Inch Cape Offshore Wind Farm

New Energy for Scotland

Offshore Environmental Statement:
VOLUME 2B
Annex 10A.3: Wave Climate Analysis Methodology

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INCH CAPE OFFSHORE LIMITED

ANNEX 10A.3 WAVE CLIMATE ANALYSIS METHODOLOGY

TECHNICAL REPORT

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	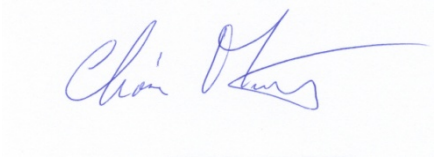
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An analysis of the wave climate at the offshore boundaries of the Forth and Tay Modelling System (FTMS) was required for two principal reasons:

- to provide FTMS model boundary inputs in the form of time series, for calibration and validation of the spectral wave model; and
- to provide FTMS model boundary inputs in the form statistical wave climate tables, for undertaking the long-term metocean and coastal processes assessment.

The wave climate analysis used hindcast model output from the UK Meteorological Office (UKMO) 12 km UK Waters model (up to November 2008) and 12 km Wave Watch III model (from December 2008 onwards). Data from these models were amalgamated into a single time series to form 11 years of wind and wave data spanning the period March 2000 to April 2011.

Data were obtained for two selected locations (UKMO model grid points) on the eastern offshore boundary of the FTMS. During calibration and validation of the FTMS spectral wave model, time series inputs were required in order to run discrete events through the FTMS wave model. Both of the UKMO model grid points were used in order to provide temporally and spatially varying boundary conditions. Conversely, for the metocean and coastal processes assessment, it was necessary to model the general long-term wave climate, rather than specific events. In order to do this, data from just one of the UKMO model locations were used (named Grid Point 1, at location 488161E, 698382N). This location was selected as being the most suitable for delivering an accurate representation of wave conditions across the Inch Cape Development Area, Offshore Export Cable Corridor and the Regional Study Area.

In order to identify a set of boundary conditions that could be used to adequately represent the long-term wave climate, the time series data for UKMO model Grid Point 1 were initially analysed using a set of joint frequency tables. The five parameters analysed were:

- significant wave height (H_s), analysed in 0.5 m bands;
- peak wave period (T_p), analysed in 0.5 s bands;
- mean wave direction (H_{dir}), analysed in 16 sectors of 22.5°;
- mean wind speed (W_s), analysed in 1 m s^{-1} bands; and
- wind direction (W_{dir}) , analysed in 16 sectors of 22.5°.

The following joint frequency tables were produced:

- H_s versus H_{dir};
- H_s versus T_p for each H_{dir} sector;
- H_s versus W_s for each H_{dir} sector; and
- H_{dir} versus W_{dir}.

Frequencies were calculated as percentage occurrence.

From the frequency analysis, two main types of scenario were identified. Wave conditions at the Inch Cape Development Area from roughly the eastern hemisphere are caused by waves propagating into the model domain from the North Sea. Conversely, waves from roughly the western hemisphere are caused by wind blowing over the sea between the coast and the Regional Study Area.

For the waves coming from the eastern hemisphere, a number of combinations of H_s, T_p and H_{dir} were selected that would fully represent the various combinations of these conditions that could occur throughout the lifetime of the development. For each one of these wave conditions, a suitable wind speed was also chosen, based on the observed relationship between wave height and wind speed. Finally, the wind direction was set equal to the mean wave direction, since analysis of the UKMO model data demonstrates that these two parameters are strongly correlated.

For waves coming from the western hemisphere, it was primarily necessary to specify wind speed and direction. Once more, a suitable number of wind conditions was selected based on the calculated joint frequency distributions of W_s and W_{dir}.

This analysis initially resulted in the identification of a large number of scenarios representing the wave/wind climate – primarily wave-driven from the east, and primarily wind-driven from the west. Each one of these scenarios has an associated frequency of occurrence. In order to focus on the scenarios of most significance to the metocean and coastal processes assessment, emphasis was placed on:

- those scenarios with a relatively high frequency of occurrence; and
- those scenarios of potential importance to the wider study (e.g. higher wave heights and longer periods, which are most likely to affect sediment movement at the seabed in the relatively deep waters of the Inch Cape Development Area).

Scenarios with similar values for wave height, period and direction were grouped together, so as to minimise model runs times while ensuring that the full long-term wave climate was suitably modelled. In this way, 196 separate model scenarios were identified, each with an associated frequency of occurrence, and each with a specific H_s, T_p, H_{dir}, W_s and W_{dir}. The 196 representative wave/wind conditions were modelled using a quasi-stationary solution to the spectral wave model, whereby each condition was modelled discretely. The wave conditions predicted across the study domain were subsequently analysed to determine the percentile values (50, 90, 95 and 9 percentile) for significant wave height, taking into account the percentage frequency of occurrence for each separate model scenario.

Table 10A.3.1 provides the results of the joint frequency analysis of the UKMO hindcast model data (Grid Point 1).

Table 10A.3.1. Joint frequency analysis of UKMO hindcast model data for Grid Point 1

Total obs. 31845

	Wave Direction (°) upper								
Hs (m) upper	45	90	135	180	225	270	315	360	Total
0.5	0.87	0.28	0.34	0.25	0.18	0.14	0.06	0.74	2.86
1.0	5.29	1.62	2.15	2.61	2.28	2.03	0.63	3.12	19.74
1.5	6.25	1.93	2.27	3.25	2.89	3.36	0.68	3.23	23.86
2.0	4.16	1.70	2.04	2.66	2.27	3.58	0.45	2.68	19.54
2.5	2.59	1.18	1.48	1.76	1.83	2.07	0.25	2.19	13.36
3.0	1.42	0.68	1.19	1.36	1.27	1.25	0.19	1.27	8.63
3.5	0.81	0.41	0.73	0.97	0.75	0.41	0.03	1.05	5.15
4.0	0.52	0.19	0.48	0.52	0.46	0.21	0.02	0.59	2.99
4.5	0.47	0.17	0.27	0.34	0.23	0.08	0.02	0.31	1.88
5.0	0.18	0.07	0.19	0.19	0.14	0.01	0.00	0.28	1.07
5.5	0.05	0.04	0.13	0.07	0.07	0.00	-	0.19	0.55
6.0	0.08	0.01	0.05	0.03	0.03	0.00	-	0.04	0.24
6.5	0.05	0.01	0.01	0.01	0.01	-	-	0.01	0.08
7.0	0.01	-	0.00	0.00	0.01	-	-	0.02	0.05
7.5	0.00	-	-	0.00	-	-	-	-	0.01
8.0	-	-	-	-	-	-	-	-	-
Total	22.75	8.30	11.33	14.01	12.41	13.15	2.33	15.71	100.00

Wave Dir (°) 0-45
Total obs. 7246

	Tp (s) upper																																			
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.01	0.07	0.10	0.12	0.18	0.18	0.65	0.30	0.37	0.21	0.17	0.40	0.25	0.01	0.41	-	-	0.01	0.23	-	0.01	-	0.03	0.08	0.01	-	-	-	-	-	-	-	-	-	-	-	3.82
1.0	-	0.01	0.76	2.04	0.03	1.53	0.39	2.84	0.68	4.22	0.79	0.61	3.96	0.21	0.26	2.04	-	0.03	-	1.50	-	0.03	-	-	0.98	0.01	0.01	-	0.01	-	0.28	-	0.01	-	-	-	-	23.24
1.5	-	-	0.03	0.21	0.08	2.59	0.28	2.59	0.26	4.65	0.75	0.99	6.64	0.58	0.23	3.66	0.04	0.10	0.03	2.19	-	0.06	-	-	1.09	-	-	-	-	-	0.41	-	-	-	-	-	0.01	27.48
2.0	-	-	-	0.01	0.03	0.21	0.14	2.69	0.14	1.75	0.23	0.68	4.78	0.87	0.32	3.11	0.29	0.26	0.04	1.79	-	0.03	-	-	0.80	-	-	-	-	-	0.14	-	-	-	-	-	-	18.30
2.5	-	-	-	-	-	0.03	0.07	0.35	0.15	2.50	0.17	0.17	2.43	0.39	0.28	2.32	0.15	0.22	0.04	1.35	0.03	0.03	-	-	0.59	-	-	-	-	-	0.14	-	-	-	-	-	0.01	11.40
3.0	-	-	-	-	-	-	0.01	0.11	0.03	0.88	0.19	0.22	1.64	0.14	0.17	1.32	0.15	0.25	0.03	0.69	-	0.01	-	0.01	0.28	-	-	-	-	-	0.08	-	-	-	-	-	-	6.22
3.5	-	-	-	-	-	-	-	-	0.01	0.19	0.08	0.11	1.26	0.15	0.18	0.86	-	0.04	0.04	0.48	0.01	0.01	-	0.01	0.11	-	-	-	-	-	-	-	-	-	-	-	-	3.56
4.0	-	-	-	-	-	-	-	-	-	-	0.15	0.03	0.62	0.10	0.04	0.92	0.03	0.06	-	0.29	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	2.26
4.5	-	-	-	-	-	-	-	-	-	-	-	0.03	0.12	0.15	0.11	1.24	0.06	0.10	-	0.22	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	2.07
5.0	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.07	0.55	0.01	-	-	0.12	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	0.80
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.36
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	0.21
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.03	0.86	2.36	0.26	4.54	1.06	9.23	1.57	14.57	2.57	2.99	21.86	2.84	1.67	16.51	0.73	1.05	0.19	9.65	0.04	0.18	-	0.06	4.03	0.03	0.01	-	0.01	-	1.05	-	0.01	-	-	-	0.03	100.00

Wave Dir (°) 46-90
Total obs. 2642

	Tp (s) upper																																			
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	-	0.19	0.64	0.42	0.83	0.26	0.61	0.04	0.23	0.08	-	0.04	-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.41
1.0	-	0.15	1.17	2.95	0.19	3.79	0.68	4.92	0.49	3.26	0.11	0.08	1.32	0.08	0.11	0.08	-	-	-	0.04	-	-	0.04	-	0.08	-	-	-	-	-	-	-	-	-	0.04	-	-	19.57
1.5	-	-	0.04	0.57	0.08	3.63	0.23	3.48	0.61	8.25	0.76	0.30	4.50	0.26	0.04	0.53	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.32
2.0	-	-	-	-	0.15	0.30	0.08	3.71	0.26	5.11	2.12	0.57	6.06	0.04	0.08	1.97	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.51
2.5	-	-	-	-	-	-	-	0.45	0.26	4.31	0.79	1.10	4.39	0.19	0.08	2.38	-	0.04	0.08	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.27
3.0	-	-	-	-	-	-	0.04	0.04	-	1.51	0.19	0.49	2.80	0.19	-	2.54	-	-	0.04	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.14
3.5	-	-	-	-	-	-	-	-	-	0.04	-	0.23	1.78	0.19	-	1.85	-	0.04	-	0.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.88
4.0	-	-	-	-	-	-	-	0.04	-	-	0.08	0.08	0.49	0.23	-	0.95	-	-	-	0.45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.31
4.5	-	-	-	-	-	-	-	-	-	0.04	0.04	-	0.08	0.23	-	0.91	-	-	-	0.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.01
5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	-	0.23	-	-	-	0.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.83
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	-	-	-	0.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.49
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.15	1.40	4.16	0.83	8.55	1.29	13.25	1.67	22.75	4.16	2.84	21.46	1.59	0.30	11.58	0.08	0.11	0.11	3.48	0.08	-	0.04	-	0.08	-	-	-	-	-	-	-	-	-	0.04	-	-	100.00

Wave Dir (°) 91-135
Total obs. 3608

	Tp (s) upper																																		
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.22	0.22	0.67	0.39	0.89	0.06	0.17	0.03	0.11	0.03	-	-	-	-	0.03	-	0.08	0.03	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.97
1.0	-	0.08	1.27	3.88	0.17	6.26	0.75	3.88	0.06	1.50	0.06	-	0.50	0.06	0.14	0.03	-	0.03	-	0.06	0.03	0.06	0.06	0.03	-	0.06	-	0.06	-	-	-	-	-	-	-	-	-	18.99
1.5	-	-	0.08	0.47	0.17	5.49	1.05	4.68	0.50	5.16	0.08	0.14	1.80	0.11	0.08	0.14	-	0.08	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.07
2.0	-	-	-	0.03	0.17	0.64	0.30	6.21	0.80	5.49	0.67	0.08	3.19	0.11	0.03	0.25	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.02
2.5	-	-	-	-	-	0.06	0.30	0.80	0.17	7.37	1.03	0.30	2.69	0.03	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.08
3.0	-	-	-	-	-	0.03	0.06	0.11	0.42	2.88	1.33	0.30	4.85	0.06	-	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.48
3.5	-	-	-	-	-	-	-	0.03	0.06	0.30	0.53	0.61	4.13	0.03	0.06	0.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.43
4.0	-	-	-	-	-	-	-	-	-	0.06	0.39	0.39	2.27	0.14	0.03	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.27
4.5	-	-	-	-	-	-	-	-	-	-	0.03	0.11	0.19	0.11	-	1.91	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.41
5.0	-	-	-	-	-	-	-	-	-	-	-	0.06	0.17	0.44	-	1.00	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.69
5.5	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.22	-	0.67	-	-	-	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.11
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	0.03	-	-	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.42
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.30	1.58	5.04	0.89	13.36	2.52	15.88	2.02	22.87	4.13	2.00	19.82	1.36	0.33	6.51	-	0.25	0.03	0.83	0.03	0.06	0.06	0.03	-	0.06	-	0.06	-	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 136-180
Total obs. 4462

	Tp (s) upper																																		
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.25	0.56	0.58	0.09	0.09	0.04	0.02	0.04	0.02	-	-	-	-	-	0.02	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.77
1.0	-	0.13	3.05	7.35	0.69	4.57	0.40	1.32	0.13	0.54	-	0.07	0.13	0.04	-	-	-	0.02	-	-	0.02	-	-	-	0.02	-	0.02	0.09	0.02	-	-	-	-	-	-	-	-	18.65
1.5	-	-	0.09	1.59	1.21	11.16	0.87	5.11	0.29	1.61	0.09	0.16	0.78	0.02	0.07	0.07	-	0.02	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	23.20
2.0	-	-	-	-	0.47	1.70	1.17	10.35	0.31	3.20	0.16	0.13	1.21	0.02	0.09	0.11	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.96
2.5	-	-	-	-	0.02	0.16	0.63	1.43	0.09	8.67	0.18	0.04	0.94	0.02	-	0.27	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.55
3.0	-	-	-	-	-	0.02	0.11	0.45	0.43	3.97	0.31	0.11	3.88	-	-	0.36	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.68
3.5	-	-	-	-	-	-	-	0.02	0.09	0.63	0.31	0.13	5.45	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.90
4.0	-	-	-	-	-	-	-	-	0.04	0.31	0.40	0.11	2.26	-	-	0.61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.74
4.5	-	-	-	-	-	-	-	-	-	-	0.22	0.16	0.49	-	-	1.52	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.42
5.0	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-	-	1.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.37
5.5	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.09	-	0.31	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.47
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.07	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.38	3.70	9.52	2.49	17.71	3.23	18.71	1.43	18.96	1.68	1.01	15.17	0.25	0.16	4.91	0.02	0.18	-	0.25	0.02	-	-	-	0.02	0.04	0.02	0.09	0.02	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 181-225
Total obs. 3952

	Tp (s) upper																																			
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.33	0.51	0.18	0.03	0.03	-	0.05	0.03	0.03	0.03	-	-	0.03	-	-	-	0.05	0.03	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.42
1.0	0.03	0.48	3.64	11.34	0.08	2.15	0.05	0.25	0.03	0.05	0.03	0.10	-	0.03	0.10	-	-	-	-	-	-	-	-	0.03	-	-	-	0.03	-	-	-	-	-	-	-	-	-	18.40
1.5	-	-	0.08	3.52	1.24	14.88	0.05	2.73	0.05	0.30	0.05	0.08	0.05	0.03	0.03	0.05	0.03	0.03	-	-	-	-	0.03	-	-	0.03	-	0.05	-	-	-	-	-	-	-	-	-	23.28
2.0	-	-	-	0.05	1.54	2.07	0.33	12.80	0.03	1.06	0.10	-	0.05	0.03	0.03	0.13	-	0.03	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.27
2.5	-	-	-	-	0.03	0.66	0.89	2.40	0.03	10.32	0.05	0.05	0.25	0.05	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.75
3.0	-	-	-	-	-	0.03	0.33	0.23	0.35	7.34	0.08	0.08	1.82	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.27
3.5	-	-	-	-	-	-	0.05	0.13	0.10	0.58	0.03	-	5.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.05
4.0	-	-	-	-	-	-	-	-	0.08	0.18	-	-	3.31	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.69
4.5	-	-	-	-	-	-	-	-	-	0.08	-	-	1.01	-	-	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.82
5.0	-	-	-	-	-	-	-	-	-	-	0.05	-	0.10	-	-	0.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.14
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.58
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.03	0.81	4.23	15.08	2.91	19.81	1.70	18.60	0.68	19.94	0.40	0.30	11.77	0.15	0.15	2.96	0.03	0.13	0.03	-	0.05	-	0.05	0.03	-	0.03	-	0.08	-	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 226-270
Total obs. 4189

	Tp (s) upper																																			
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.07	0.31	0.31	0.05	0.02	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	1.07
1.0	0.02	0.17	1.93	9.69	0.10	2.70	-	0.07	0.05	0.12	0.02	0.02	0.10	0.05	0.07	-	0.02	-	-	0.10	0.05	0.07	0.05	-	-	0.02	-	0.02	-	-	-	-	-	-	-	-	-	15.45
1.5	-	-	0.07	2.20	2.08	16.52	0.02	3.94	0.02	0.07	-	0.02	0.07	0.19	0.07	0.07	-	0.05	0.07	0.02	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.54
2.0	-	-	-	0.10	1.48	3.77	0.64	20.24	-	0.67	0.07	0.02	0.07	0.05	-	0.02	0.02	0.02	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.21
2.5	-	-	-	-	0.02	0.33	1.62	3.39	-	10.24	-	-	-	-	0.02	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.73
3.0	-	-	-	-	-	-	0.33	0.95	0.02	7.90	-	-	0.29	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.52
3.5	-	-	-	-	-	-	-	0.10	0.17	0.98	-	-	1.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.10
4.0	-	-	-	-	-	-	-	-	-	0.10	0.02	-	1.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.60
4.5	-	-	-	-	-	-	-	-	-	0.05	0.02	-	0.48	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.62
5.0	-	-	-	-	-	-	-	-	-	-	0.02	-	0.02	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.02	0.24	2.32	12.29	3.72	23.35	2.63	28.72	0.26	20.12	0.17	0.07	4.37	0.29	0.17	0.31	0.10	0.10	0.07	0.12	0.10	0.12	0.12	0.02	-	0.02	-	0.02	-	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 271-315
Total obs. 743

	Tp (s) upper																																		
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.13	0.27	-	-	-	-	0.40	0.27	-	-	0.13	-	0.27	0.13	-	0.13	0.40	-	-	-	0.27	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.69
1.0	-	0.13	3.36	13.06	0.40	2.15	-	0.27	0.40	-	0.67	0.40	-	0.94	0.40	0.67	0.54	0.67	0.27	0.13	0.13	0.13	0.40	0.40	0.67	0.27	0.13	0.27	-	-	-	-	-	-	-	-	-	26.92
1.5	-	-	0.13	3.36	1.35	14.94	-	1.08	-	0.40	0.94	0.67	0.54	1.48	0.67	0.81	0.13	0.94	0.54	0.54	0.27	-	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-	-	28.94
2.0	-	-	-	-	1.21	1.62	0.13	11.04	-	0.67	0.13	0.13	0.54	1.75	0.54	0.54	-	0.54	0.13	0.13	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.38
2.5	-	-	-	-	0.13	0.67	0.81	3.63	-	3.90	-	0.13	0.13	-	0.40	0.27	0.27	-	-	0.27	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.77
3.0	-	-	-	-	-	0.13	0.13	0.13	-	7.00	-	-	0.67	-	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.34
3.5	-	-	-	-	-	-	-	0.13	-	0.67	-	-	0.54	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.48
4.0	-	-	-	-	-	-	-	-	0.27	0.13	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.67
4.5	-	-	-	-	-	-	-	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.67
5.0	-	-	-	-	-	-	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.27	3.77	16.42	3.10	19.52	1.08	16.69	0.94	12.79	1.75	1.48	3.50	4.44	2.15	2.42	1.08	2.83	0.94	1.08	0.40	0.81	0.67	0.40	0.67	0.27	0.13	0.27	0.13	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 316-360
Total obs. 5003

	Tp (s) upper																																		
Hs (m) upper	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	Total
0.5	-	0.08	0.10	0.16	0.06	0.08	0.12	0.32	0.18	0.22	0.24	0.20	0.52	0.24	0.10	0.52	0.20	0.22	0.10	0.38	0.06	0.10	0.14	0.08	0.26	-	0.02	-	-	-	0.04	-	-	-	-	-	-	4.74
1.0	0.04	0.14	0.94	2.58	0.18	1.28	0.16	1.08	0.28	1.66	0.32	0.42	3.96	0.42	0.28	2.36	0.06	0.32	0.14	1.46	0.18	0.08	0.14	0.14	0.92	0.08	0.06	0.10	0.02	-	0.06	-	-	-	-	-	-	19.85
1.5	0.02	-	0.10	0.56	0.34	4.12	0.28	2.24	0.08	1.96	0.24	0.24	3.36	0.70	0.44	3.26	0.22	0.10	0.20	1.42	0.04	0.02	0.04	0.02	0.46	-	-	-	-	-	0.10	-	-	-	-	-	-	20.55
2.0	-	-	-	0.08	0.08	0.48	0.42	7.70	0.16	1.46	0.12	0.22	1.66	0.64	0.60	1.62	0.26	0.42	0.08	0.68	0.02	0.04	0.08	-	0.20	-	-	-	-	-	0.02	-	-	-	-	-	-	17.03
2.5	-	-	-	-	0.02	0.04	0.20	0.92	0.14	8.63	0.08	0.08	0.74	0.58	0.28	0.98	0.24	0.24	0.12	0.50	0.02	0.08	0.02	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	13.93
3.0	-	-	-	-	-	-	-	0.08	0.08	4.52	0.16	0.04	2.00	0.10	0.06	0.40	0.08	0.26	0.08	0.18	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.08
3.5	-	-	-	-	-	-	-	0.02	-	0.22	0.16	0.10	5.64	0.08	0.12	0.14	0.06	0.06	0.02	0.02	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.68
4.0	-	-	-	-	-	-	-	-	-	0.02	0.04	0.04	2.92	0.02	0.06	0.38	0.02	0.08	0.10	0.04	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.74
4.5	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.04	-	1.36	0.02	0.08	-	0.06	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.98
5.0	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.06	1.56	-	0.02	-	0.08	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.78
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	1.10	-	-	0.04	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.22
6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04
7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.06	0.22	1.14	3.38	0.68	6.00	1.18	12.35	0.92	18.69	1.36	1.34	21.21	2.84	2.02	13.85	1.16	1.80	0.88	5.12	0.34	0.42	0.44	0.24	1.84	0.08	0.08	0.10	0.02	-	0.24	-	-	-	-	-	-	100.00

Wave Dir (°) 0-45

	Wind Speed (m/s) upper																															
Hs (m) upper	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
0.5	0.01	0.15	0.40	0.81	0.95	0.79	0.37	0.17	0.12	0.03	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.82
1	0.04	0.48	2.00	3.55	4.35	4.79	4.57	2.40	0.86	0.19	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.24
1.5	0.04	0.25	1.44	2.53	3.55	4.11	3.93	5.27	3.82	1.68	0.66	0.17	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.48
2	-	0.12	0.75	1.13	1.63	1.50	2.25	2.75	2.61	2.66	1.71	0.81	0.30	0.04	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.30
2.5	-	0.12	0.12	0.44	0.55	0.62	0.99	1.38	1.44	1.60	1.49	1.31	0.84	0.33	0.11	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.40
3	-	-	0.03	0.06	0.17	0.18	0.23	0.43	0.51	0.80	0.98	1.08	0.79	0.62	0.21	0.10	0.01	0.01	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	6.22
3.5	-	-	-	0.01	0.10	0.07	0.08	0.18	0.21	0.40	0.43	0.54	0.47	0.44	0.28	0.19	0.08	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	3.56
4	-	-	-	-	-	0.01	0.01	0.10	0.11	0.10	0.22	0.22	0.28	0.36	0.39	0.23	0.17	0.04	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	2.26
4.5	-	-	-	0.01	-	-	-	0.03	0.03	0.04	0.08	0.07	0.17	0.29	0.30	0.39	0.33	0.25	0.07	0.01	-	-	-	-	-	-	-	-	-	-	-	2.07
5	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.10	0.21	0.17	0.14	0.08	0.06	-	0.03	-	-	-	-	-	-	-	-	-	-	0.80
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.06	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.10	0.17	0.04	0.01	0.01	-	-	-	-	-	-	-	-	-	0.36
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.03	0.01	0.03	0.06	0.04	0.01	-	-	-	-	-	-	-	-	0.21
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	0.03	-	-	-	-	-	-	-	-	0.06
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	0.01
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.10	1.13	4.73	8.54	11.29	12.08	12.45	12.70	9.70	7.51	5.60	4.21	2.87	2.19	1.53	1.19	0.84	0.62	0.40	0.10	0.11	0.07	0.04	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 46-90

	Wind Speed (m/s) upper																															
Hs (m) upper	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
0.5	-	0.08	0.68	0.76	0.68	0.76	0.23	0.15	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.41
1	-	0.34	1.59	2.61	4.35	3.79	3.67	1.97	0.91	0.23	0.08	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.57
1.5	0.08	0.30	0.91	2.27	2.69	3.60	3.37	4.43	2.95	2.01	0.53	0.11	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.32
2	-	0.19	0.38	1.14	1.89	2.23	2.50	2.99	2.50	3.10	2.01	1.25	0.23	0.04	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.51
2.5	-	0.08	0.30	0.76	0.95	0.95	1.44	1.82	1.89	1.85	1.93	1.29	0.53	0.26	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.27
3	-	0.04	0.08	0.19	0.42	0.19	0.53	0.87	0.98	1.17	1.06	1.44	0.53	0.34	0.15	0.04	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.14
3.5	-	-	0.04	0.04	0.15	0.30	0.15	0.30	0.49	0.68	0.72	0.57	0.49	0.34	0.26	0.30	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	4.88
4	-	-	0.04	0.04	-	0.08	0.08	0.11	0.23	0.15	0.30	0.08	0.23	0.42	0.34	0.15	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	2.31
4.5	-	-	-	-	-	0.04	0.19	0.08	0.08	0.08	0.15	0.11	0.15	0.42	0.30	0.23	-	0.08	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	2.01
5	-	-	-	-	-	-	0.08	-	-	0.08	-	0.08	0.08	0.08	0.08	0.15	0.11	0.08	-	-	0.04	-	-	-	-	-	-	-	-	-	-	0.83
5.5	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.08	0.04	0.11	0.04	0.08	0.11	-	-	-	-	-	-	-	-	-	-	-	-	0.49
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.08	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.15
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	0.04	-	-	-	-	-	-	-	-	-	0.11
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.08	1.02	4.01	7.80	11.13	11.92	12.23	12.72	10.11	9.35	6.81	4.96	2.27	2.01	1.48	1.02	0.30	0.42	0.15	0.08	0.11	0.04	-	-	-	-	-	-	-	-	-	100.00

Wave Dir (°) 91-135

	Wind Speed (m/s) upper																															
Hs (m) upper	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
0.5	-	0.11	0.50	0.75	0.67	0.39	0.28	0.11	0.08	0.06	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.97
1	0.06	0.33	1.03	2.69	3.82	3.58	3.52	2.52	1.25	0.17	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.99
1.5	-	0.08	0.28	1.16	1.94	2.52	3.30	2.97	3.35	2.94	1.08	0.36	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.07
2	-	0.03	0.17	0.42	0.91	1.08	1.91	2.36	2.72	2.63	2.61	1.91	0.94	0.22	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.02
2.5	-	0.06	0.06	0.22	0.36	0.33	0.58	0.86	1.19	2.08	2.22	1.94	1.69	0.94	0.30	0.14	0.06	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	13.08
3	0.03	-	0.03	-	0.03	0.19	0.19	0.47	0.55	1.00	1.47	1.88	2.05	1.36	0.64	0.36	0.17	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	10.48
3.5	-	-	0.08	0.08	0.03	0.11	0.17	0.11	0.19	0.47	0.69	1.00	1.11	1.00	0.72	0.36	0.14	0.08	0.06	0.03	-	-	-	-	-	-	-	-	-	-	-	6.43
4	-	-	-	-	0.03	0.03	-	-	0.14	0.11	0.17	0.33	0.47	0.69	1.08	0.50	0.39	0.25	0.06	-	0.03	-	-	-	-	-	-	-	-	-	-	4.27
4.5	-	-	-	-	-	-	-	-	-	-	0.08	0.22	0.19	0.33	0.50	0.33	0.42	0.17	0.14	0.03	-	-	-	-	-	-	-	-	-	-	-	2.41
5	-	-	-	-	-	-	-	-	0.03	-	-	-	0.08	0.11	0.17	0.50	0.22	0.22	0.30	0.06	-	-	-	-	-	-	-	-	-	-	-	1.69
5.5	-	-	-	-	0.03	-	-	-	-	-	0.03	0.03	-	-	0.11	0.08	0.28	0.22	0.22	-	0.11	-	-	-	-	-	-	-	-	-	-	1.11
6	-	-	-	-	-	-	-	0.03	-	0.03	-	-	-	-	0.03	-	0.03	0.06	0.11	0.03	0.06	0.06	-	-	-	-	-	-	-	-	-	0.42
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	-	0.03	-	-	-	-	-	-	-	-	-	0.06
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	0.03
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.08	0.61	2.13	5.32	7.82	8.23	9.95	9.42	9.51	9.48	8.40	7.68	6.62	4.66	3.66	2.27	1.69	1.08	0.94	0.14	0.19	0.08	-	0.03	-	-	-	-	-	-	-	100.00

Wave Dir (°) 136-180

	Wind Speed (m/s) upper																															
Hs (m) upper	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
0.5	-	0.02	0.22	0.25	0.27	0.63	0.29	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.77
1	-	0.07	0.56	1.46	2.13	3.14	3.83	3.72	2.76	0.65	0.18	0.11	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.65
1.5	-	0.02	0.18	0.38	0.81	1.34	1.79	3.23	4.80	5.18	3.65	1.37	0.31	0.11	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.20
2	-	0.04	0.04	0.11	0.18	0.47	0.76	1.10	1.52	3.16	4.68	3.79	1.84	0.85	0.18	0.20	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.96
2.5	-	-	0.02	0.04	0.13	0.22	0.16	0.34	0.61	0.96	1.64	1.86	2.78	2.17	0.99	0.40	0.18	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	12.55
3	-	-	-	0.02	0.04	0.09	0.11	0.16	0.36	0.45	0.43	0.72	1.37	1.88	1.97	1.08	0.63	0.25	0.11	0.02	-	-	-	-	-	-	-	-	-	-	-	9.68
3.5	-	-	-	-	0.02	-	-	0.07	0.13	0.20	0.20	0.31	0.58	0.76	1.41	1.32	1.19	0.49	0.11	0.04	0.02	0.02	-	-	-	-	-	-	-	-	-	6.90
4	-	-	-	-	-	-	-	0.04	0.02	0.04	0.07	0.04	0.07	0.27	0.45	0.74	0.90	0.40	0.43	0.11	0.11	0.04	-	-	-	-	-	-	-	-	-	3.74
4.5	-	-	-	-	-	-	-	-	-	0.04	0.02	0.07	0.04	0.13	0.13	0.18	0.38	0.40	0.47	0.13	0.27	0.11	0.02	-	-	-	-	-	-	-	-	2.42
5	-	-	-	-	-	-	-	-	-	-	-	0.02	-	0.02	-	0.09	0.09	0.07	0.34	0.13	0.34	0.16	0.07	0.04	-	-	-	-	-	-	-	1.37
5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.07	0.04	0.04	0.07	0.13	-	0.02	0.02	0.02	-	-	-	-	-	0.47
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.02	-	0.02	0.02	-	-	0.04	-	-	-	-	-	0.20
6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	0.04
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	0.02
7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	0.02
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	0.16	1.03	2.26	3.59	5.89	6.95	8.70	10.24	10.69	10.87	8.29	7.04	6.21	5.15	4.01	3.43	1.73	1.59	0.52	0.81	0.49	0.16	0.07	0.02	0.07	0.02	-	-	0.02	-	100.00

Wave Dir (°) 181-225

	Wind Speed (m/s) upper																															
Hs (m) upper	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
0.5	-	0.03	0.05	0.20	0.20	0.43	0.35	0.13	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.42
1	-	0.03	0.28	0.66	0.96	2.13	3.54	5.36	3.31	1.62	0.46	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.40
1.5	-	-	0.05	0.15	0.28	0.35	0.61	2.00	4.73	6.88	4.76	2.40	0.84	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.28
2	-	-	-	-	0.03	0.08	0.15	0.35	0.76	1.87	3.87	5.16	3.44	1.77	0.51	0.20	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.27
2.5	-	-	-	-	-	0.03	0.08	0.08	0.25	0.25	1.06	1.95	3.49	3.37	2.51	1.19	0.35	0.10	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	14.75
3	-	-	-	-	-	-	-	0.03	0.03	0.03	0.18	0.48	1.16	2.10	2.48	2.28	1.09	0.33	0.08	0.03	-	-	-	-	-	-	-	-	-	-	-	10.27