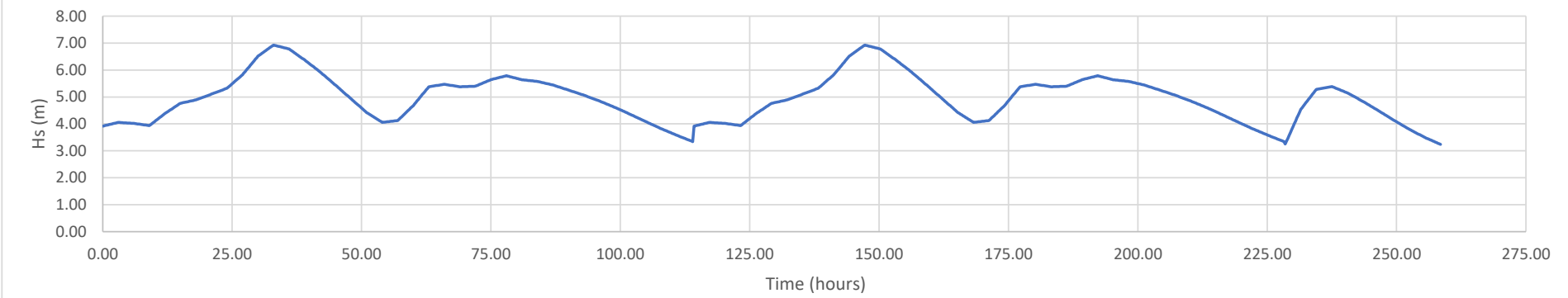
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	25 Year
Storm Sequence	BH10 + BH9



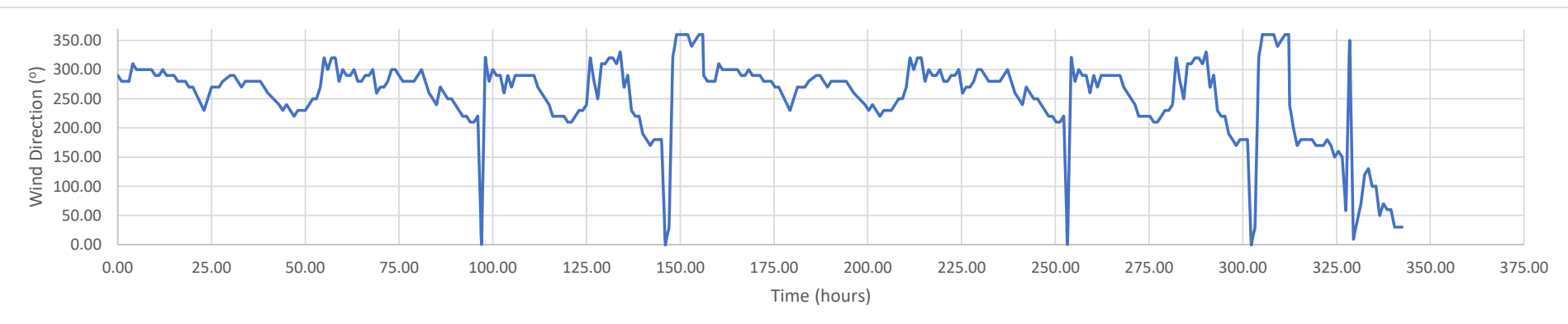
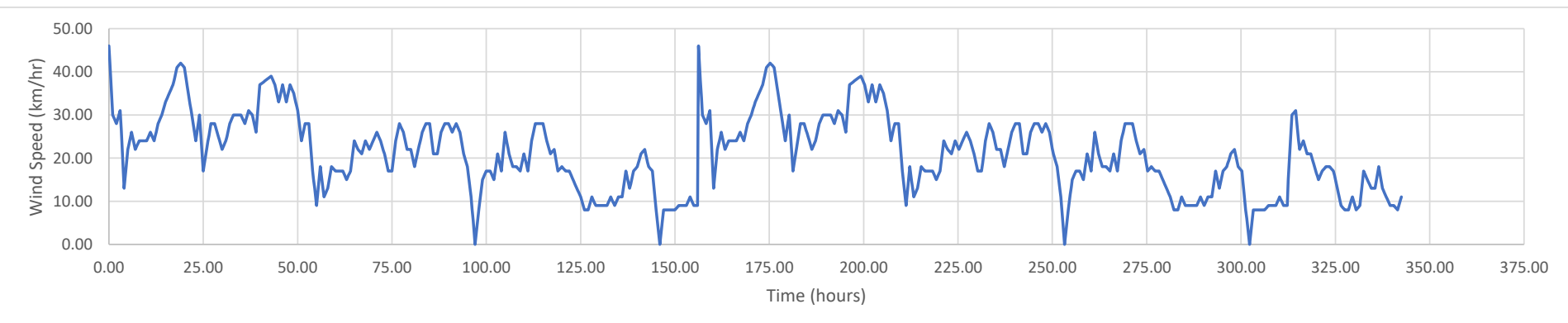
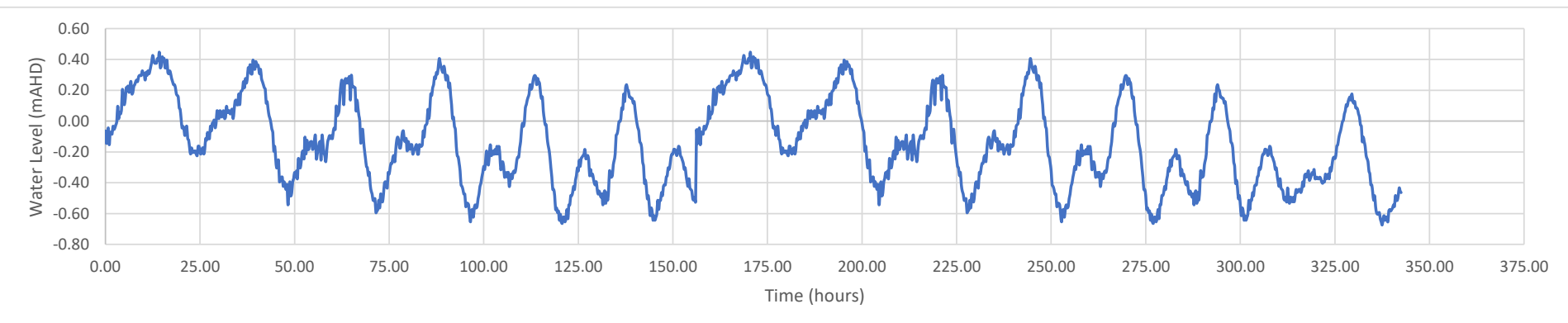
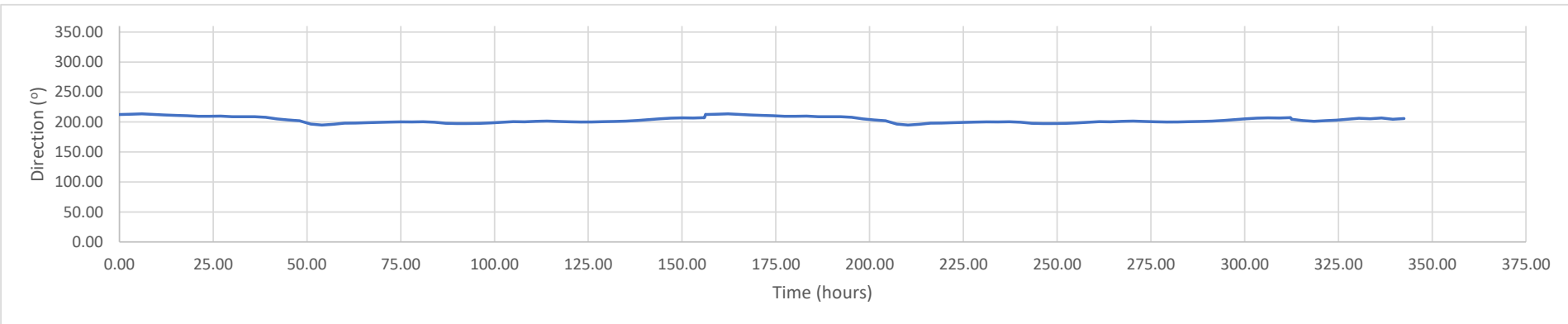
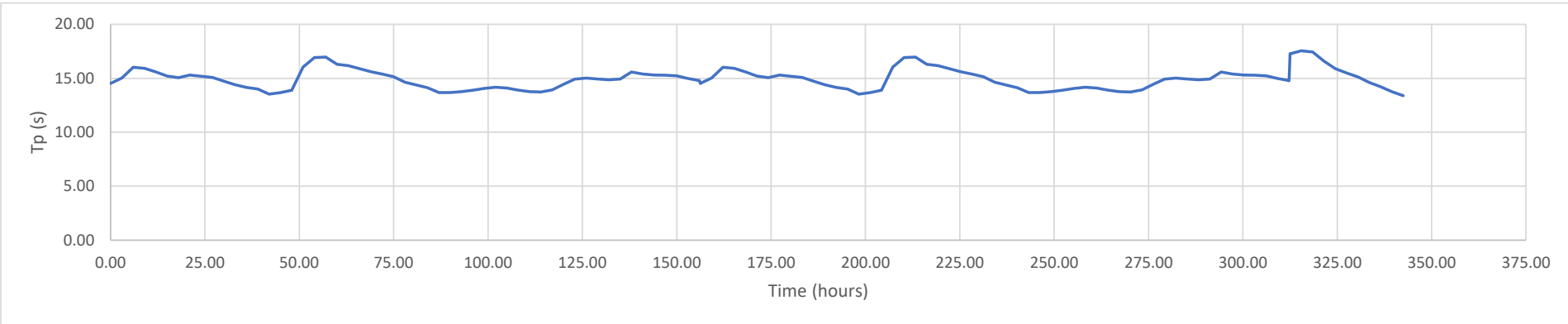
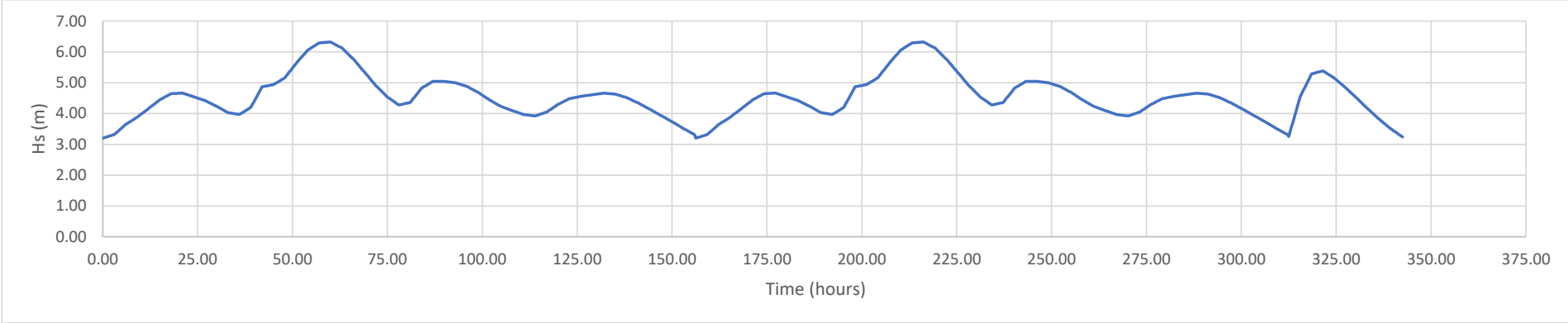
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	25 Year
Storm Sequence	2x BH9 + BH1



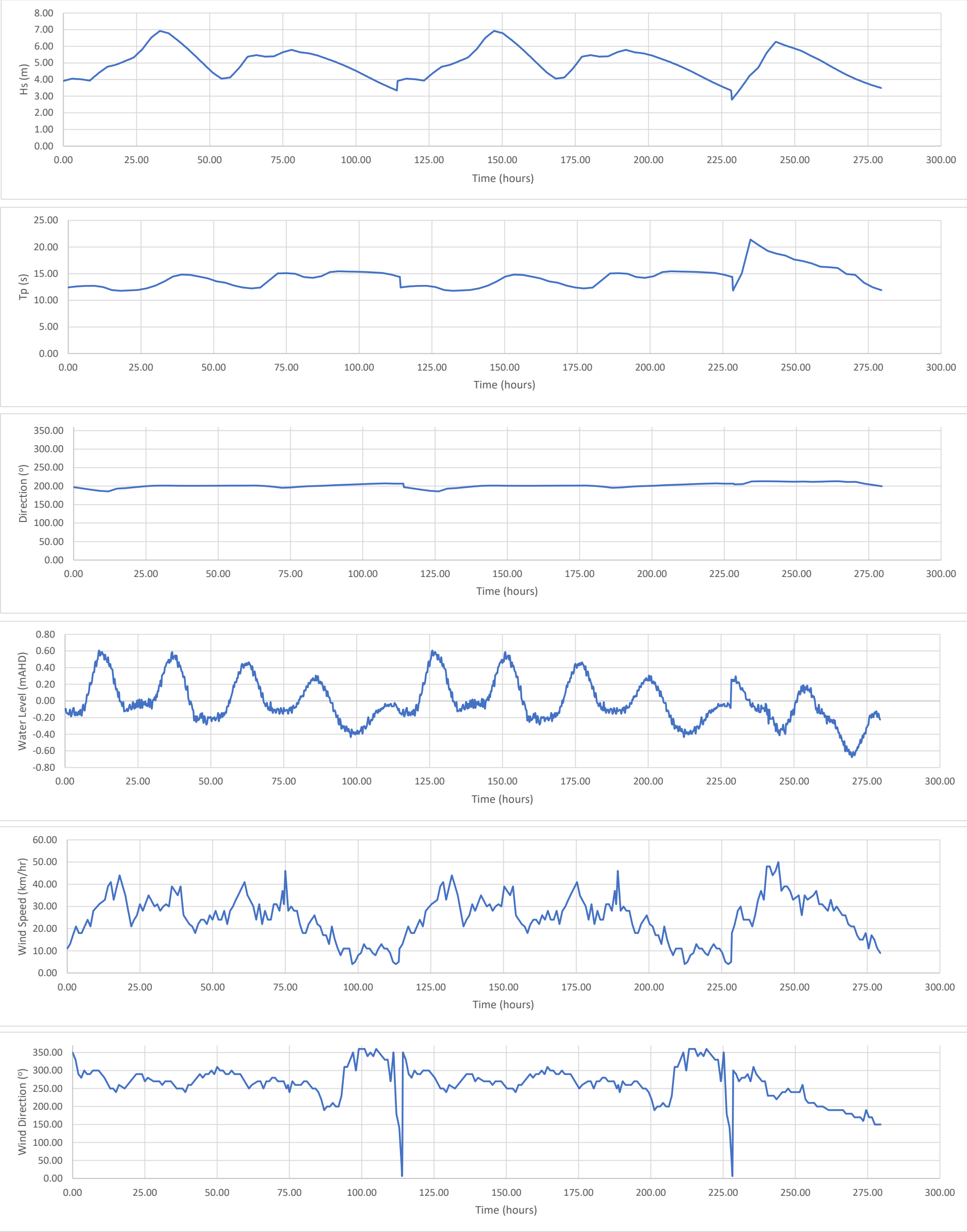
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	50 Year
Storm Sequence	2xBH10 + BH1



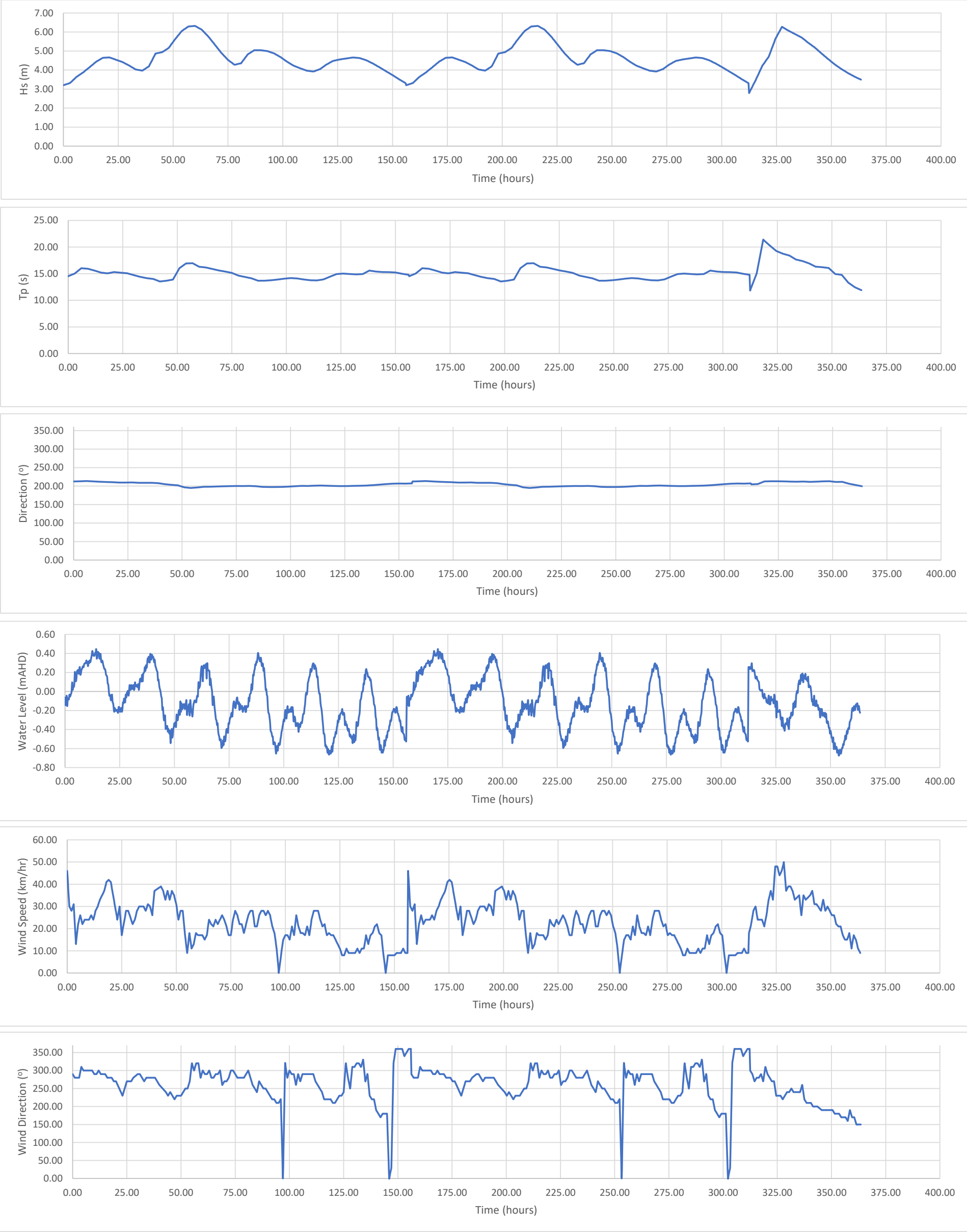
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	50 Year
Storm Sequence	2x BH9 + BH4



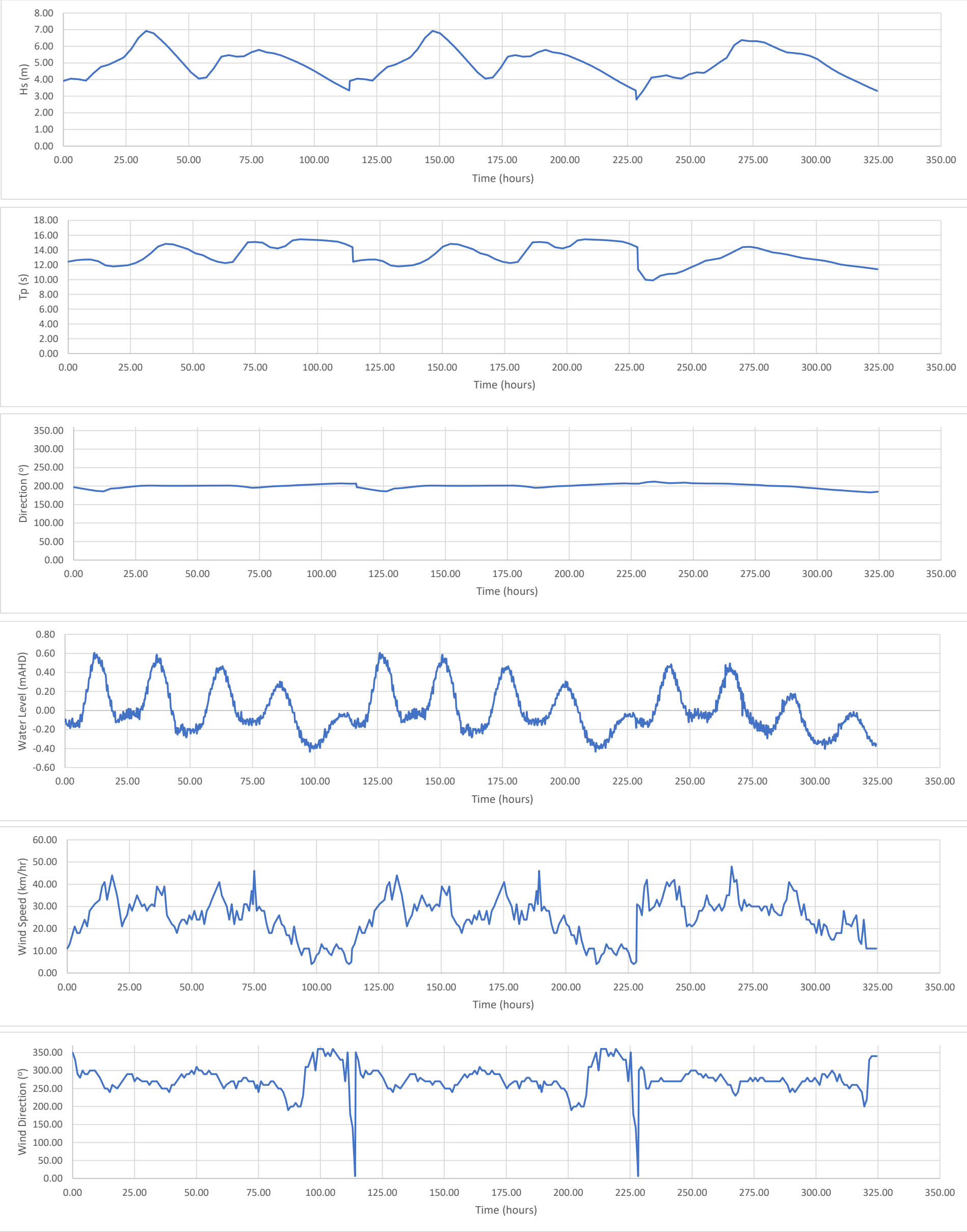
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	100 Year
Storm Sequence	2x BH10 + BH4



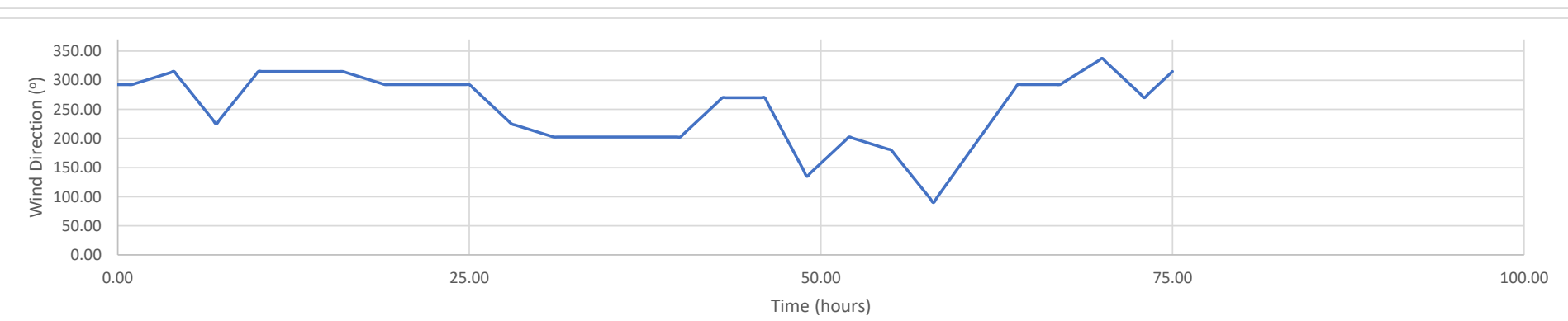
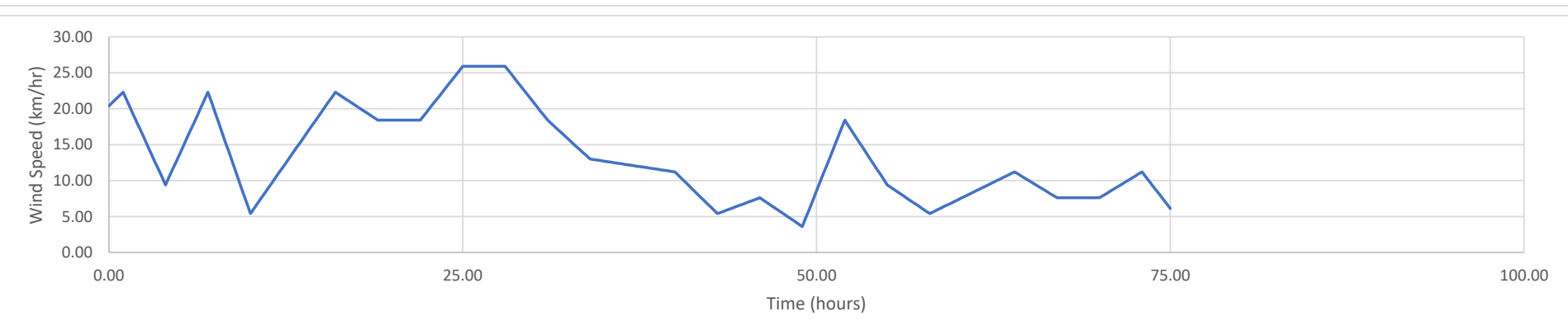
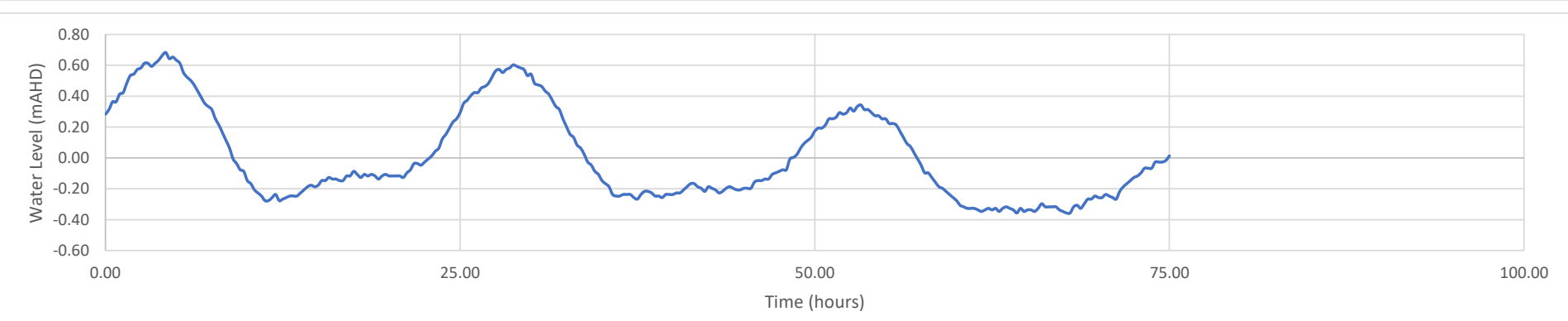
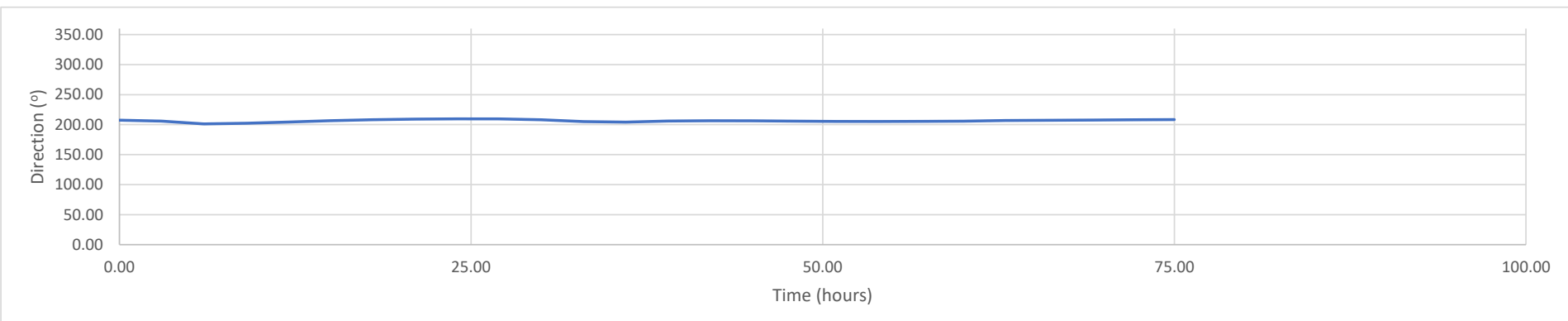
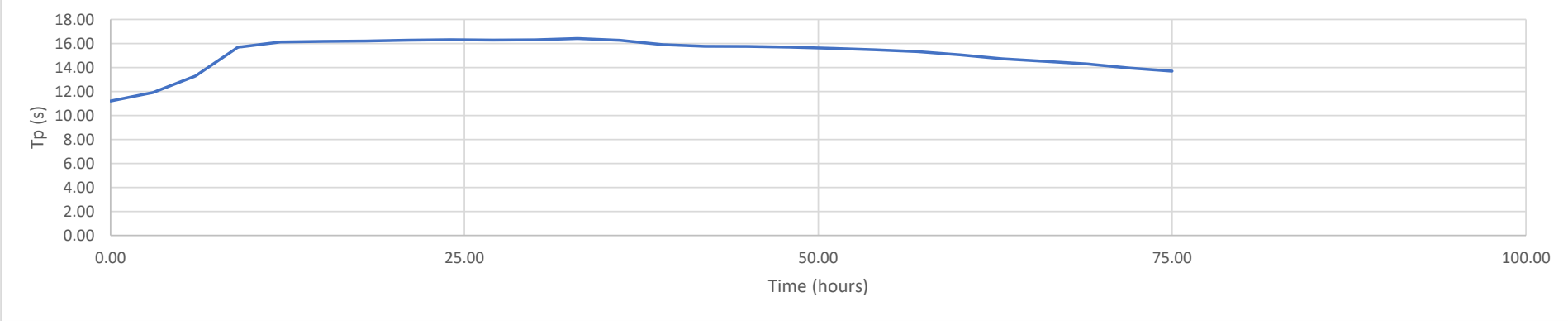
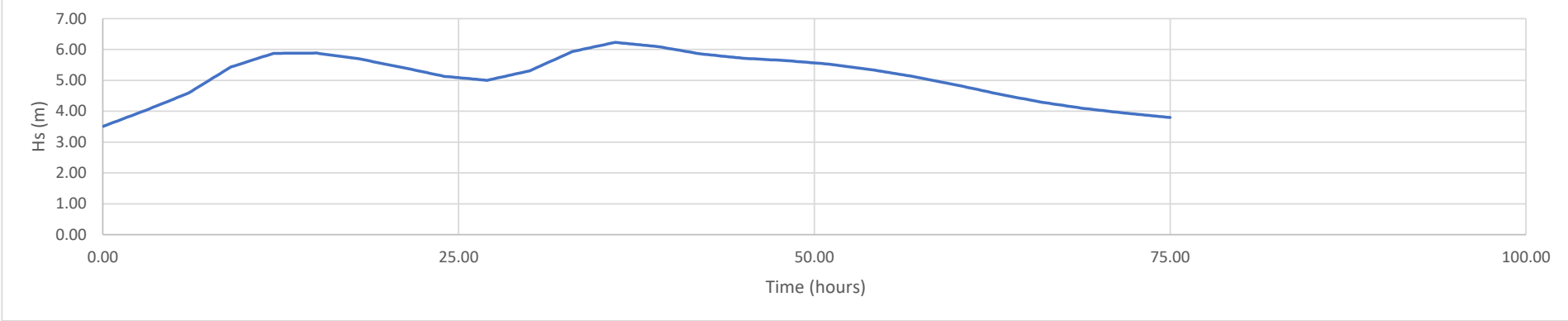
K1509 - South West Storm Selection
Design Storm Sequences

Location	Hopetoun & Bremer
ARI Storm Sequence	100 Year
Storm Sequence	2x BH9 + BH8



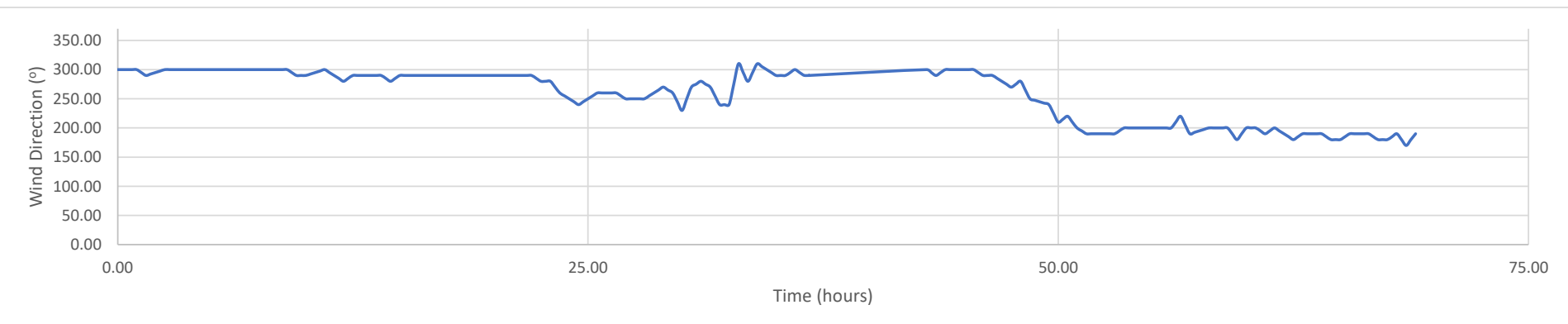
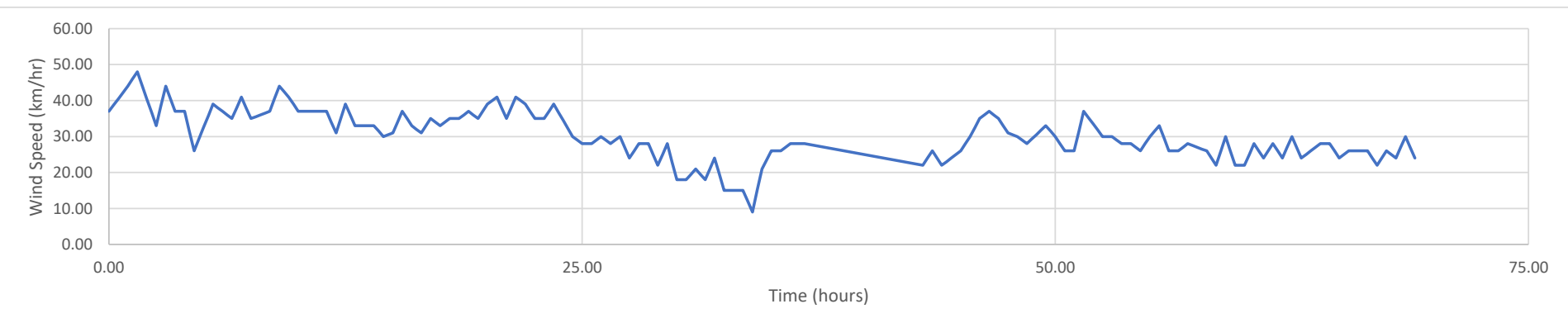
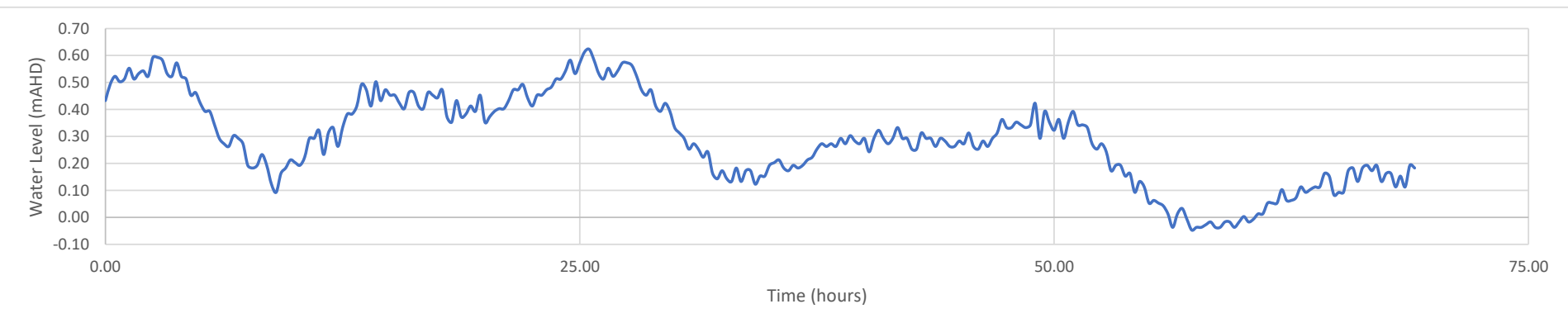
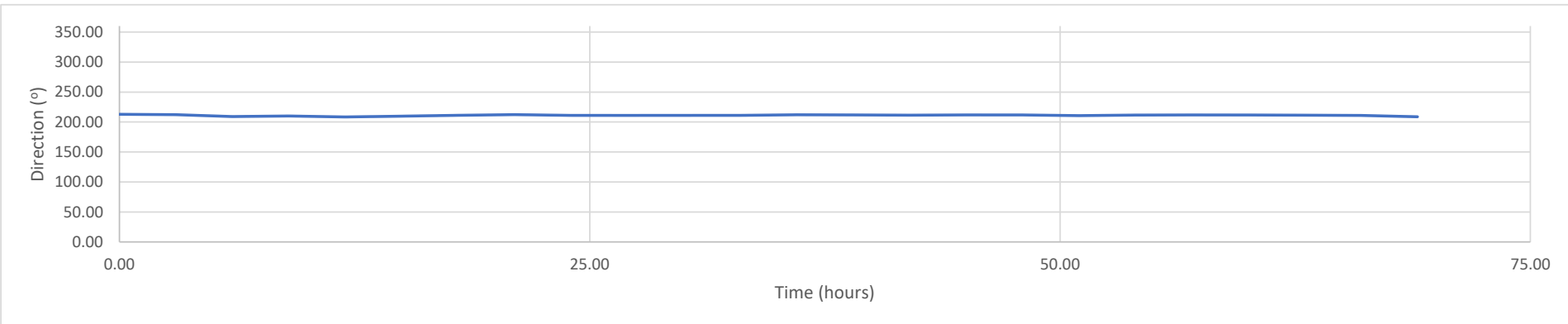
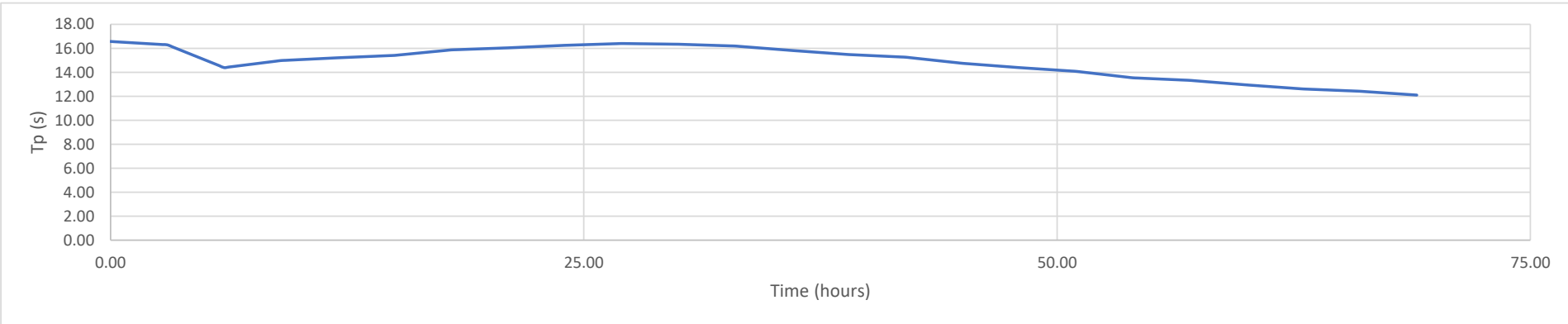
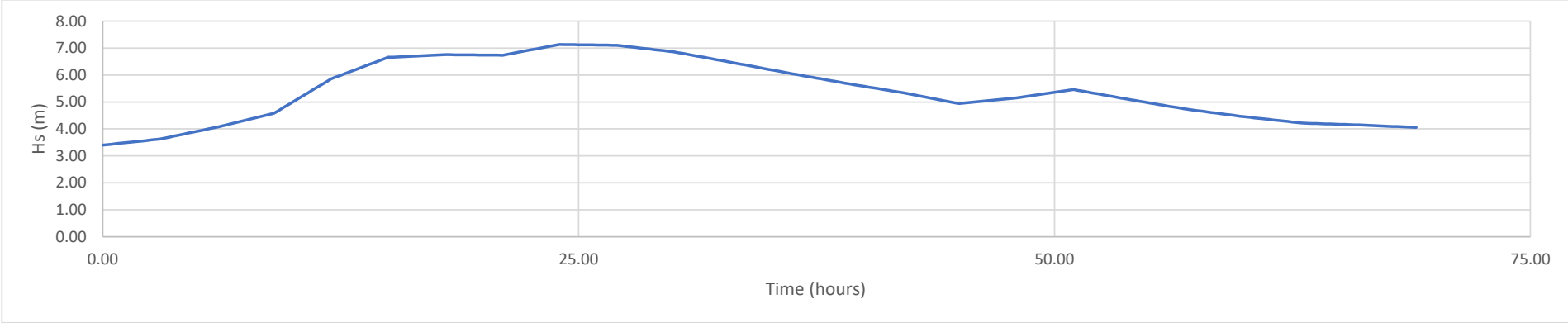
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	1 Year
Storm Sequence	E6



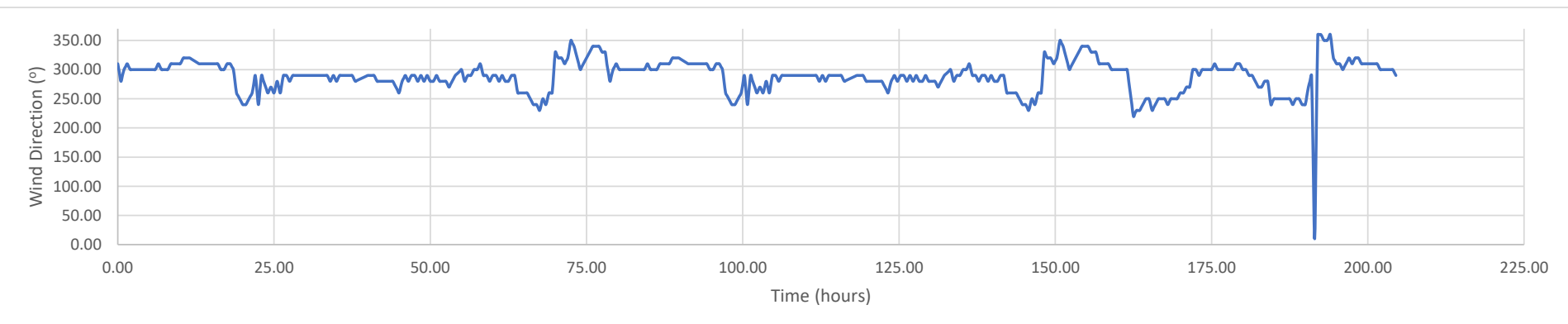
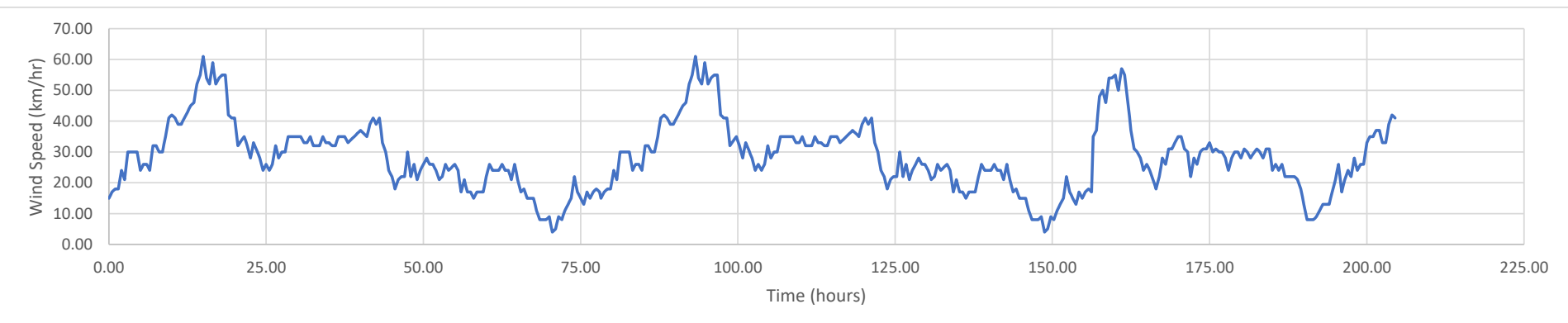
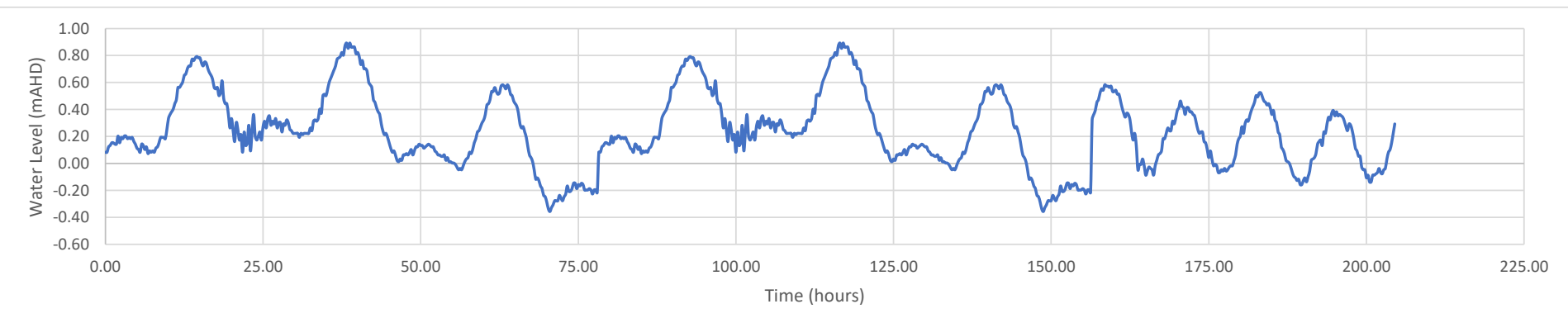
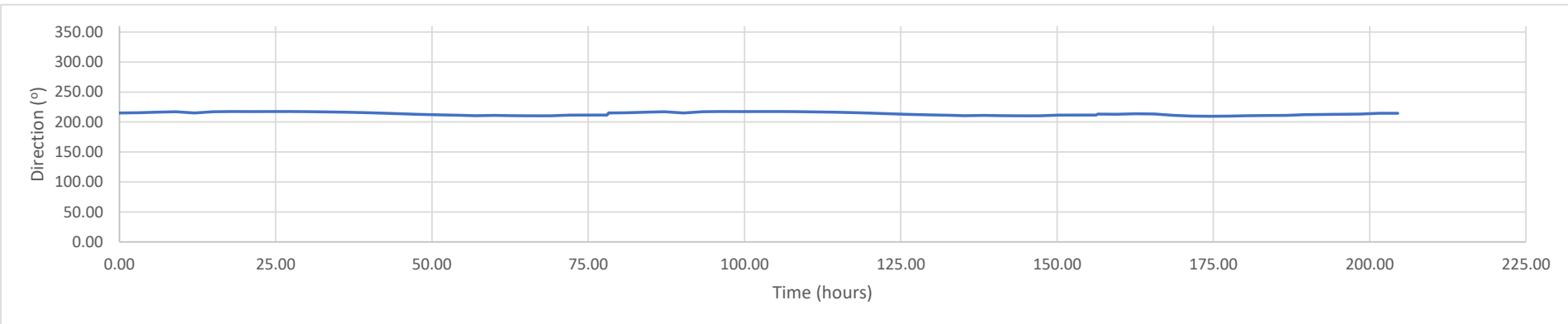
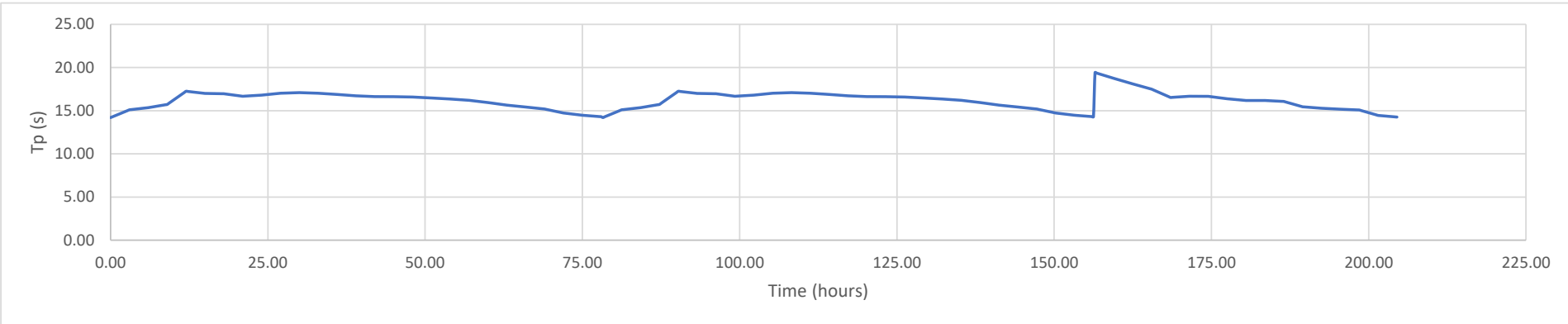
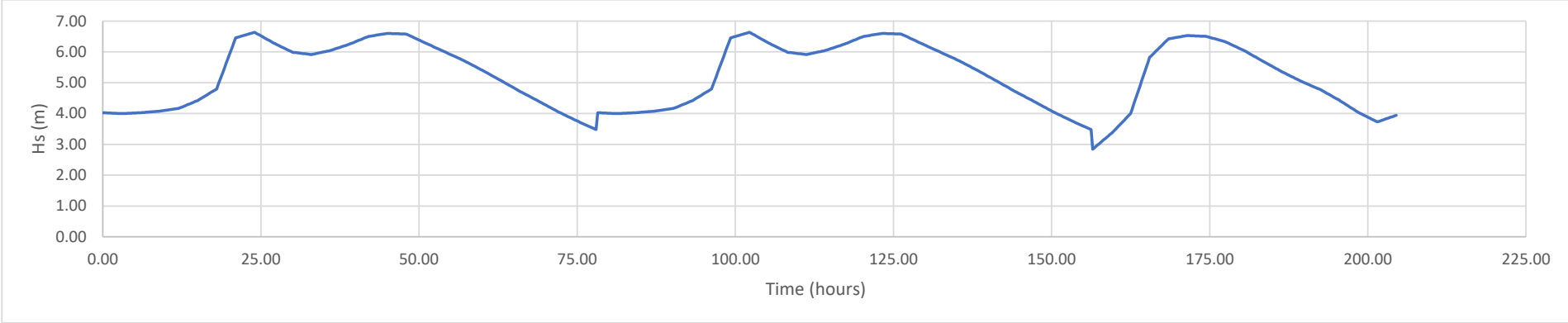
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	1 Year
Storm Sequence	E5



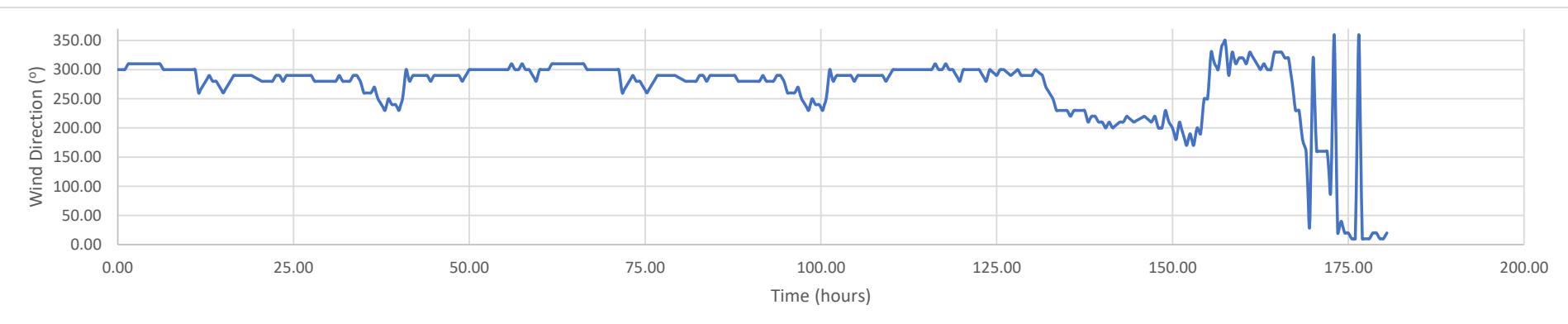
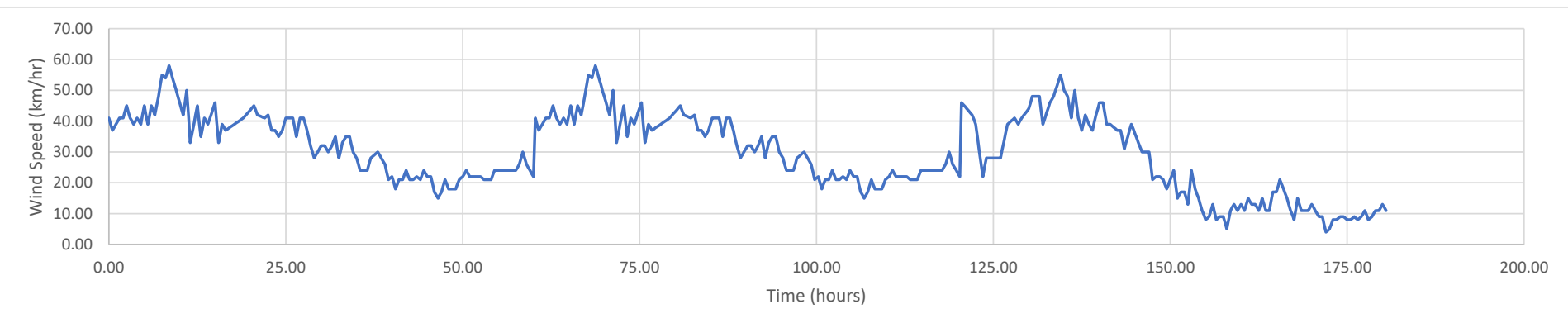
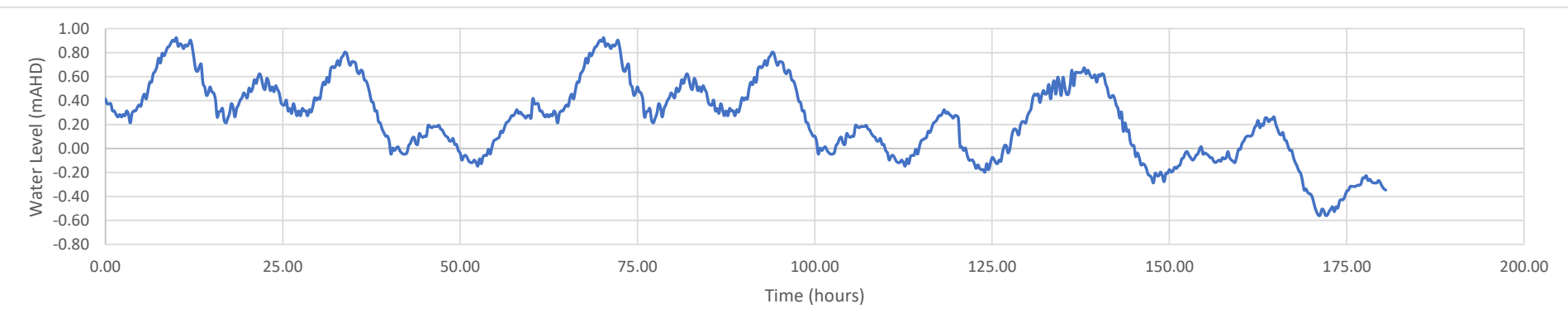
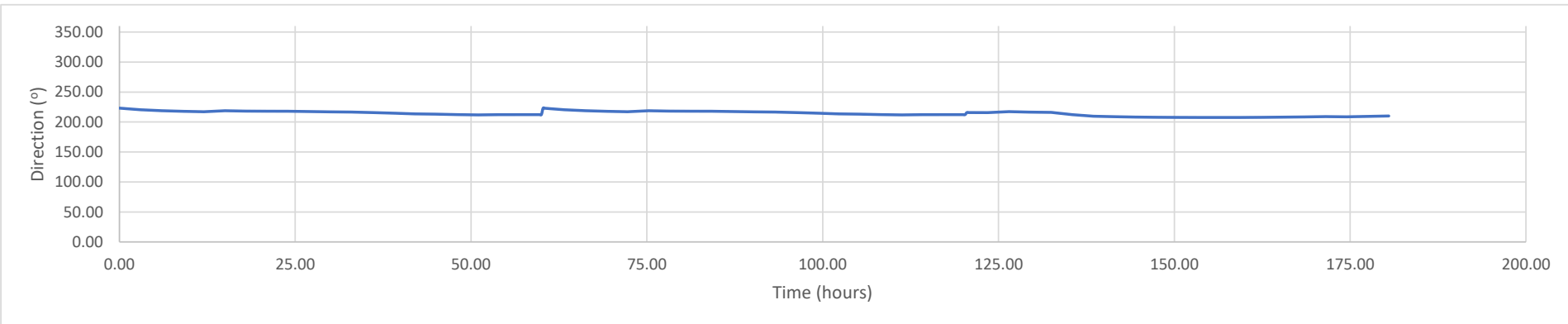
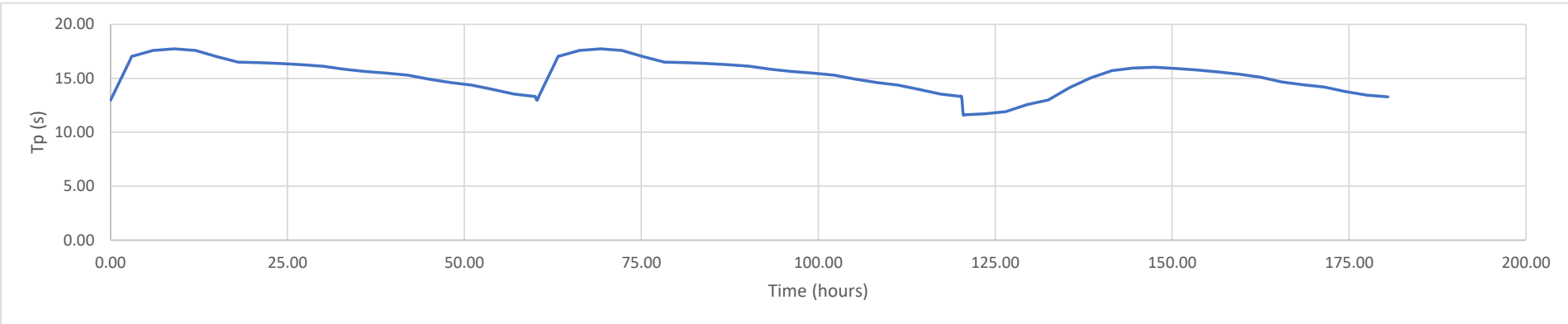
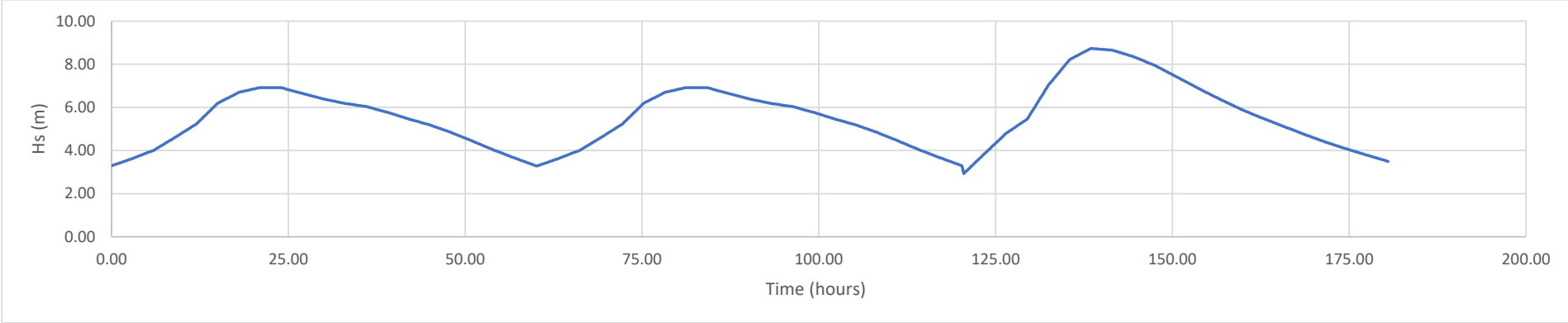
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	10 Year
Storm Sequence	2x E7 + E1



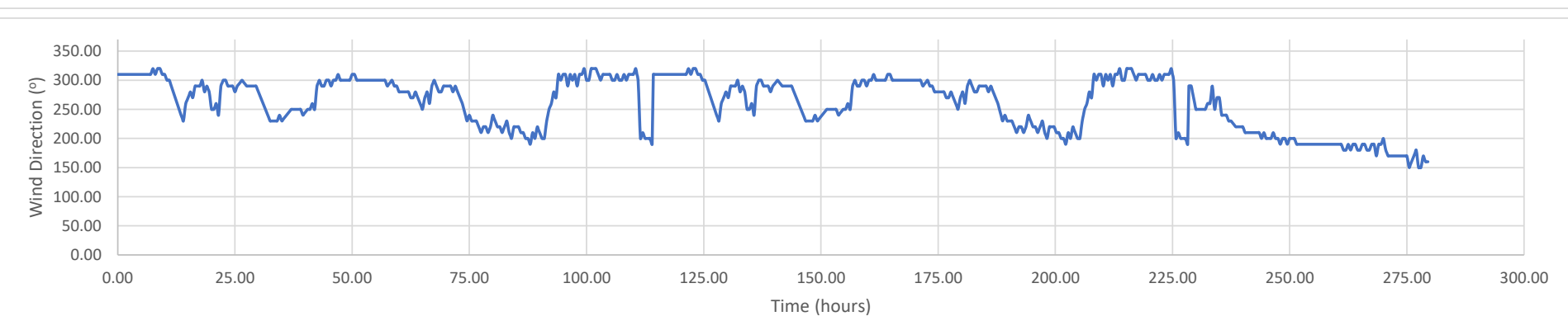
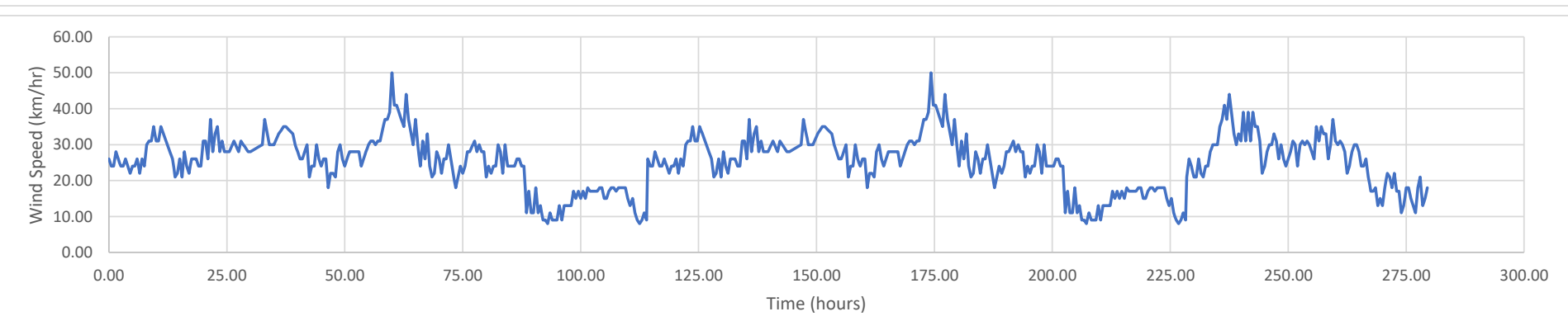
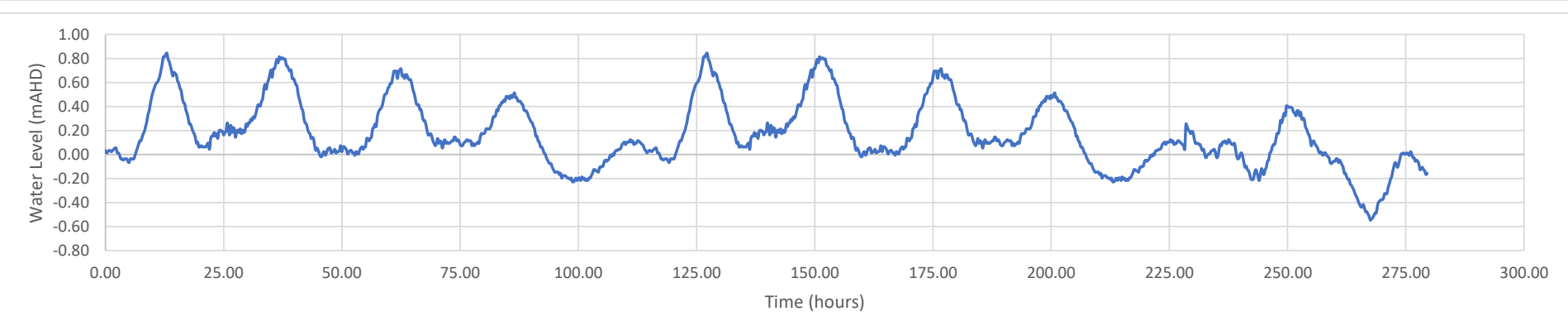
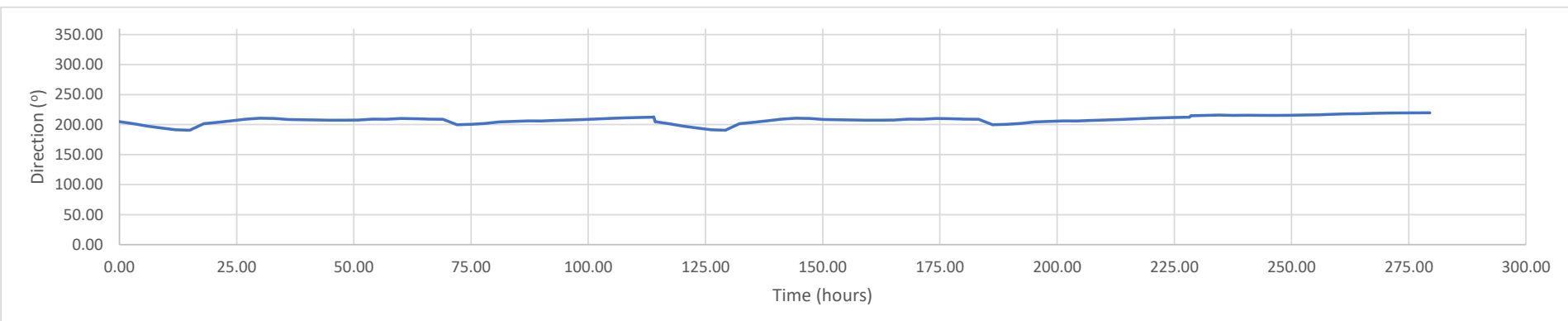
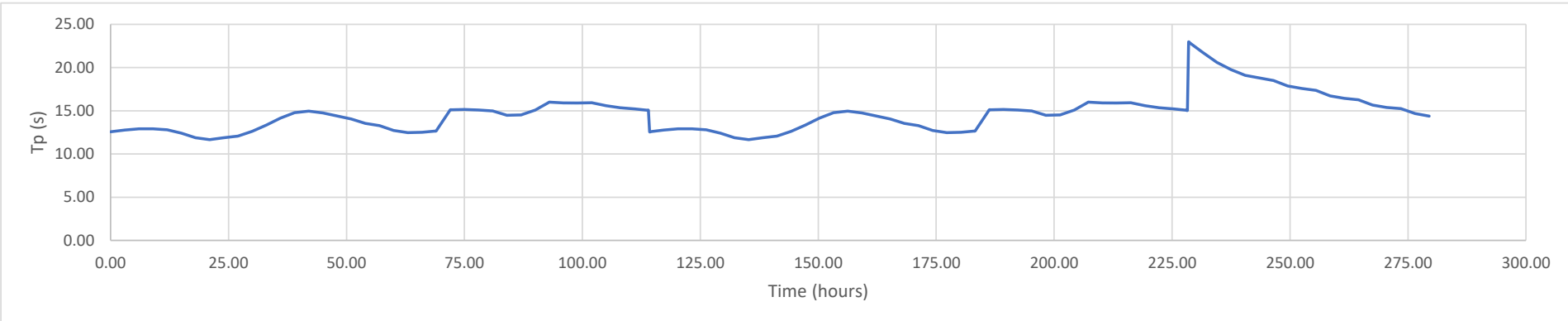
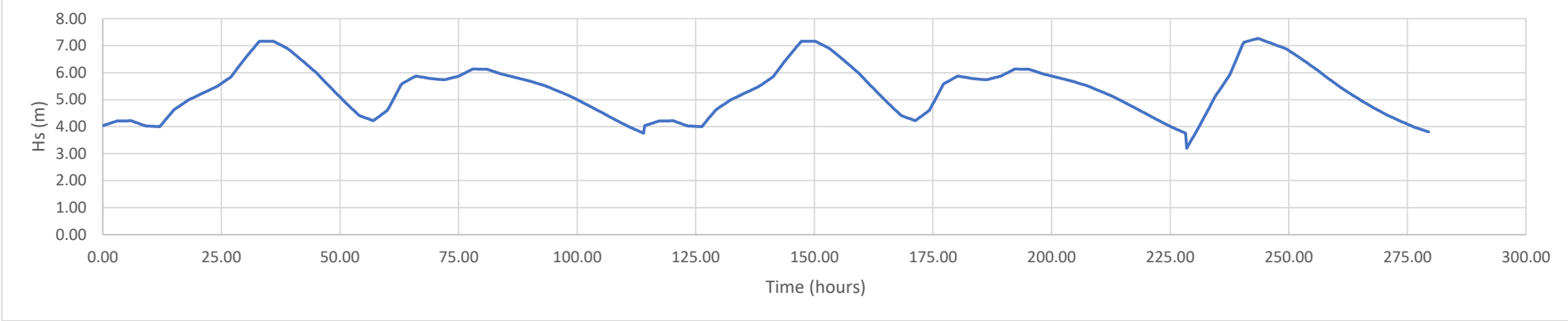
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	10 Year
Storm Sequence	2x E4 + E8



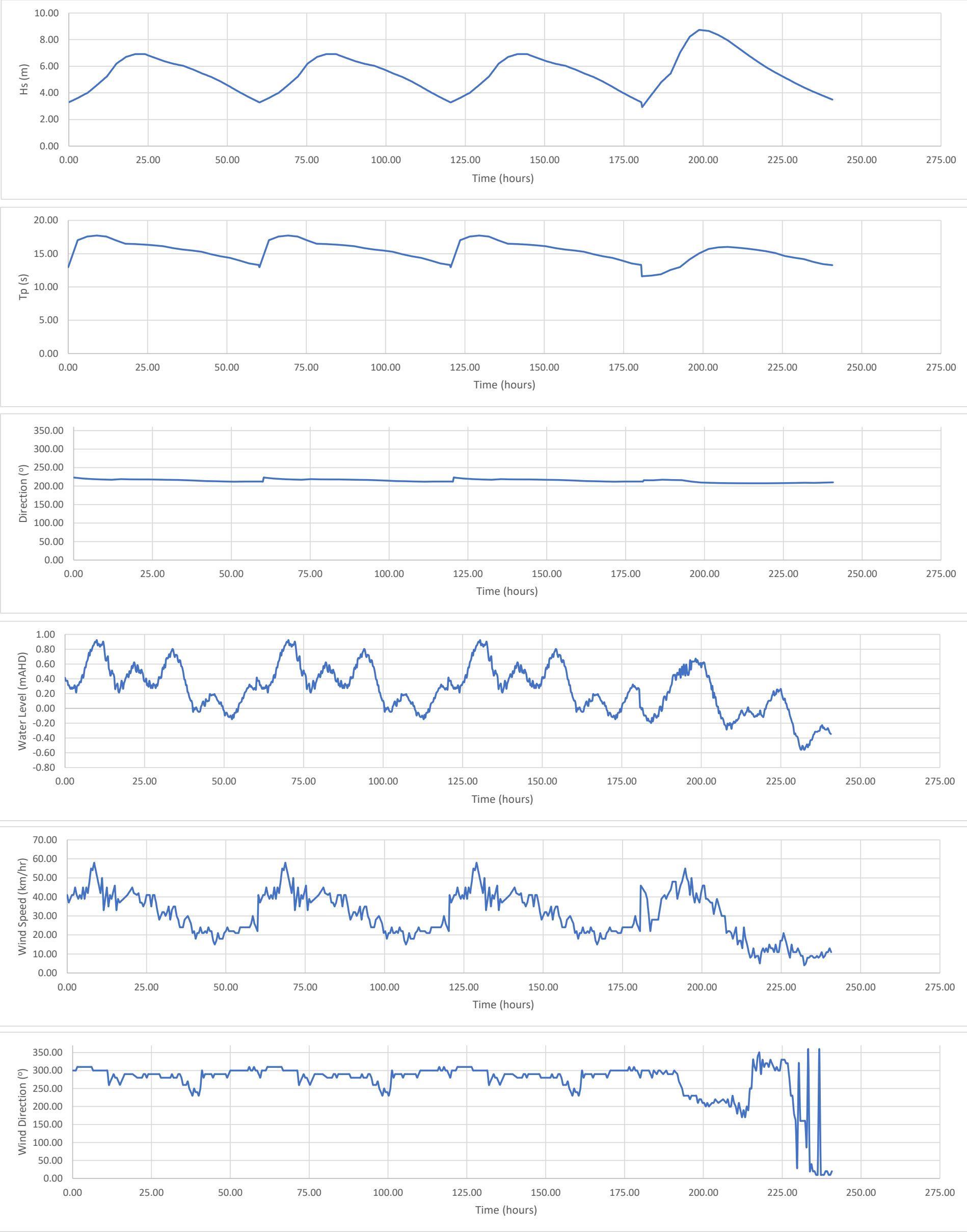
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	25 Year
Storm Sequence	2x E9 + E3



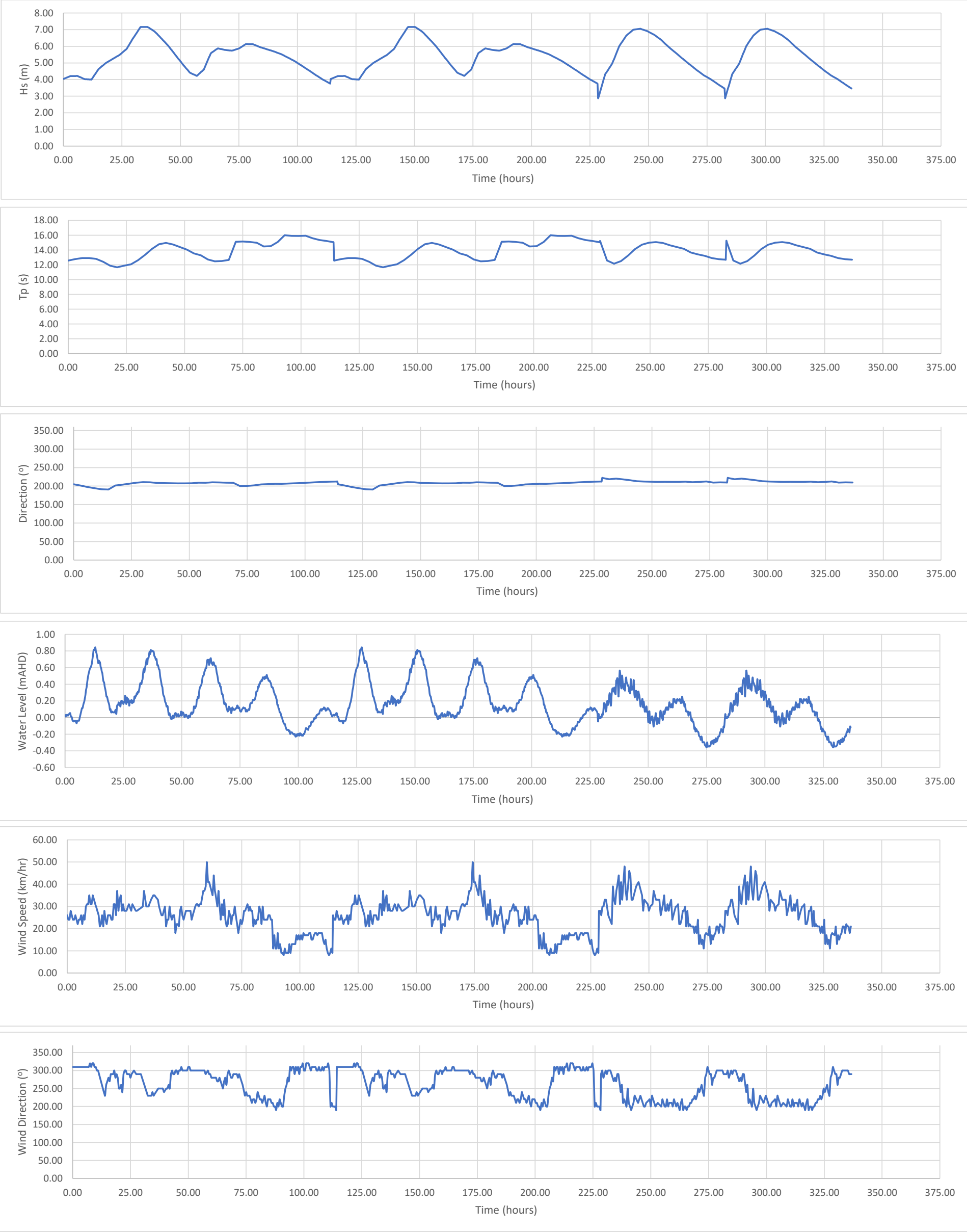
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	25 Year
Storm Sequence	3x E4 + E8



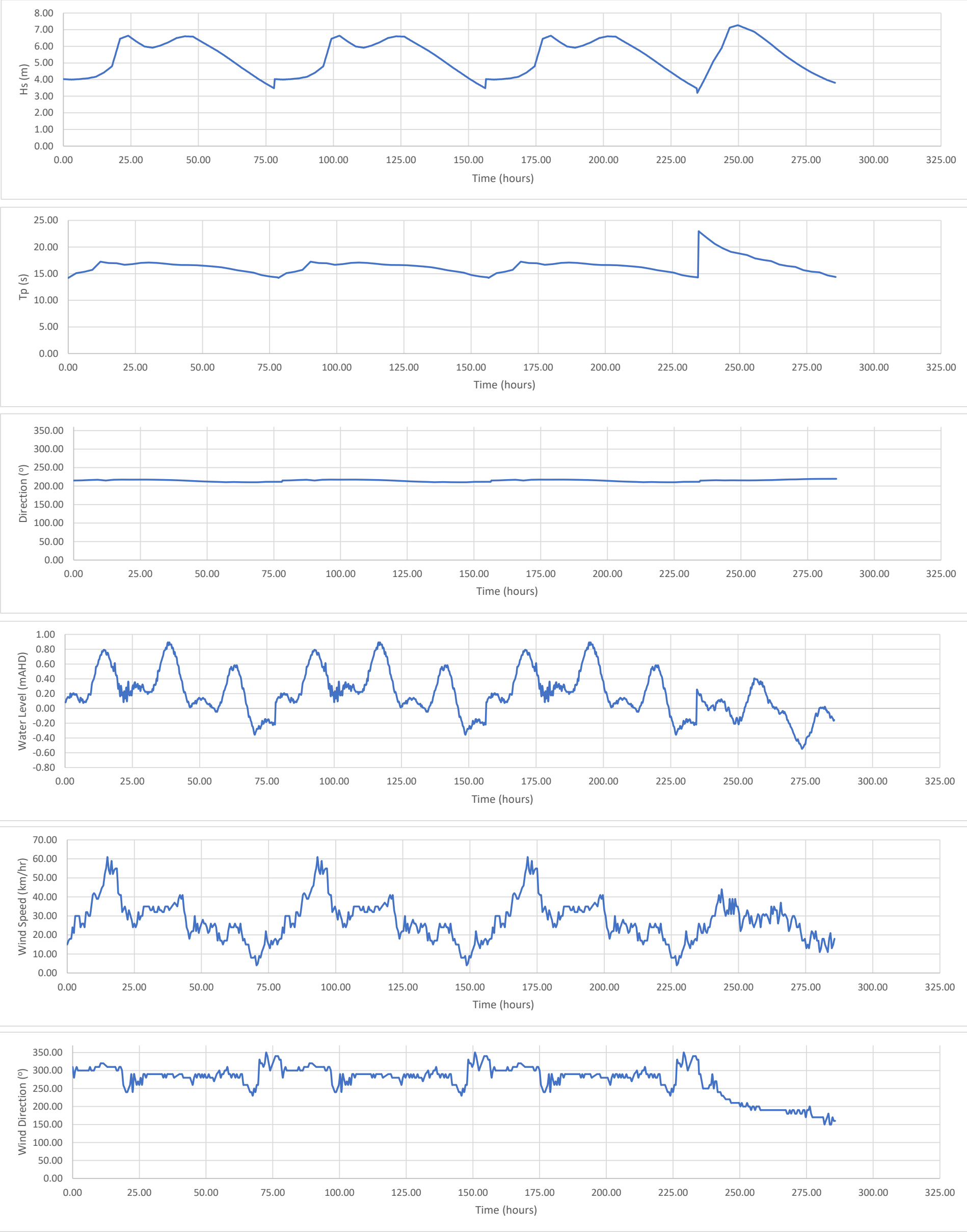
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	50 Year
Storm Sequence	2x E9 + 2x E2



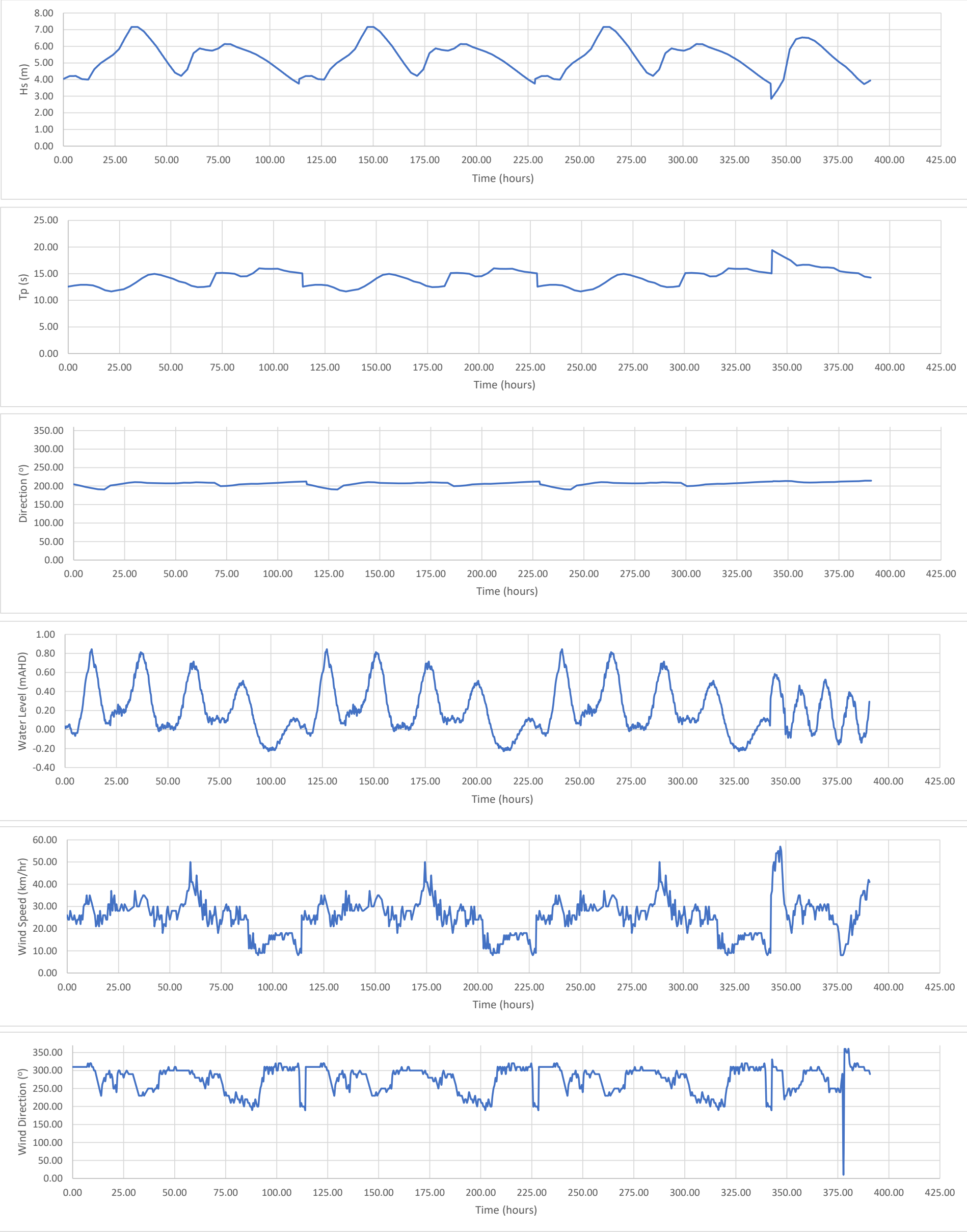
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	50 Year
Storm Sequence	3x E7 + E3



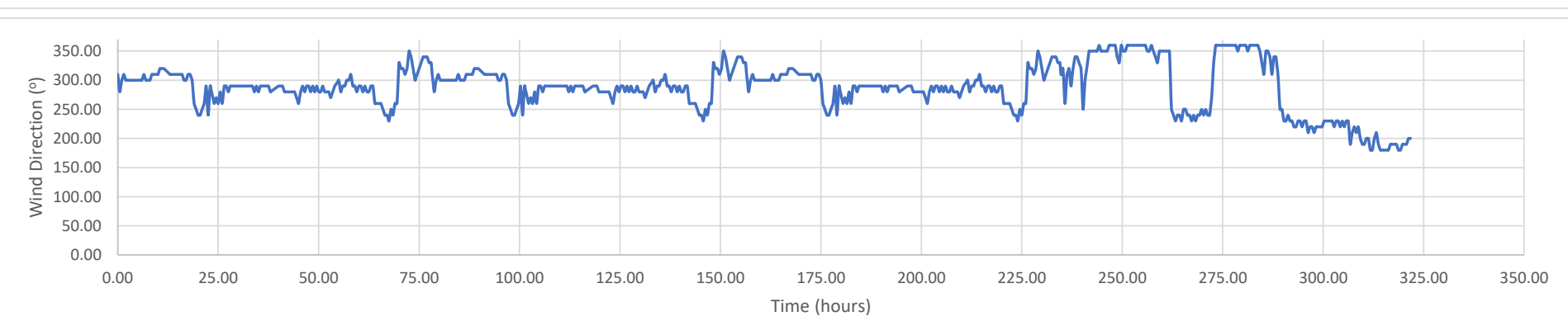
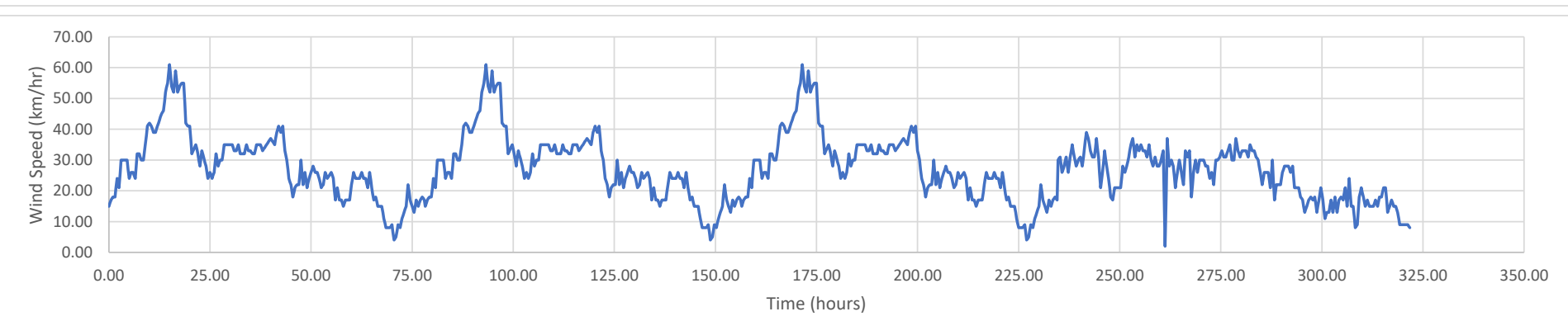
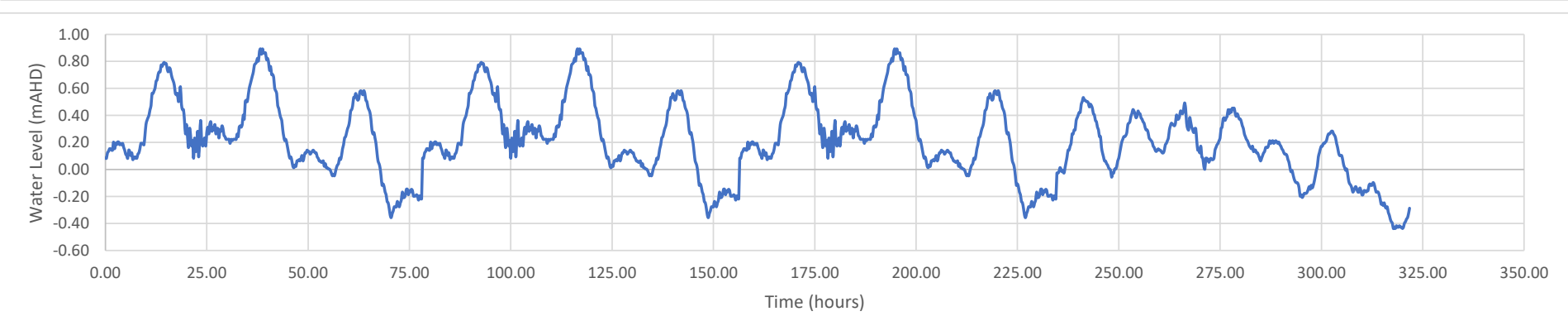
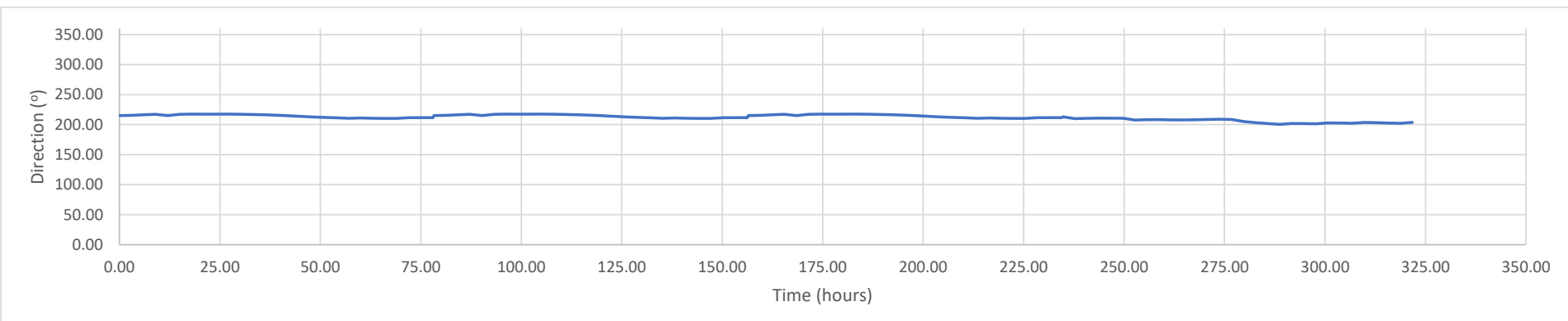
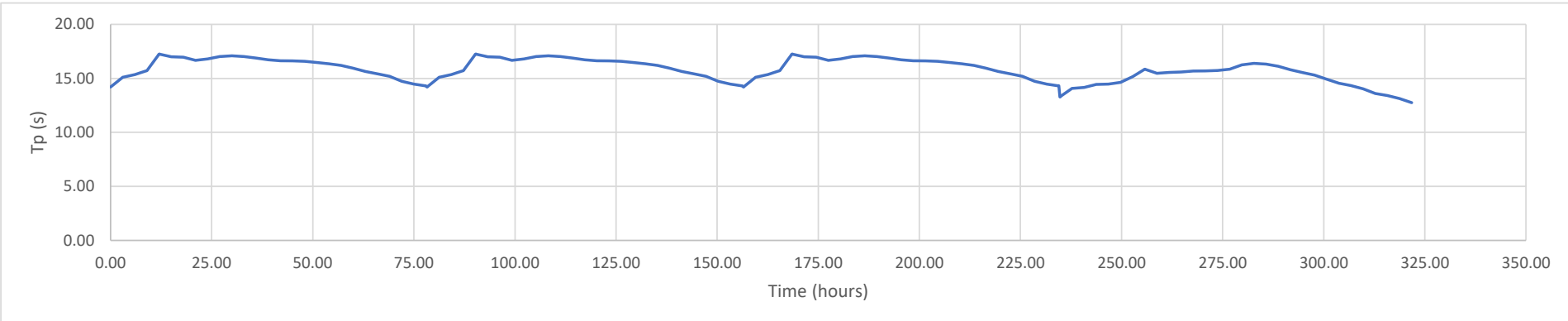
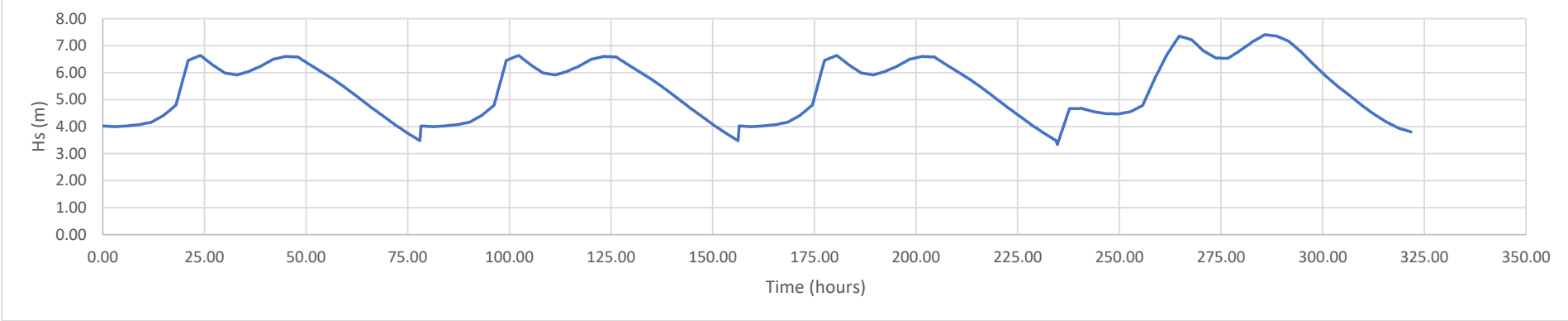
K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	100 Year
Storm Sequence	3x E9 + E1



K1509 - South West Storm Selection
Design Storm Sequences

Location	Esperance
ARI Storm Sequence	100 Year
Storm Sequence	3x E7 + E10



Appendix F Top Storm Clusters Ranked by Net Cluster Power – Abnormal Directions

K1509 - South West Storm Selection
Top Storm Clusters Non Standard Direction

Location	Jurien
Method	Storm Cluster Analysis [270 360]

Rank	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power within Directional Band (MW Days)	Integral Hsq/1000	Mean Sea Direction from Wind Correlation (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	'02-Jul-2007 01:30:00'	'02-Jul-2007 19:30:00'	0.75	4.52	13.07	5.03	0.24	0.39	280.84	-9999.00	-9999.00	0.43	0.72
2	'23-Aug-2004 19:45:00'	'25-Aug-2004 03:45:00'	1.33	5.39	14.23	6.49	0.23	0.97	267.80	-9999.00	-9999.00	0.12	0.50
3	'07-Aug-2006 05:45:00'	'07-Aug-2006 17:45:00'	0.50	4.60	11.93	5.61	0.15	0.28	276.65	-9999.00	-9999.00	0.15	0.54
4	'28-Jun-2009 19:15:00'	'29-Jun-2009 02:15:00'	0.29	5.34	14.21	5.54	0.14	0.23	274.85	-9999.00	-9999.00	0.26	0.42
5	'24-Jun-2009 15:15:00'	'28-Jun-2009 00:15:00'	3.38	3.47	11.65	5.04	0.13	1.03	273.02	-9999.00	-9999.00	0.17	0.59
6	'11-Jul-2002 16:30:00'	'12-Jul-2002 00:30:00'	0.33	4.82	14.68	5.20	0.13	0.21	273.99	-9999.00	-9999.00	-0.08	0.15
7	'17-Aug-2005 13:45:00'	'17-Aug-2005 21:45:00'	0.33	5.04	11.58	5.61	0.11	0.23	276.48	-9999.00	-9999.00	-0.02	0.26
8	'14-Aug-2009 05:15:00'	'14-Aug-2009 11:15:00'	0.25	4.78	15.36	4.99	0.10	0.16	281.73	-9999.00	-9999.00	0.23	0.44
9	'02-Feb-2012 09:58:00'	'03-Feb-2012 00:28:00'	0.60	3.48	11.11	4.52	0.10	0.19	-9999.00	287.16	305.00	0.71	0.89
10	'06-Jun-2005 23:45:00'	'07-Jun-2005 09:45:00'	0.42	4.29	10.56	4.70	0.09	0.20	282.66	-9999.00	-9999.00	0.58	0.89
11	'17-Jun-2014 14:04:00'	'17-Jun-2014 23:04:00'	0.38	4.62	9.73	5.17	0.09	0.20	-9999.00	285.21	281.59	0.46	0.85
12	'21-Jul-2004 05:45:00'	'21-Jul-2004 17:45:00'	0.50	4.14	9.21	4.29	0.09	0.22	284.47	-9999.00	-9999.00	0.58	0.86
13	'16-Jul-2000 17:30:00'	'16-Jul-2000 23:30:00'	0.25	4.31	15.24	4.72	0.08	0.13	271.75	-9999.00	-9999.00	0.07	0.24
14	'21-May-2009 05:15:00'	'21-May-2009 14:15:00'	0.38	4.00	12.31	4.53	0.08	0.16	288.40	-9999.00	-9999.00	0.64	0.80
15	'10-Sep-2009 06:15:00'	'10-Sep-2009 11:15:00'	0.21	4.50	16.12	4.95	0.08	0.12	273.84	-9999.00	-9999.00	0.03	0.11
16	'11-Aug-2003 01:30:00'	'11-Aug-2003 07:30:00'	0.25	4.66	11.83	4.97	0.08	0.15	287.13	-9999.00	-9999.00	0.49	0.66
17	'01-Sep-2002 03:30:00'	'01-Sep-2002 09:30:00'	0.25	4.37	13.00	4.83	0.07	0.13	281.92	-9999.00	-9999.00	0.36	0.45
18	'11-Oct-2004 14:45:00'	'11-Oct-2004 19:45:00'	0.21	3.97	14.96	4.08	0.06	0.09	281.02	-9999.00	-9999.00	-0.11	0.03
19	'29-Jul-2008 23:30:00'	'30-Jul-2008 03:30:00'	0.17	4.11	14.34	4.28	0.05	0.08	286.62	-9999.00	-9999.00	0.41	0.62
20	'10-Jul-2002 08:45:00'	'10-Jul-2002 13:30:00'	0.20	3.85	12.75	4.13	0.04	0.08	279.86	-9999.00	-9999.00	0.44	0.62
21	'18-Jul-2008 05:30:00'	'18-Jul-2008 11:30:00'	0.25	3.98	9.92	4.32	0.04	0.11	283.02	-9999.00	-9999.00	0.66	0.76
22	'23-Jun-2005 05:45:00'	'23-Jun-2005 11:45:00'	0.25	2.96	9.72	3.37	0.02	0.06	289.68	-9999.00	-9999.00	0.63	0.72
23	'30-May-2011 03:03:00'	'30-May-2011 11:03:00'	0.33	2.48	8.61	2.83	0.02	0.05	-9999.00	287.71	292.83	0.58	0.69
24	'14-Jun-2011 07:33:00'	'14-Jun-2011 12:03:00'	0.19	3.18	8.37	3.58	0.02	0.05	-9999.00	301.29	321.34	0.64	0.73
25	'29-Jan-2011 15:03:00'	'29-Jan-2011 22:03:00'	0.29	1.93	11.70	2.21	0.02	0.03	-9999.00	286.87	259.06	0.63	0.72
26	'26-Feb-2011 11:33:00'	'26-Feb-2011 19:03:00'	0.31	1.34	9.55	1.57	0.01	0.01	-9999.00	299.18	263.74	0.47	0.49
27	'22-Feb-2011 10:03:00'	'22-Feb-2011 15:33:00'	0.23	0.94	9.67	1.00	0.00	0.01	-9999.00	288.77	200.36	0.48	0.54

K1509 - South West Storm Selection
Top Storm Clusters Non Standard Direction

Location	Rottnest
Method	Directional Storm Cluster Analysis [270 360] Wind Correlated

	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power within Directional Band (MW Days)	Integral Hsq/1000	Mean Sea Direction from Wind Correlation (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
Rank													
1	'15-Jul-1996 22:00:00'	'18-Jul-1996 15:00:00'	2.71	6.34	13.07	8.31	1.75	2.71	293.22	-9999.00	-9999.00	0.56	0.96
2	'17-Jun-1996 23:00:00'	'28-Jun-1996 05:00:00'	10.25	3.58	13.30	6.11	1.15	3.67	238.54	-9999.00	-9999.00	0.29	0.88
3	'04-Jul-2000 11:45:00'	'18-Jul-2000 00:30:00'	13.53	3.91	12.97	5.74	1.08	5.37	240.32	-9999.00	-9999.00	0.24	0.86
4	'14-Sep-1996 15:00:00'	'18-Sep-1996 06:00:00'	3.63	4.92	13.25	6.95	0.97	2.19	269.85	-9999.00	-9999.00	0.24	0.58
5	'23-Aug-2004 18:30:00'	'26-Aug-2004 15:30:00'	2.88	6.03	14.69	7.61	0.81	2.59	275.37	-9999.00	-9999.00	0.20	0.88
6	'27-Jul-1996 05:00:00'	'01-Aug-1996 11:00:00'	5.25	5.09	14.23	7.09	0.76	3.36	241.02	-9999.00	-9999.00	0.29	0.89
7	'09-May-2004 11:45:00'	'10-May-2004 18:30:00'	1.28	5.09	12.27	6.90	0.51	0.86	299.46	-9999.00	-9999.00	0.57	1.13
8	'10-Jul-2002 05:30:00'	'11-Jul-2002 22:30:00'	1.71	4.98	13.72	6.70	0.43	1.06	280.21	-9999.00	-9999.00	0.28	0.84
9	'08-Oct-1997 19:00:00'	'10-Oct-1997 03:00:00'	1.33	5.08	11.66	5.76	0.42	0.86	287.55	-9999.00	-9999.00	0.19	0.53
10	'06-May-2002 10:00:00'	'11-May-2002 13:45:00'	5.16	4.19	13.07	6.25	0.39	2.31	231.99	-9999.00	-9999.00	0.34	0.71
11	'01-Sep-2002 02:00:00'	'02-Sep-2002 14:30:00'	1.52	5.11	14.10	6.14	0.39	0.98	277.36	-9999.00	-9999.00	0.24	0.69
12	'24-Jun-2003 21:30:00'	'26-Jun-2003 12:30:00'	1.63	4.50	10.66	5.64	0.38	0.84	286.02	-9999.00	-9999.00	0.67	0.97
13	'03-Jun-1997 19:00:00'	'04-Jun-1997 12:00:00'	0.71	5.39	15.93	6.19	0.38	0.53	281.89	-9999.00	-9999.00	0.35	0.73
14	'15-May-2003 21:00:00'	'16-May-2003 13:00:00'	0.67	6.04	10.96	7.89	0.34	0.65	288.50	-9999.00	-9999.00	0.86	1.21
15	'04-Jun-1998 06:40:00'	'08-Jun-1998 16:40:00'	4.42	4.19	13.01	6.27	0.34	2.03	241.31	-9999.00	-9999.00	0.33	0.93
16	'14-Aug-1997 17:00:00'	'15-Aug-1997 12:00:00'	0.79	5.20	12.95	6.13	0.33	0.55	286.40	-9999.00	-9999.00	0.23	0.49
17	'16-Oct-2017 10:59:00'	'17-Oct-2017 05:29:00'	0.77	5.33	11.18	6.49	0.30	0.55	-9999.00	283.98	288.80	0.38	0.70
18	'01-Jul-2000 03:30:00'	'02-Jul-2000 01:45:00'	0.93	4.56	11.68	5.82	0.28	0.50	284.92	-9999.00	-9999.00	0.37	0.88
19	'08-Jul-1995 18:00:00'	'13-Jul-1995'	4.25	3.91	11.59	7.40	0.24	1.80	-9999.00	266.22	275.23	0.24	1.04
20	'13-Sep-1999 14:39:00'	'14-Sep-1999 06:40:00'	0.67	4.95	12.14	5.58	0.23	0.43	280.73	-9999.00	-9999.00	0.26	0.44
21	'01-Jul-2002 02:00:00'	'01-Jul-2002 14:00:00'	0.50	5.37	11.54	5.84	0.20	0.38	279.87	-9999.00	-9999.00	0.34	0.53
22	'02-Sep-1999 10:39:00'	'03-Sep-1999 02:40:00'	0.67	4.85	10.39	6.05	0.19	0.42	287.34	-9999.00	-9999.00	0.23	0.76
23	'17-Aug-1999 18:40:00'	'18-Aug-1999 06:40:00'	0.50	5.27	10.90	5.68	0.18	0.37	283.60	-9999.00	-9999.00	0.52	0.64
24	'07-Oct-1999 10:39:00'	'07-Oct-1999 22:39:00'	0.50	5.22	10.30	6.47	0.18	0.37	280.19	-9999.00	-9999.00	0.46	0.79
25	'22-Aug-2006 05:05:00'	'22-Aug-2006 20:35:00'	0.65	4.61	10.38	5.75	0.17	0.35	-9999.00	301.67	290.09	0.41	0.87
26	'21-Sep-2003 03:45:00'	'21-Sep-2003 12:45:00'	0.38	5.03	13.69	5.71	0.15	0.25	304.55	-9999.00	-9999.00	0.30	0.44
27	'15-Jul-1999 23:39:00'	'16-Jul-1999 09:40:00'	0.42	5.42	10.94	6.06	0.15	0.33	278.06	-9999.00	-9999.00	0.40	0.57
28	'02-Aug-2003 15:00:00'	'03-Aug-2003 01:00:00'	0.42	5.09	10.88	5.87	0.13	0.29	308.48	-9999.00	-9999.00	0.19	0.59
29	'27-Jun-2003 13:30:00'	'28-Jun-2003 00:30:00'	0.46	4.99	10.13	6.26	0.13	0.30	278.72	-9999.00	-9999.00	0.34	0.54
30	'28-Jul-2011 01:37:00'	'28-Jul-2011 12:37:00'	0.46	4.81	10.26	5.61	0.13	0.27	-9999.00	287.88	288.05	0.71	0.98
31	'09-Jun-1998 13:40:00'	'10-Jun-1998 00:40:00'	0.46	4.33	12.52	4.64	0.13	0.23	303.14	-9999.00	-9999.00	0.27	0.48
32	'24-May-1994 16:59:59'	'24-May-1994 22:59:59'	0.25	5.56	13.79	6.06	0.12	0.22	277.76	-9999.00	-9999.00	-0.09	0.14
33	'28-Jul-2011 22:07:00'	'29-Jul-2011 06:07:00'	0.33	5.14	12.09	5.63	0.12	0.22	-9999.00	276.17	264.83	0.52	0.69
34	'22-Sep-2013 00:58:00'	'22-Sep-2013 13:58:00'	0.54	4.53	9.15	5.40	0.12	0.28	-9999.00	287.78	288.05	0.34	0.75
35	'05-Oct-2002 15:30:00'	'05-Oct-2002 21:30:00'	0.25	6.00	10.76	7.31	0.12	0.26	281.50	-9999.00	-9999.00	0.24	0.42
36	'17-Jun-2014 19:29:00'	'18-Jun-2014 04:29:00'	0.38	4.75	11.01	5.03	0.11	0.21	-9999.00	292.21	281.95	0.46	0.56
37	'21-Jul-2004 06:30:00'	'21-Jul-2004 20:30:00'	0.58	4.07	9.58	4.65	0.11	0.25	305.75	-9999.00	-9999.00	0.65	1.00
38	'23-Jul-2007 20:12:00'	'24-Jul-2007 06:12:00'	0.42	4.82	9.72	5.32	0.10	0.24	-9999.00	283.66	278.70	0.52	0.80
39	'31-May-1996 13:00:00'	'31-May-1996 21:00:00'	0.33	4.57	11.72	4.81	0.09	0.19	284.12	-9999.00	-9999.00	0.11	0.24
40	'14-Sep-2002 12:00:00'	'14-Sep-2002 19:00:00'	0.29	5.09	10.83	5.89	0.09	0.21	286.98	-9999.00	-9999.00	0.10	0.35

Location	Cape Nat
Method	Storm Cluster Analysis [270 360]

Rank	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power within Directional Band (MW Days)	Integral Hsq/1000	Mean Sea Direction from Wind Correlation (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	'10-Jul-2000 01:15:00'	'17-Jul-2000 20:30:00'	7.80	5.30	13.29	6.65	2.11	5.39	291.82	-9999.00	-9999.00	0.40	1.05
2	'29-Jul-2007 05:15:00'	'01-Aug-2007 06:15:00'	3.04	5.90	14.63	7.18	1.45	2.64	298.35	-9999.00	-9999.00	0.34	1.04
3	'06-May-2002 19:30:00'	'11-May-2002 08:30:00'	4.54	5.42	13.93	7.64	1.43	3.39	304.62	-9999.00	-9999.00	0.44	0.92
4	'18-Jun-2009 22:30:00'	'29-Jun-2009 04:30:00'	10.25	4.24	12.05	6.81	1.24	4.93	286.94	-9999.00	-9999.00	0.36	1.06
5	'10-Sep-2009 01:45:00'	'11-Sep-2009 14:30:00'	1.53	6.73	15.32	7.64	1.24	1.72	289.09	-9999.00	-9999.00	0.35	0.82
6	'22-Aug-2004 20:45:00'	'26-Aug-2004 12:30:00'	3.66	5.68	14.48	7.68	1.05	2.93	288.77	-9999.00	-9999.00	0.27	0.94
7	'09-May-2004 11:30:00'	'10-May-2004 16:45:00'	1.22	6.20	12.25	8.00	0.70	1.17	321.53	-9999.00	-9999.00	0.65	1.24
8	'07-Jun-2004 16:45:00'	'12-Jun-2004 06:45:00'	4.58	5.07	13.60	6.28	0.56	2.89	297.27	-9999.00	-9999.00	0.32	0.74
9	'13-Aug-2009 15:30:00'	'14-Aug-2009 19:30:00'	1.17	5.56	13.56	6.62	0.56	0.90	295.76	-9999.00	-9999.00	0.41	0.68
10	'31-Aug-2002 16:15:00'	'01-Sep-2002 17:15:00'	1.04	6.37	13.77	7.71	0.55	1.07	298.17	-9999.00	-9999.00	0.38	0.81
11	'16-Jul-2009 06:45:00'	'20-Jul-2009 17:30:00'	4.45	4.47	11.69	6.90	0.46	2.36	279.65	-9999.00	-9999.00	0.24	0.90
12	'28-Feb-2007 19:00:00'	'01-Mar-2007 12:00:00'	0.71	5.96	13.25	6.66	0.41	0.65	300.01	-9999.00	-9999.00	0.39	0.72
13	'21-Sep-2003 00:15:00'	'22-Sep-2003 13:15:00'	1.54	5.61	14.12	6.27	0.36	1.20	283.33	-9999.00	-9999.00	0.26	0.63
14	'25-Jun-2003 06:15:00'	'26-Jun-2003 07:00:00'	1.03	4.79	10.86	5.76	0.31	0.61	297.75	-9999.00	-9999.00	0.73	1.01
15	'17-Aug-1999 18:45:00'	'18-Aug-1999 07:45:00'	0.54	6.18	11.91	6.62	0.29	0.54	288.15	-9999.00	-9999.00	0.62	0.74
16	'10-Jul-2002 05:30:00'	'11-Jul-2002 19:30:00'	1.58	5.72	13.64	6.41	0.27	1.28	290.86	-9999.00	-9999.00	0.38	1.04
17	'21-May-2009 05:45:00'	'21-May-2009 23:45:00'	0.75	5.15	10.64	5.73	0.24	0.51	302.26	-9999.00	-9999.00	0.71	1.23
18	'30-Jul-2003 06:15:00'	'02-Aug-2003 23:15:00'	3.71	4.47	14.00	6.69	0.22	1.85	298.59	-9999.00	-9999.00	0.14	0.80
19	'16-May-2005 05:30:00'	'16-May-2005 16:30:00'	0.46	5.56	13.23	6.25	0.21	0.35	294.76	-9999.00	-9999.00	0.57	1.00
20	'18-Jun-1999 09:45:00'	'18-Jun-1999 16:45:00'	0.29	6.06	15.66	6.67	0.20	0.30	275.33	-9999.00	-9999.00	0.60	0.76
21	'13-Jun-2002 18:30:00'	'14-Jun-2002 02:30:00'	0.33	5.93	12.75	6.86	0.18	0.32	274.94	-9999.00	-9999.00	0.17	0.32
22	'26-Apr-2000 19:45:00'	'27-Apr-2000 04:45:00'	0.38	5.42	12.68	5.89	0.17	0.29	289.84	-9999.00	-9999.00	0.52	0.77
23	'05-Jul-2003 06:30:00'	'05-Jul-2003 17:15:00'	0.45	5.44	11.22	6.28	0.16	0.35	285.93	-9999.00	-9999.00	0.49	0.66
24	'15-Aug-2006 00:45:00'	'15-Aug-2006 13:45:00'	0.54	4.87	11.41	5.26	0.16	0.33	289.90	-9999.00	-9999.00	0.42	0.68
25	'15-May-2003 22:00:00'	'16-May-2003 07:15:00'	0.39	5.64	10.65	7.44	0.15	0.33	316.26	-9999.00	-9999.00	0.90	1.43
26	'28-Nov-2012 10:49:00'	'28-Nov-2012 22:19:00'	0.48	4.90	10.39	6.30	0.14	0.29	-9999.00	297.66	306.19	0.87	1.20
27	'02-Jul-2007 08:15:00'	'02-Jul-2007 14:15:00'	0.25	5.86	13.21	6.51	0.14	0.25	293.75	-9999.00	-9999.00	0.99	1.26
28	'12-Oct-2006 02:00:00'	'12-Oct-2006 11:00:00'	0.38	4.98	12.53	5.18	0.14	0.25	281.91	-9999.00	-9999.00	-0.01	0.31
29	'20-Jul-2005 17:30:00'	'21-Jul-2005 01:30:00'	0.33	5.15	12.99	5.58	0.13	0.24	288.73	-9999.00	-9999.00	0.14	0.35
30	'29-Jul-2008 22:45:00'	'30-Jul-2008 07:45:00'	0.38	5.06	12.03	5.35	0.13	0.26	285.73	-9999.00	-9999.00	0.69	1.01
31	'16-Jul-1999 22:45:00'	'17-Jul-1999 02:45:00'	0.17	6.36	15.03	6.65	0.12	0.20	276.45	-9999.00	-9999.00	0.17	0.28
32	'19-Jun-2006 19:15:00'	'20-Jun-2006 01:15:00'	0.25	5.64	12.38	5.92	0.11	0.22	276.20	-9999.00	-9999.00	0.21	0.29
33	'28-Jun-2011 02:00:00'	'28-Jun-2011 11:30:00'	0.40	4.89	10.74	5.39	0.11	0.24	-9999.00	297.20	302.28	0.77	1.25
34	'28-Apr-2000 01:45:00'	'28-Apr-2000 06:45:00'	0.21	5.28	13.58	5.46	0.09	0.17	286.12	-9999.00	-9999.00	0.45	0.66
35	'08-Sep-2003 09:15:00'	'08-Sep-2003 13:15:00'	0.17	5.30	17.32	5.55	0.09	0.14	290.98	-9999.00	-9999.00	0.29	0.42
36	'16-Aug-2005 03:00:00'	'16-Aug-2005 08:00:00'	0.21	4.96	14.48	5.41	0.09	0.15	318.56	-9999.00	-9999.00	0.71	0.88
37	'26-Jun-2012 05:19:00'	'26-Jun-2012 16:49:00'	0.48	3.90	10.30	4.41	0.09	0.18	-9999.00	314.13	345.71	0.66	0.82
38	'01-Jul-2007 07:15:00'	'01-Jul-2007 15:15:00'	0.33	4.48	11.34	5.22	0.08	0.18	321.82	-9999.00	-9999.00	0.98	1.29
39	'12-Sep-2008 13:45:00'	'12-Sep-2008 17:45:00'	0.17	5.22	15.05	5.42	0.08	0.14	289.23	-9999.00	-9999.00	0.02	0.10
40	'03-Jul-2005 12:30:00'	'03-Jul-2005 17:30:00'	0.21	4.91	13.17	5.10	0.08	0.14	283.79	-9999.00	-9999.00	0.21	0.40

Location	Albany
Method	Storm Cluster Analysis [90 180]

Rank	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power within Directional Band (MW Days)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	'03-Aug-1984 05:00:00'	'04-Aug-1984 11:00:00'	1.25	6.13	12.18	7.39	0.65	1.26	165.75	-9999.00	-9999.00	-0.03	0.19
2	'03-May-1988 14:00:00'	'04-May-1988 02:00:00'	0.50	5.23	10.04	5.51	0.14	0.41	175.80	-9999.00	-9999.00	-0.07	0.34
3	'05-Jan-2007 06:00:00'	'05-Jan-2007 13:00:00'	0.29	5.23	11.73	5.49	0.11	0.22	156.63	-9999.00	-9999.00	-0.45	-0.35
4	'26-Sep-2017 03:38:00'	'26-Sep-2017 12:08:00'	0.35	5.18	10.35	5.77	0.10	0.24	-9999.00	142.24	148.22	0.08	0.19
5	'12-May-1987 08:00:00'	'12-May-1987 14:00:00'	0.25	5.23	11.84	5.48	0.09	0.25	173.90	-9999.00	-9999.00	0.11	0.24
6	'02-May-1988 17:00:00'	'03-May-1988 02:00:00'	0.38	4.93	9.30	4.98	0.09	0.29	171.66	-9999.00	-9999.00	-0.04	0.08
7	'25-Sep-2017 19:38:00'	'26-Sep-2017 02:38:00'	0.29	5.20	10.08	5.64	0.08	0.20	-9999.00	141.20	142.68	0.29	0.36
8	'04-Jan-2007 23:00:00'	'05-Jan-2007 04:00:00'	0.21	5.33	10.47	5.57	0.07	0.17	163.56	-9999.00	-9999.00	0.26	0.46
9	'07-Jun-2012 09:24:00'	'07-Jun-2012 14:54:00'	0.23	2.59	9.83	2.86	0.02	0.04	-9999.00	116.50	103.35	0.61	0.68
10	'06-Dec-2010 19:49:00'	'07-Dec-2010 01:18:00'	0.23	2.11	10.60	2.30	0.01	0.03	-9999.00	163.41	181.74	0.70	0.80

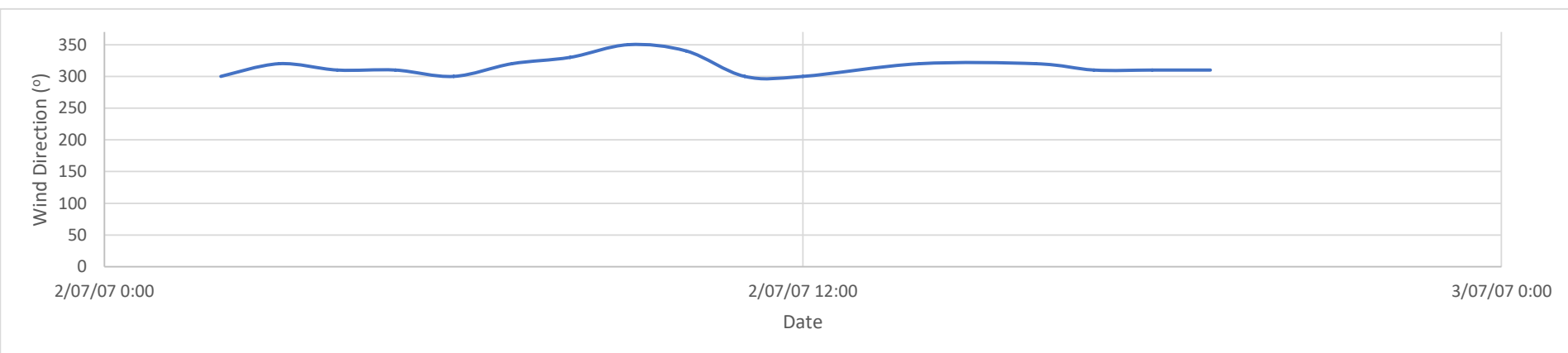
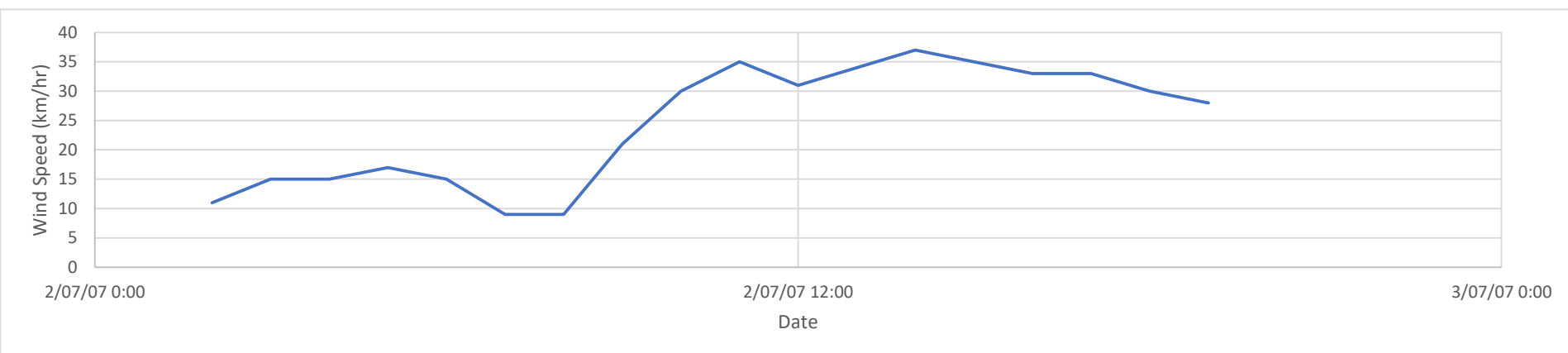
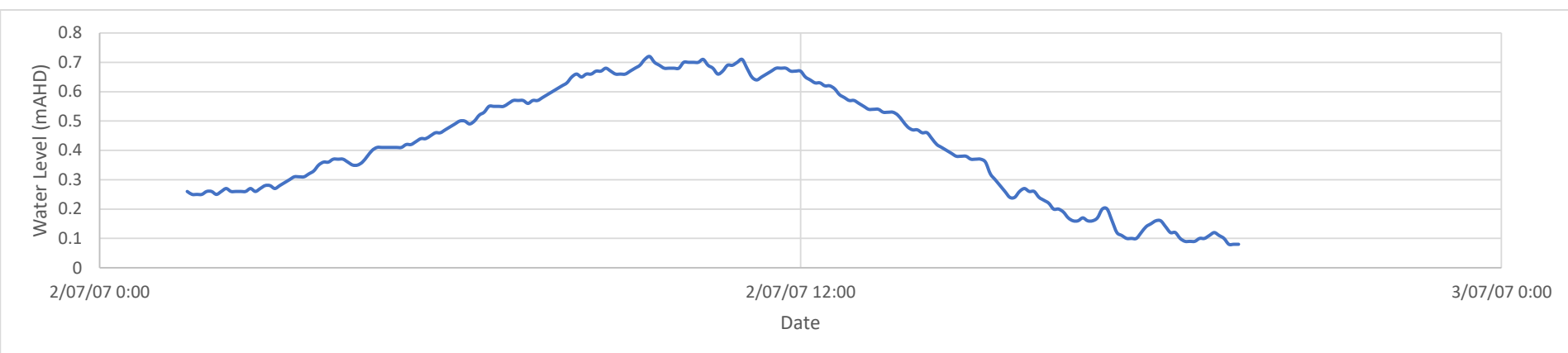
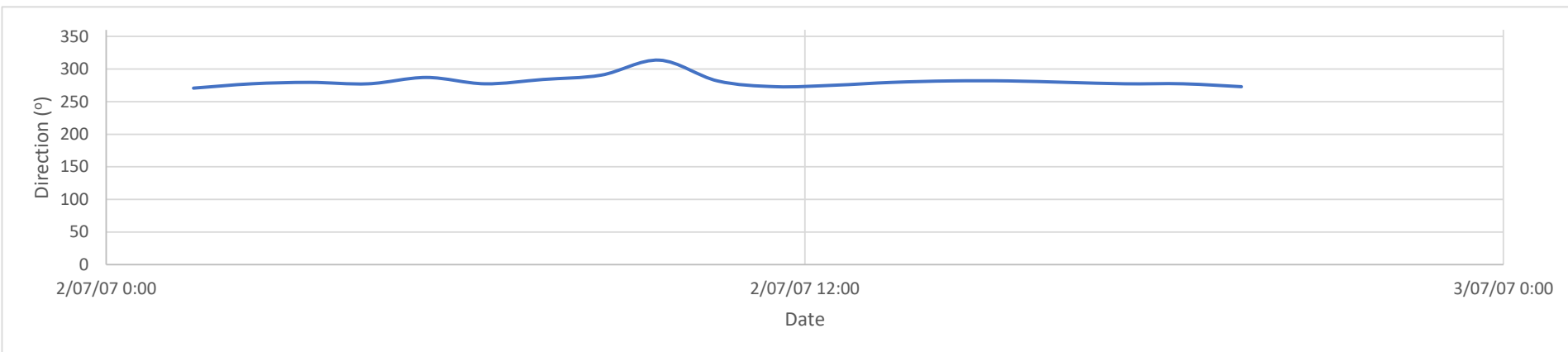
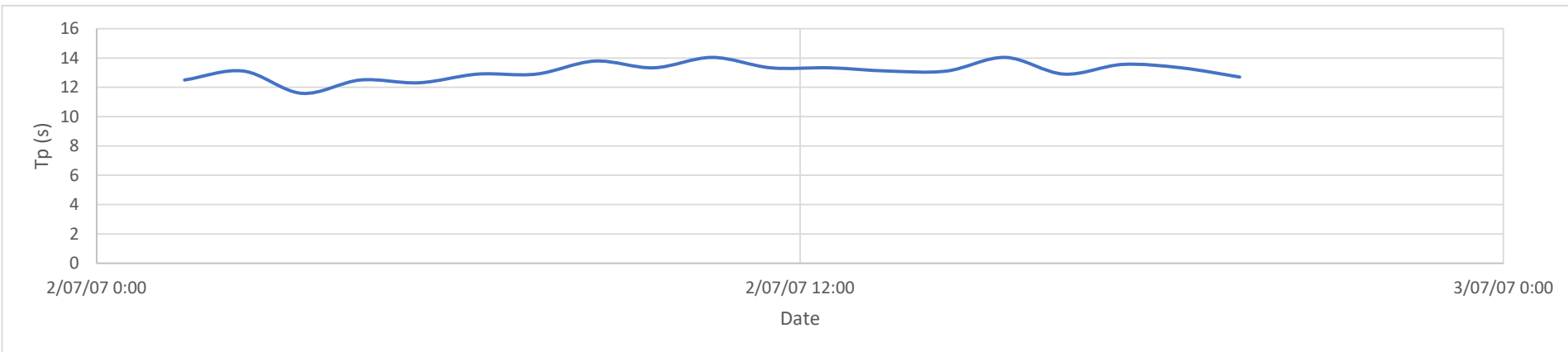
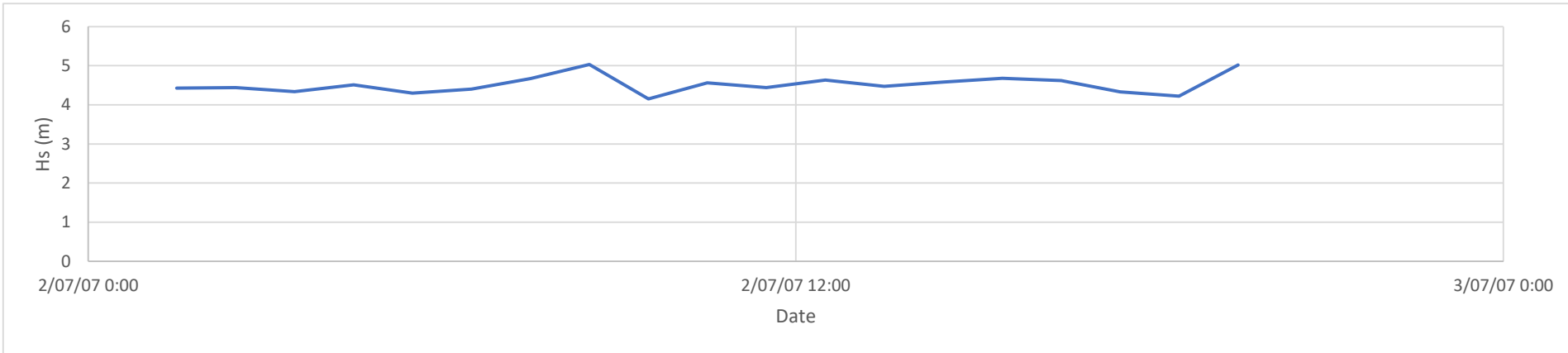
Location	Esperance
Method	Storm Cluster Analysis [90 180]

Rank	Start Date	End Date	Event Duration (Days)	Mean Hs (m)	Mean Tp (s)	Peak Instantaneous Hs (m)	Net Cluster Power Within Directional Band (MWDays)	Integral Hsq/1000	Mean Total Dir (deg)	Mean Swell Dir (deg)	Mean Sea Dir (deg)	Mean Water Level (mAHD)	Peak Water Level (mAHD)
1	'14-Jun-1989 05:00:00'	'16-Jun-1989 05:00:00'	2.00	5.09	10.45	5.51	0.60	1.32	150.90	-9999.00	-9999.00	0.02	0.37
2	'04-Jan-2007 17:00:00'	'05-Jan-2007 17:00:00'	1.00	6.11	10.37	7.33	0.46	1.03	157.94	-9999.00	-9999.00	0.20	0.95
3	'12-May-1987 20:00:00'	'13-May-1987 11:00:00'	0.63	5.32	11.91	5.89	0.24	0.51	170.39	-9999.00	-9999.00	-0.02	0.37
4	'06-Oct-1992 17:00:00'	'07-Oct-1992 11:00:00'	0.75	5.08	9.17	5.37	0.18	0.54	151.95	-9999.00	-9999.00	-0.26	-0.07
5	'11-Jul-2006 05:00:00'	'11-Jul-2006 17:00:00'	0.50	5.02	11.97	5.16	0.18	0.38	166.40	-9999.00	-9999.00	0.16	0.53
6	'05-Jun-2001 14:00:00'	'05-Jun-2001 23:00:00'	0.38	4.72	9.65	4.80	0.09	0.27	168.45	-9999.00	-9999.00	-0.28	0.03
7	'17-May-1999 08:00:00'	'17-May-1999 14:00:00'	0.25	2.22	11.63	2.28	0.02	0.04	171.22	-9999.00	-9999.00	0.80	0.92

Appendix G Time Histories of Top Storm Clusters from Abnormal Directions

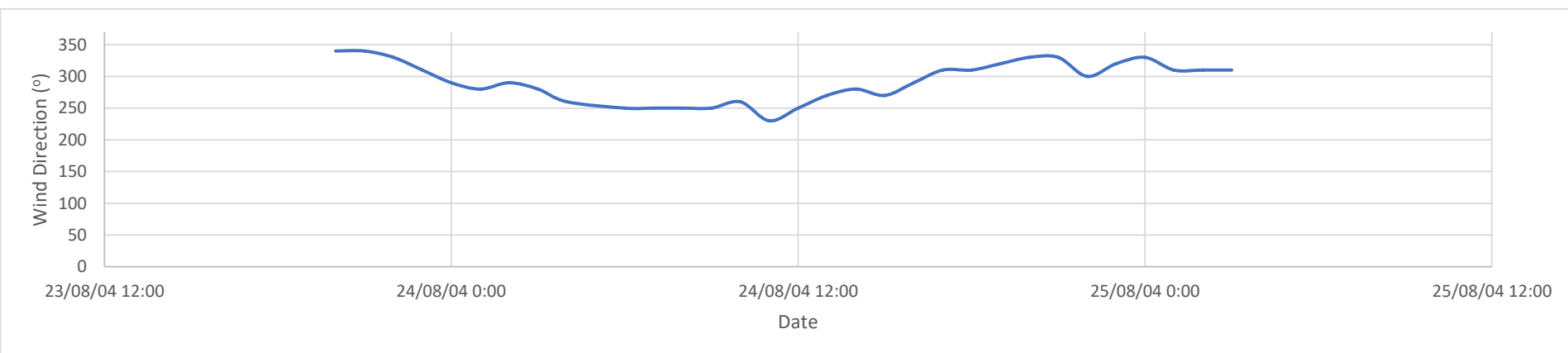
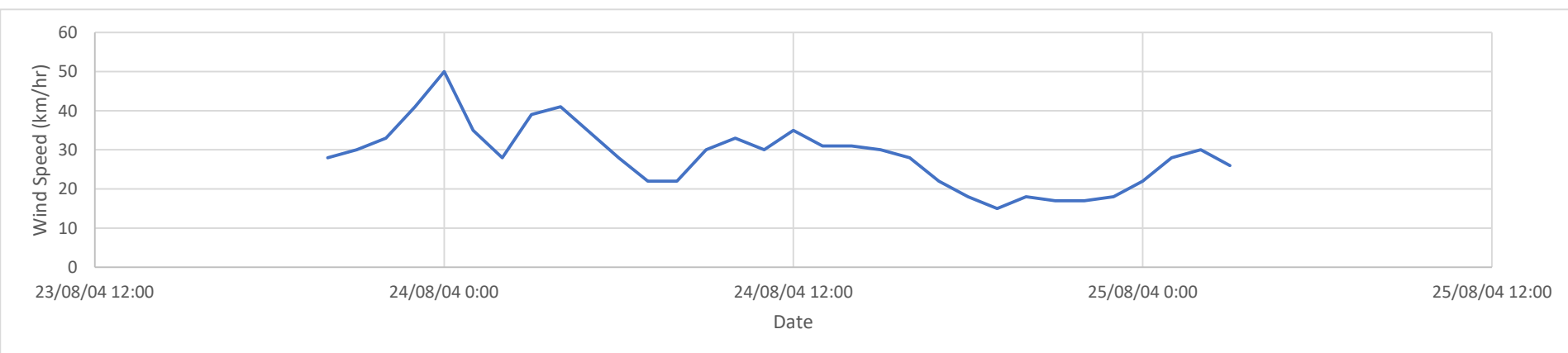
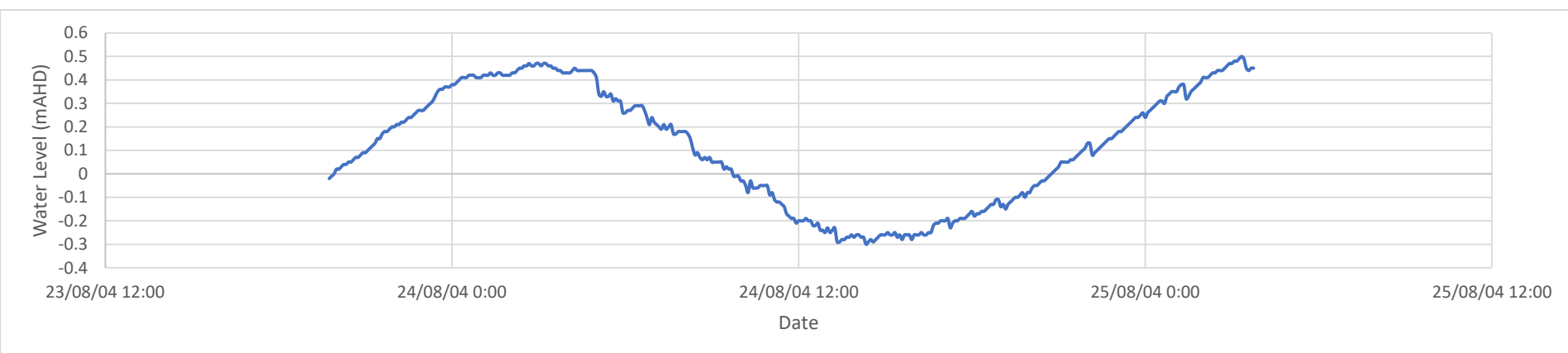
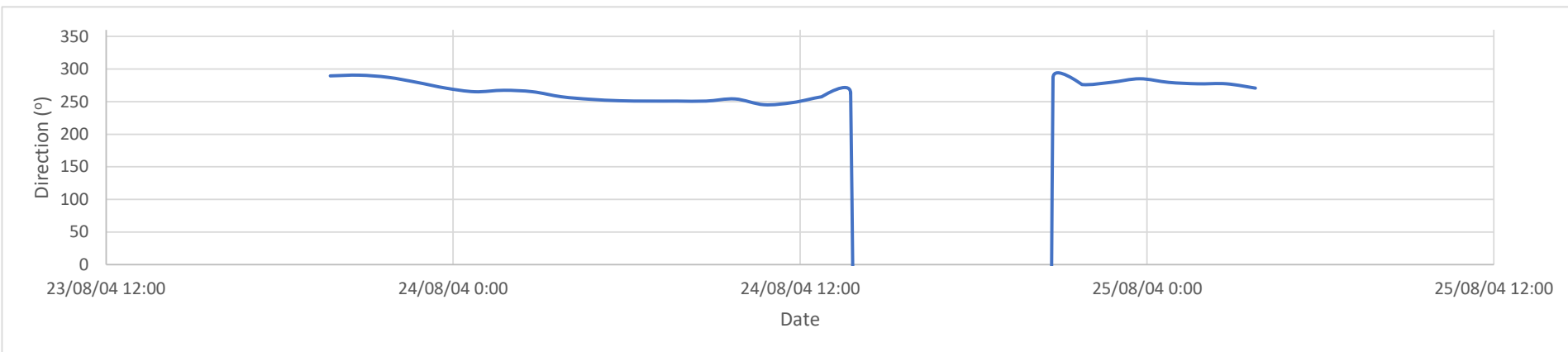
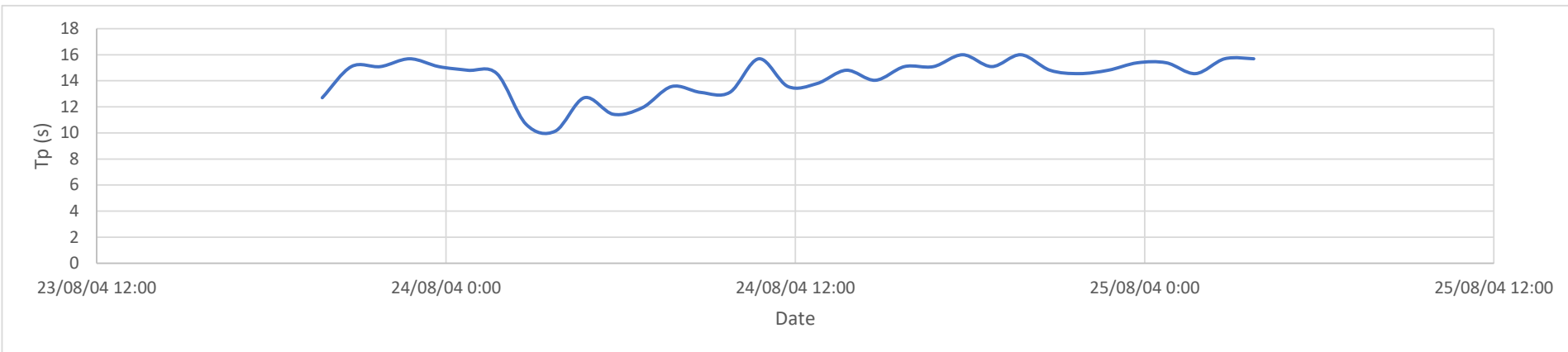
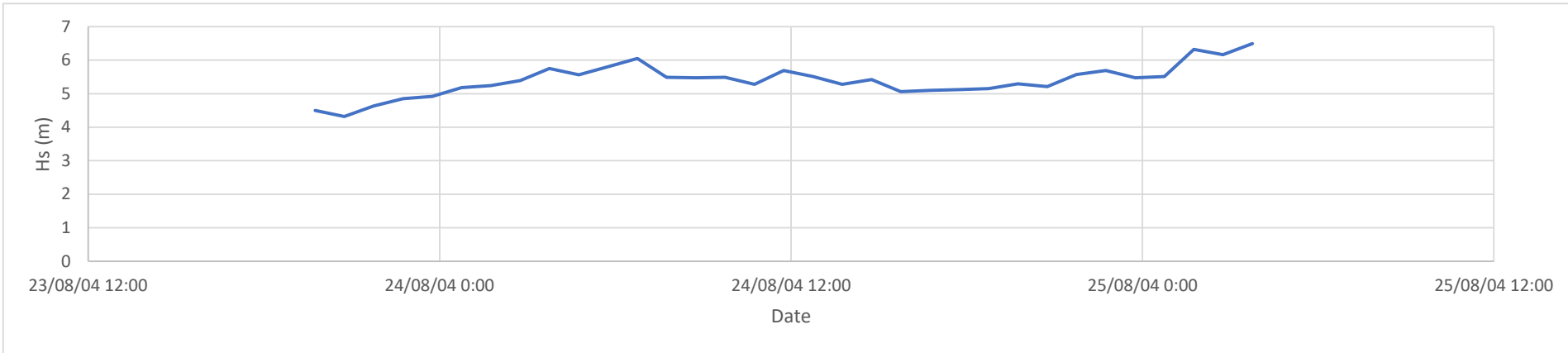
K1509 - South West Storm Selection
Top South West (Jurien) Storm Clusters
from Abnormal Directions Plots

Location	Jurien
Start Date	2/07/2007 1:30
End Date	2/07/2007 19:30



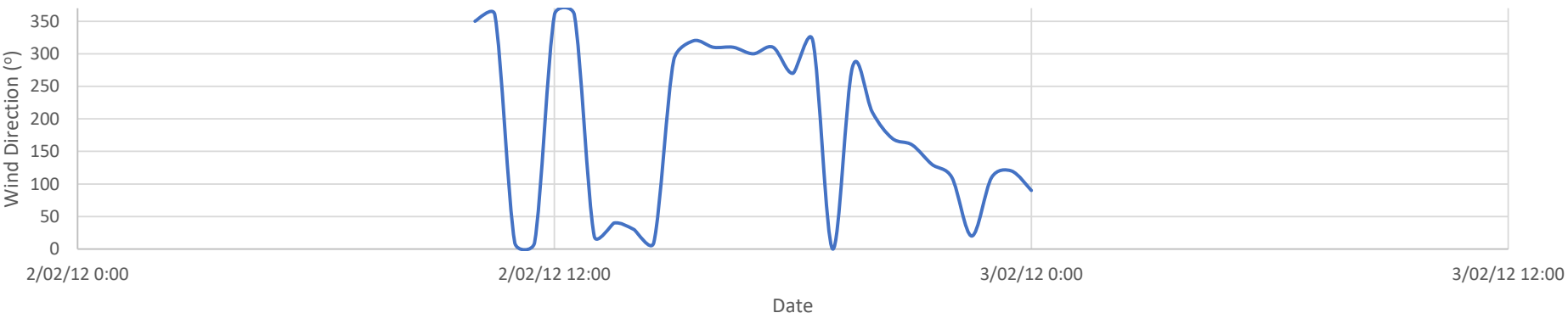
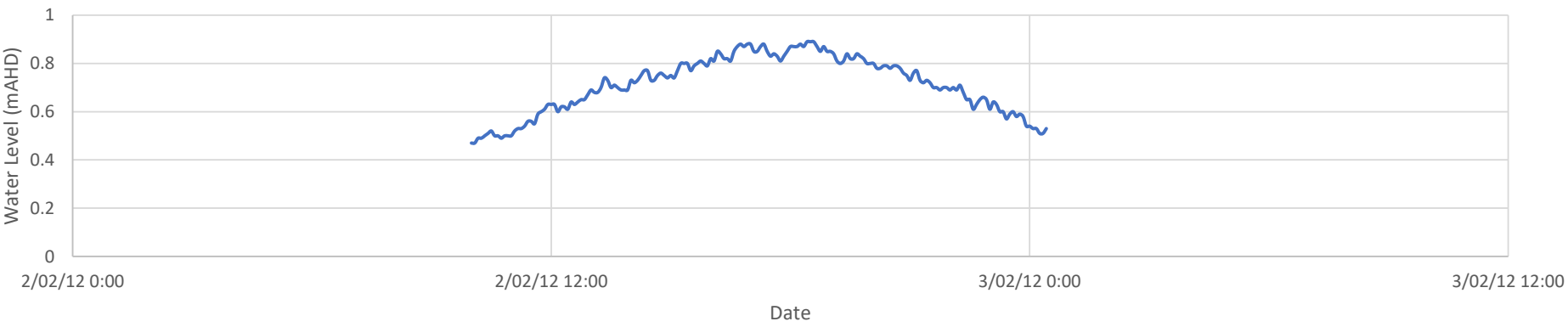
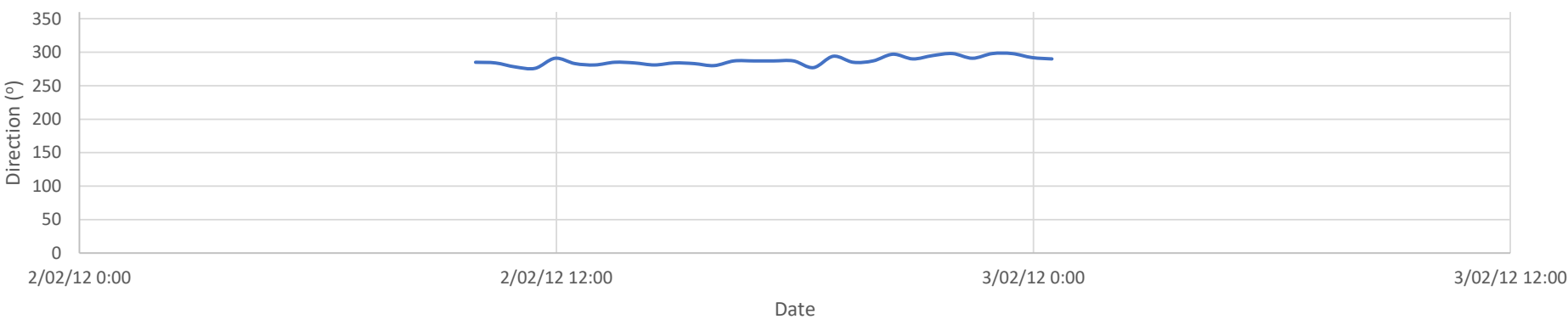
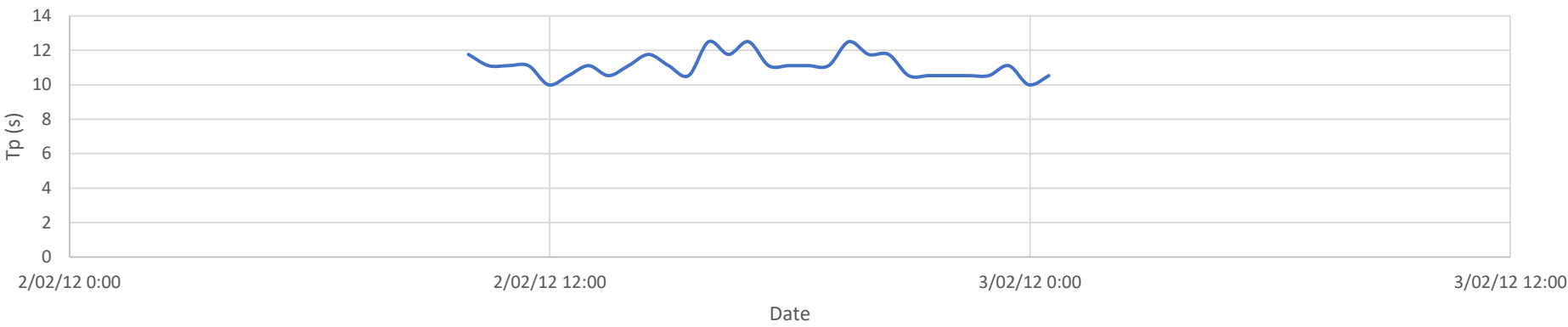
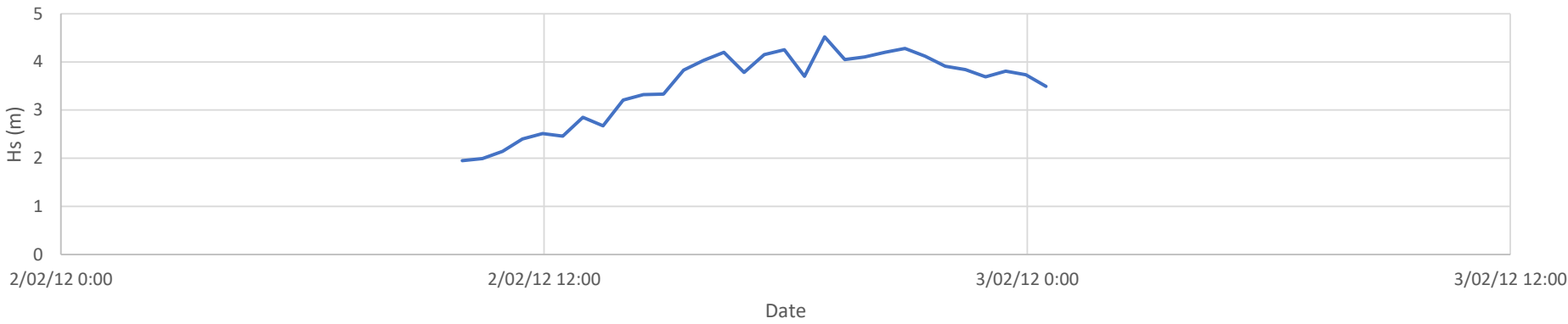
K1509 - South West Storm Selection
Top South West (Jurien) Storm Clusters
from Abnormal Directions Plots

Location	Jurien
Start Date	23/08/2004 19:45
End Date	25/08/2004 3:45



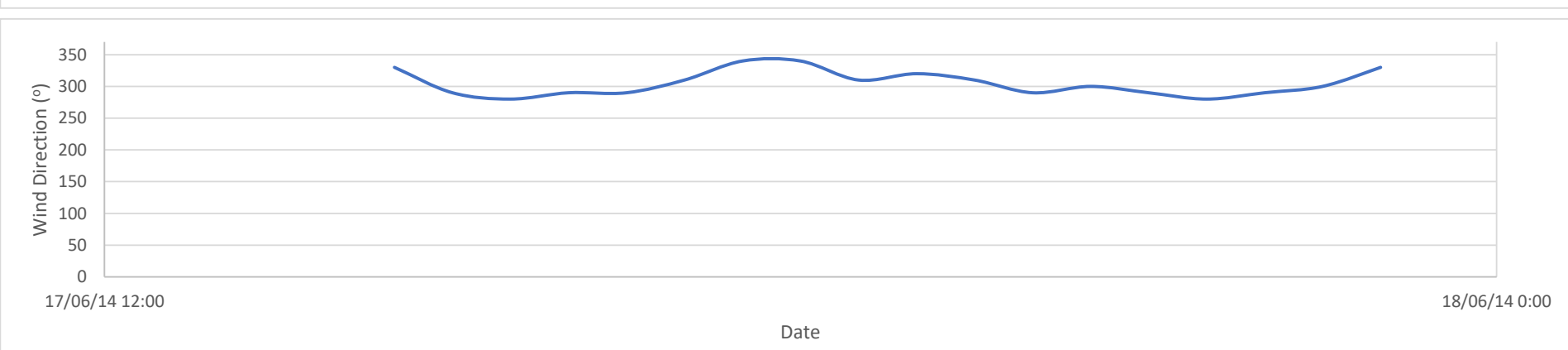
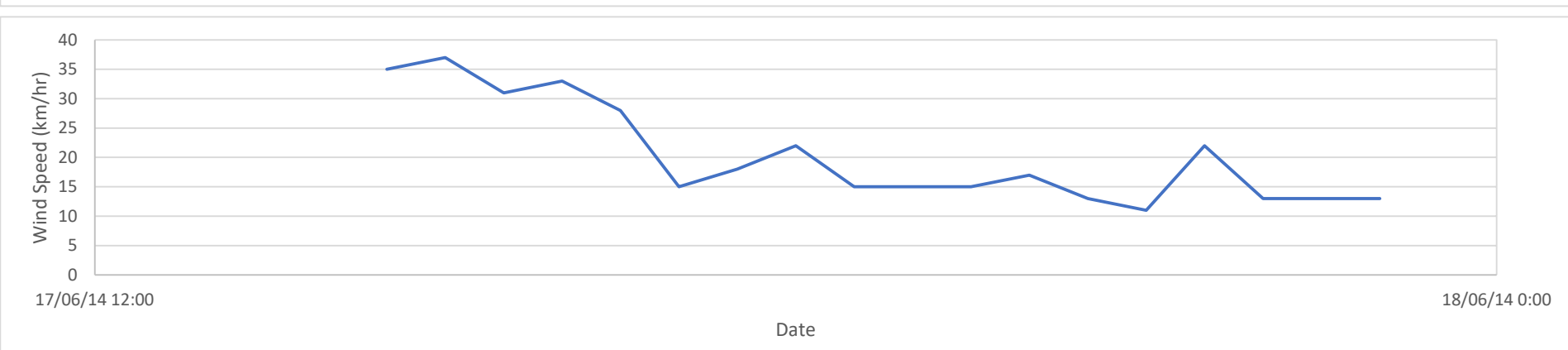
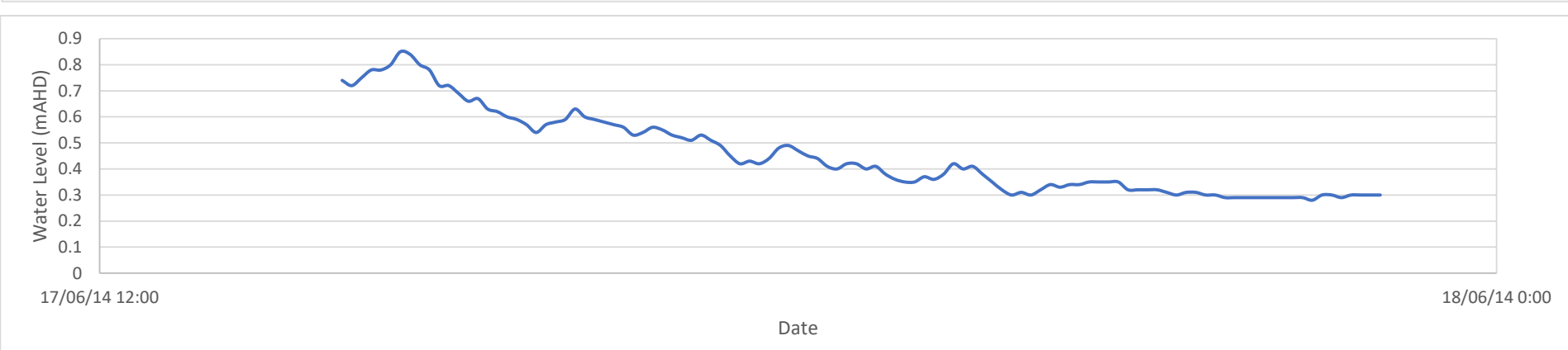
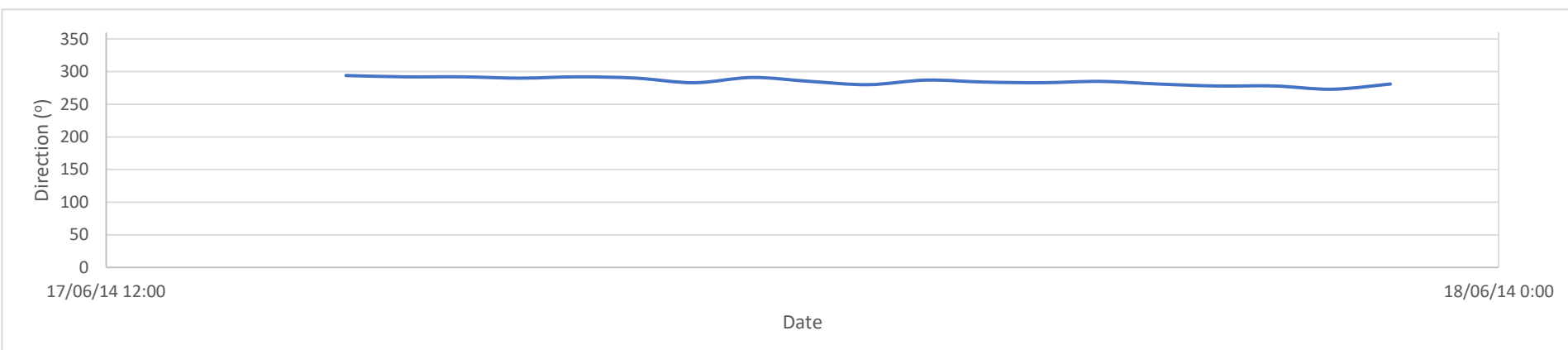
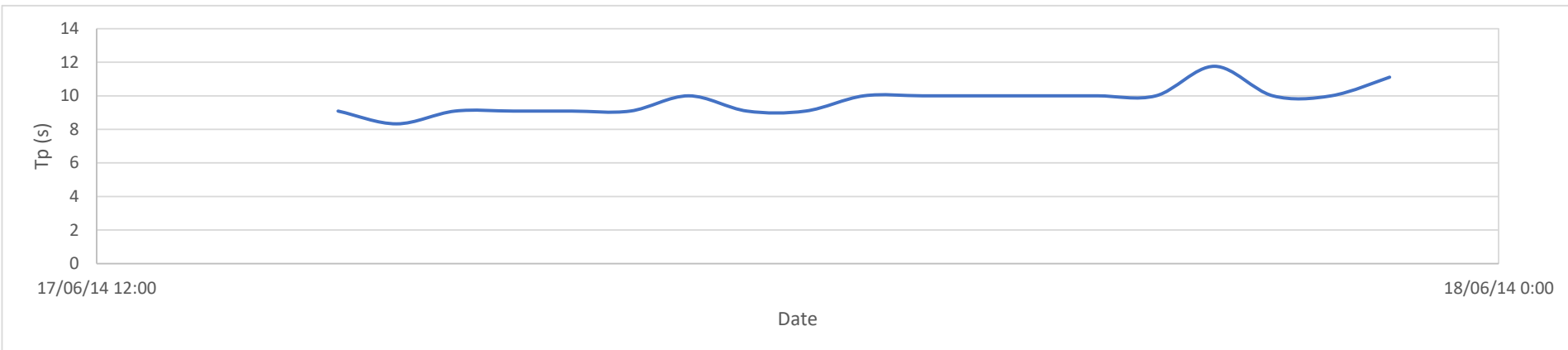
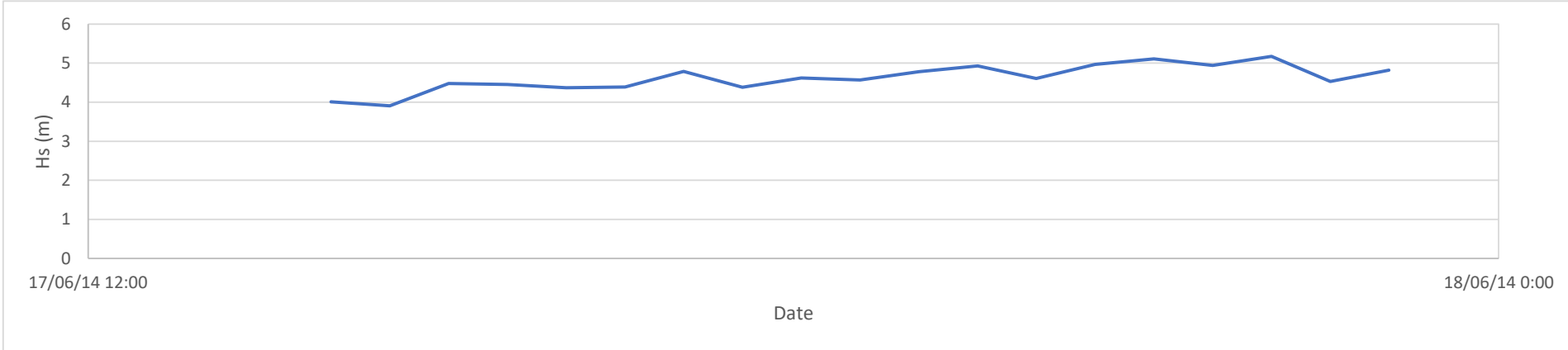
K1509 - South West Storm Selection
Top South West (Jurien) Storm Clusters
from Abnormal Directions Plots

Location	Jurien
Start Date	2/02/2012 9:58
End Date	3/02/2012 0:28



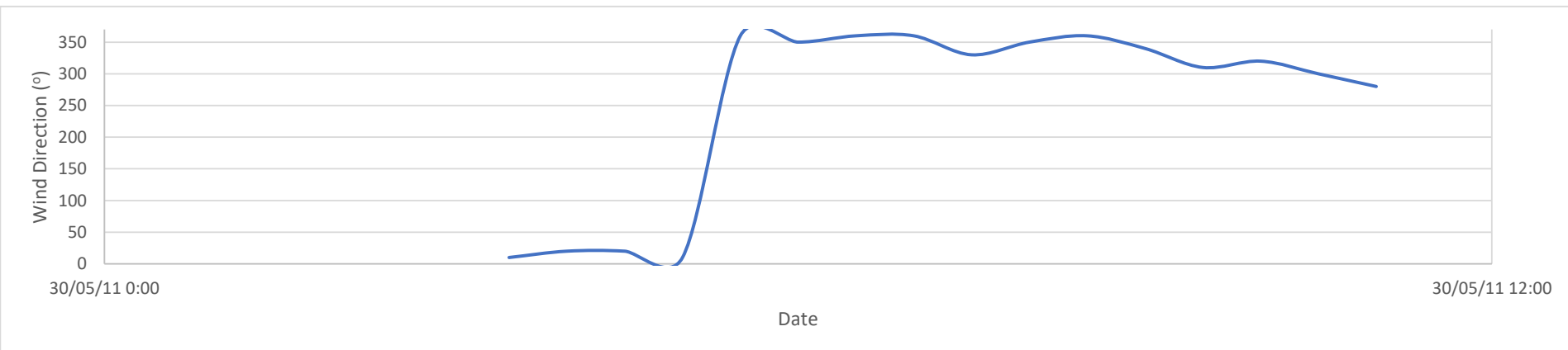
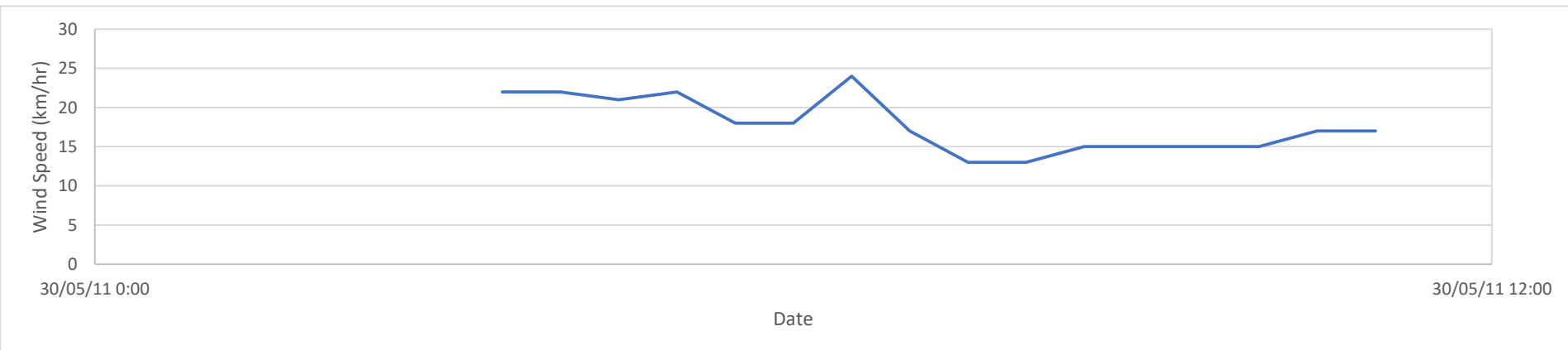
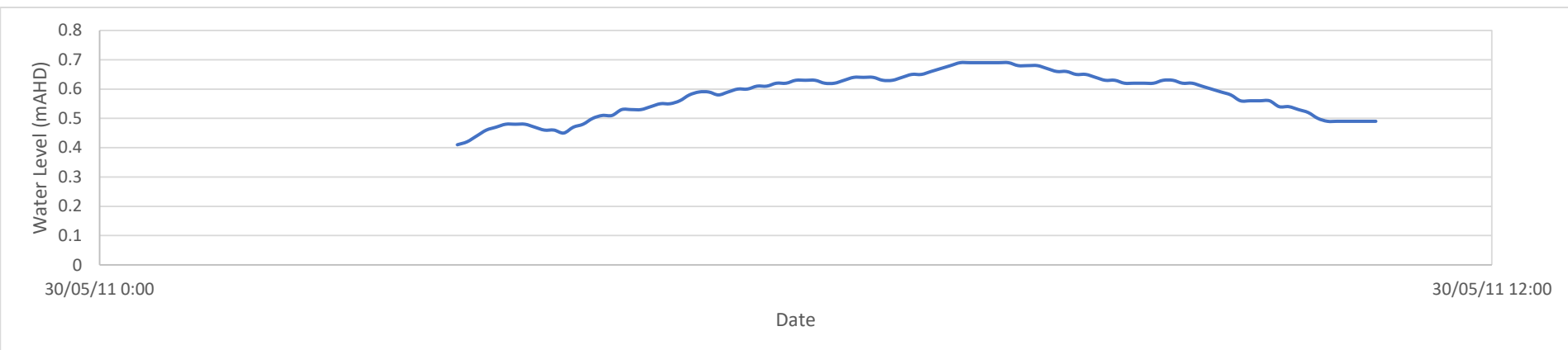
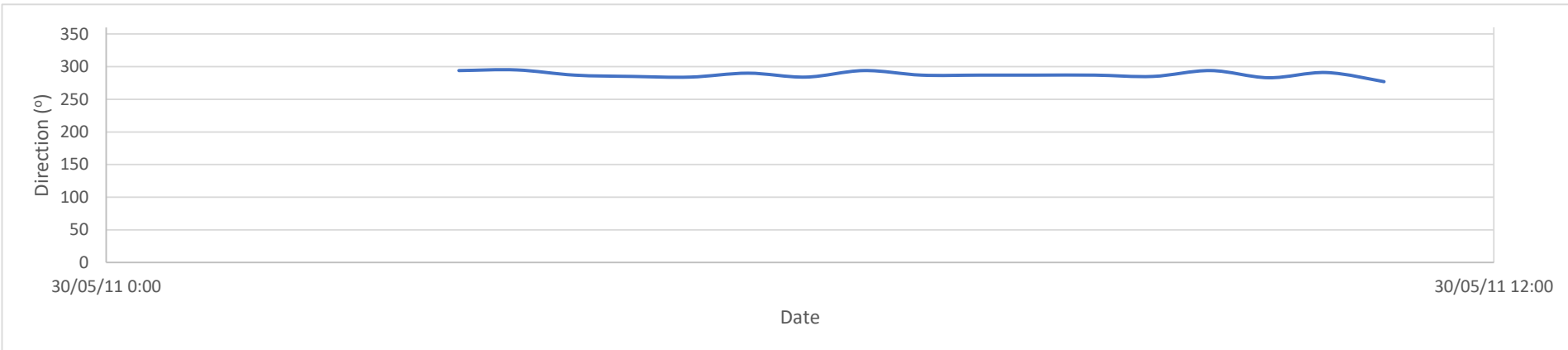
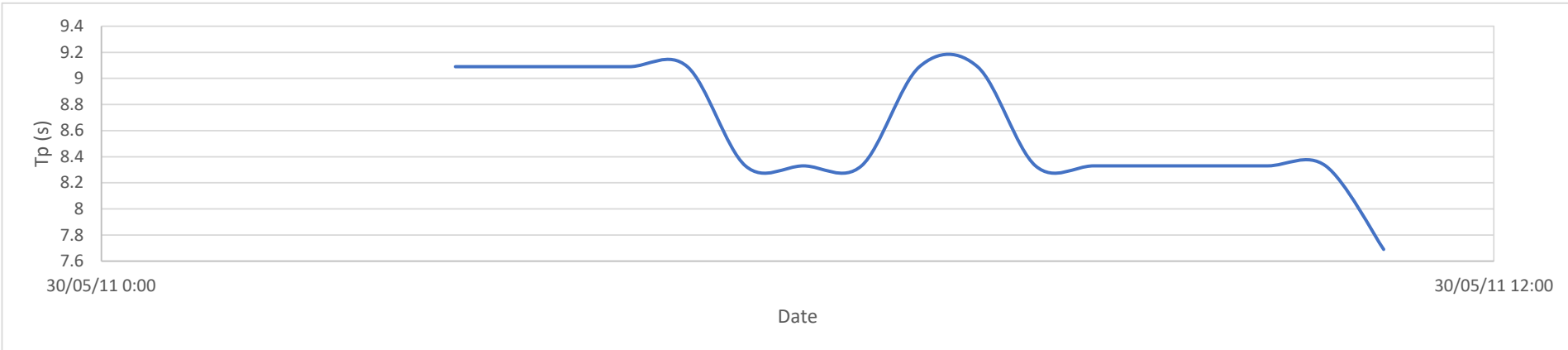
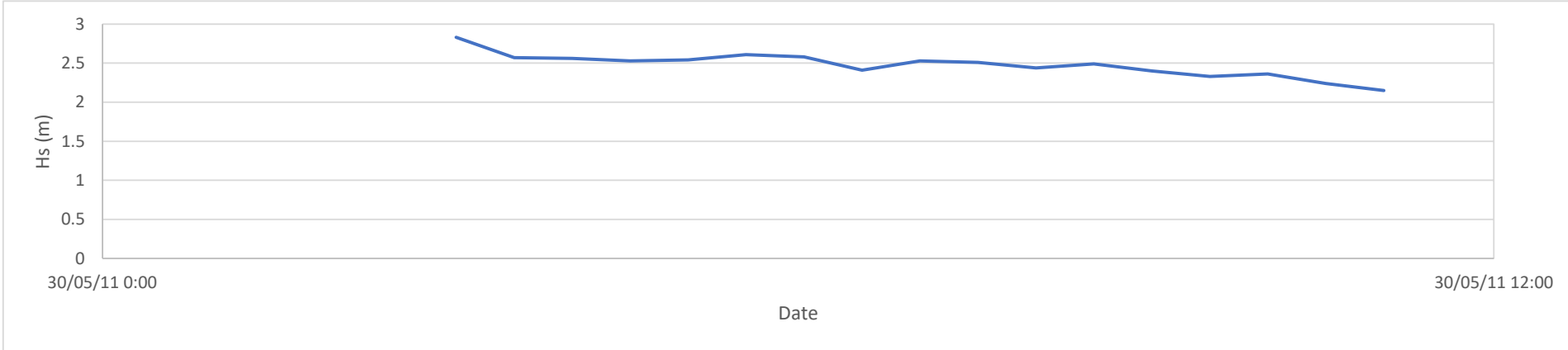
K1509 - South West Storm Selection
Top South West (Jurien) Storm Clusters
from Abnormal Directions Plots

Location	Jurien
Start Date	17/06/2014 14:04
End Date	17/06/2014 23:04



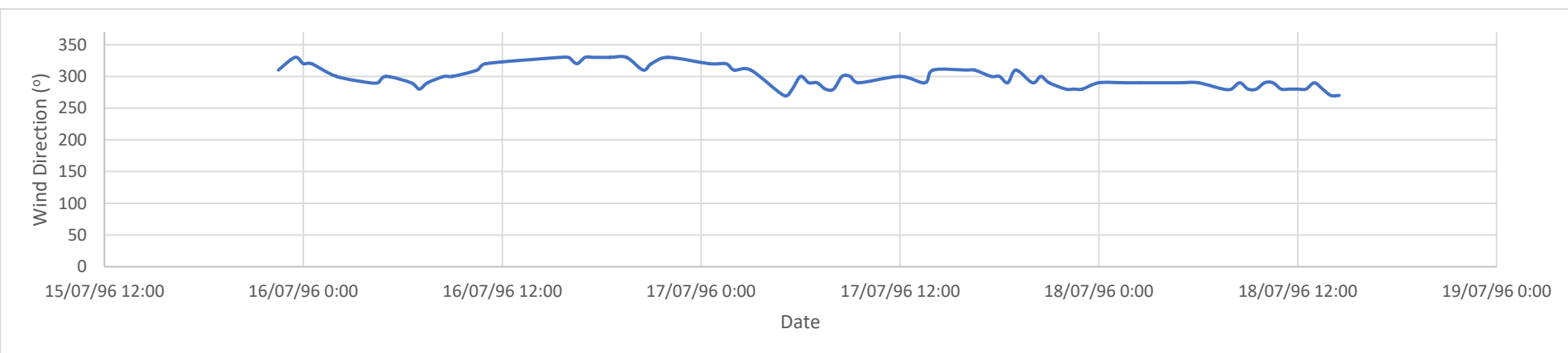
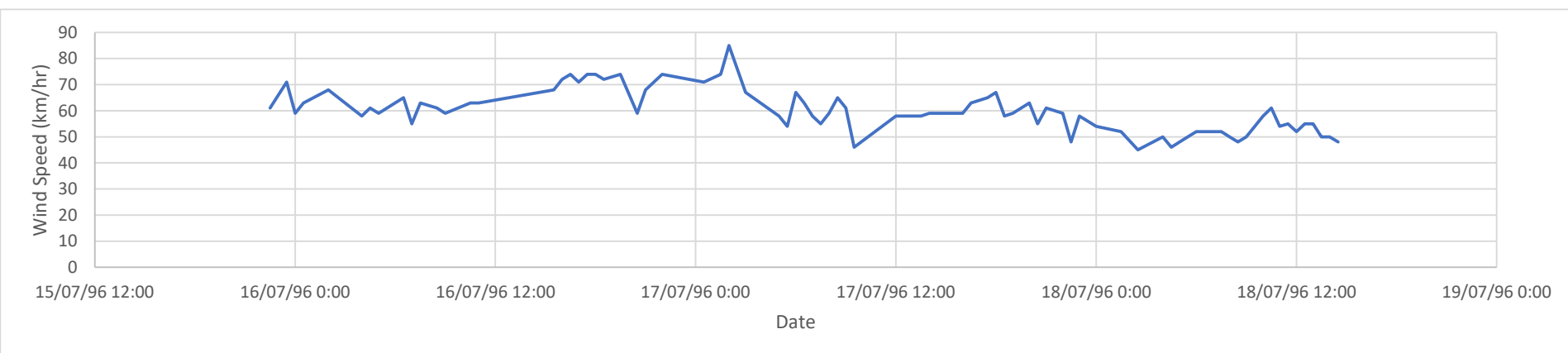
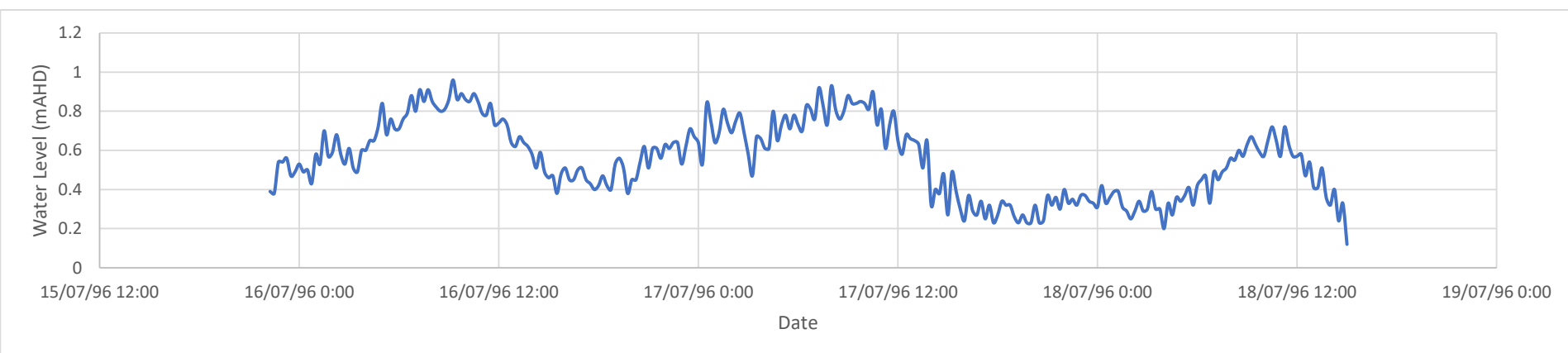
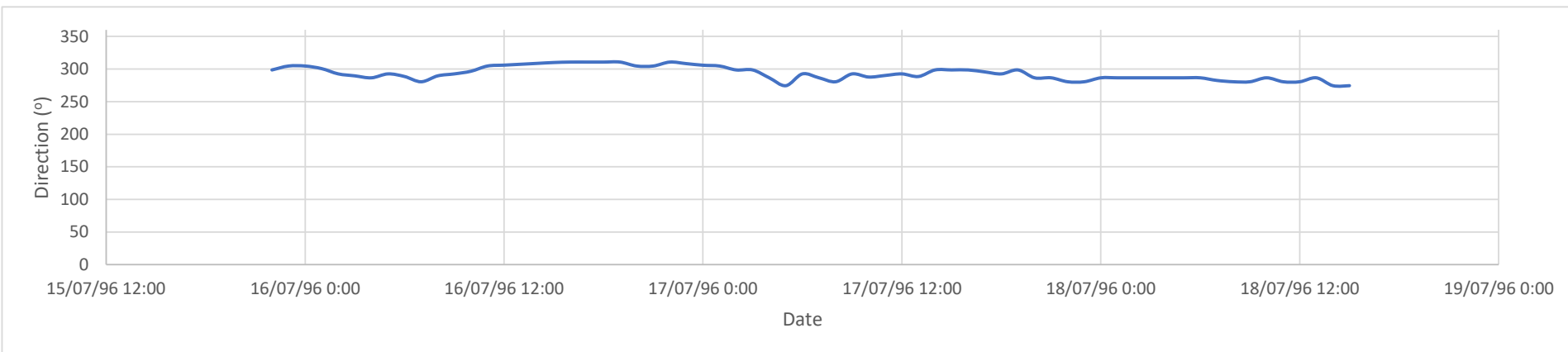
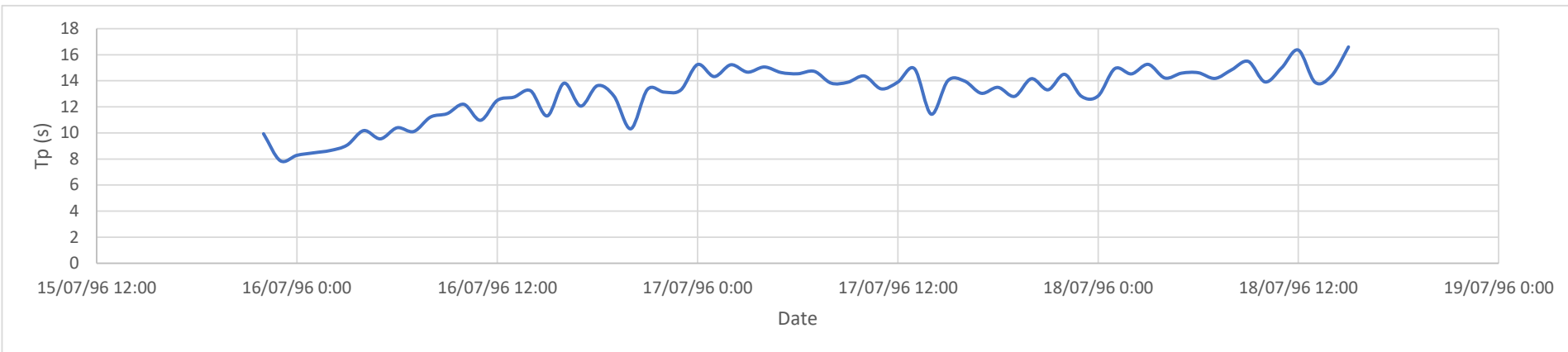
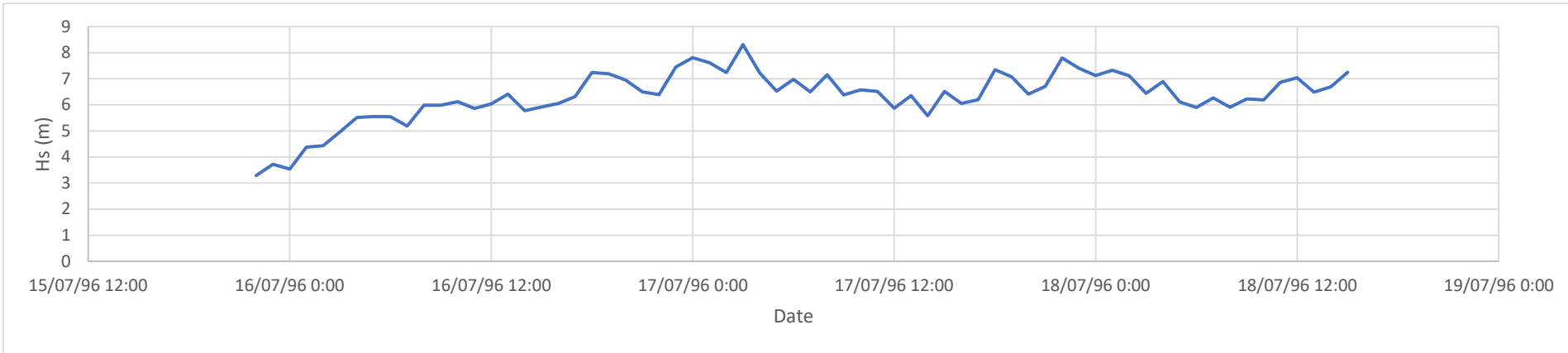
K1509 - South West Storm Selection
Top South West (Jurien) Storm Clusters
from Abnormal Directions Plots

Location	Jurien
Start Date	30/05/2011 3:03
End Date	30/05/2011 11:03



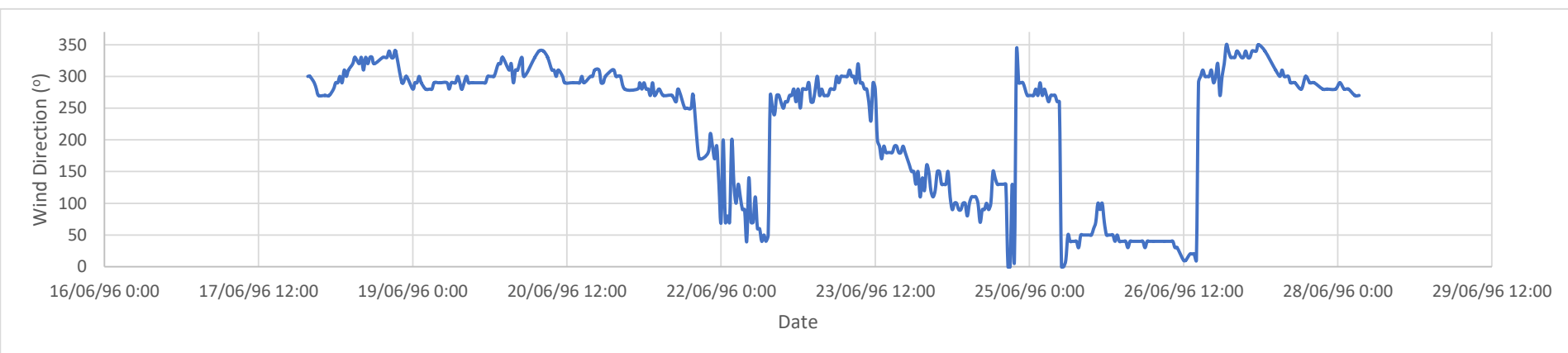
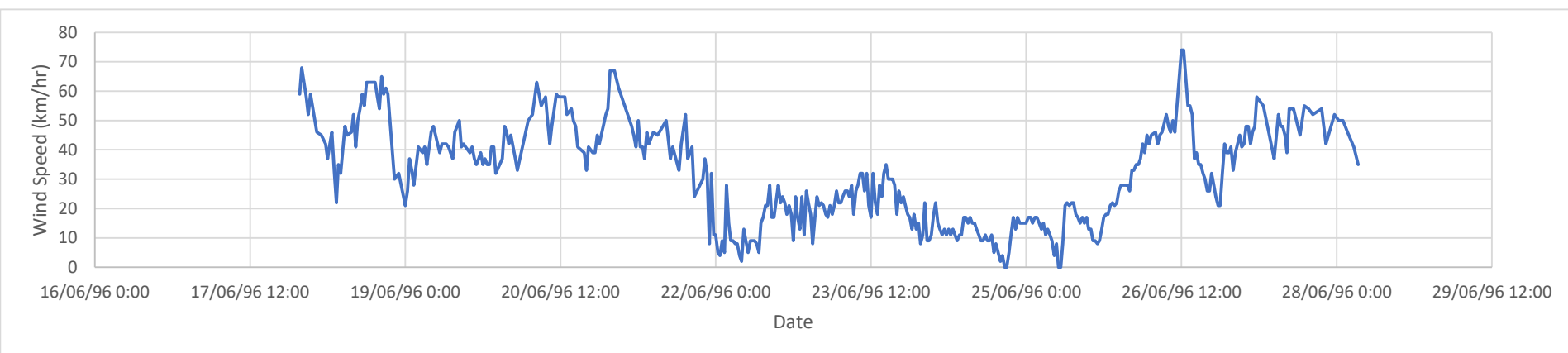
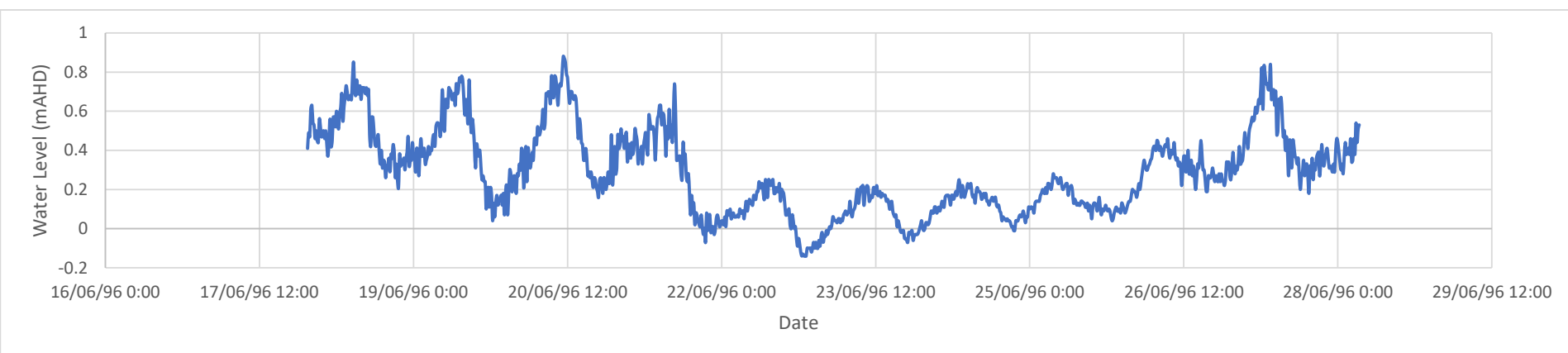
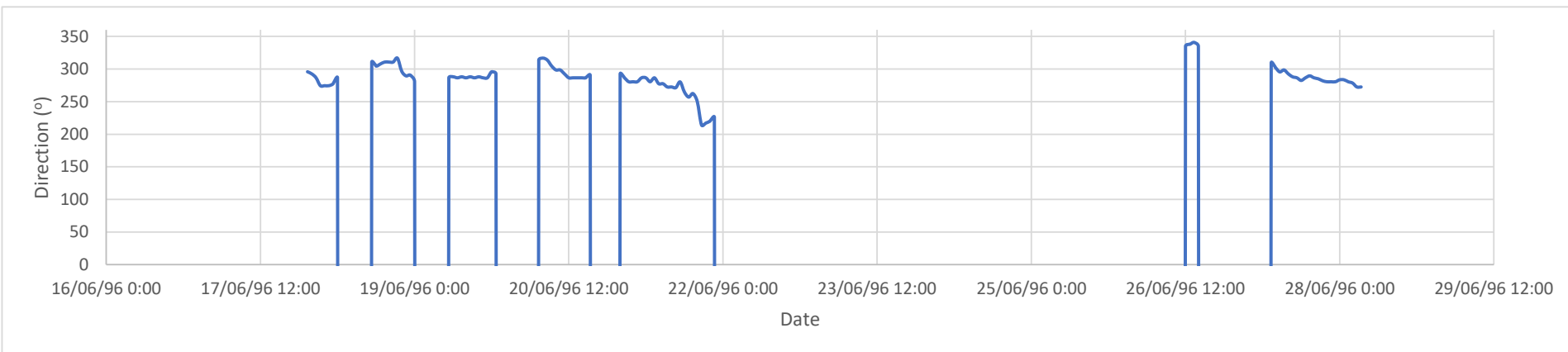
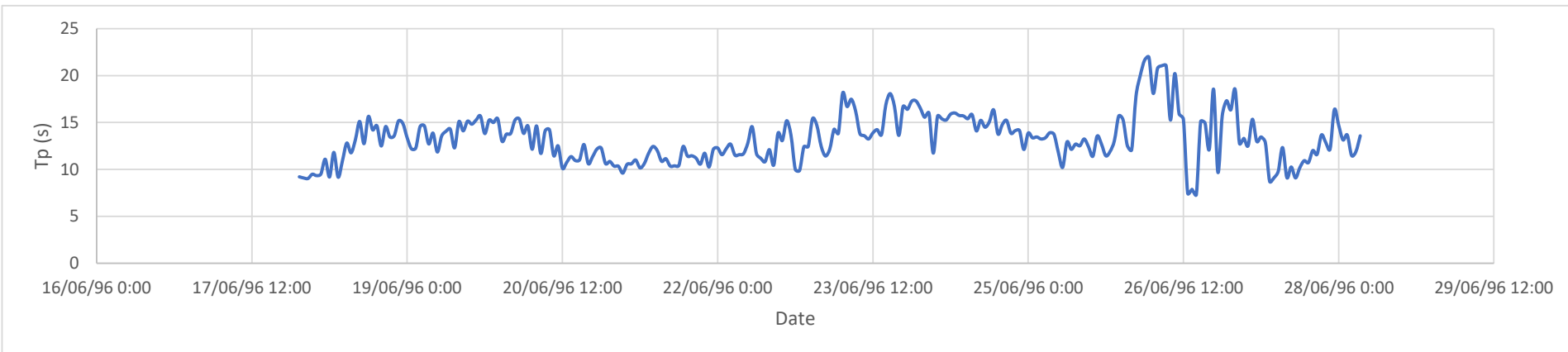
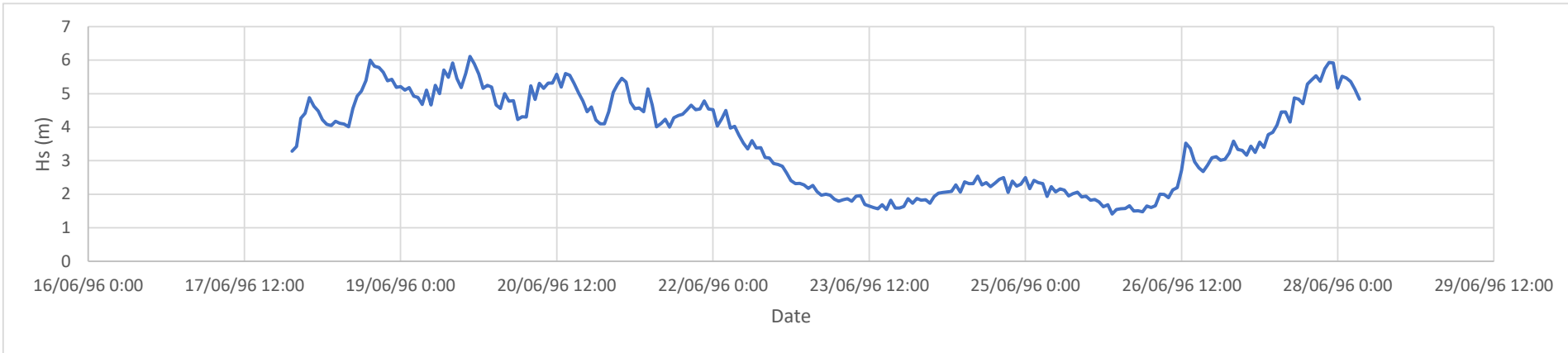
K1509 - South West Storm Selection
Top South West (Metro) Storm Clusters
from Abnormal Directions Plots

Location	Metro
Start Date	15/07/1996 22:00
End Date	18/07/1996 15:00



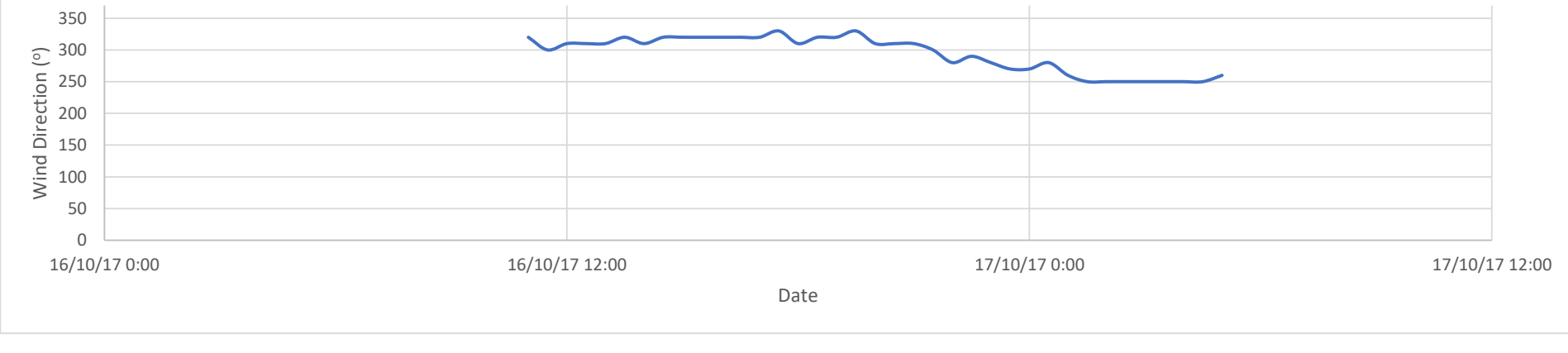
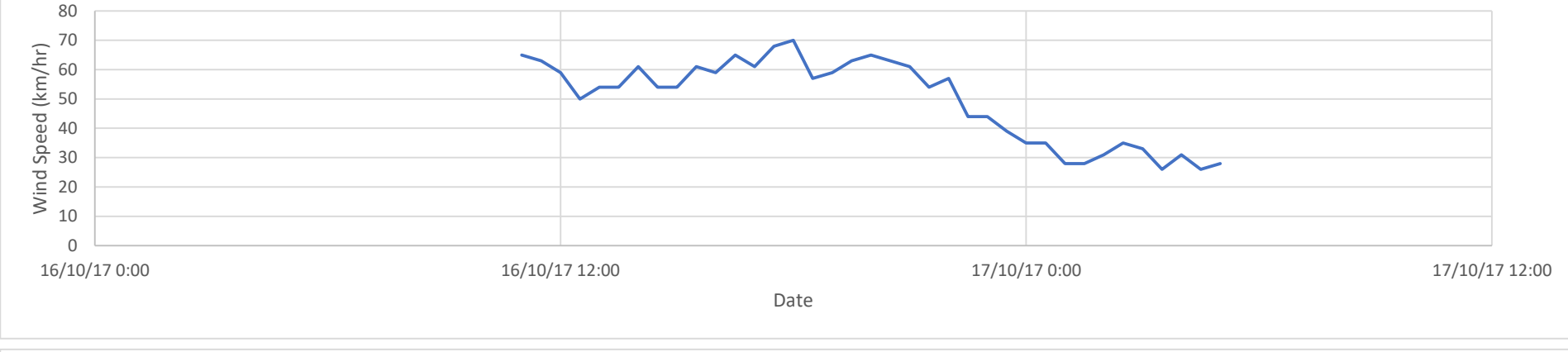
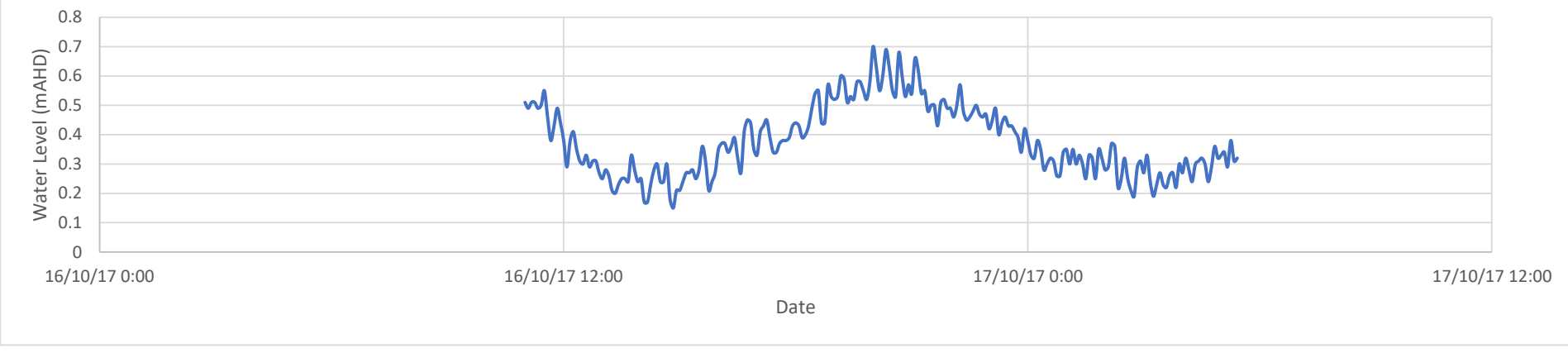
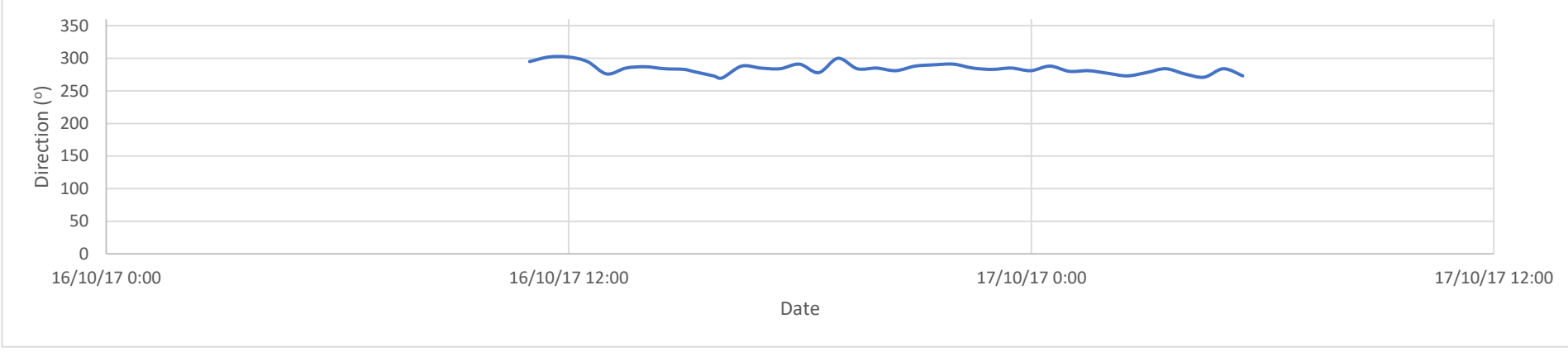
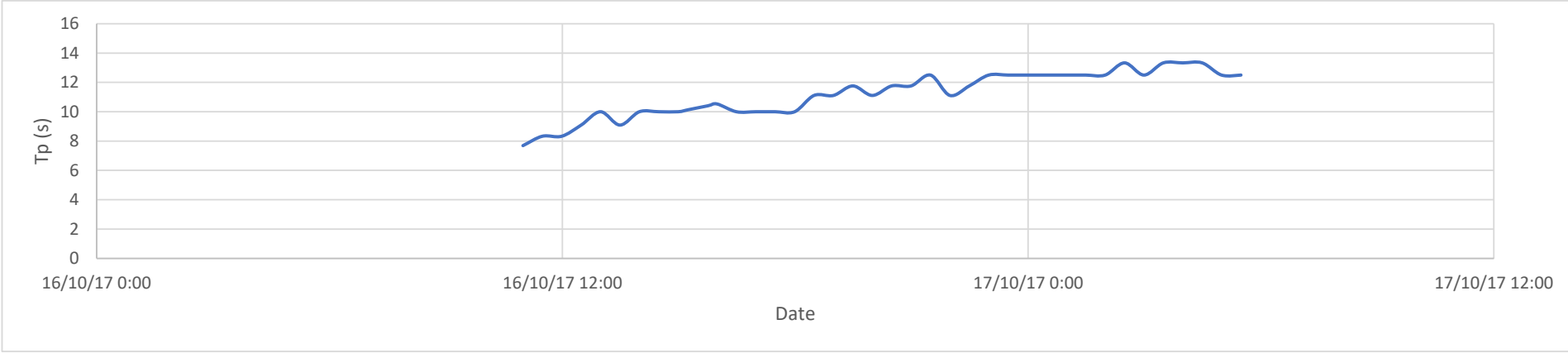
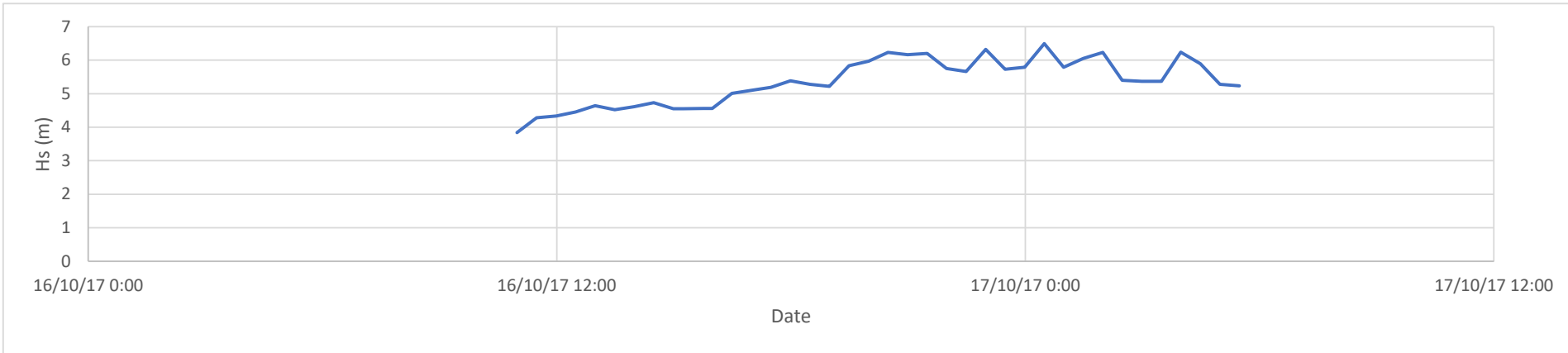
K1509 - South West Storm Selection
Top South West (Metro) Storm Clusters
from Abnormal Directions Plots

Location	Metro
Start Date	17/06/1996 23:00
End Date	28/06/1996 4:00



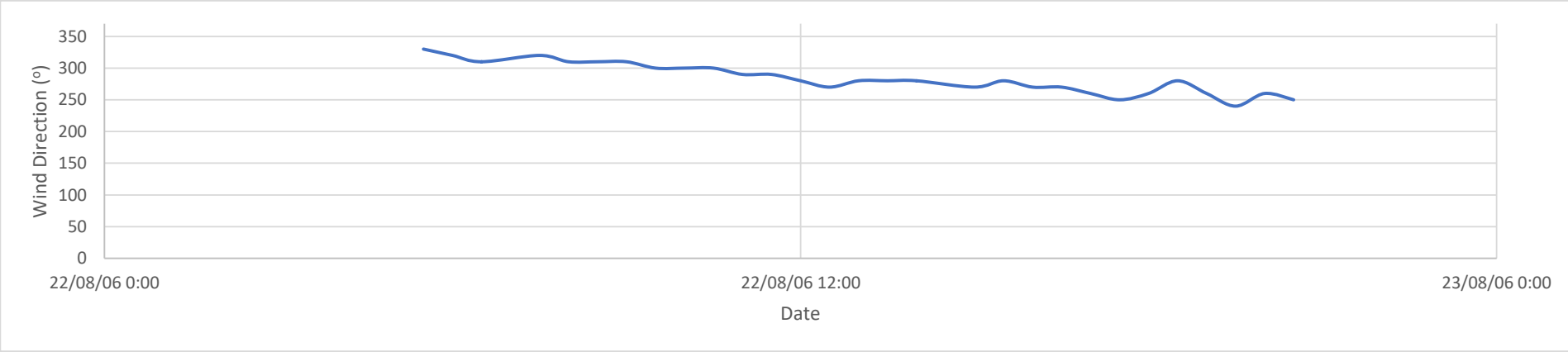
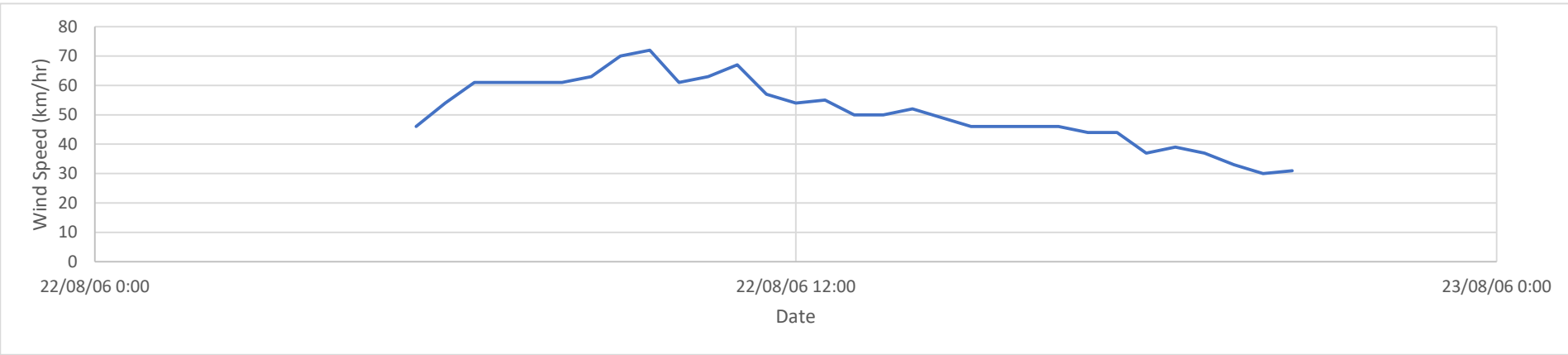
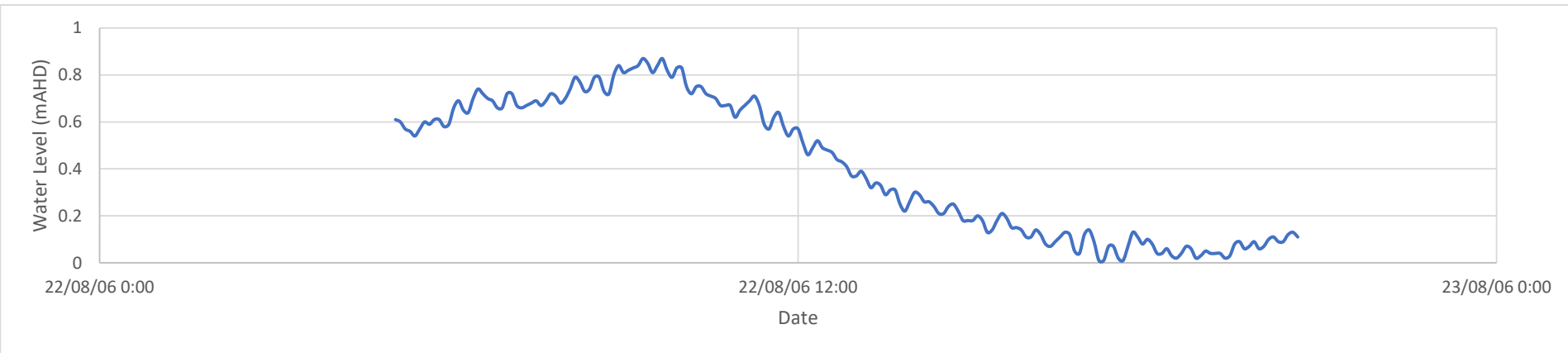
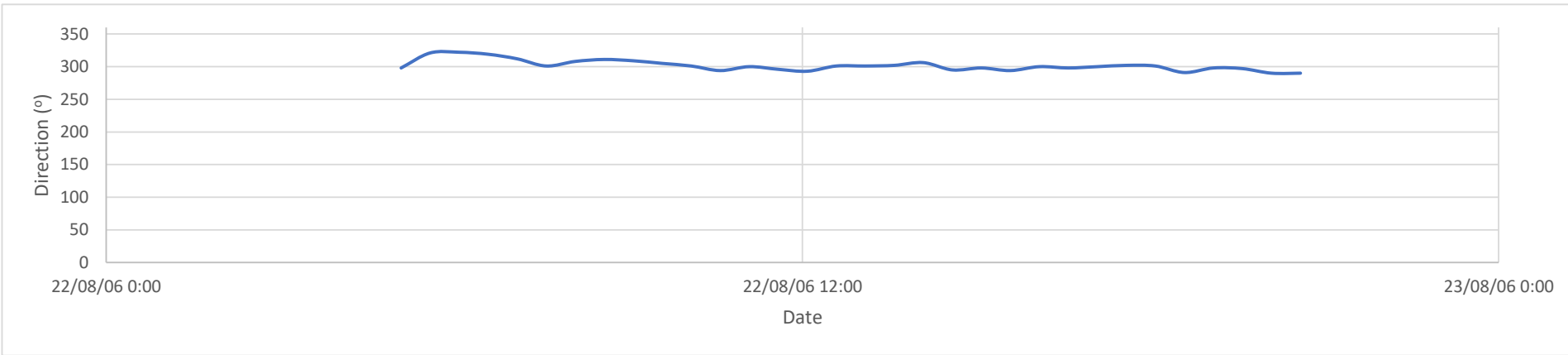
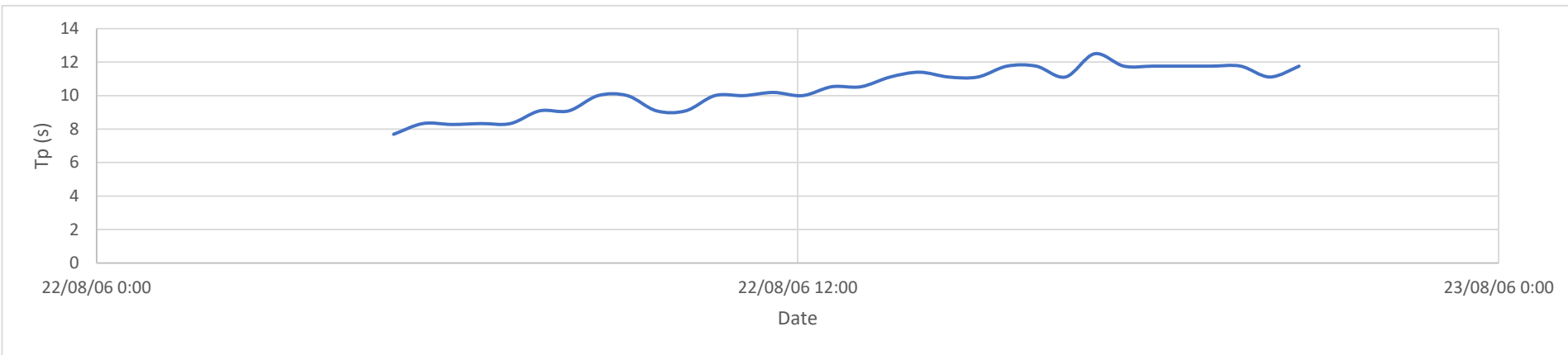
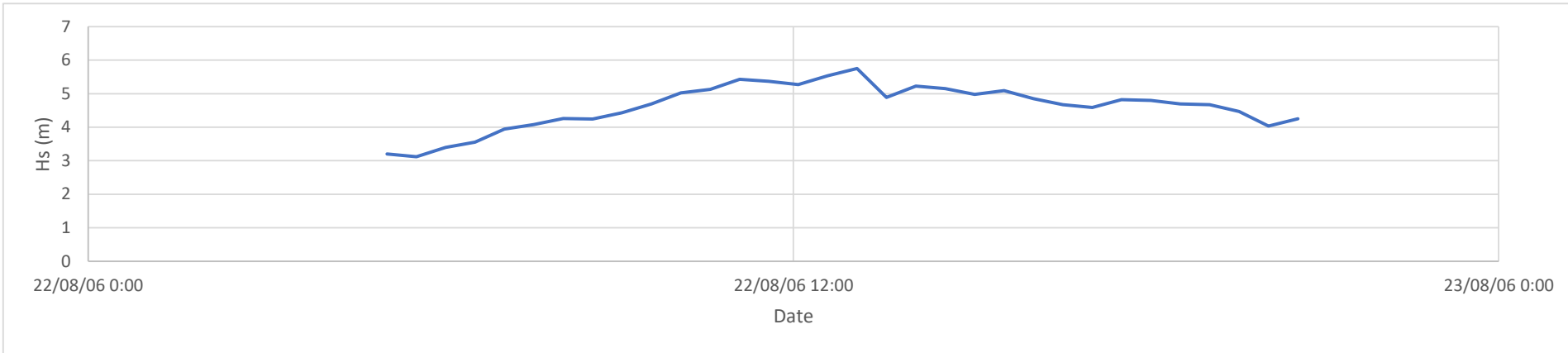
K1509 - South West Storm Selection
Top South West (Metro) Storm Clusters
from Abnormal Directions Plots

Location	Metro
Start Date	16/10/2017 10:59
End Date	17/10/2017 5:29



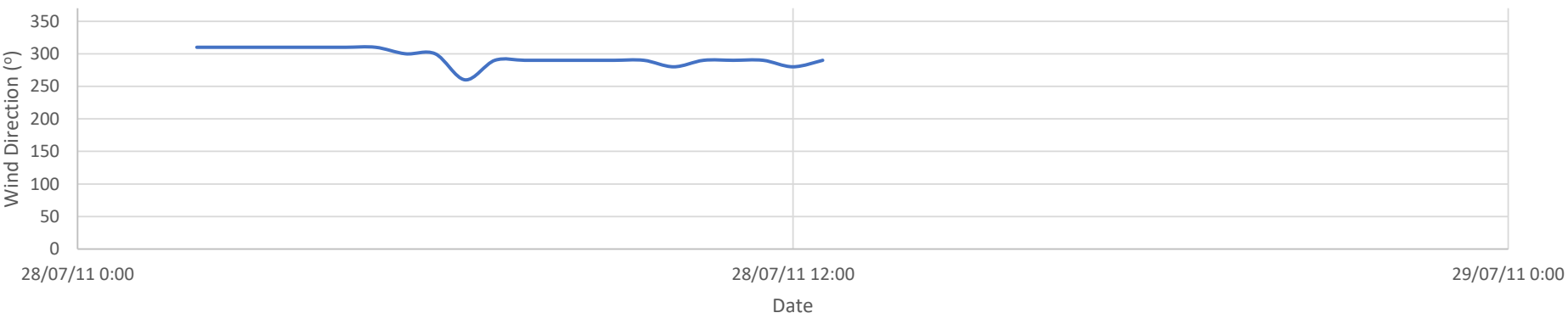
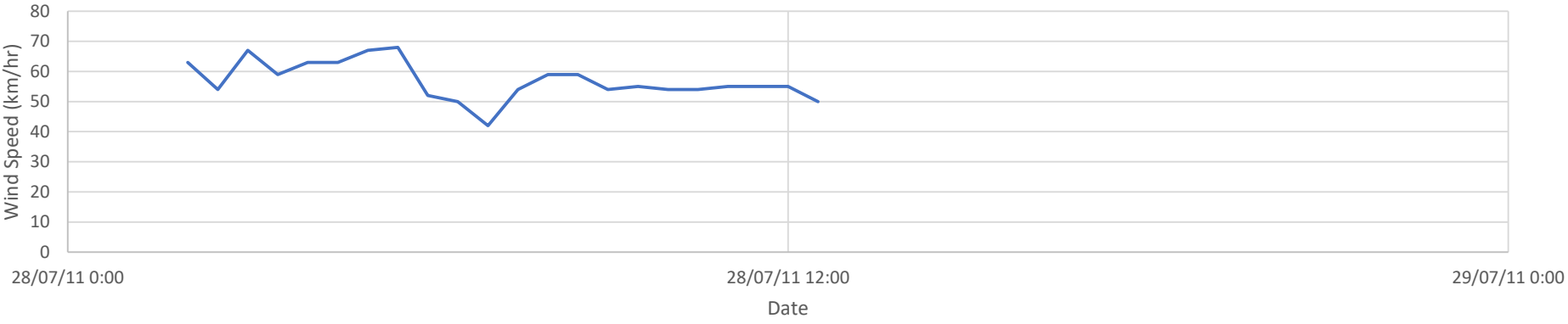
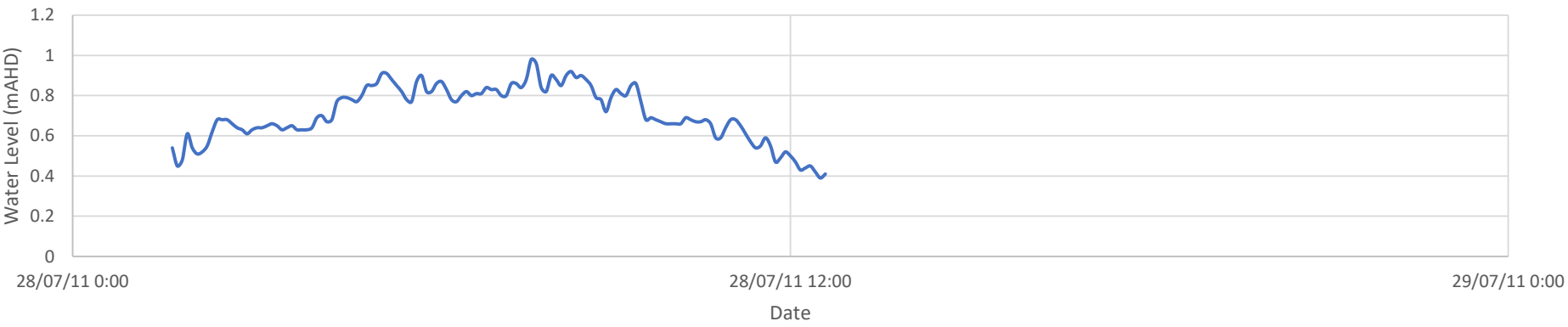
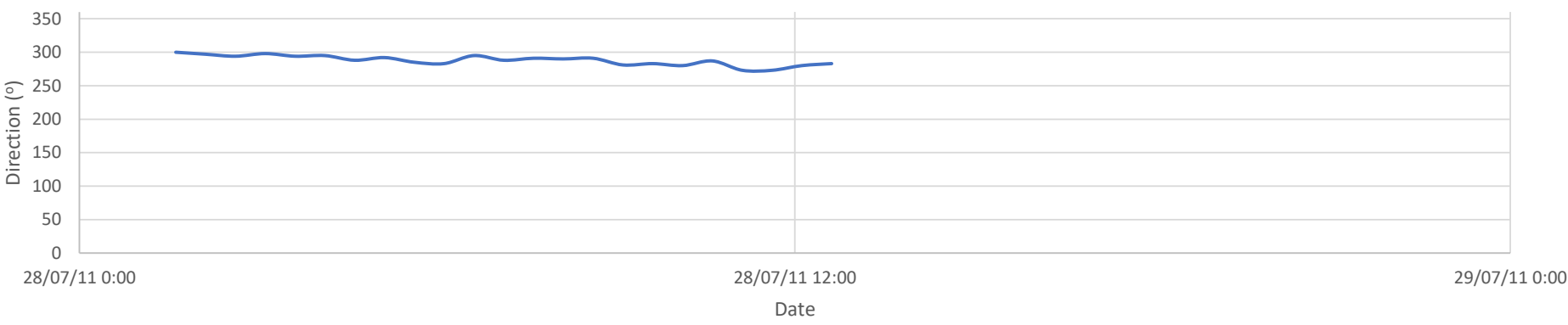
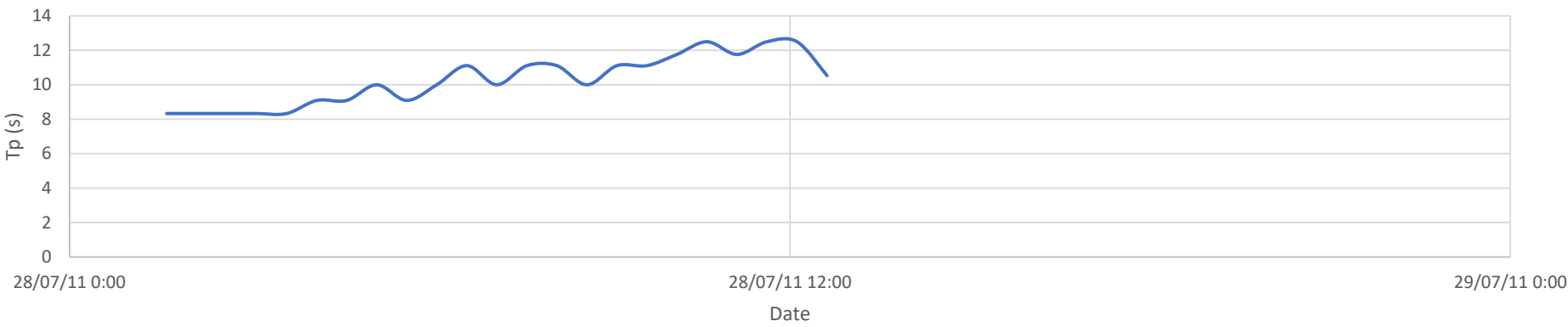
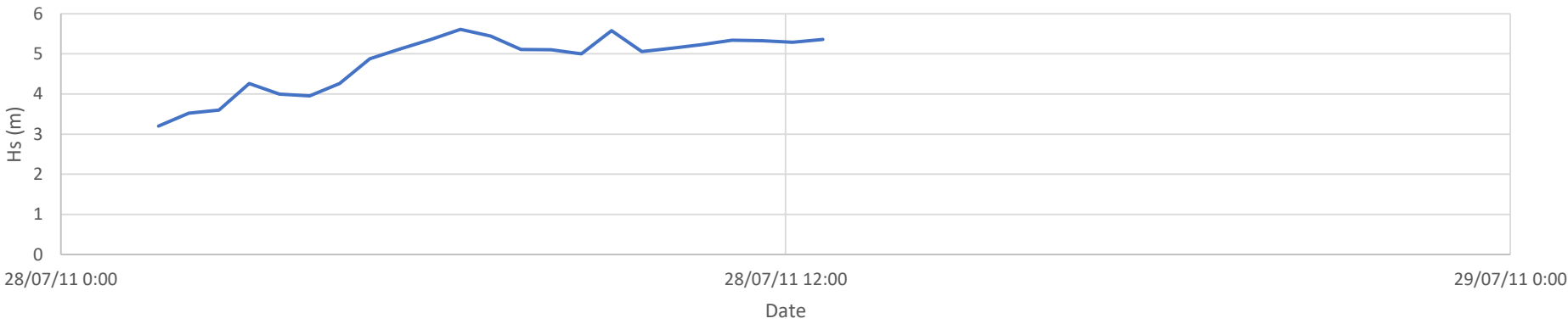
K1509 - South West Storm Selection
Top South West (Metro) Storm Clusters
from Abnormal Directions Plots

Location	Metro
Start Date	22/08/2006 5:05
End Date	22/08/2006 20:35



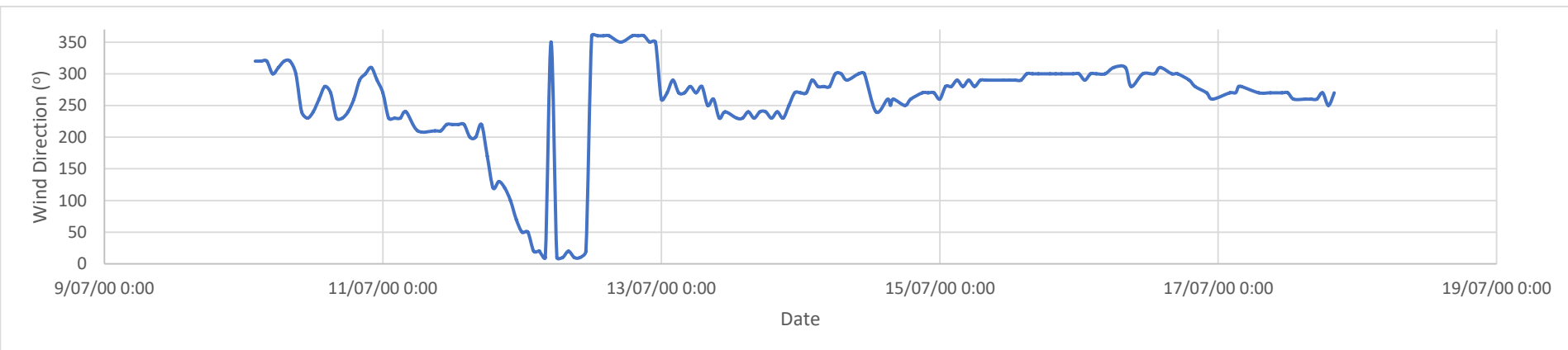
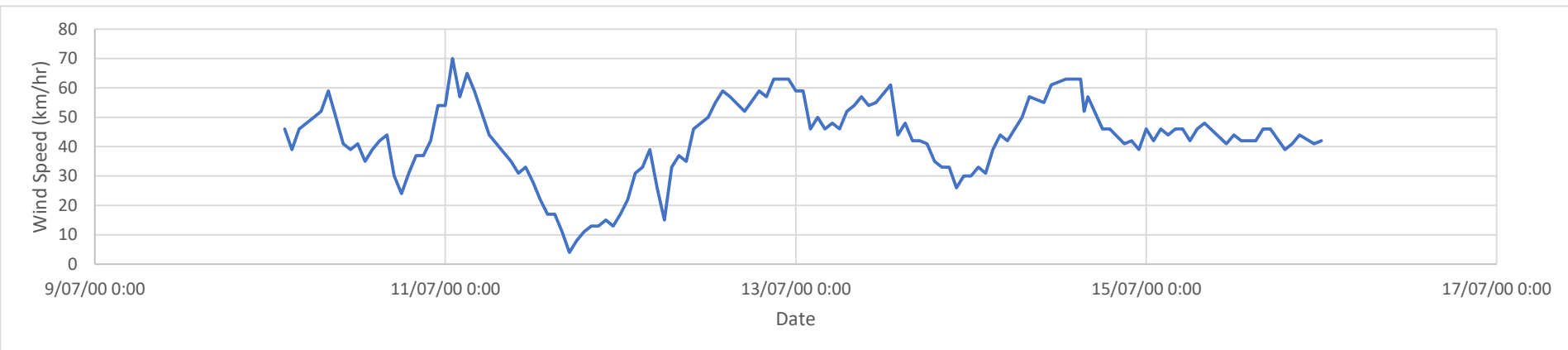
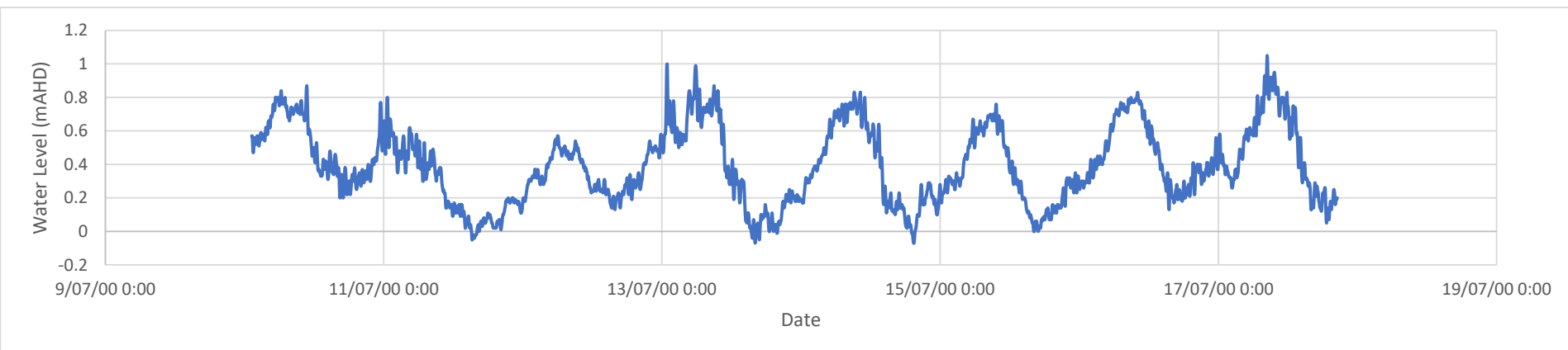
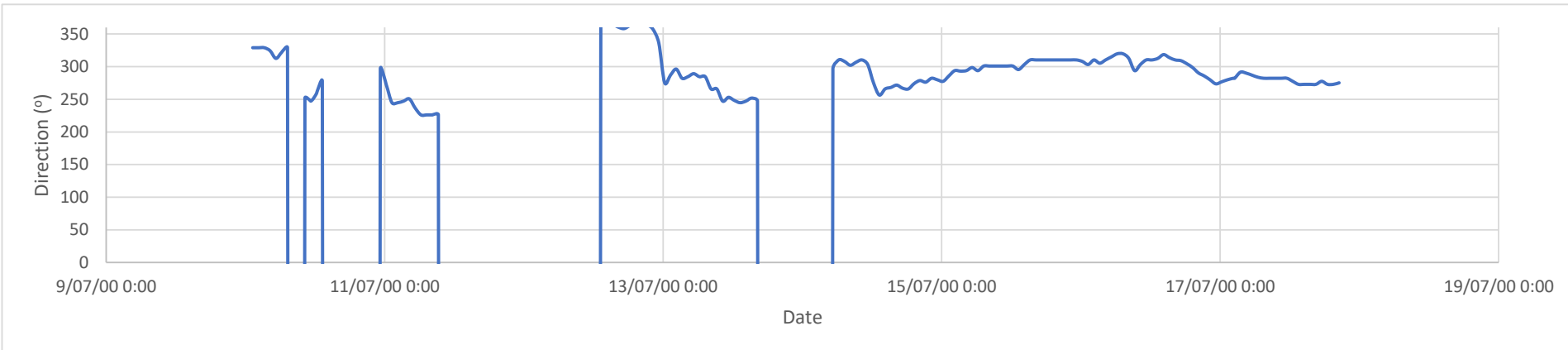
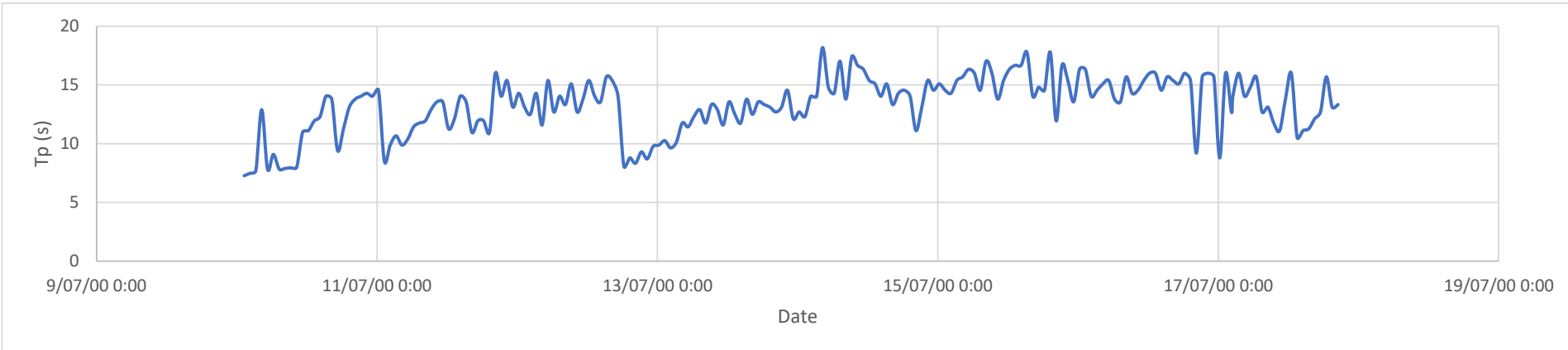
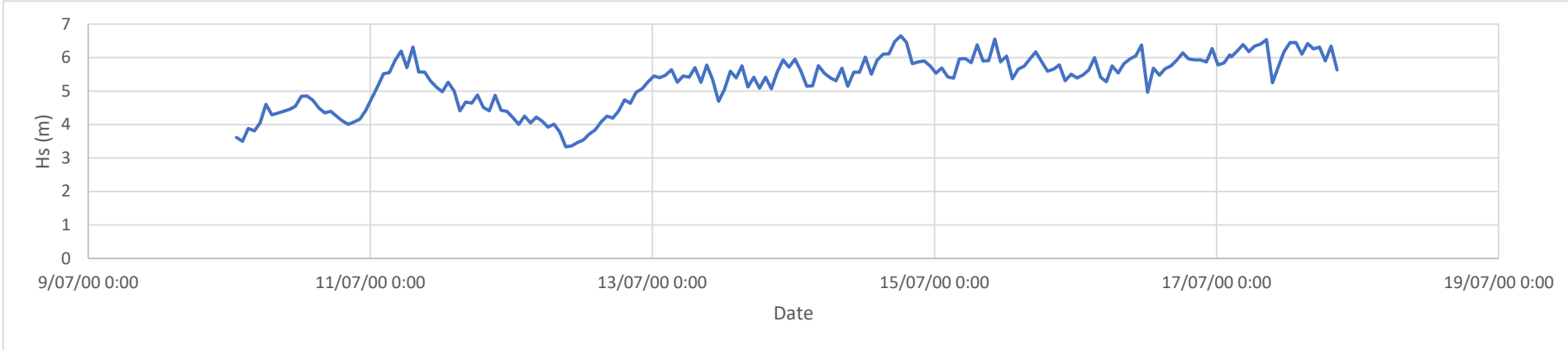
K1509 - South West Storm Selection
Top South West (Metro) Storm Clusters
from Abnormal Directions Plots

Location	Metro
Start Date	28/07/2011 1:37
End Date	28/07/2011 12:37



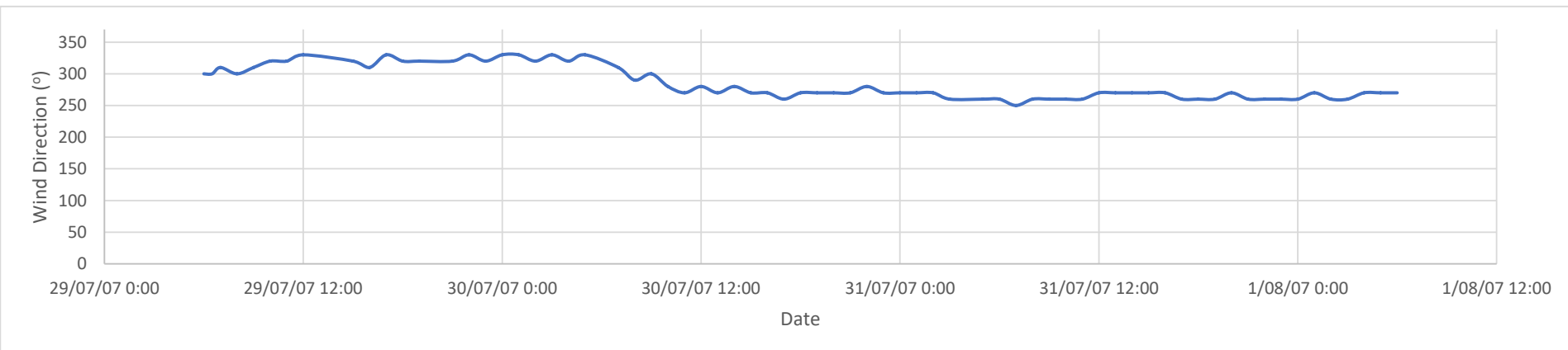
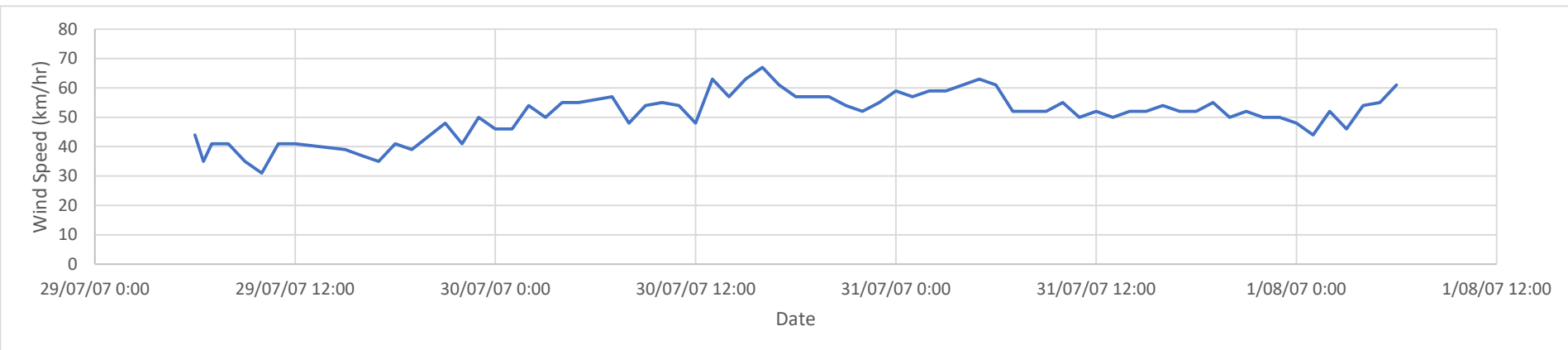
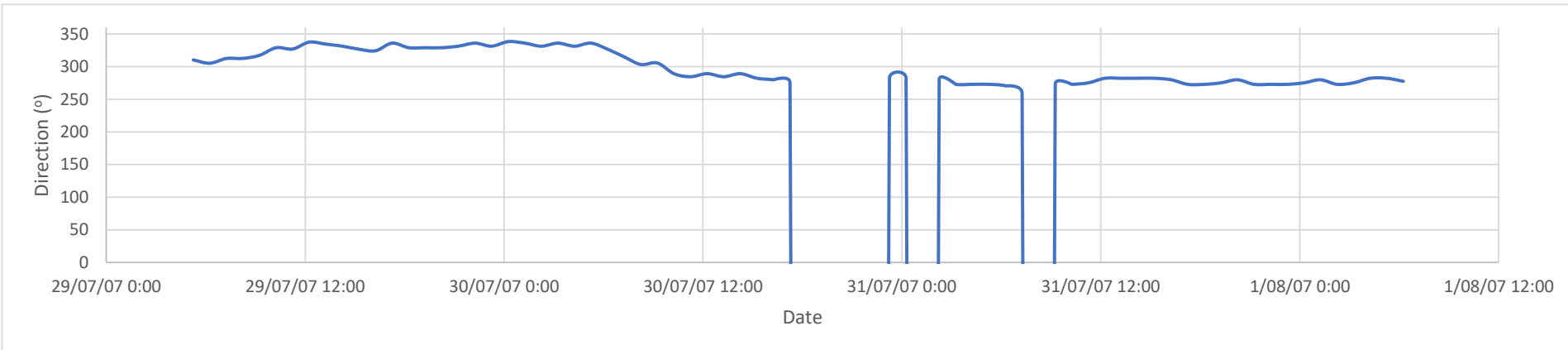
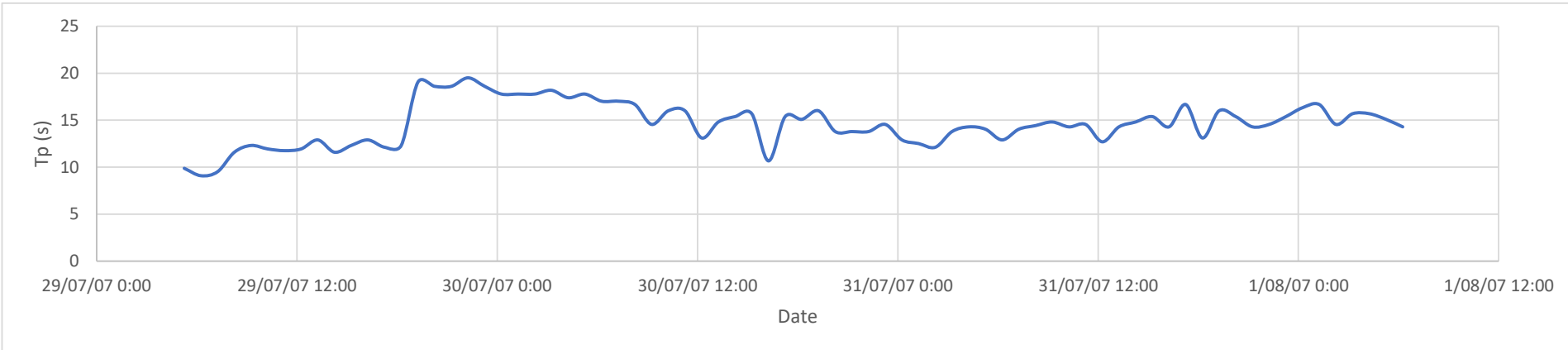
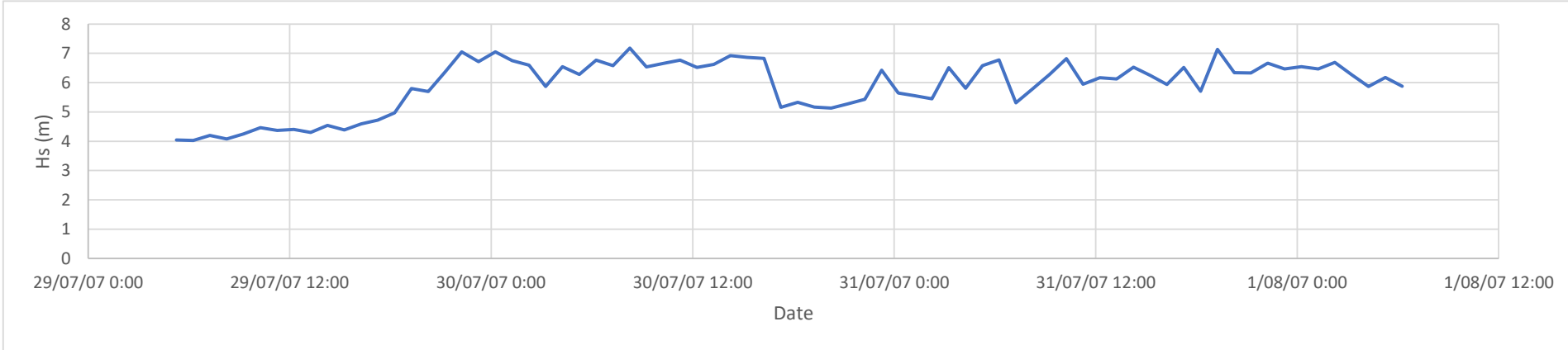
K1509 - South West Storm Selection
Top South West (Cape Naturaliste) Storm
Clusters from Abnormal Directions Plots

Location	Cape Naturaliste
Start Date	10/07/2000 1:15
End Date	17/07/2000 20:30



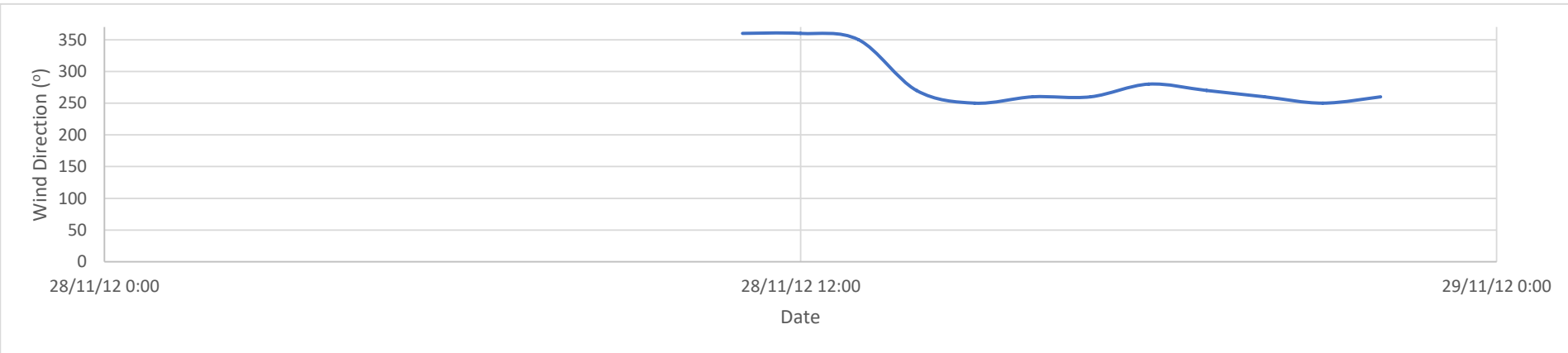
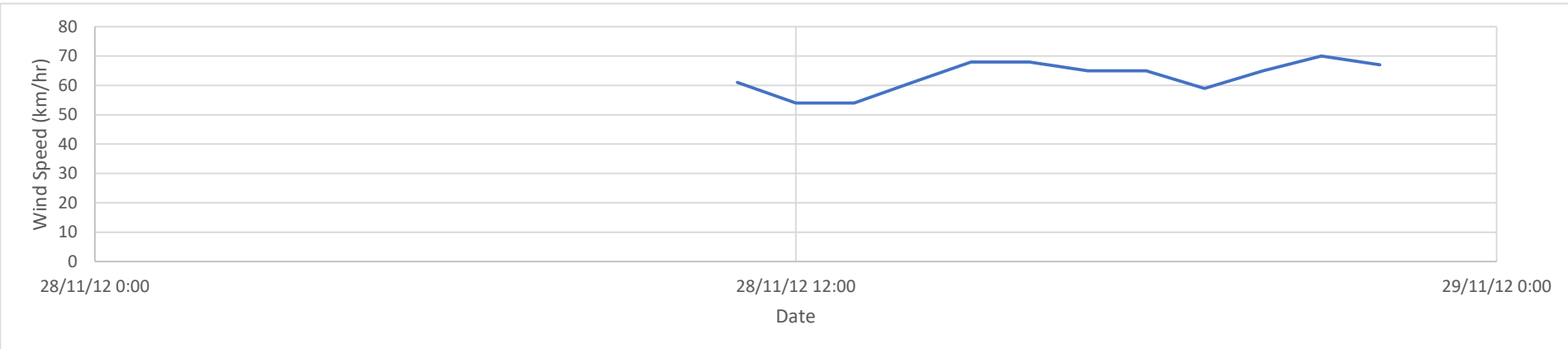
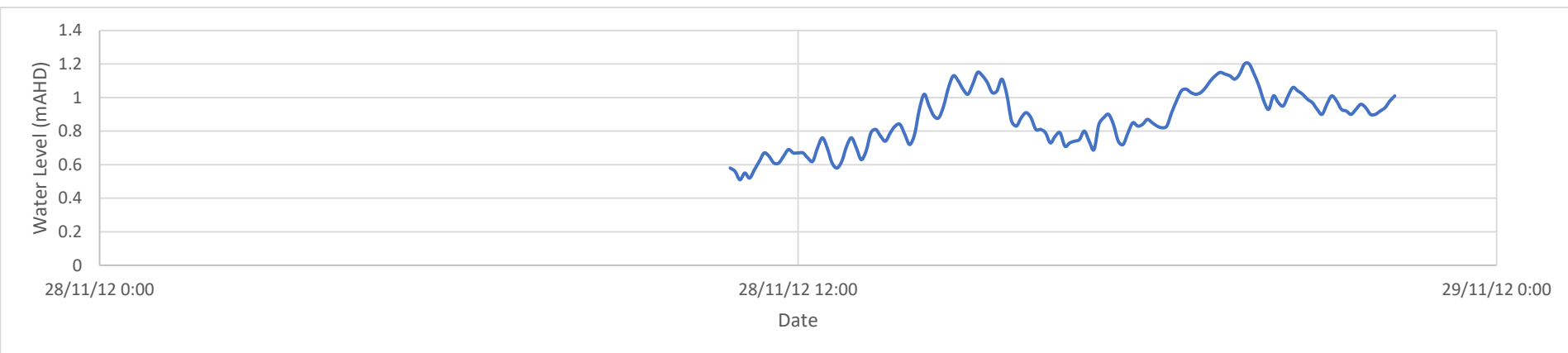
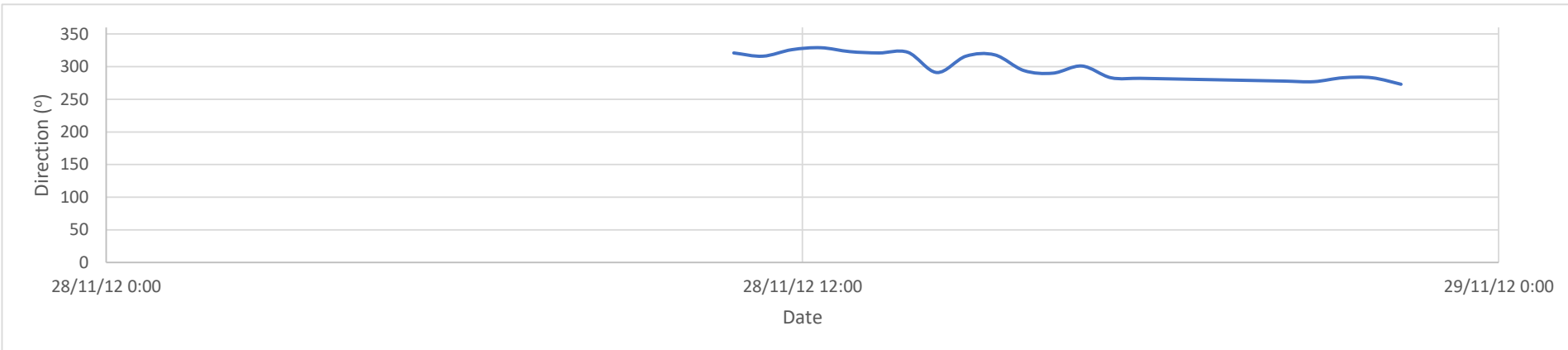
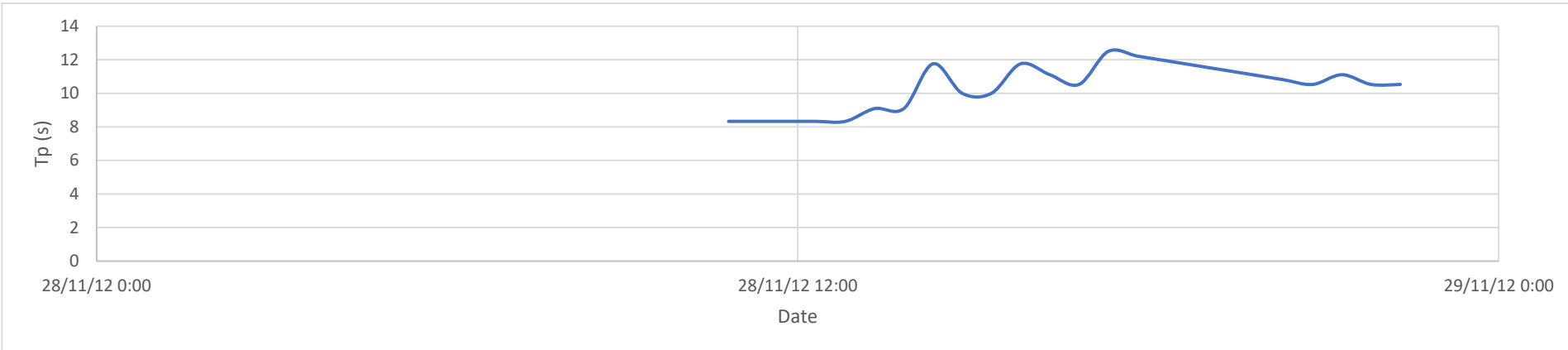
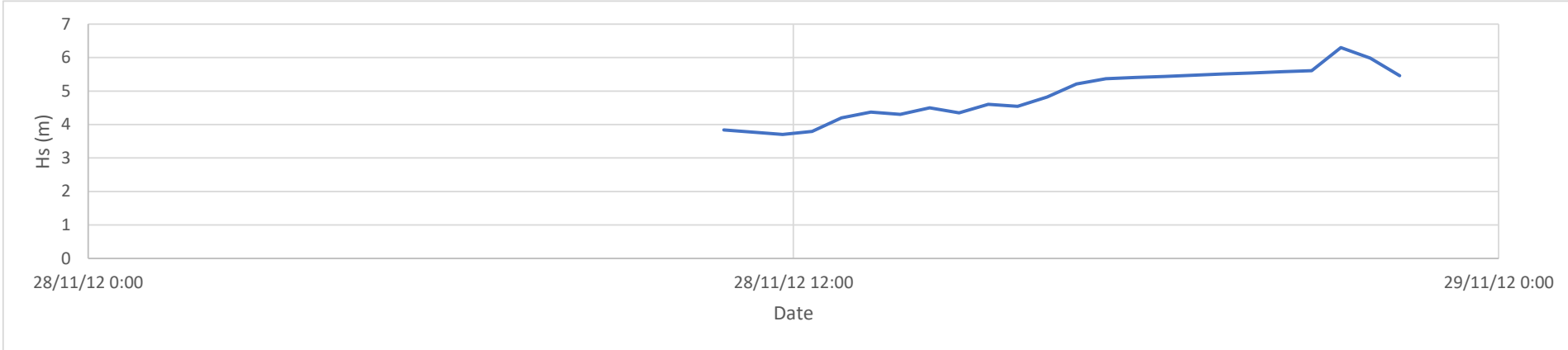
K1509 - South West Storm Selection
Top South West (Cape Naturaliste) Storm
Clusters from Abnormal Directions Plots

Location	Cape Naturaliste
Start Date	29/07/2007 5:15
End Date	1/08/2007 6:15



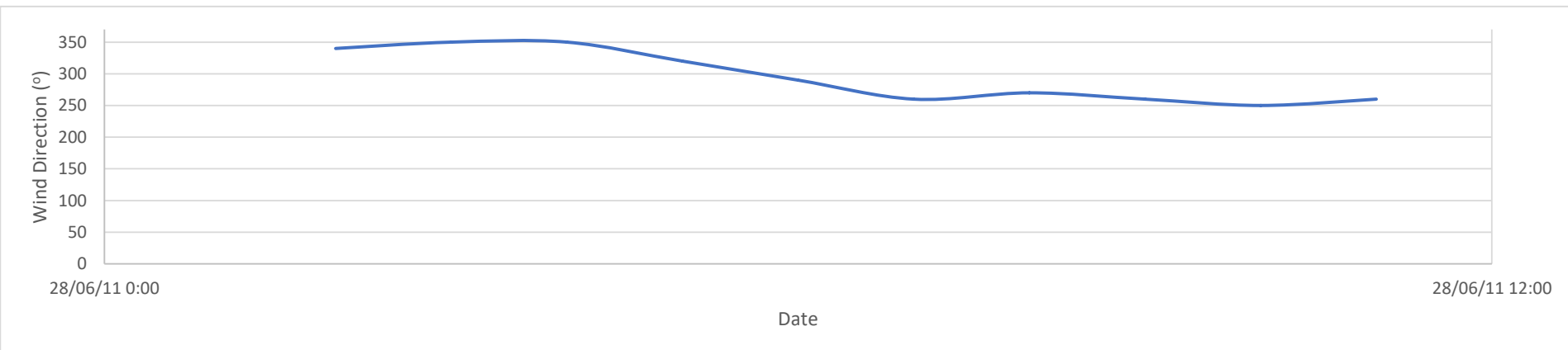
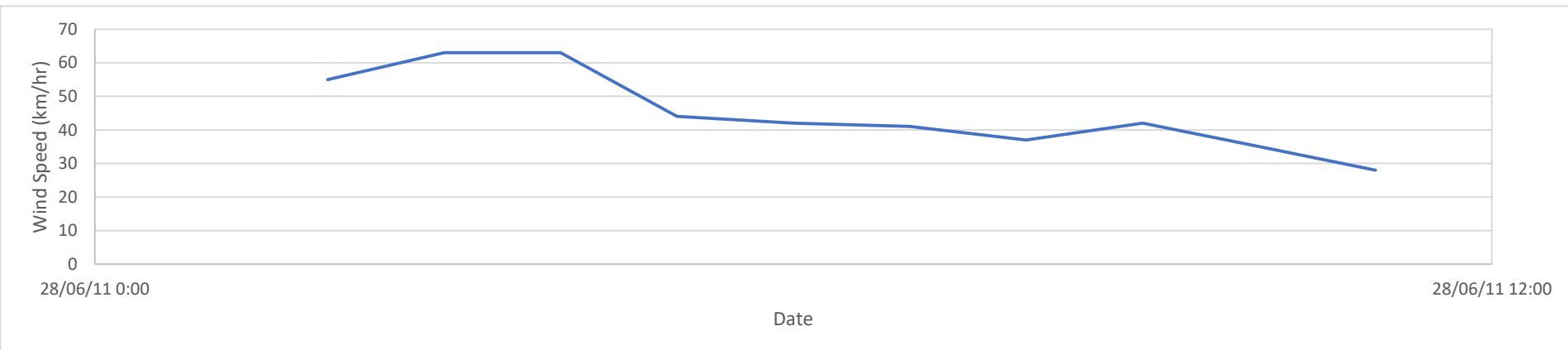
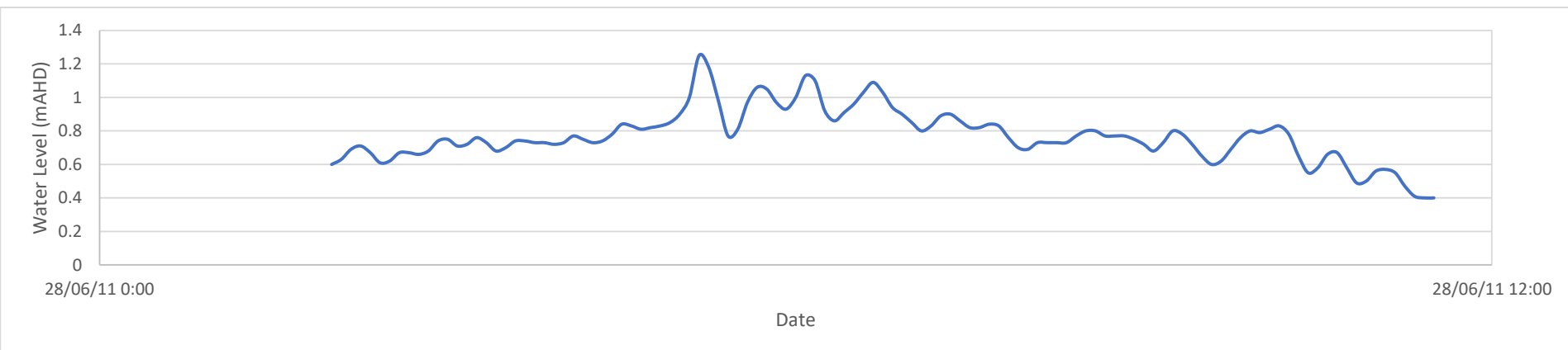
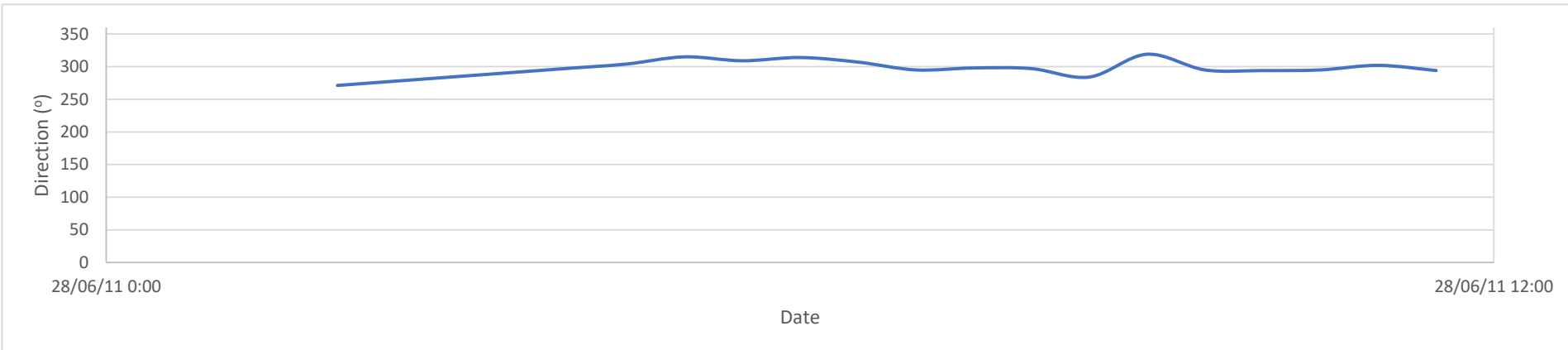
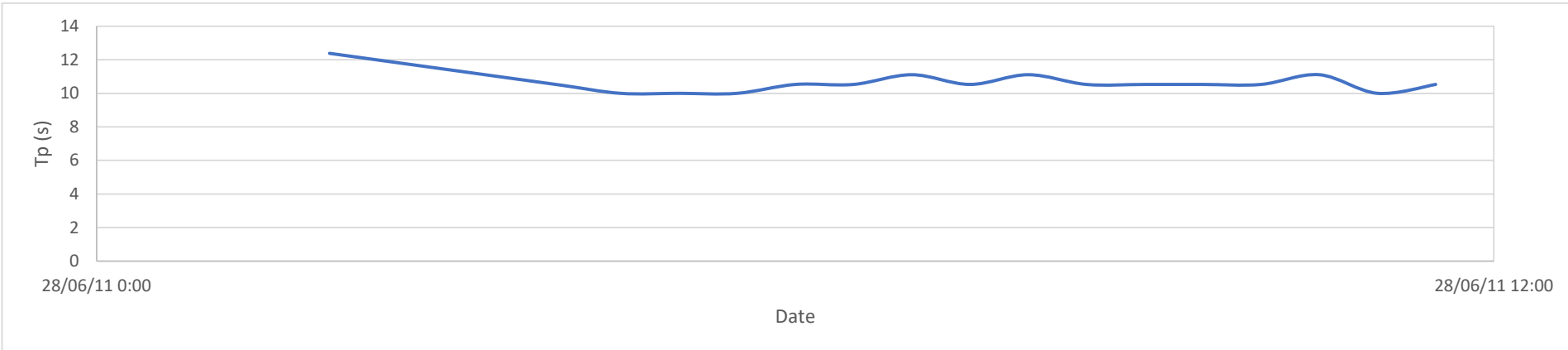
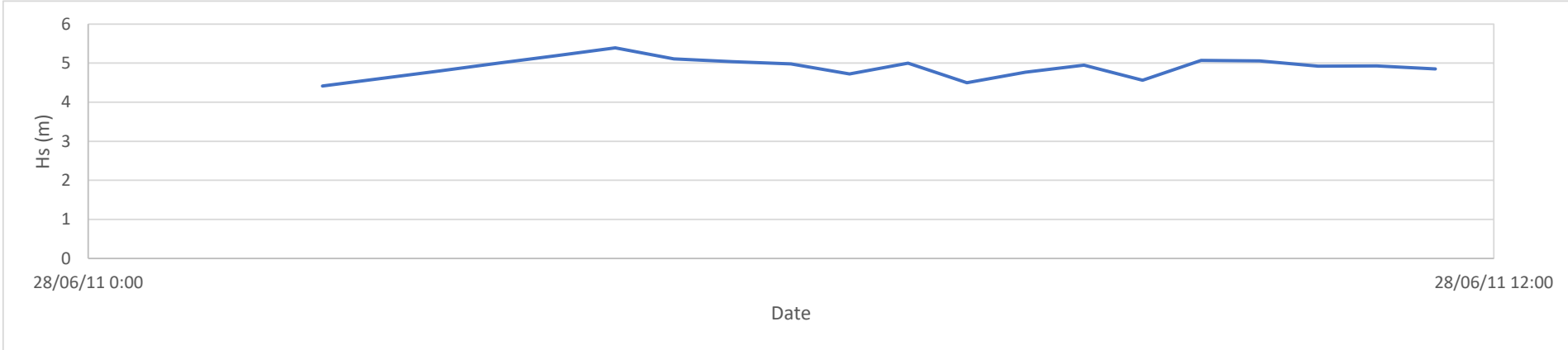
K1509 - South West Storm Selection
Top South West (Cape Naturaliste) Storm
Clusters from Abnormal Directions Plots

Location	Cape Naturaliste
Start Date	28/11/2012 10:49
End Date	28/11/2012 22:19



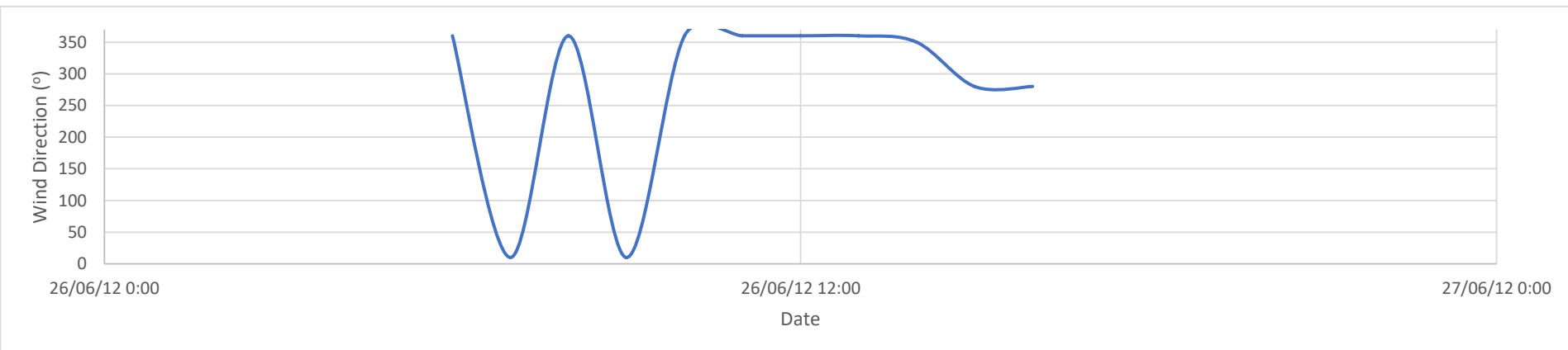
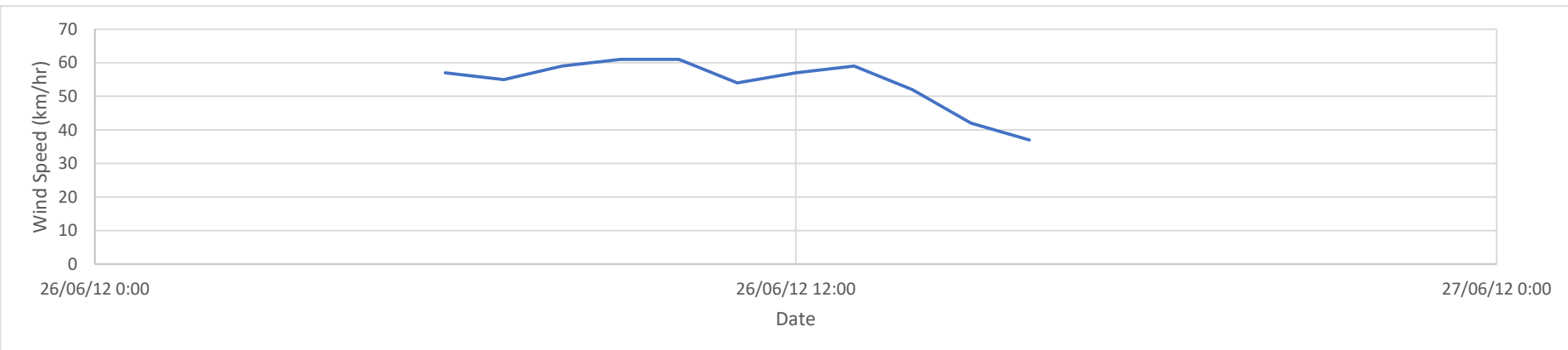
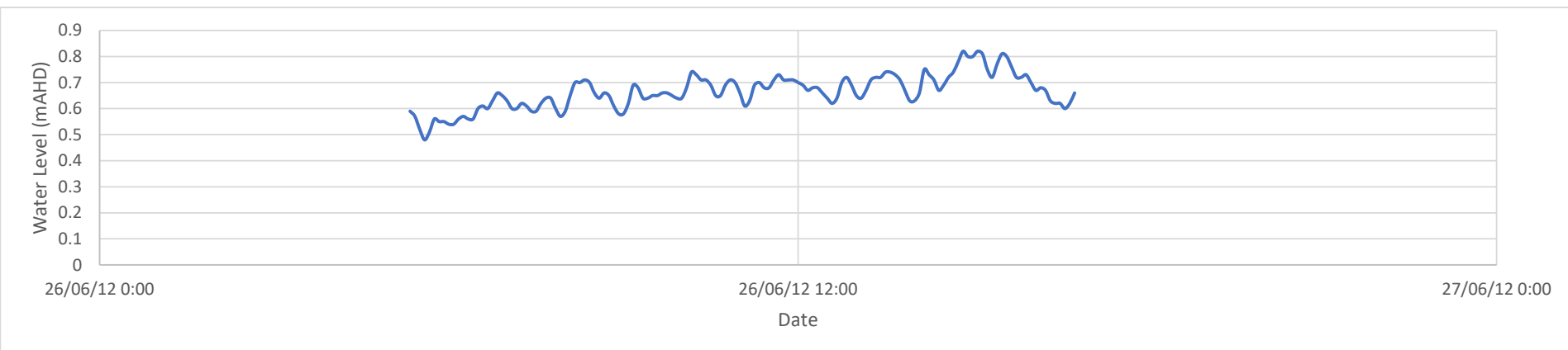
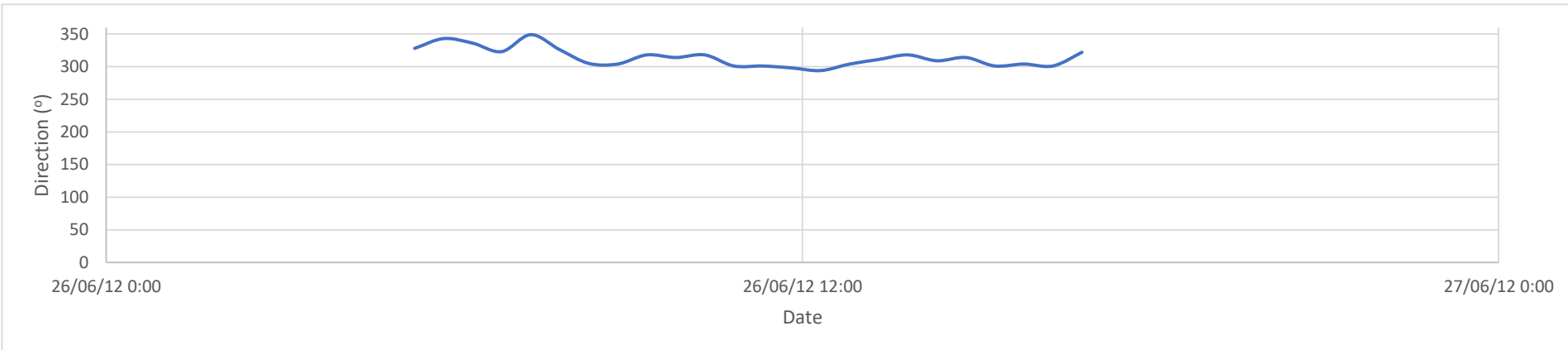
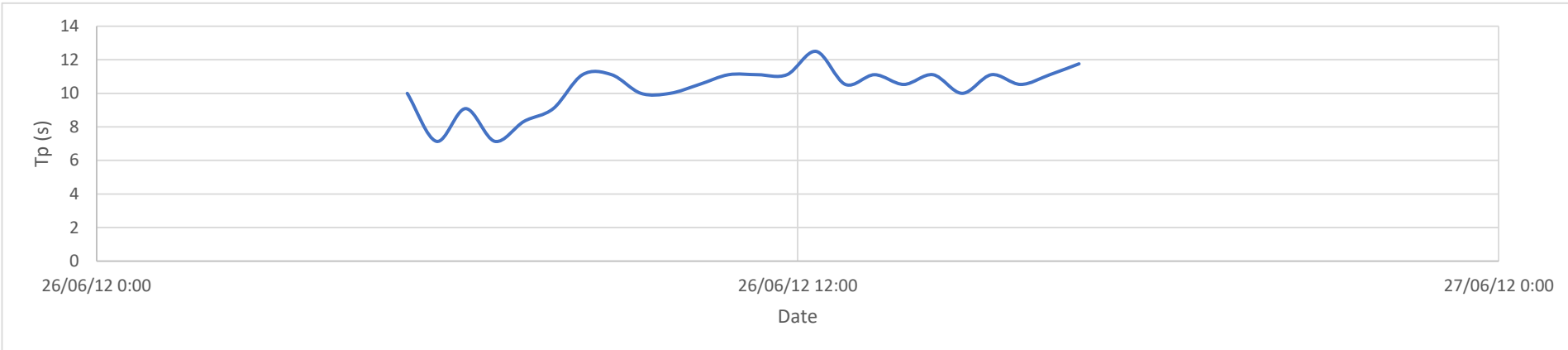
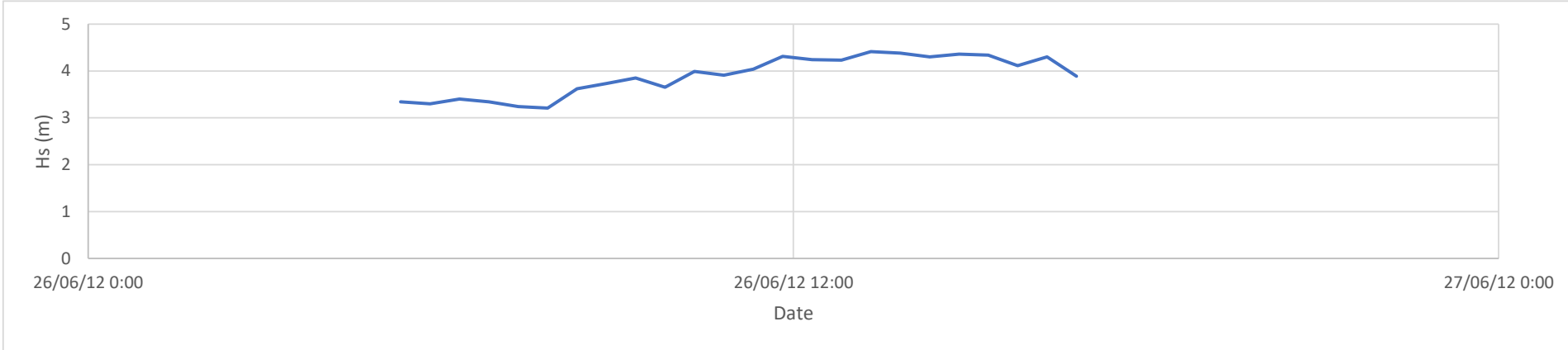
K1509 - South West Storm Selection
Top South West (Cape Naturaliste) Storm
Clusters from Abnormal Directions Plots

Location	Cape Naturaliste
Start Date	28/06/2011 2:00
End Date	28/06/2011 11:30



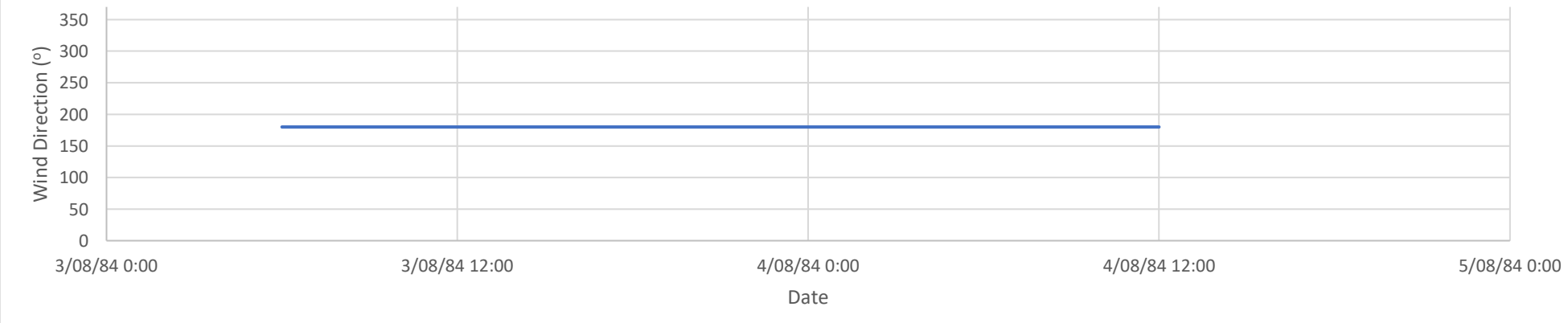
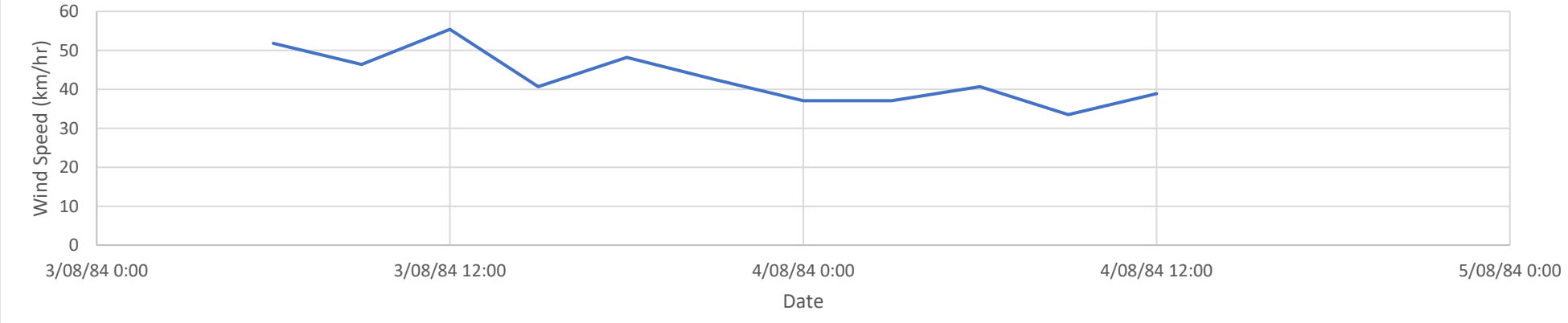
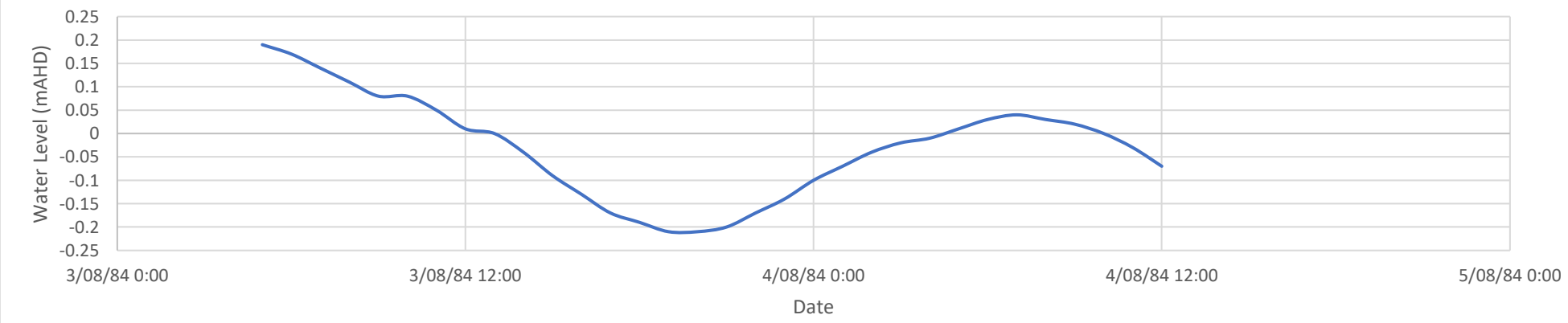
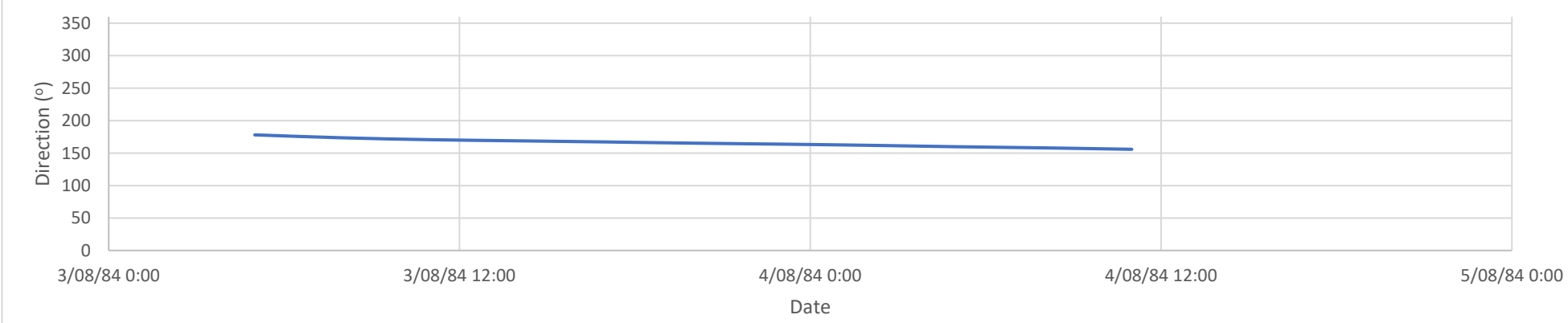
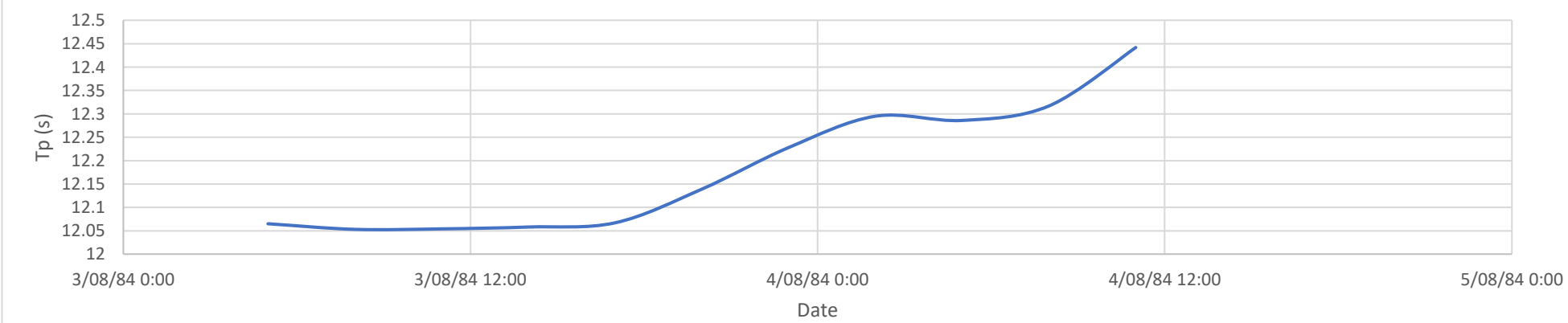
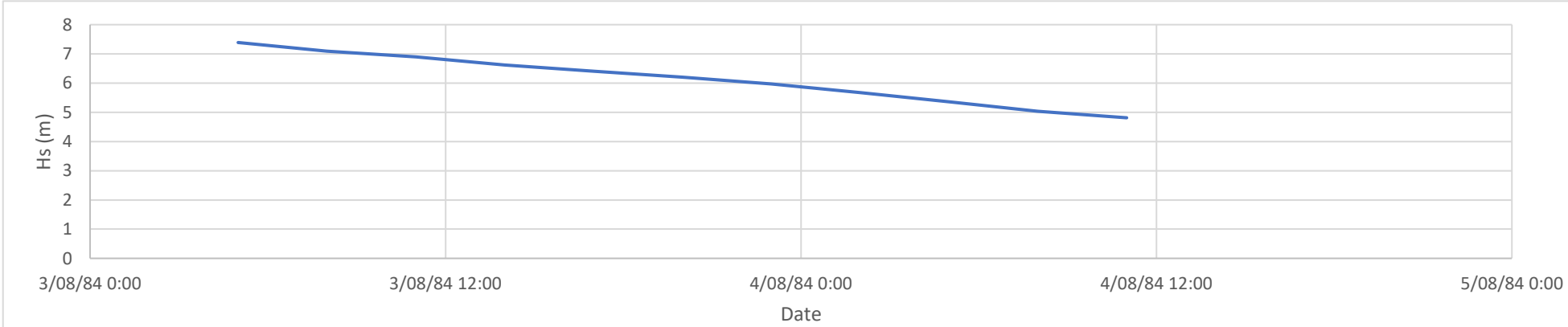
K1509 - South West Storm Selection
Top South West (Cape Naturaliste) Storm
Clusters from Abnormal Directions Plots

Location	Cape Naturaliste
Start Date	26/06/2012 5:19
End Date	26/06/2012 16:49



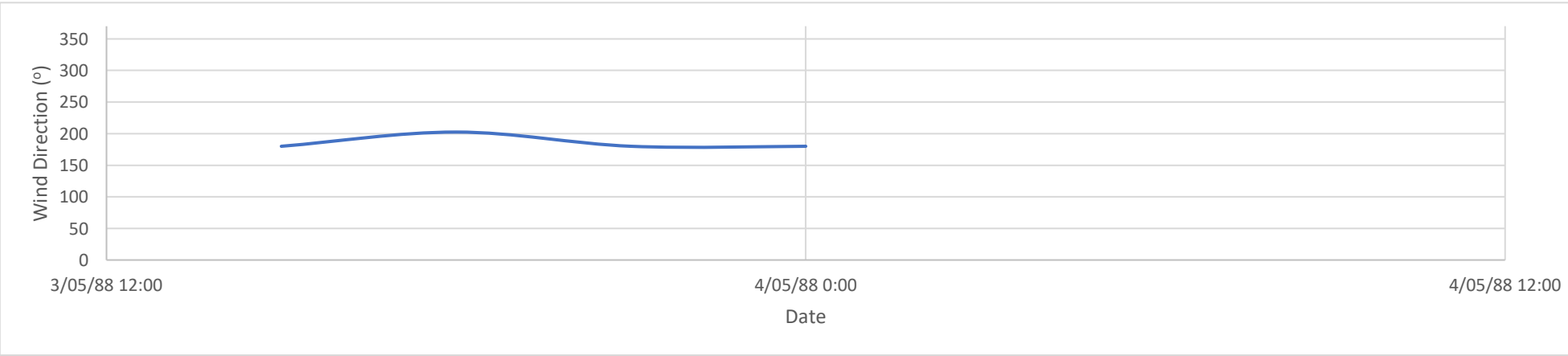
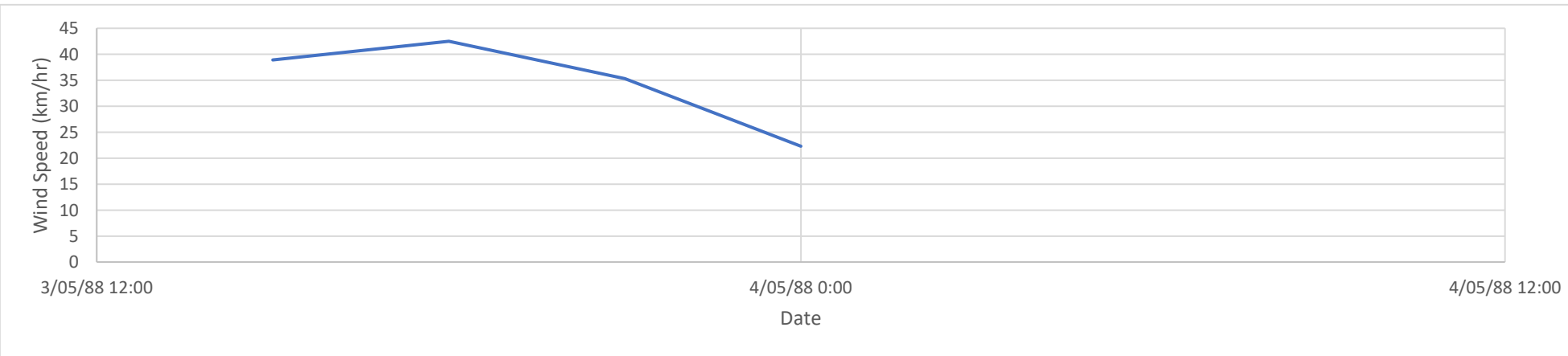
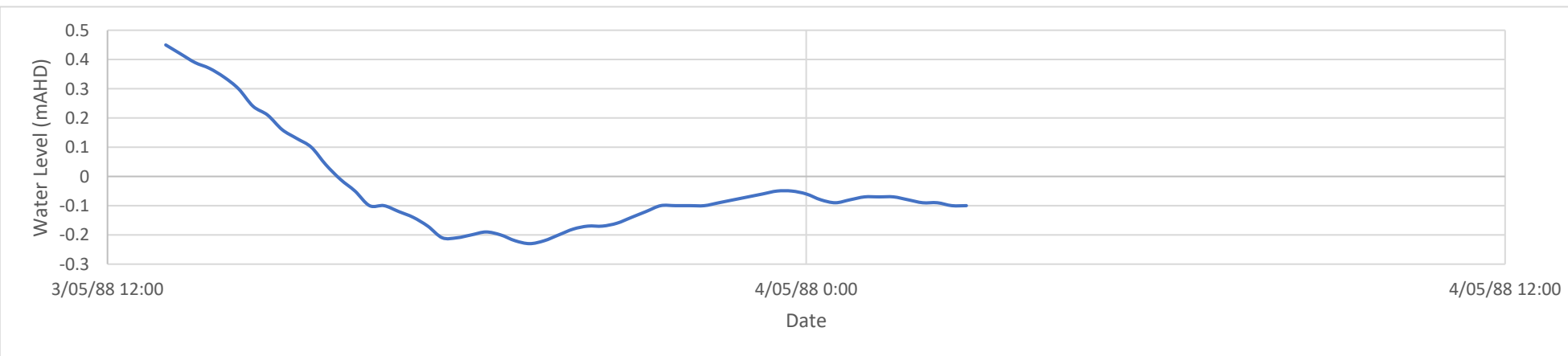
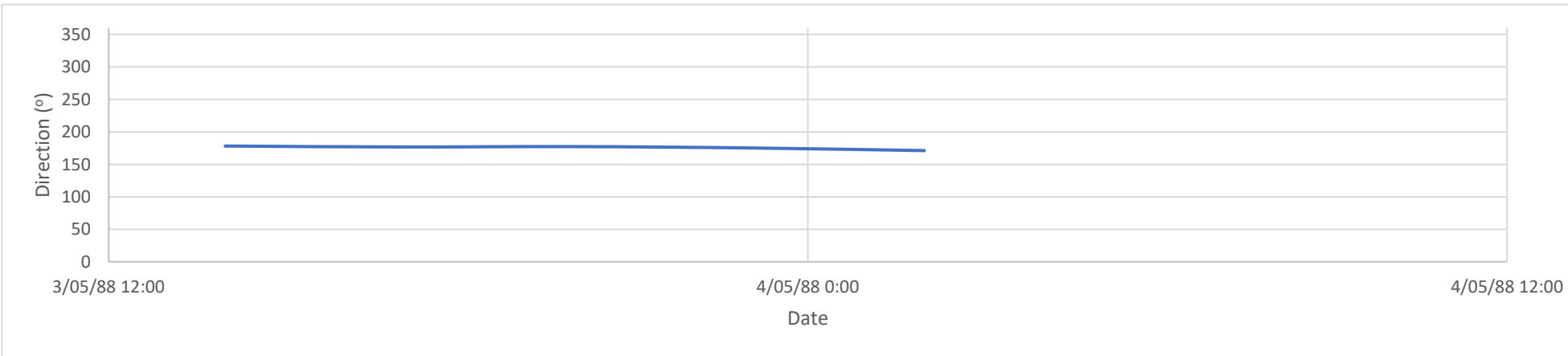
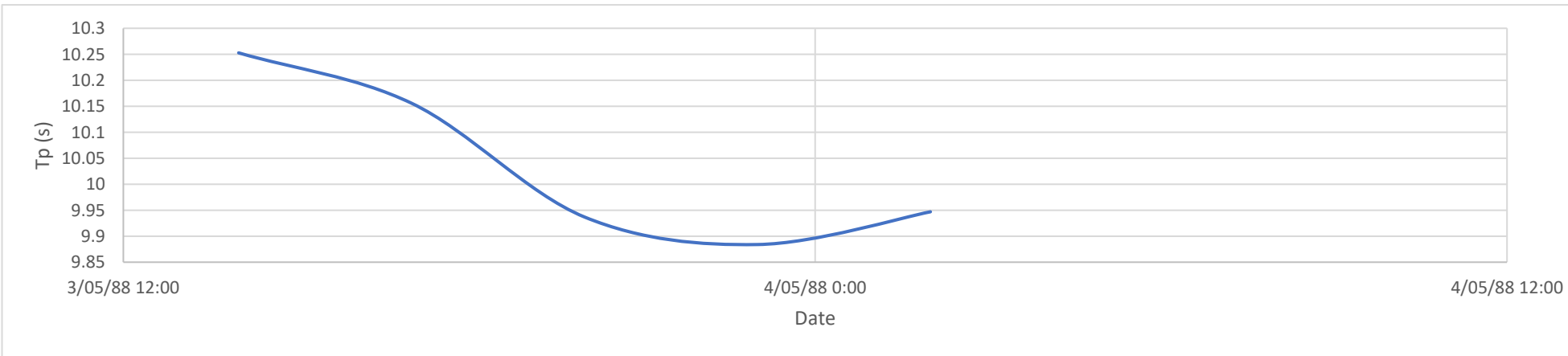
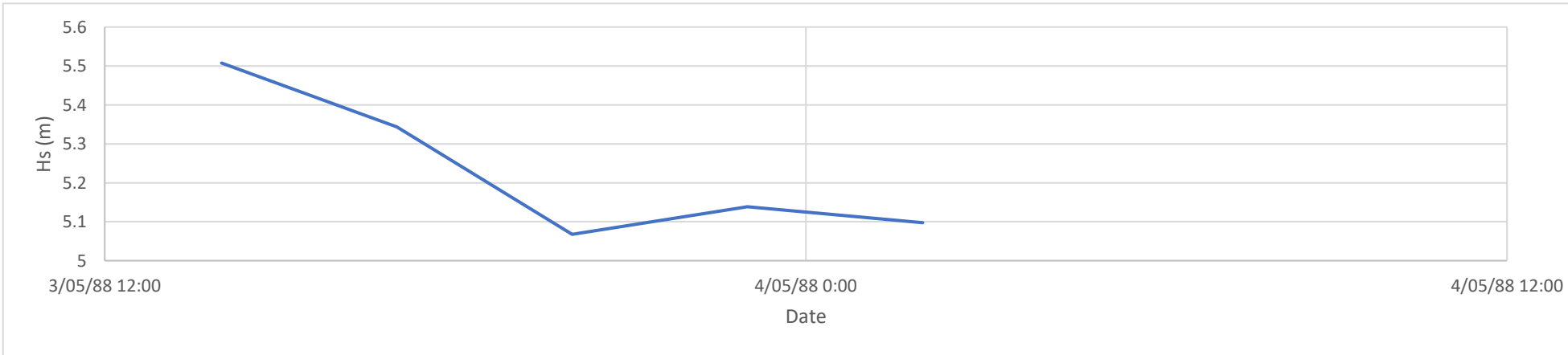
K1509 - South West Storm Selection
Top South West (Albany) Storm Clusters
from Abnormal Directions Plots

Location	Albany
Start Date	03-08-84 5:00
End Date	04-08-84 11:00



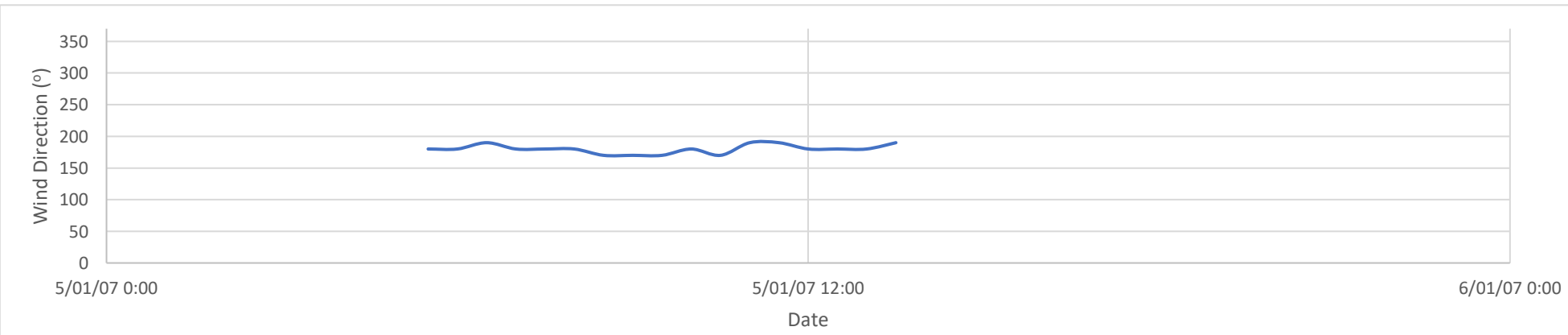
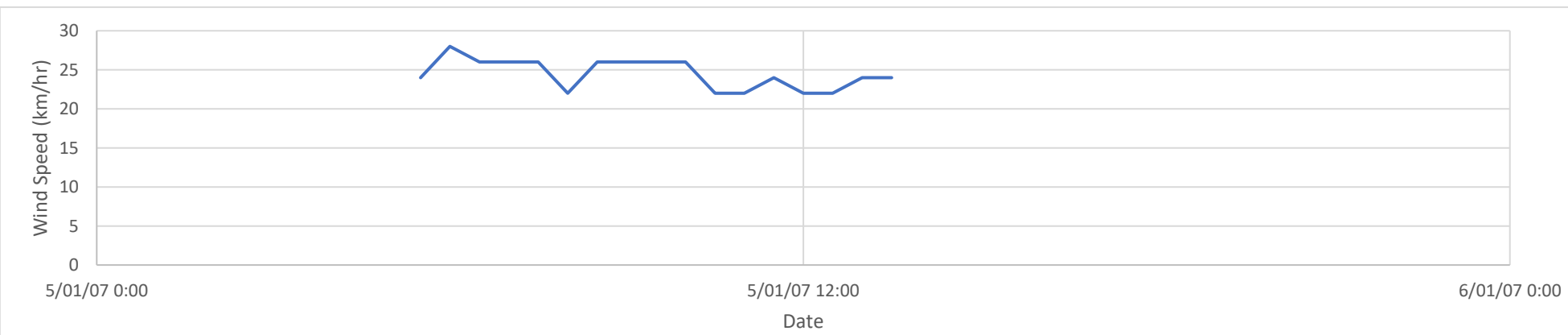
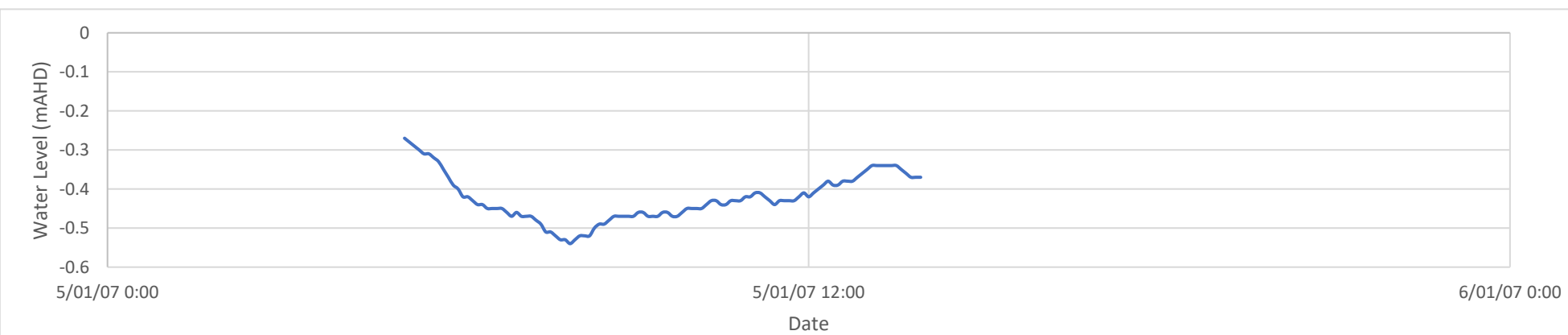
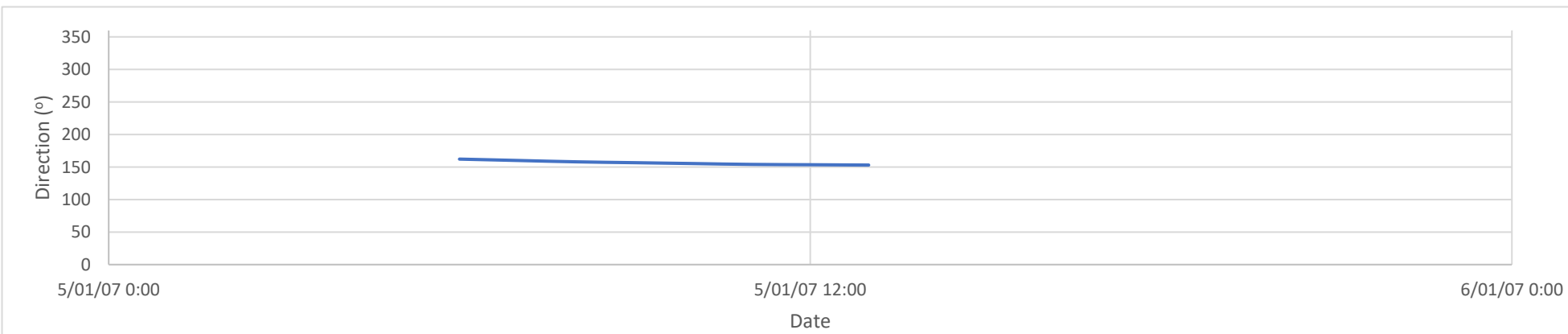
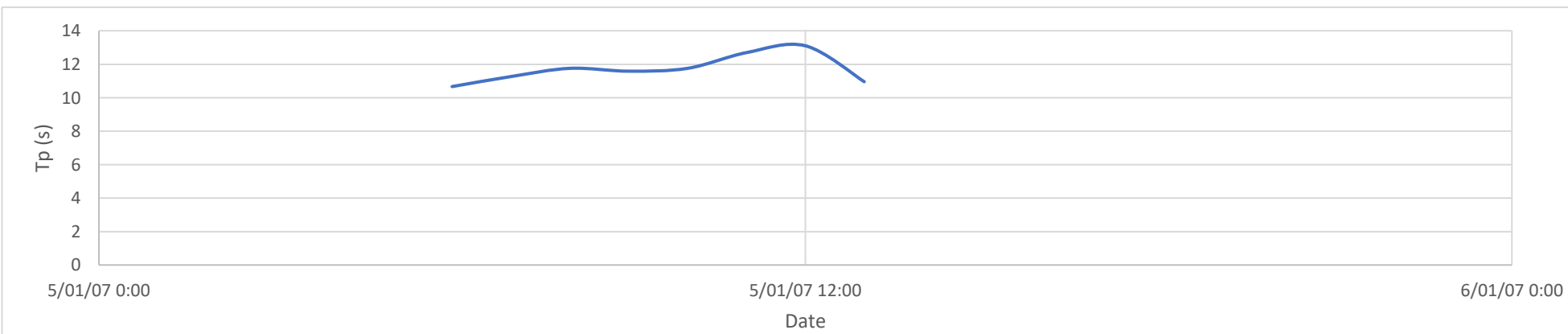
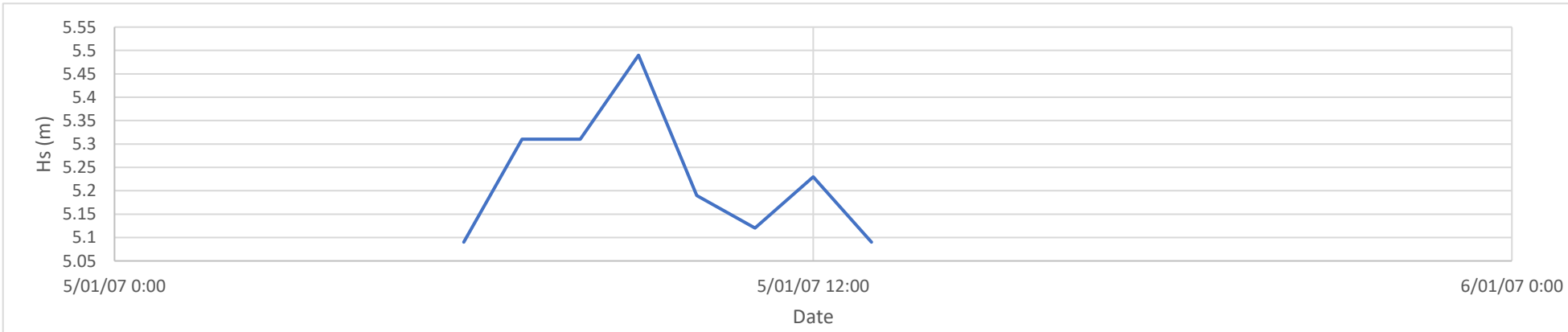
K1509 - South West Storm Selection
Top South West (Albany) Storm Clusters
from Abnormal Directions Plots

Location	Albany
Start Date	03-05-88 14:00
End Date	04-05-88 2:00



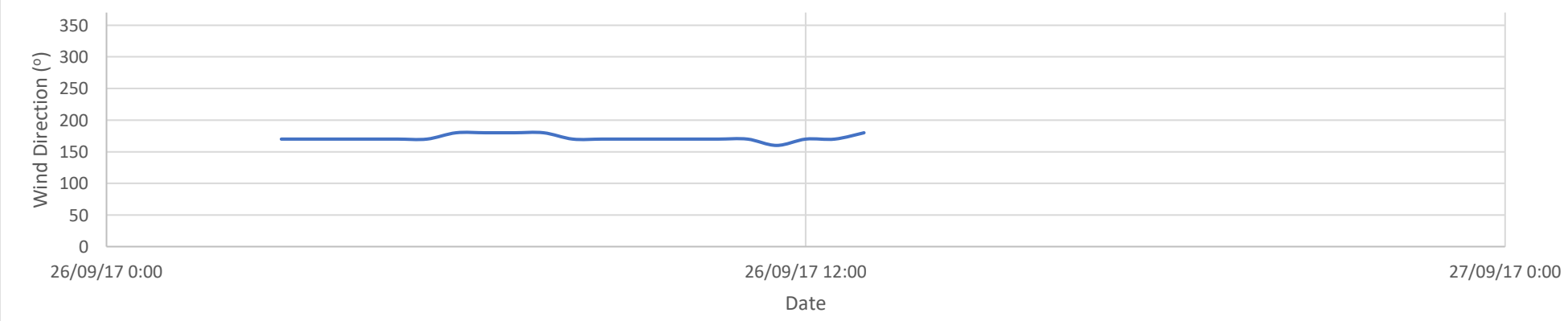
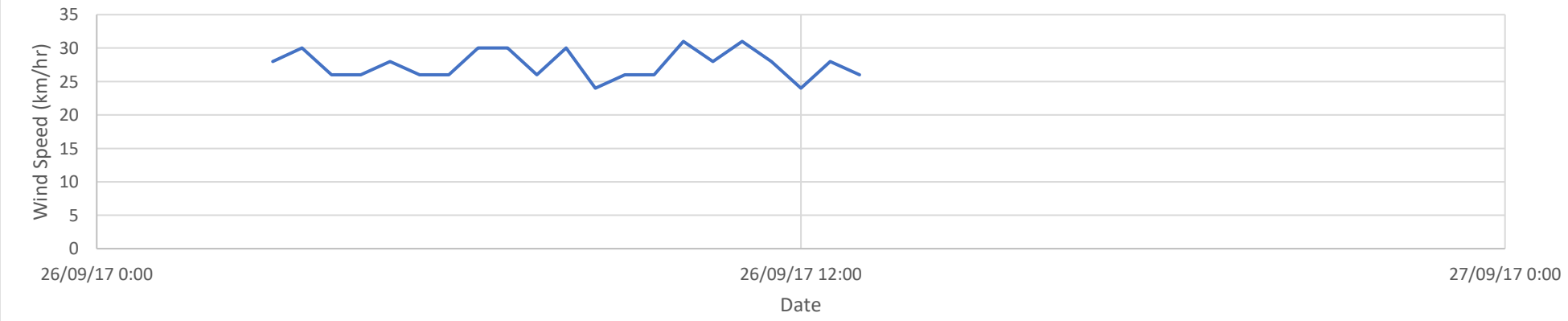
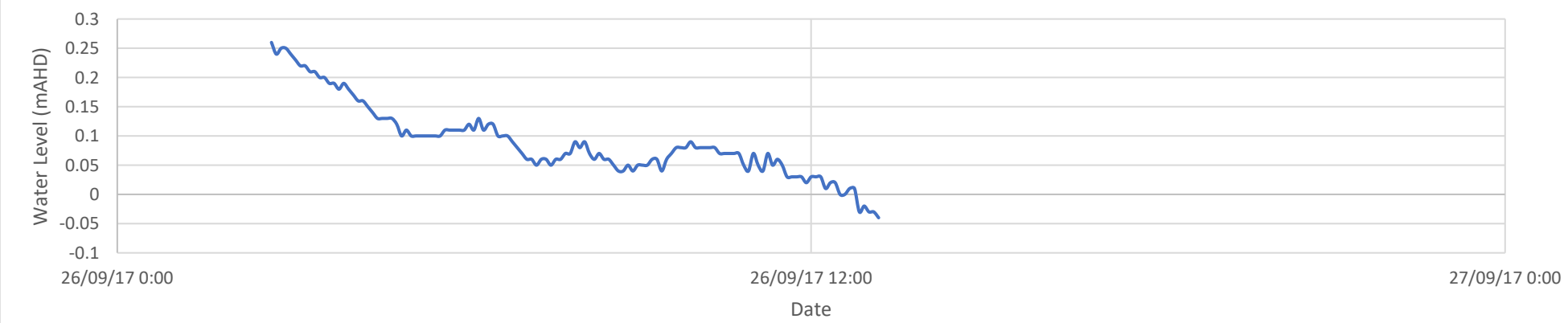
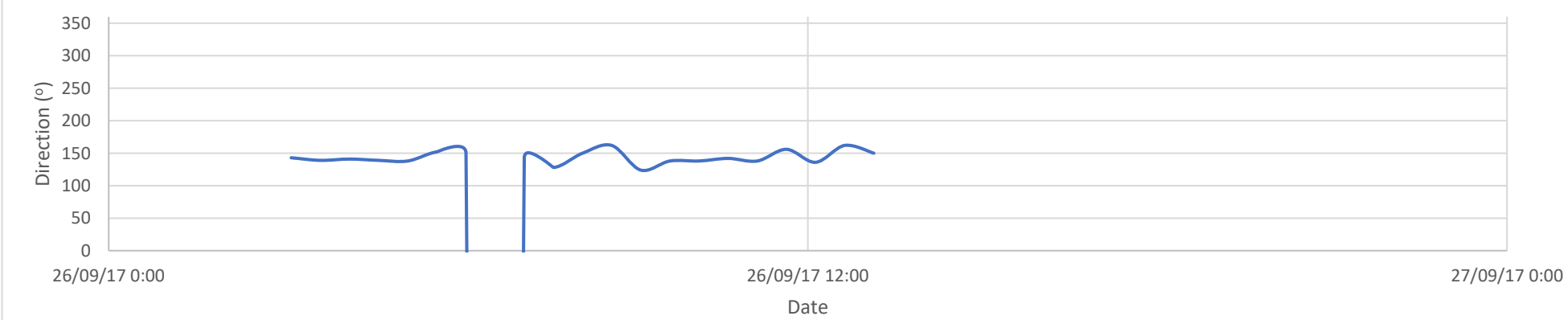
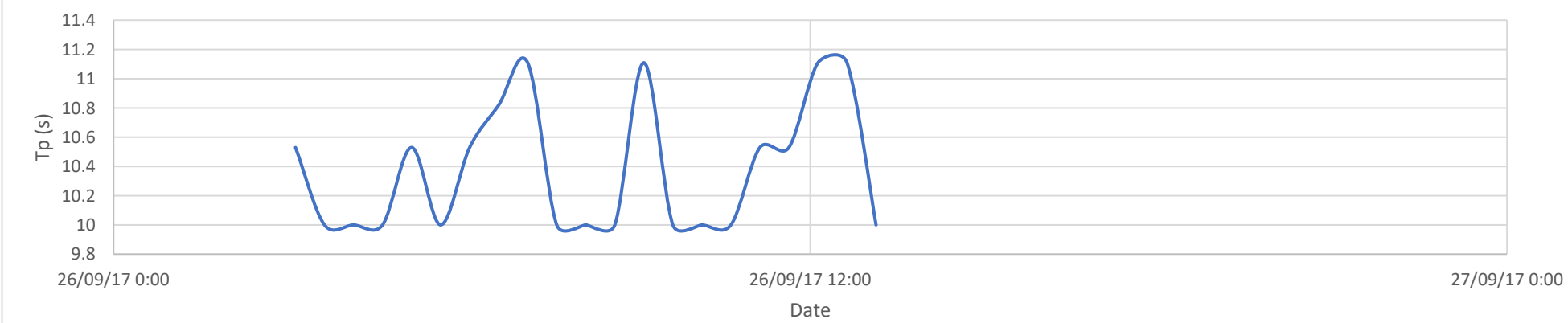
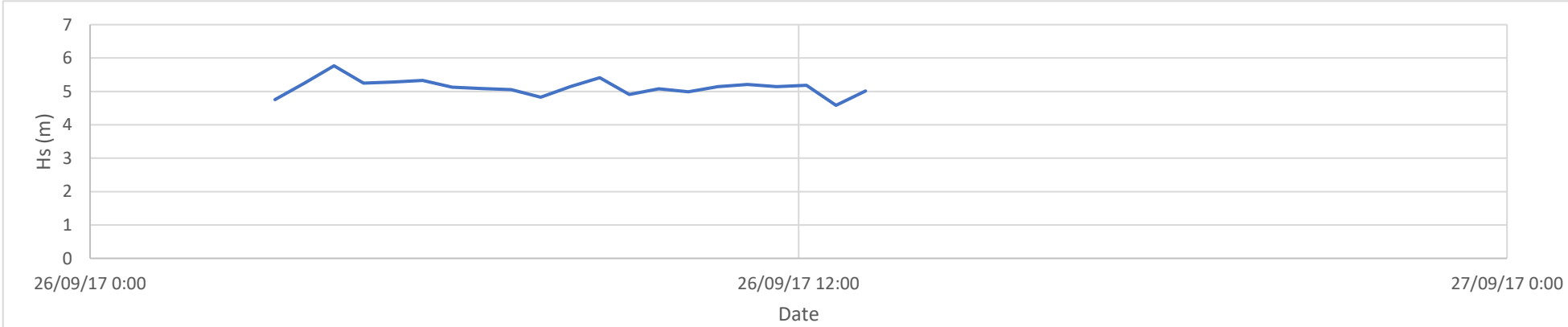
K1509 - South West Storm Selection
Top South West (Albany) Storm Clusters
from Abnormal Directions Plots

Location	Albany
Start Date	05-01-07 6:00
End Date	05-01-07 13:00



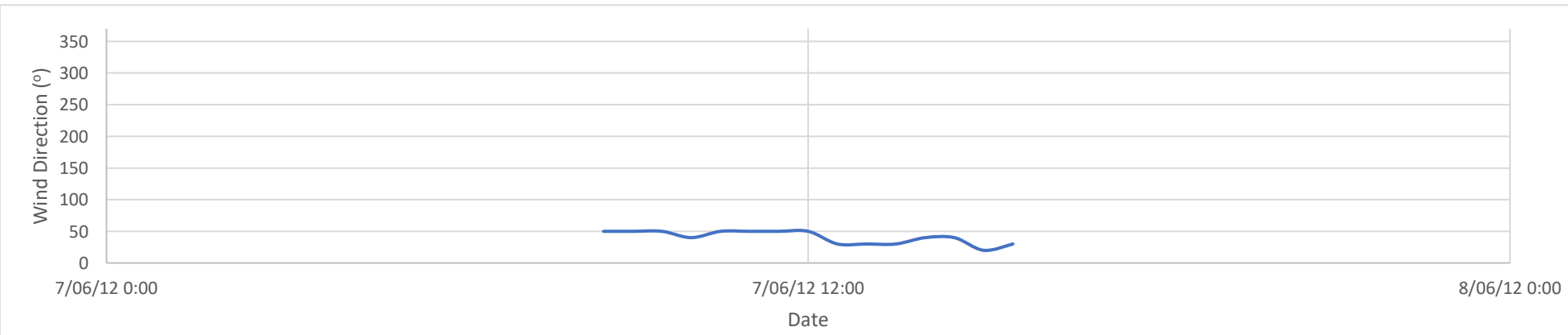
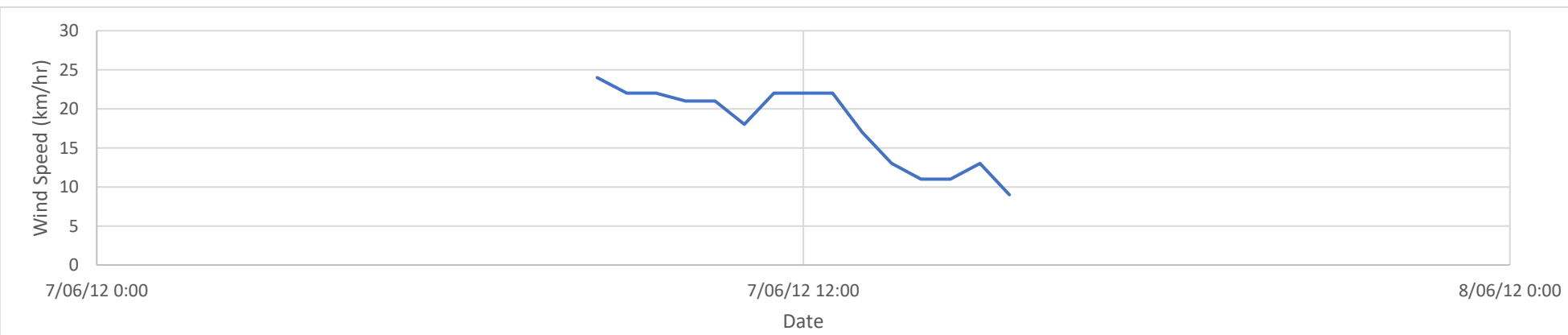
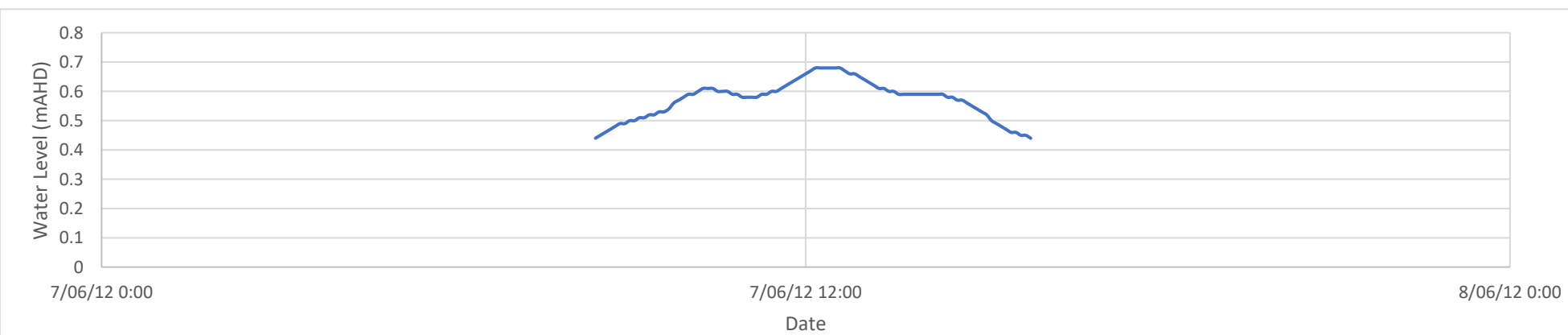
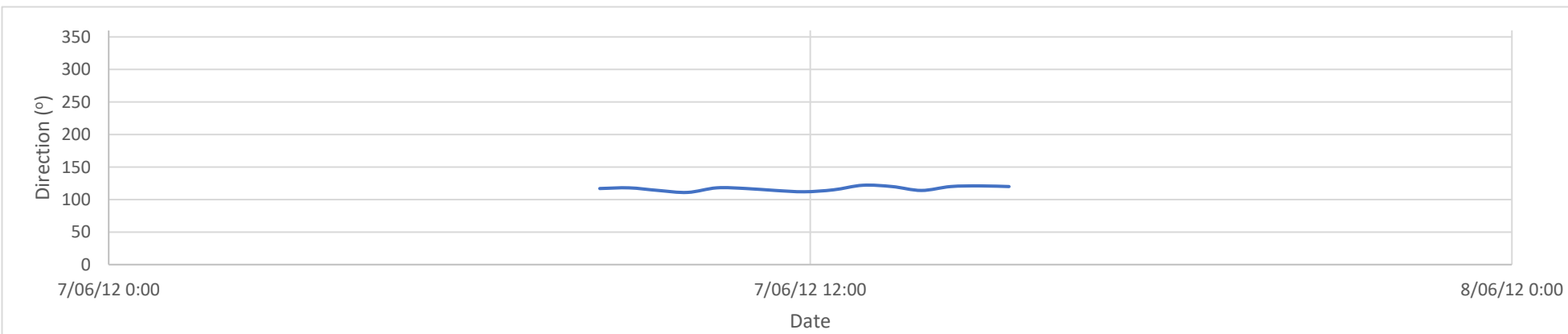
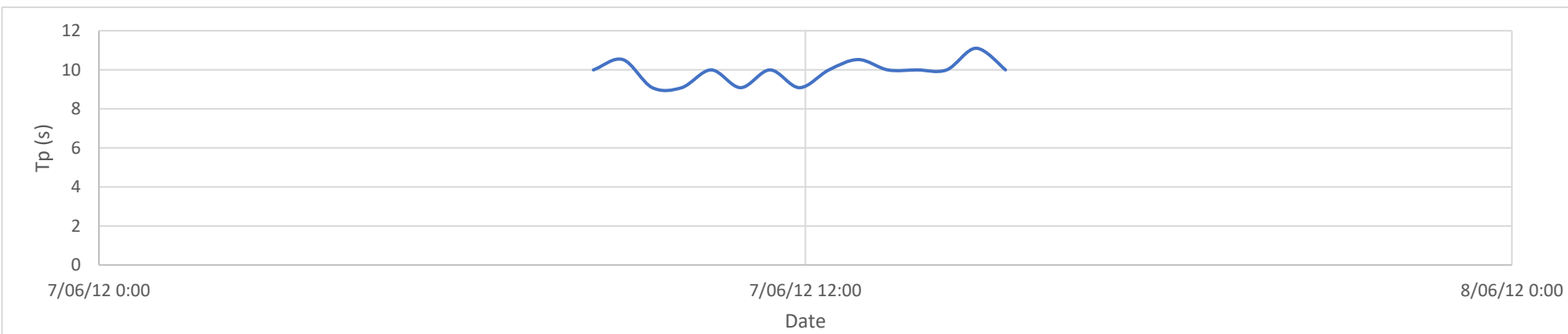
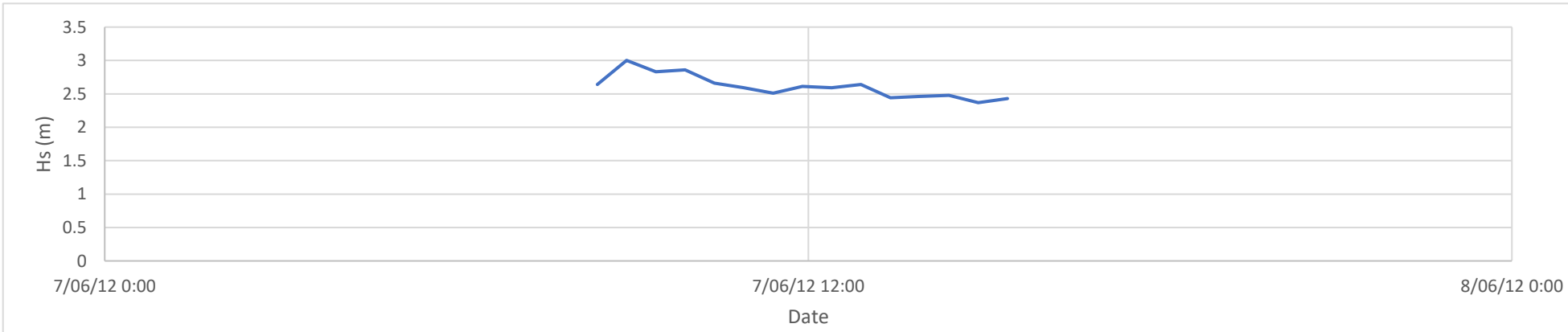
K1509 - South West Storm Selection
Top South West (Albany) Storm Clusters
from Abnormal Directions Plots

Location	Albany
Start Date	26-09-17 3:38
End Date	26-09-17 12:08



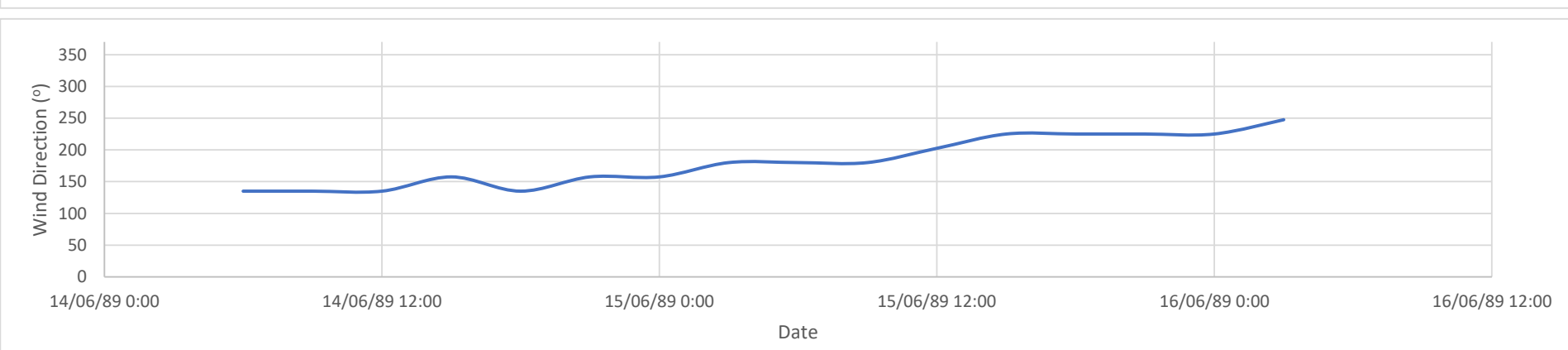
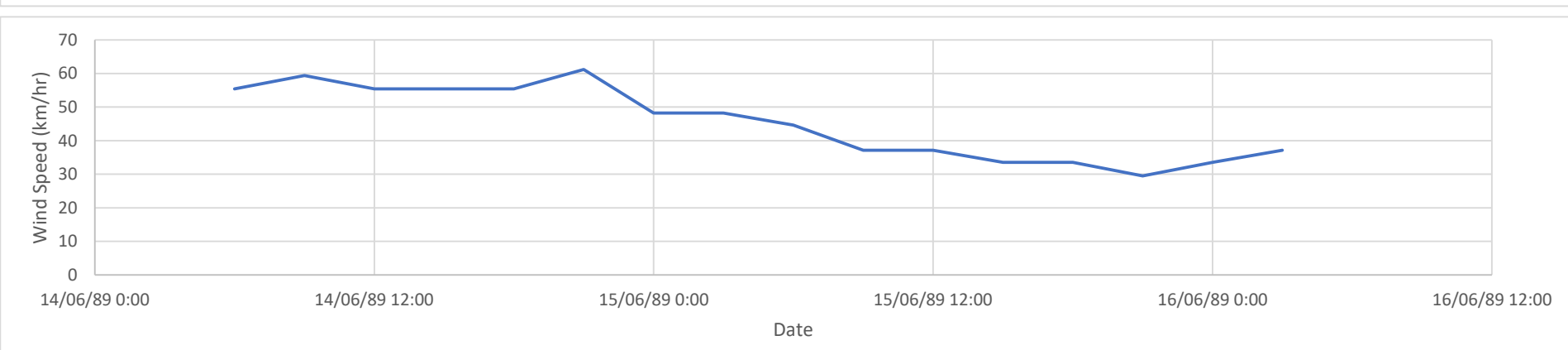
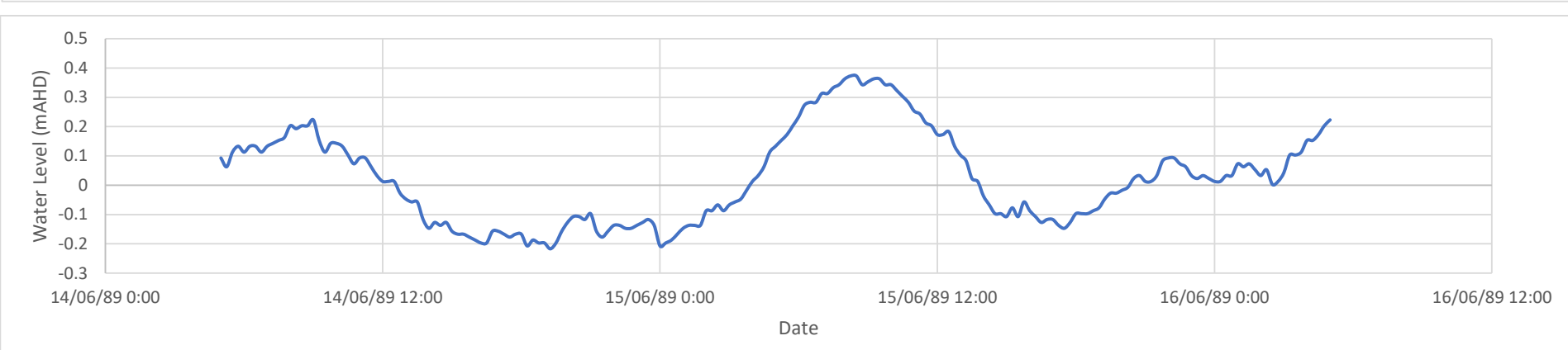
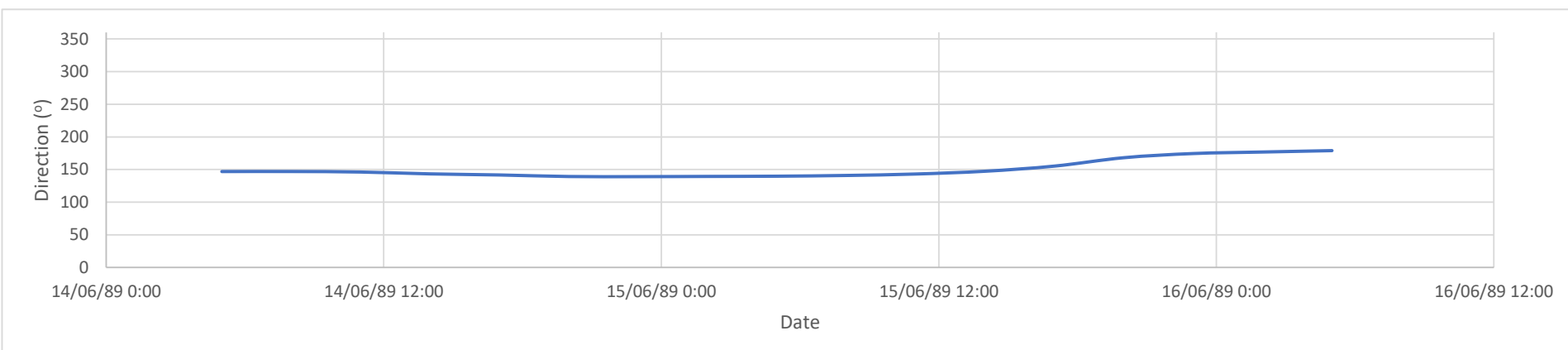
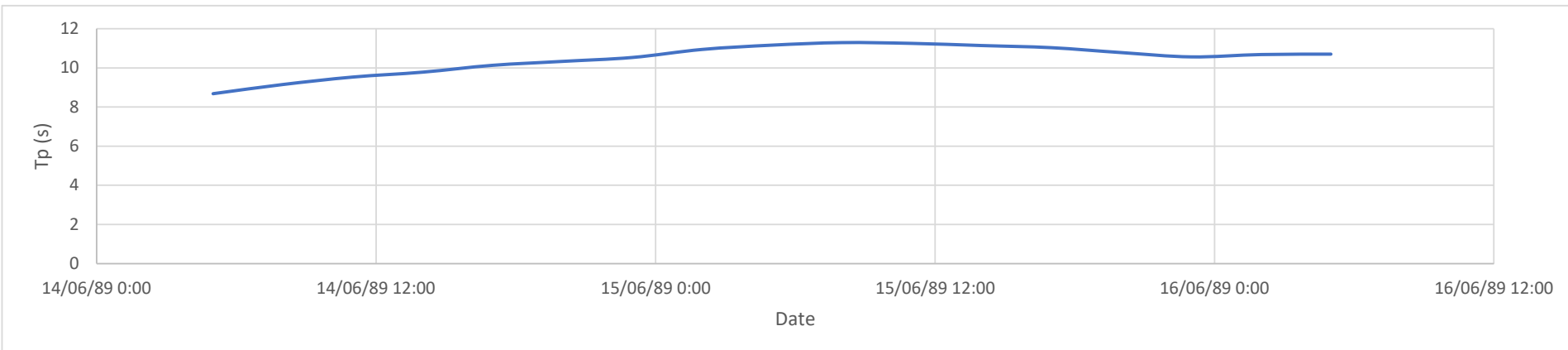
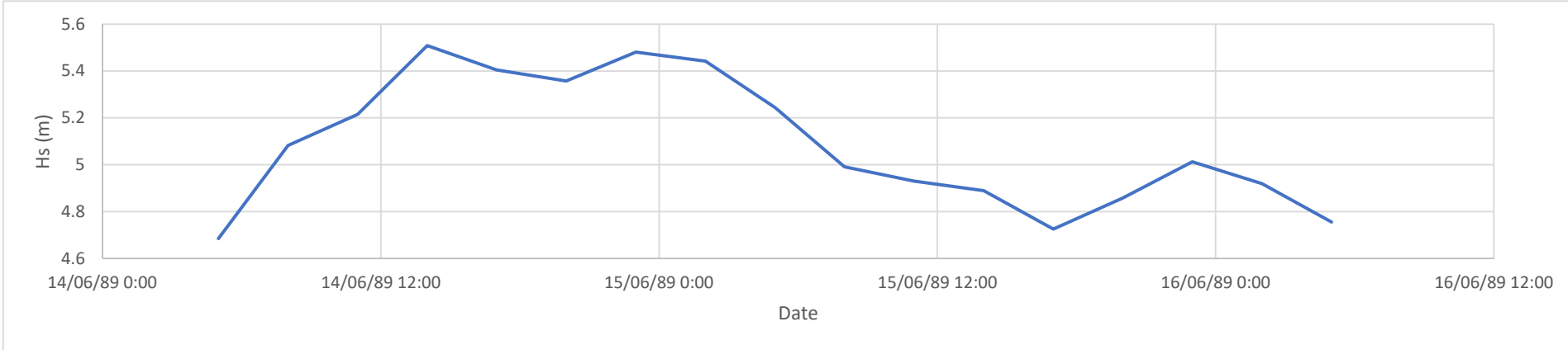
K1509 - South West Storm Selection
Top South West (Albany) Storm Clusters
from Abnormal Directions Plots

Location	Albany
Start Date	07-06-12 9:24
End Date	07-06-12 14:54



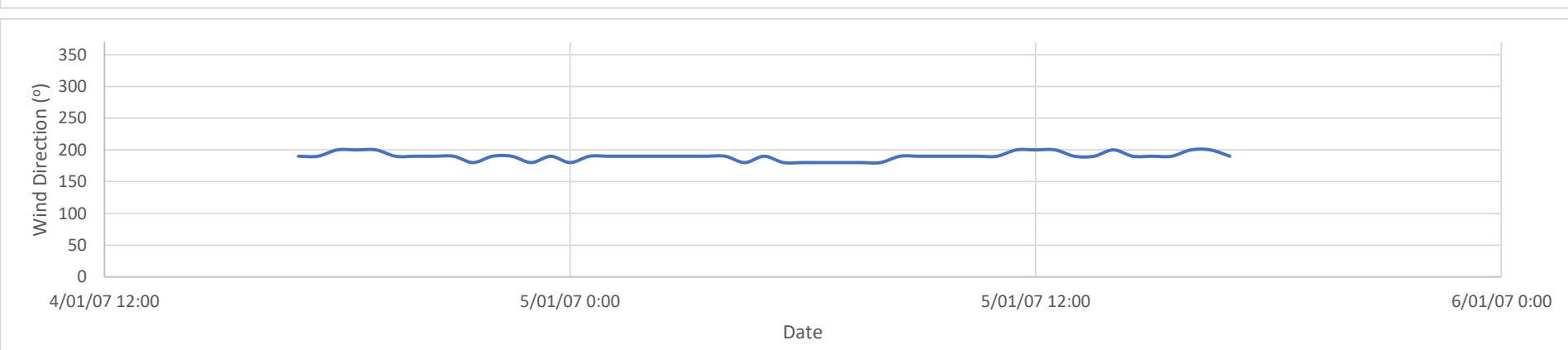
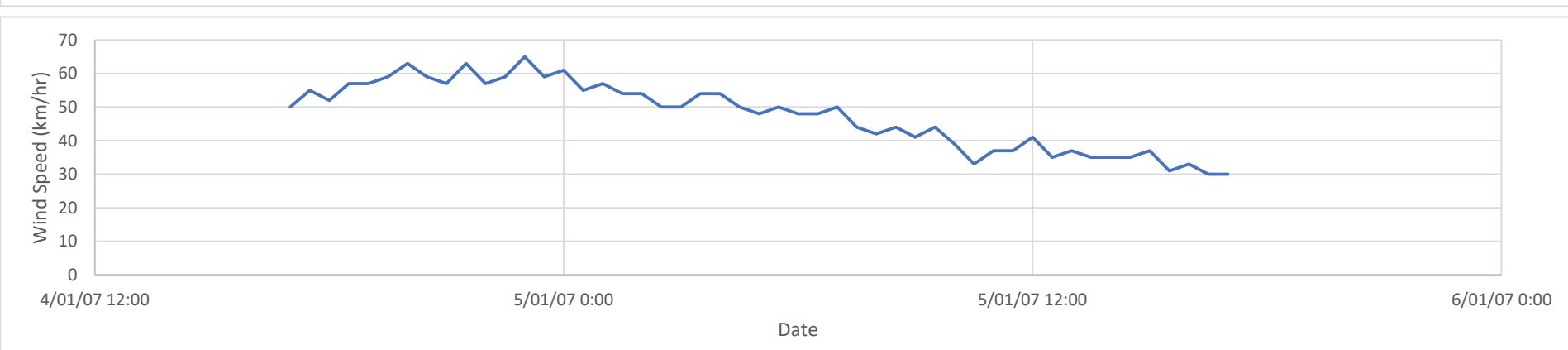
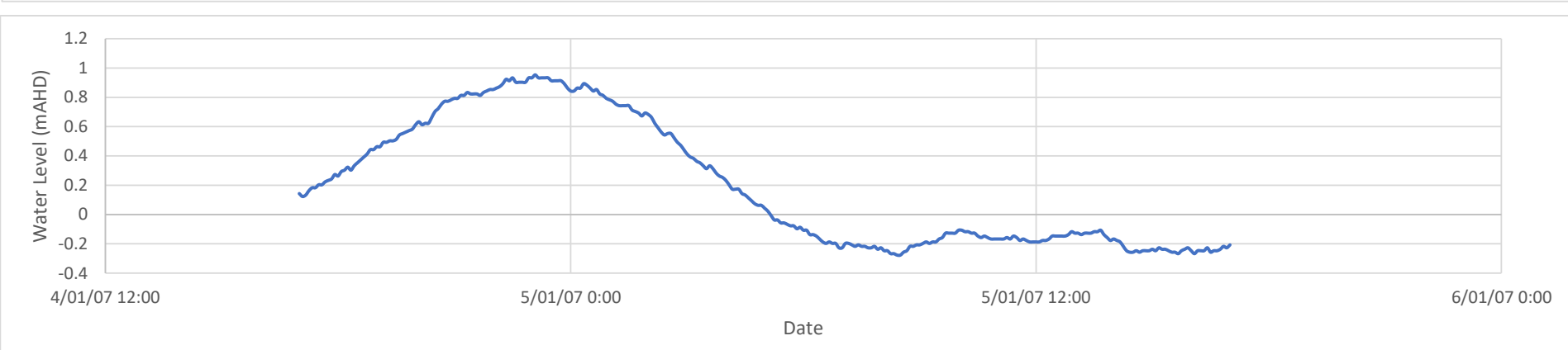
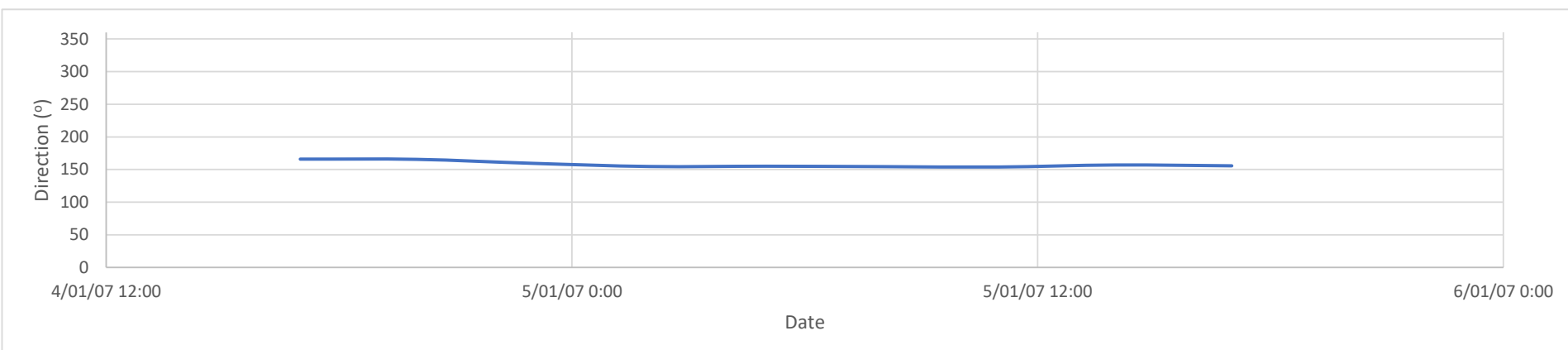
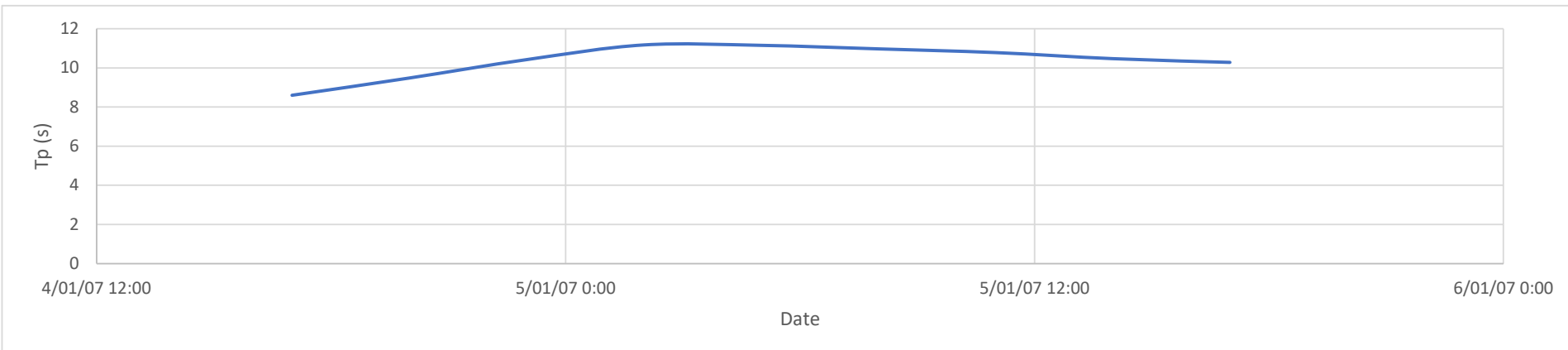
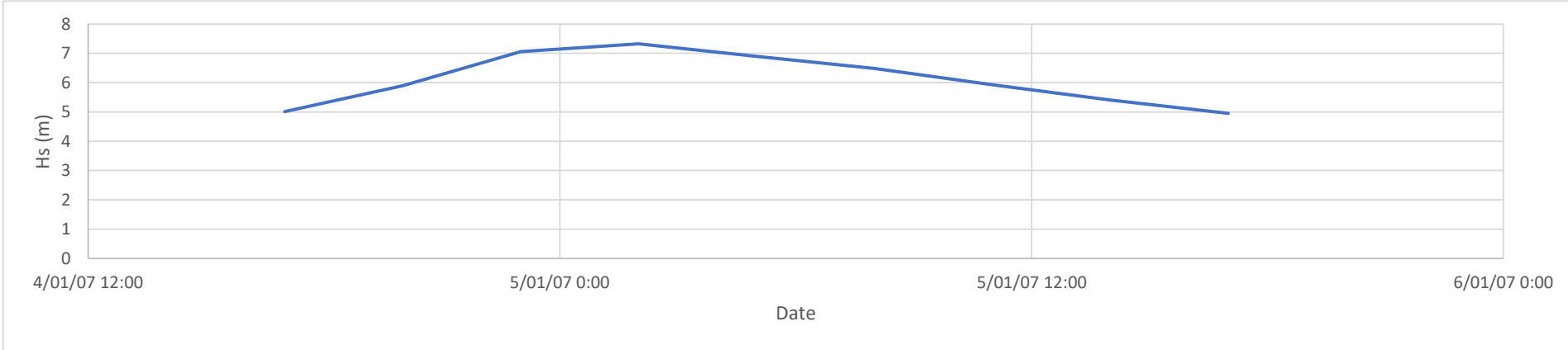
K1509 - South West Storm Selection
Top South West (Esperance) Storm Clusters
from Abnormal Directions Plots

Location	Esperance
Start Date	14/06/1989 5:00
End Date	16/06/1989 5:00



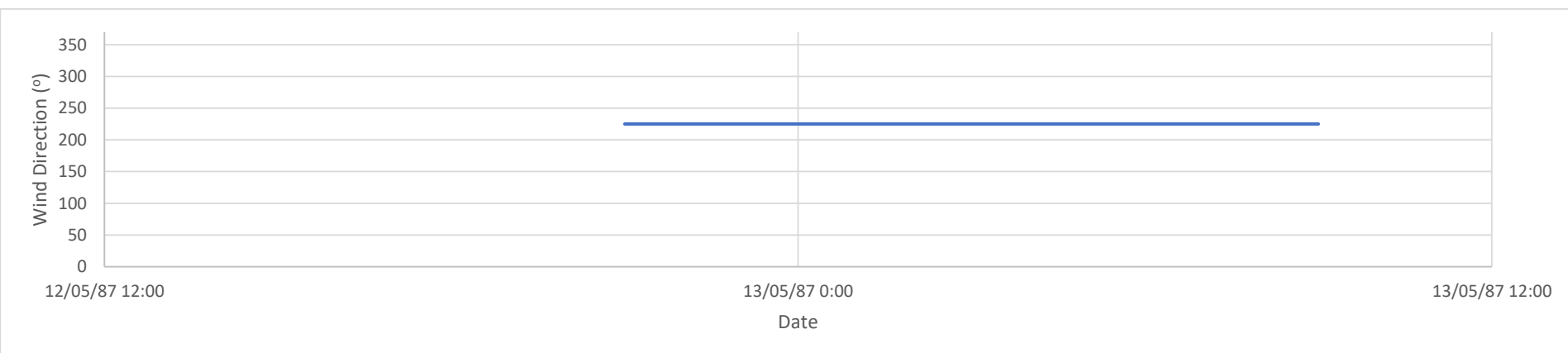
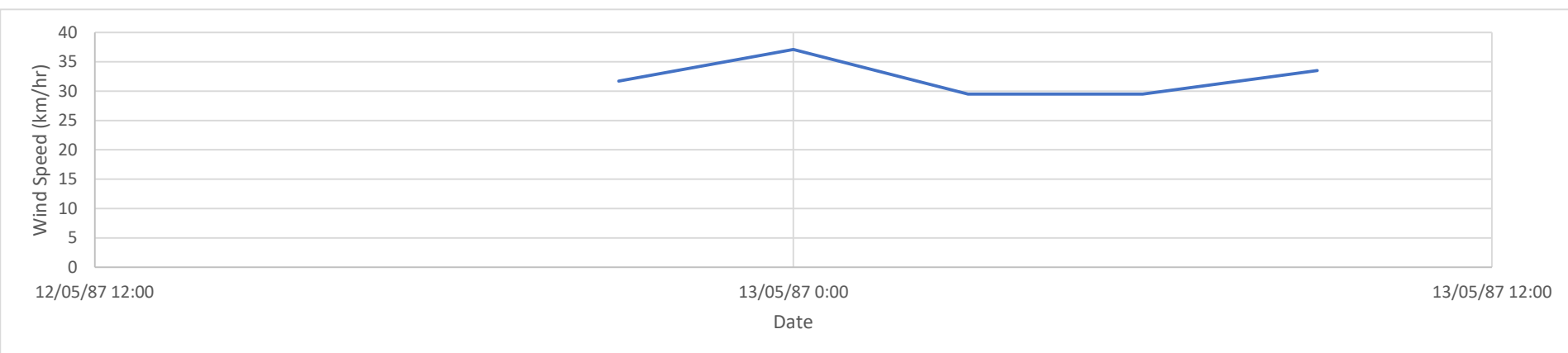
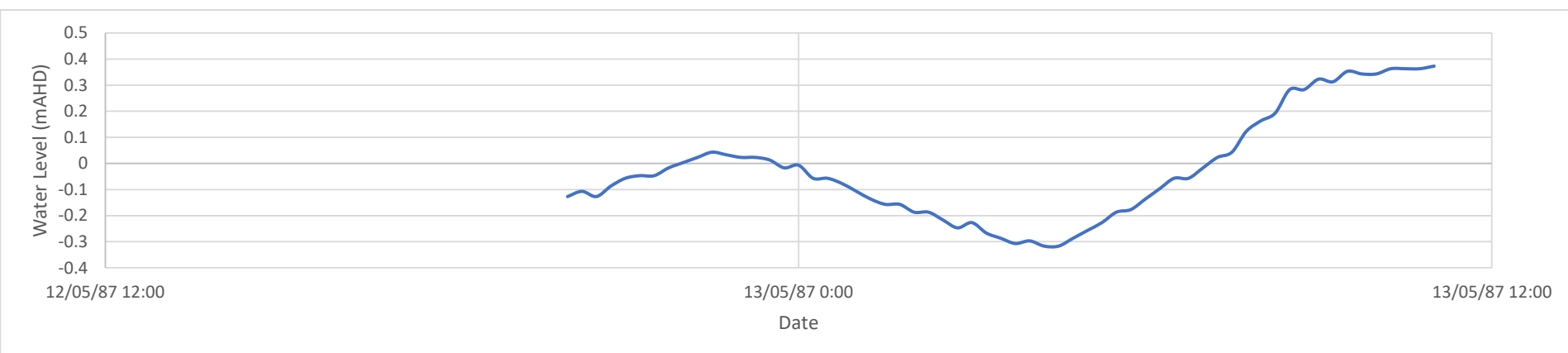
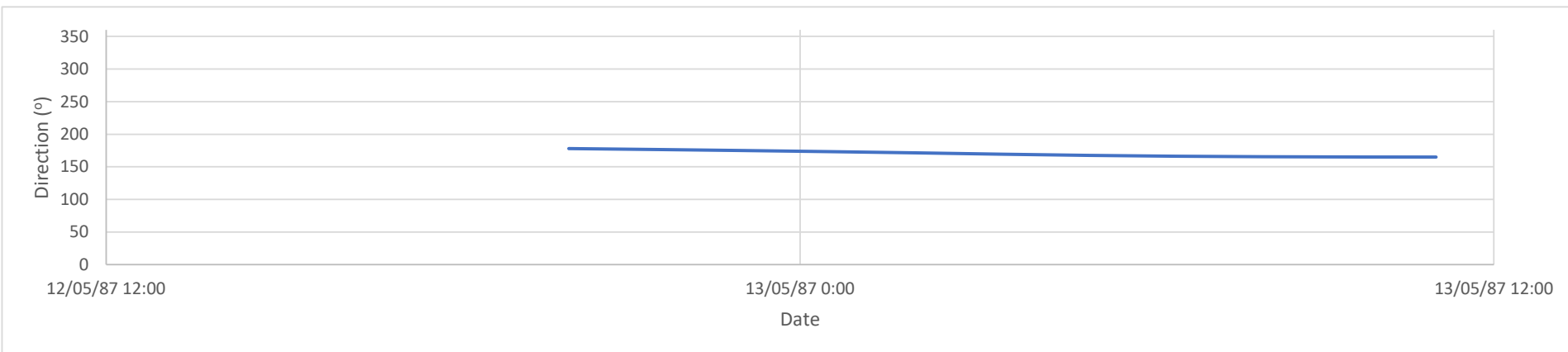
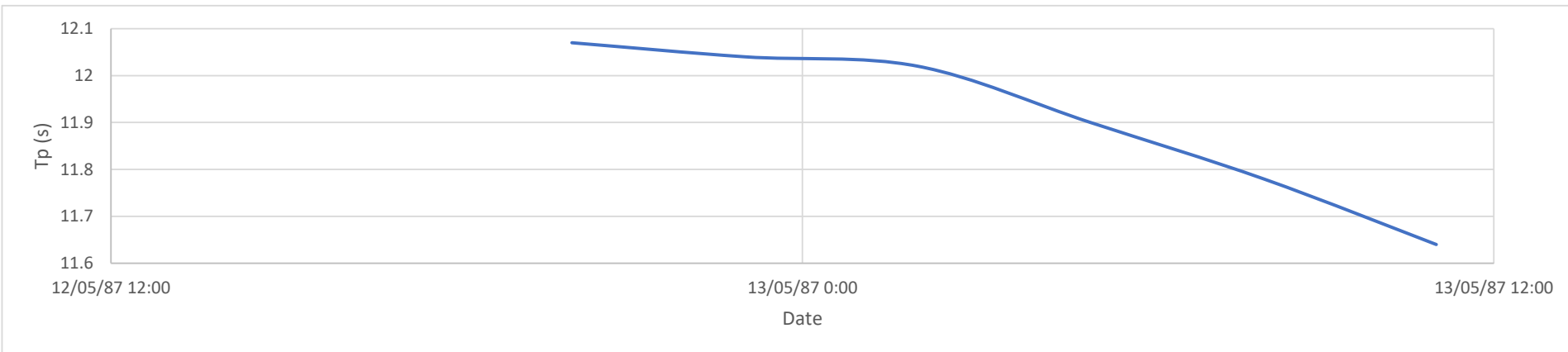
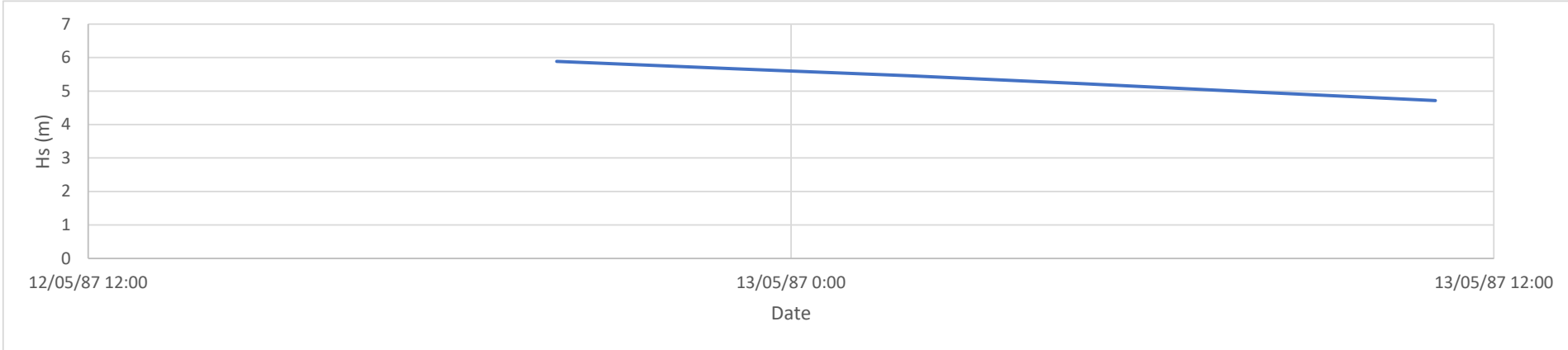
K1509 - South West Storm Selection
Top South West (Esperance) Storm Clusters
from Abnormal Directions Plots

Location	Esperance
Start Date	4/01/2007 17:00
End Date	5/01/2007 17:00



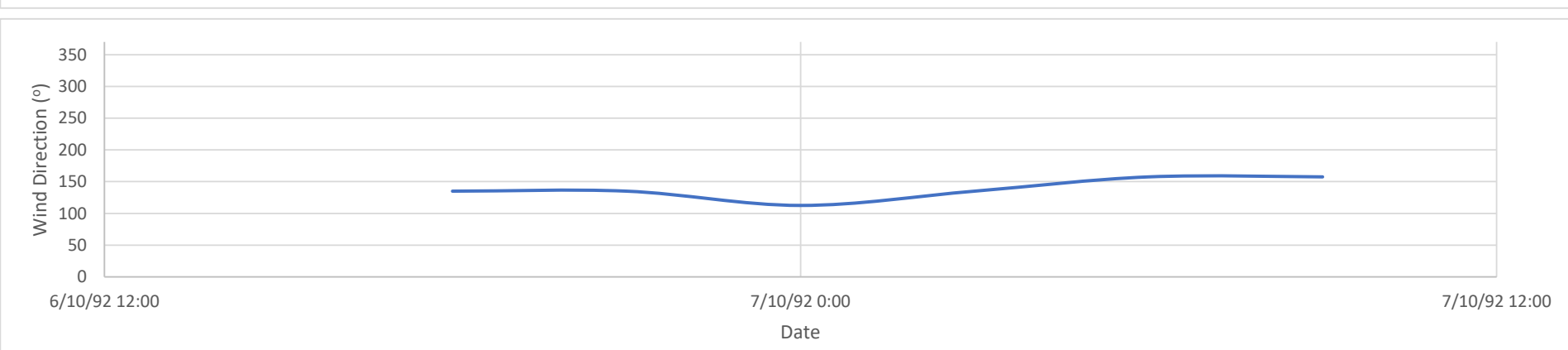
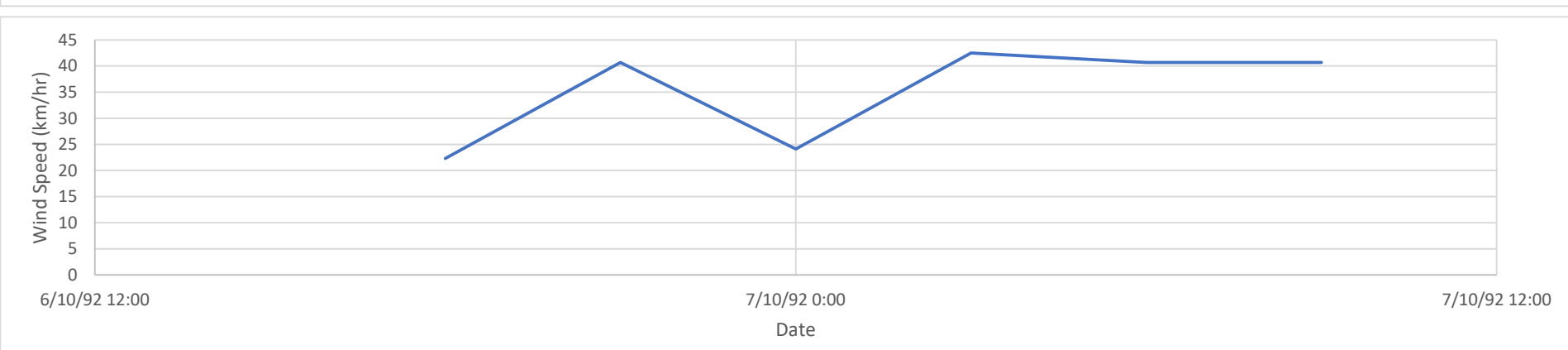
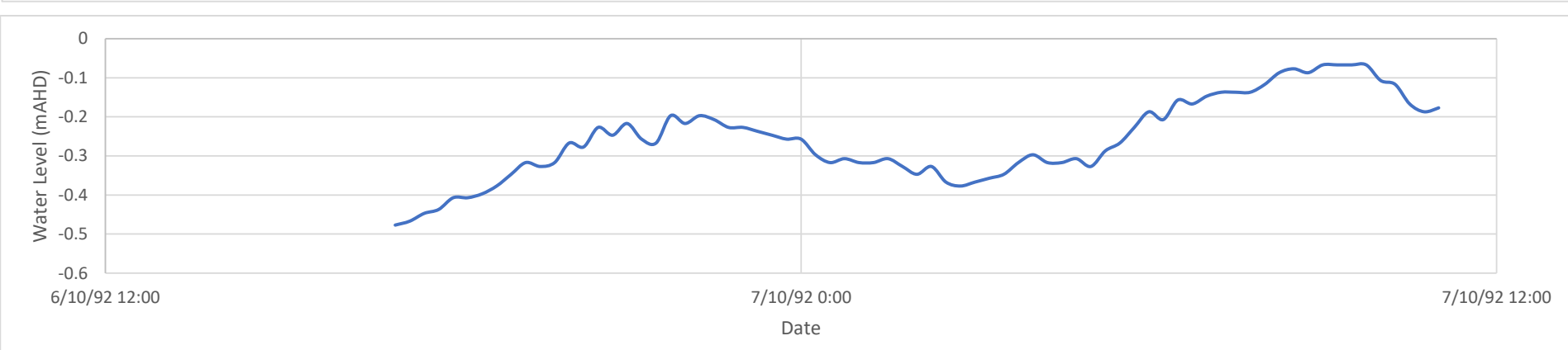
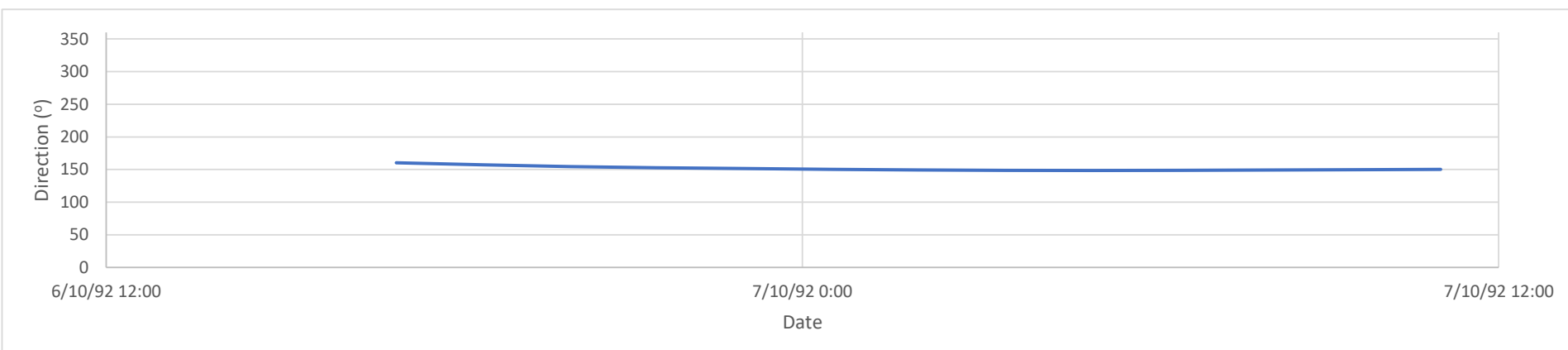
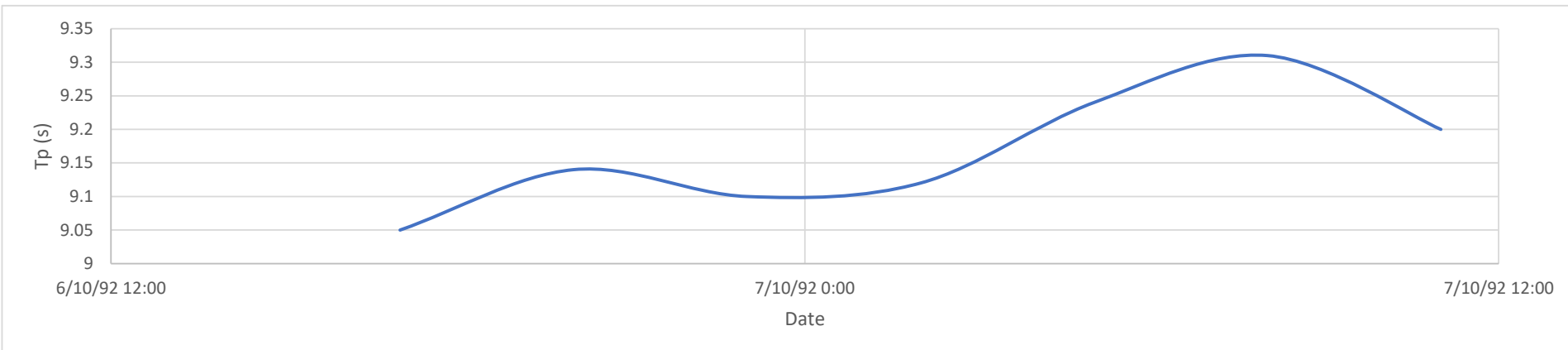
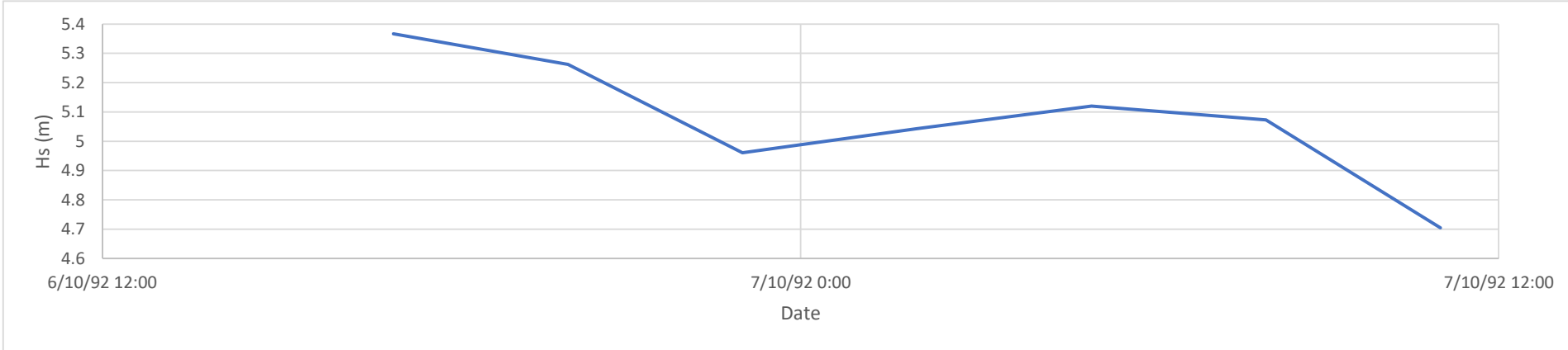
K1509 - South West Storm Selection
Top South West (Esperance) Storm Clusters
from Abnormal Directions Plots

Location	Esperance
Start Date	12/05/1987 20:00
End Date	13/05/1987 11:00



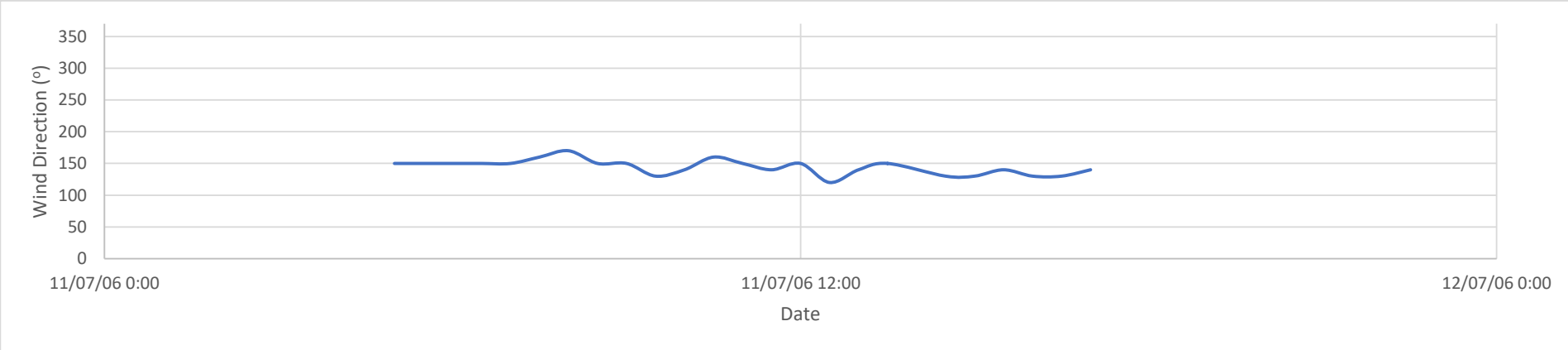
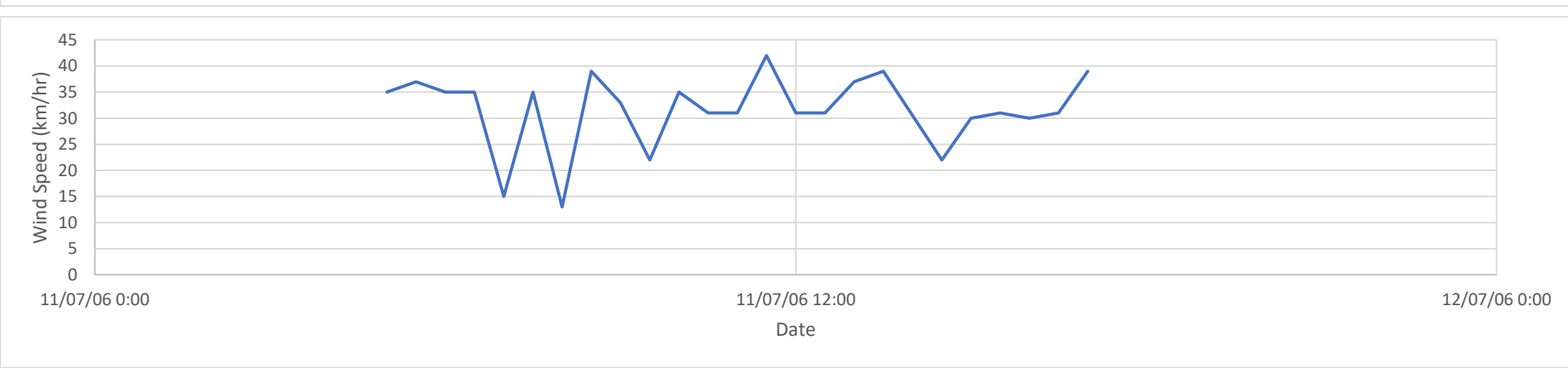
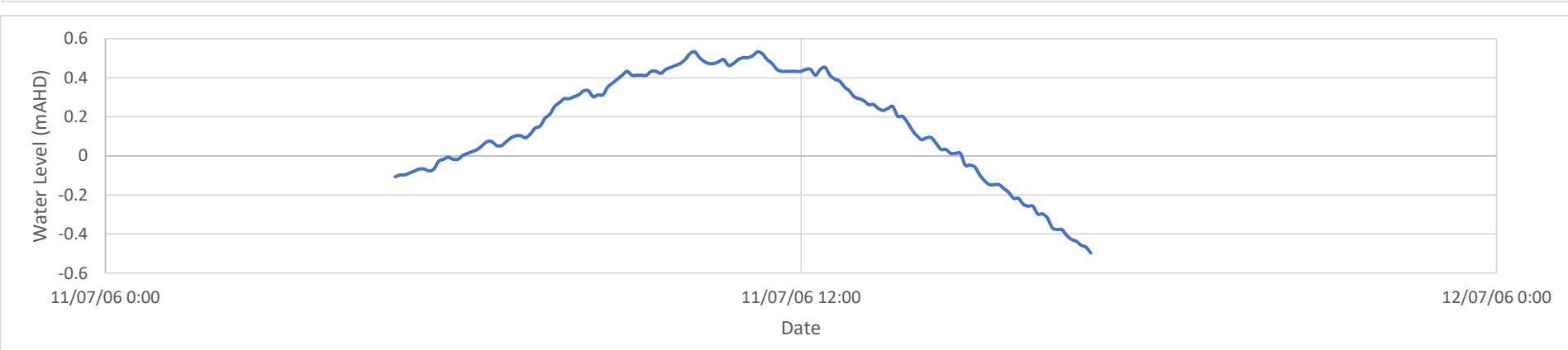
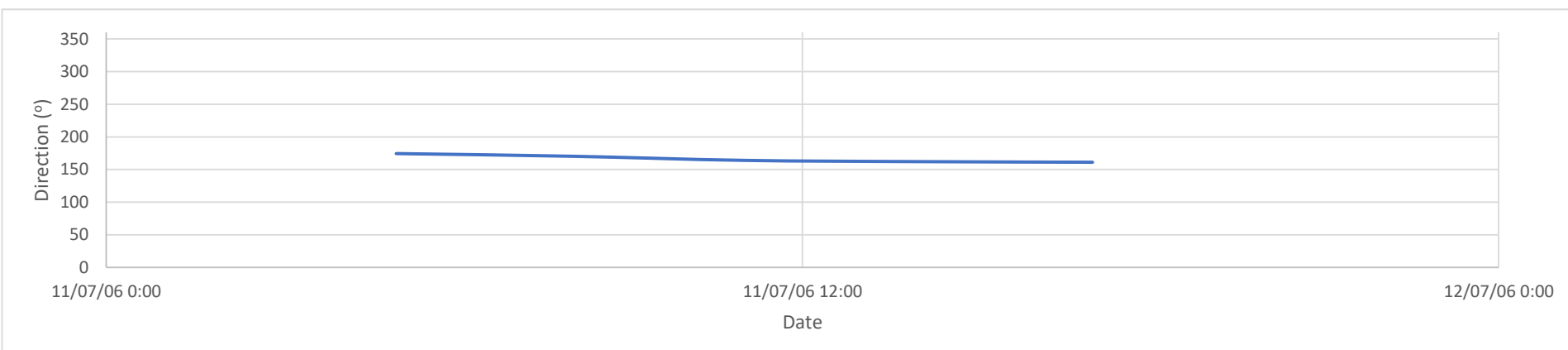
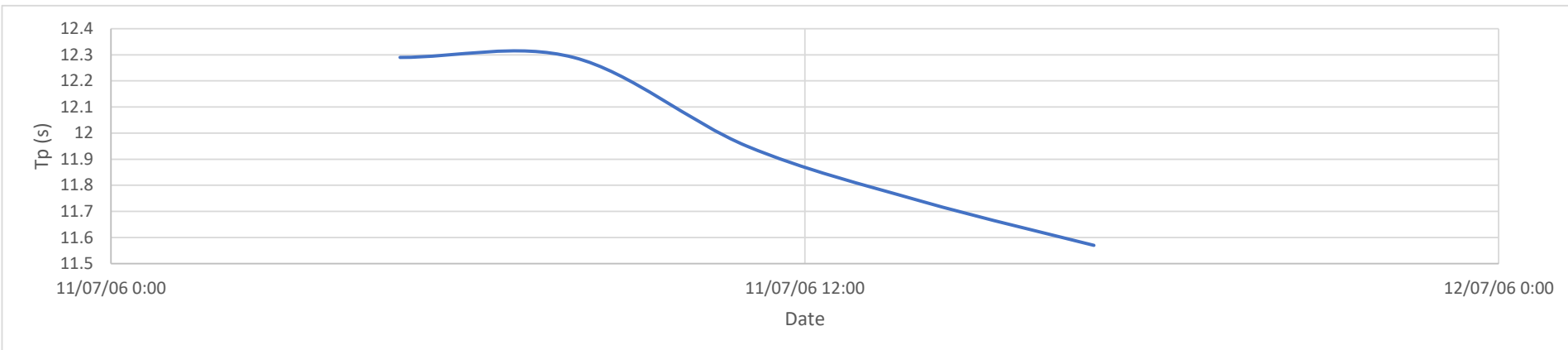
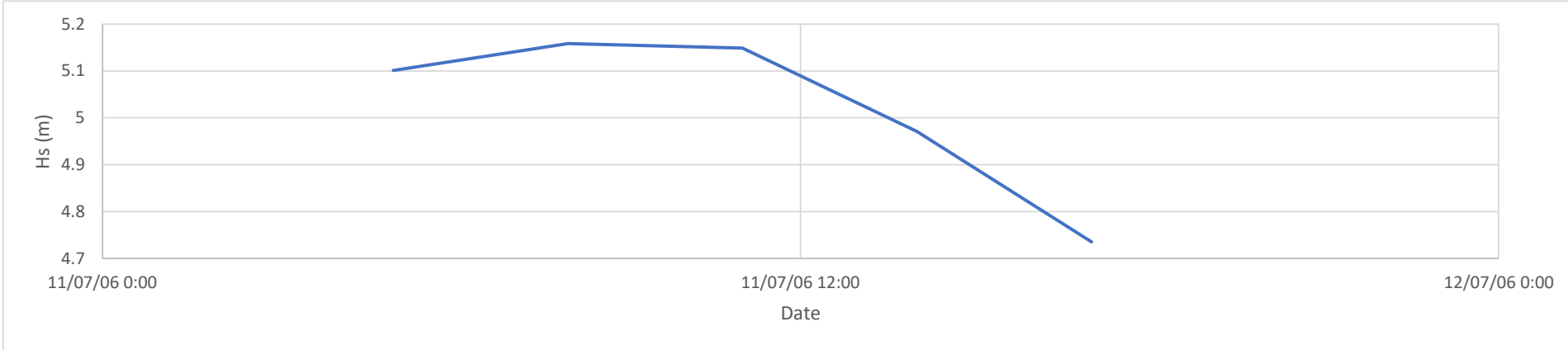
K1509 - South West Storm Selection
Top South West (Esperance) Storm Clusters
from Abnormal Directions Plots

Location	Esperance
Start Date	6/10/1992 17:00
End Date	7/10/1992 11:00



K1509 - South West Storm Selection
Top South West (Esperance) Storm Clusters
from Abnormal Directions Plots

Location	Esperance
Start Date	11/07/2006 5:00
End Date	11/07/2006 17:00



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