



## Folkestone Directional Waverider Buoy

<b>Location</b>			
OS	619260 E 133909 N		
WGS84	Latitude: 51° 03.76' N Longitude: 01° 07.67' E		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~13m CD	Buoy in situ off Sandgate beach. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

## Data Quality

<b>Recovery rate (%)</b>	<b>Sample interval</b>
42	30 minutes

## Monthly Averages – 2003

All times are GMT

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-
July	0.47	4.7	3.2	153	17.9	-	16
August	0.43	5.0	3.4	129	19.3	-	24
September	0.40	5.1	3.5	133	18.9	-	29
October	0.73	5.5	3.7	127	14.5	-	27
November	0.82	5.7	3.7	151	12.3	-	28
December	0.76	5.7	3.8	148	9.6	-	30

## Monthly Averages - All Years (July 2003 – December 2019)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.75	5.9	3.8	156	7.8	0
February	0.66	6.1	3.7	148	6.8	0
March	0.57	5.7	3.6	145	7.4	0
April	0.44	5.4	3.4	140	9.6	0
May	0.45	5.0	3.4	141	12.2	0
June	0.45	4.8	3.3	145	14.9	0
July	0.46	4.5	3.3	156	17.3	0
August	0.47	4.5	3.3	159	18.3	0
September	0.48	4.9	3.4	148	17.7	0
October	0.64	5.3	3.6	151	15.2	0
November	0.71	5.7	3.8	153	12.3	0
December	0.75	5.9	3.8	156	9.3	0

## Storm Analysis

Date/Time	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	Water level elevation* (OD)	Tidal stage (hours re. HW)	Tidal range (m)	Tidal surge (m)	Max. surge (m)
29-Nov-2003 13:00:00	3.07	6.7	5.3	167	0.74	HW -2	4.30	-0.23	-0.14
26-Nov-2003 10:30:00	2.96	7.1	5.3	163	1.62	HW -2	5.63	0.21	0.28
20-Dec-2003 14:00:00	2.60	7.1	5.2	169	-2.04	HW -1	4.73	-0.04	0.06
14-Nov-2003 02:30:00	2.45	6.3	4.9	155	2.13	HW +1	4.39	-0.02	0.02

\* Tidal information is obtained from the National Network gauge at Dover. The surge shown is the residual at the time of the highest H<sub>s</sub>. The maximum tidal surge is the largest surge during the storm event.

## Annual Statistics

Year	Annual H <sub>s</sub> exceedance** (m)						Annual Maximum H <sub>s</sub>	
	0.05%	0.5%	1%	2%	5%	10%	Date	A <sub>max</sub> (m)
2003	2.79	2.23	2.03	1.75	1.37	1.17	29-Nov-2003 13:00:00	3.07
2004	2.91	2.26	1.94	1.73	1.43	1.18	08-Jan-2004 11:30:00	3.25
2005	2.90	2.15	1.81	1.54	1.25	0.97	30-Dec-2005 13:30:00	3.15
2006	2.55	2.08	1.89	1.67	1.41	1.16	03-Dec-2006 09:00:00	3.13
2007	2.56	2.06	1.83	1.59	1.34	1.11	08-Dec-2007 16:30:00	2.86
2008	2.98	2.40	2.10	1.84	1.43	1.16	10-Mar-2008 10:00:00	3.58
2009	2.65	2.14	1.88	1.69	1.39	1.13	22-Jan-2009 08:30:00	2.98
2010	2.66	1.95	1.69	1.43	1.15	0.94	08-Nov-2010 12:00:00	2.92
2011	2.87	1.98	1.73	1.52	1.31	1.08	13-Dec-2011 01:00:00	3.11
2012	2.69	2.12	1.94	1.71	1.38	1.10	14-Dec-2012 12:30:00	2.87
2013	3.24	2.35	2.04	1.76	1.40	1.10	24-Dec-2013 02:00:00	3.57+
2014	2.82	2.42	2.21	1.94	1.60	1.27	05-Feb-2014 03:30:00	3.64+
2015	2.47	1.95	1.82	1.67	1.43	1.18	15-Jan-2015 05:30:00	2.71
2016	3.21	2.24	1.86	1.65	1.33	1.04	20-Nov-2016 08:00:00	3.92
2017	2.35	2.00	1.78	1.54	1.22	0.97	26-Dec-2017 00:30:00	2.76
2018	2.77	2.17	1.93	1.68	1.33	1.10	15-Dec-2018 20:30:00	3.08
2019	2.50	2.02	1.83	1.67	1.40	1.14	02-Nov-2019 13:00:00	2.86

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2003 exceeded 1.37 m

\* Note that waves were breaking at the buoy for several hours during this storm; where breaking waves were clearly present in the measured time series, the parameters have been omitted. Accordingly, there may have been short periods where measured significant wave heights exceeded this value.

## Significant wave height return periods

Return periods for significant wave height can be calculated since the buoy has been deployed for more than 5 years. The return periods are based on 0.5 hourly records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Generalised Pareto Distribution (GPD).

Observation period	July 2003 to December 2019	
Return period (years)	Significant wave height (m)	Comments
0.25	2.45	No depth limitation
1	2.99	
2	3.21	
5	3.47	
10	3.63	
20	3.78	
50	3.95	
100	4.06	

## Distribution plots

The distribution of wave parameters are shown in the accompanying graphs of:

- Annual time series of  $H_s$  (red line is 2.45 m storm alert threshold)
- Incidence of storm waves for 2003. Storm events are defined using the Peaks-over-Threshold method. The highest  $H_s$  of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of  $H_s$ ,  $T_p$ ,  $T_z$  and Direction for 2003
- Wave rose (percentage of occurrence of direction vs  $H_s$ ) for all measured data
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

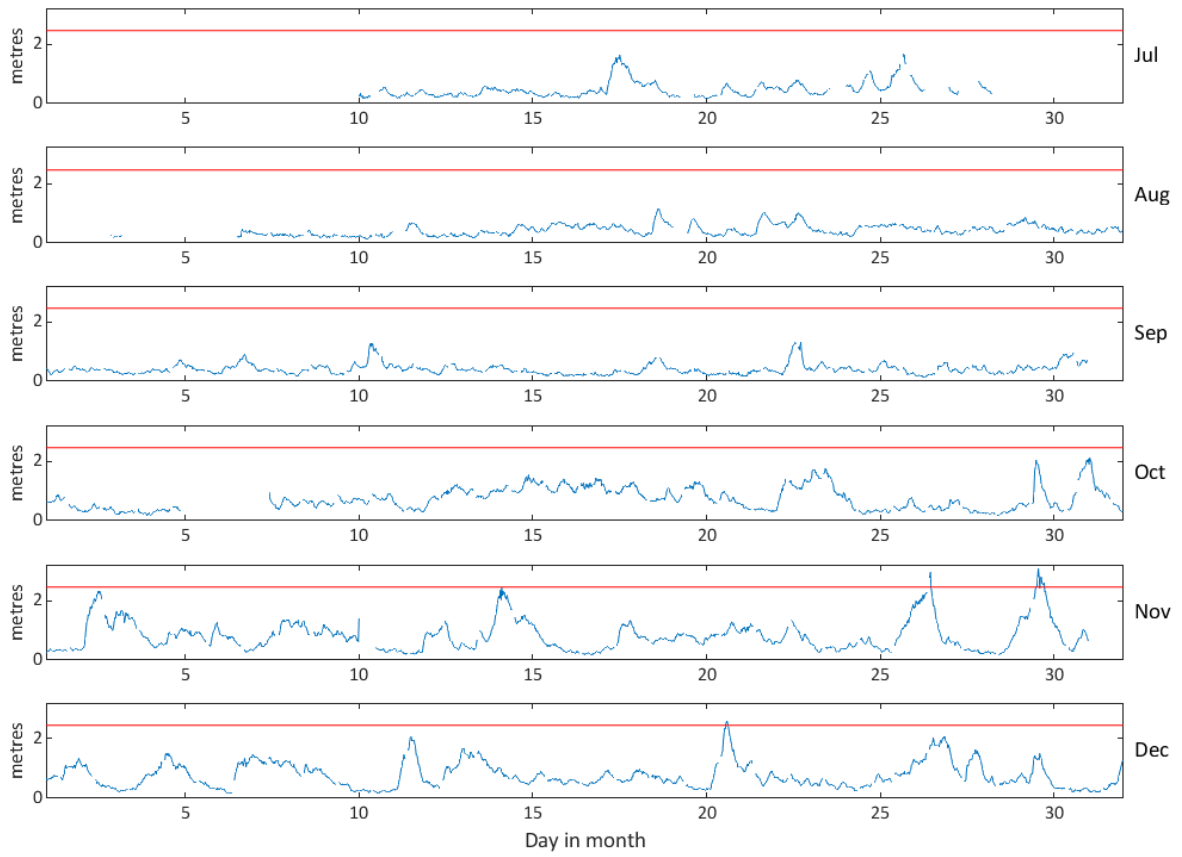
## General

The buoy, owned by New Forest District Council, was first deployed on 8 July 2003, at which time the magnetic declination at the site was 2.1° west, changing by 0.14° east per year.

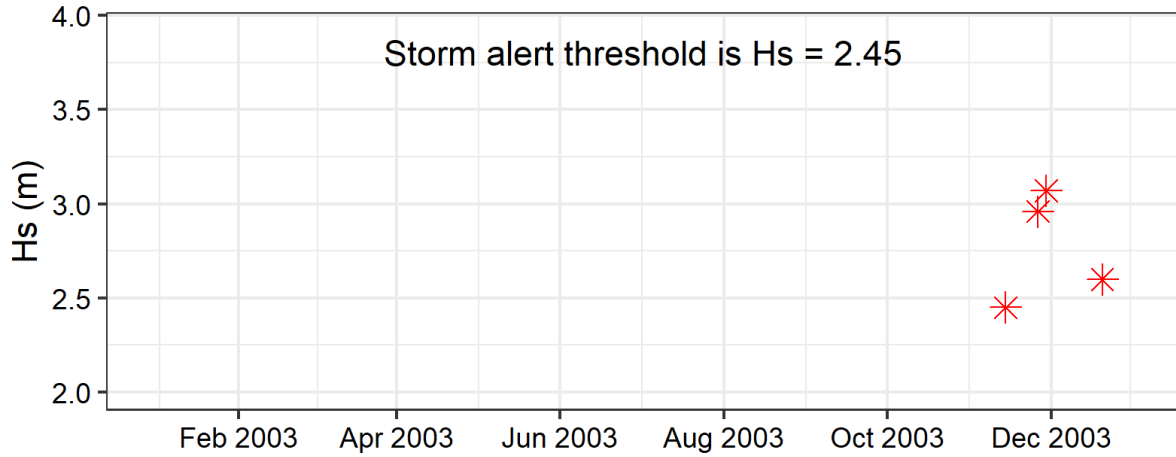
## Acknowledgements

The shore station is kindly hosted by Shepway District Council Offices.

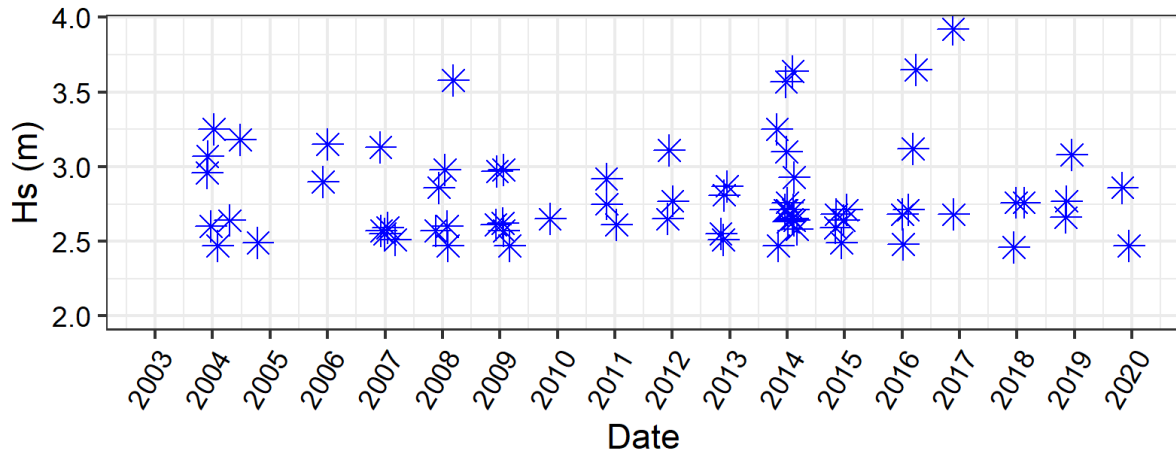
Tidal data at Dover were provided by the British Oceanographic Data Centre from the UK national tide gauge network, owned and operated by the Environment Agency.



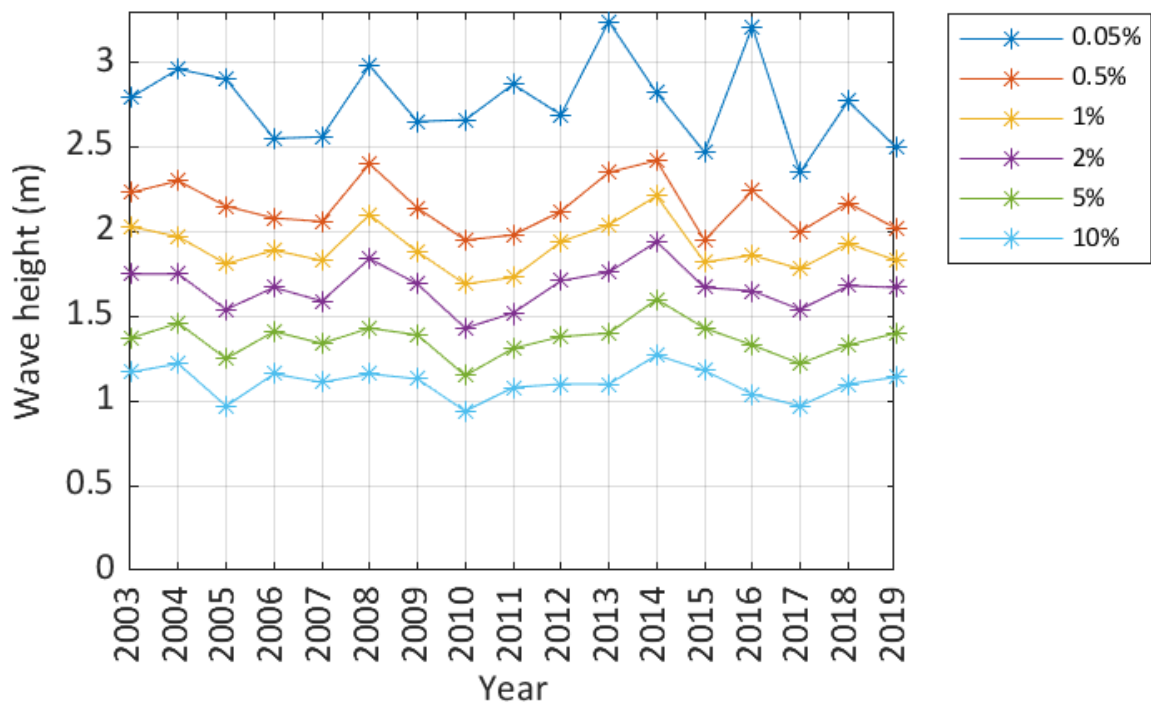
### Storms at Folkestone during 2003



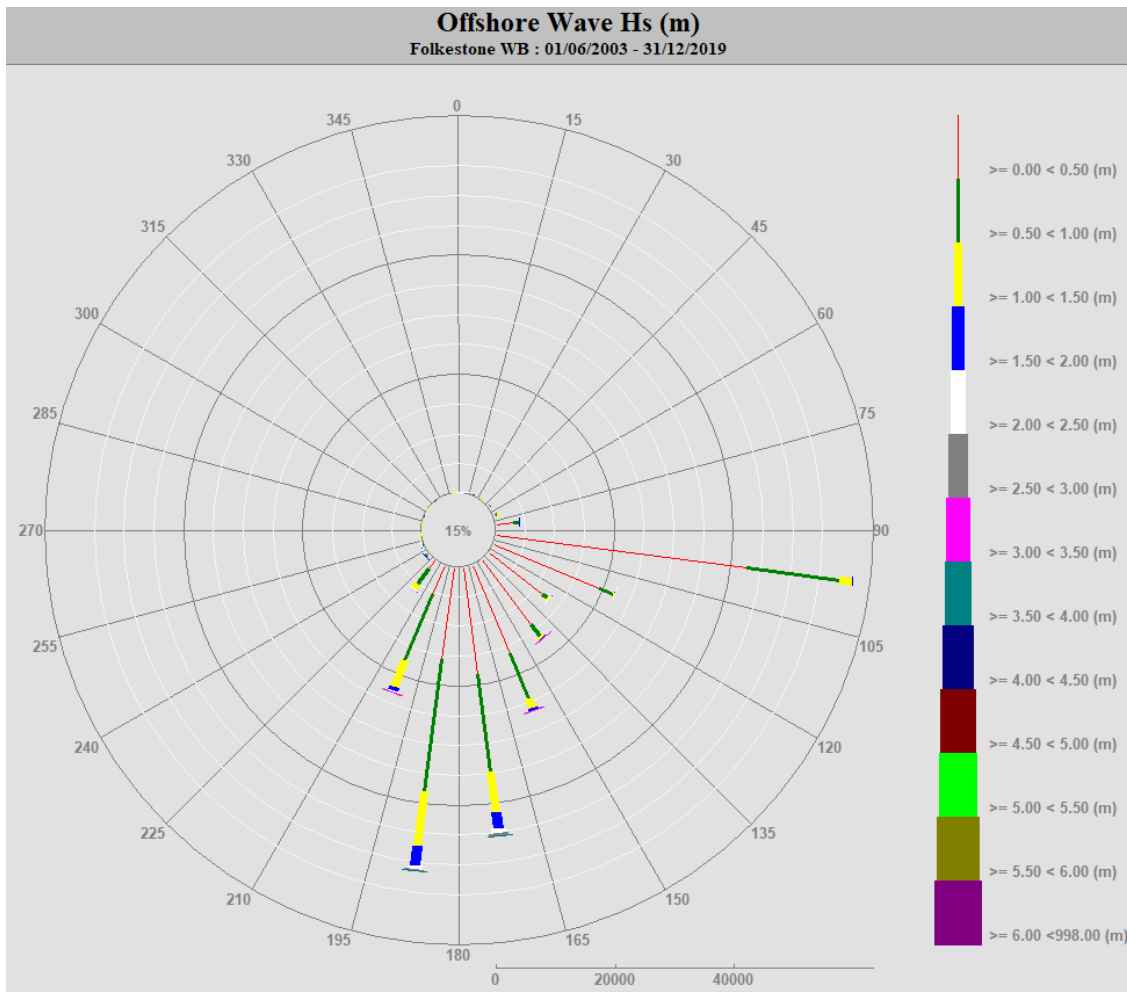
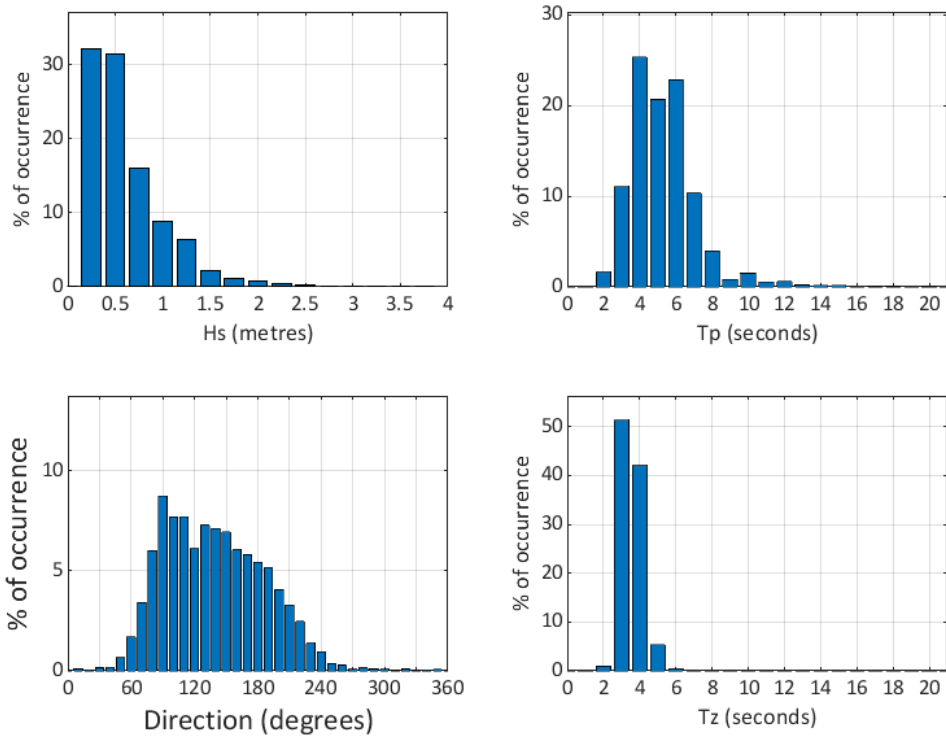
### Storms at Folkestone - all years



### Folkestone - Wave height exceedance (Hs)



Folkestone 2003



Folkestone 2003 to 2019 - Joint distribution (% of occurrence)

