



## Chapel Point Directional Waverider Buoy

<b>Location</b>			
OS	563362 E 374881 N		
WGS84	Latitude: 53° 14.75' N Longitude: 00° 26.81' E		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~13m CD	Example buoy in situ. Photo courtesy of Fugro Marine GB Limited	Location of buoy (Google mapping, image ©2019 Landsat / Copernicus)

## Data Quality

<b>Recovery rate (%)</b>	<b>Sample interval</b>
61	30 minutes

## Monthly Averages – 2012

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	0.58	6.6	3.8	55	12.7	-	9
June	0.80	5.7	3.8	95	14.3	-	30
July	0.56	5.6	3.5	96	16.8	-	31
August	0.57	4.7	3.3	111	18.3	-	31
September	0.68	5.4	3.4	115	15.9	-	30
October	0.82	6.2	3.8	90	12.0	-	31
November	0.78	6.9	3.7	97	8.6	-	30
December	0.94	6.3	3.9	100	5.7	-	31

## Monthly Averages - All Years (June 2012 – December 2019)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.87	6.9	4.0	100	5.6	-
February	0.87	6.7	4.0	98	4.9	-
March	0.85	6.9	4.0	93	6.0	-
April	0.76	6.3	3.8	82	8.6	-
May	0.75	6.1	3.8	83	11.9	-
June	0.64	5.7	3.7	86	14.9	-
July	0.56	4.8	3.4	107	17.9	-
August	0.57	5.0	3.3	119	18.5	-
September	0.67	5.6	3.6	96	16.6	-
October	0.90	6.0	3.8	99	13.5	-
November	0.93	6.3	4.0	103	9.9	-
December	0.81	6.4	3.7	121	7.3	-

## 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)
27-Oct-2012 05:00:00	3.16	9.1	5.9	25	2.55	HW	4.90	-	-
05-Dec-2012 20:30:00	2.75	9.1	5.6	23	-0.75	HW +4	3.80	-	-

\* Tidal information is obtained from the predicted tide levels (Admiralty Total Tide).

## 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)
2012	2.97	2.37	2.17	1.92	1.52	1.22	27-Oct-2012 05:00:00	3.16
2013	3.45	2.71	2.56	2.34	1.86	1.49	10-Oct-2013 19:30:00	3.63
2014	2.50	2.09	1.89	1.68	1.41	1.22	02-Dec-2014 12:00:00	2.67
2015	3.10	2.08	1.88	1.70	1.43	1.23	21-Nov-2015 12:00:00	3.54
2016	3.20	2.42	2.19	1.95	1.63	1.38	14-Jan-2016 20:00:00	3.49
2017	3.23	2.72	2.53	2.30	1.94	1.63	13-Jan-2017 17:00:00	3.59
2018	2.88	2.28	2.10	1.86	1.49	1.26	27-Oct-2018 16:30:00	3.17
2019	3.06	2.47	2.18	1.93	1.59	1.33	27-Jan-2019 20:30:00	3.75

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2012 exceeded 1.52 m

## 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	May 2012 to December 2019	
Return period (years)	Significant wave height (m)	Comments
0.25	2.67	No depth limitation
1	3.23	
2	3.41	
5	3.59	
10	3.69	
20	3.76	
50	3.84	

## Distribution plots

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

- Annual time series of  $H_s$  (red line is 2.67 m storm threshold)
- Incidence of storm waves for 2012. 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 2012
- 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

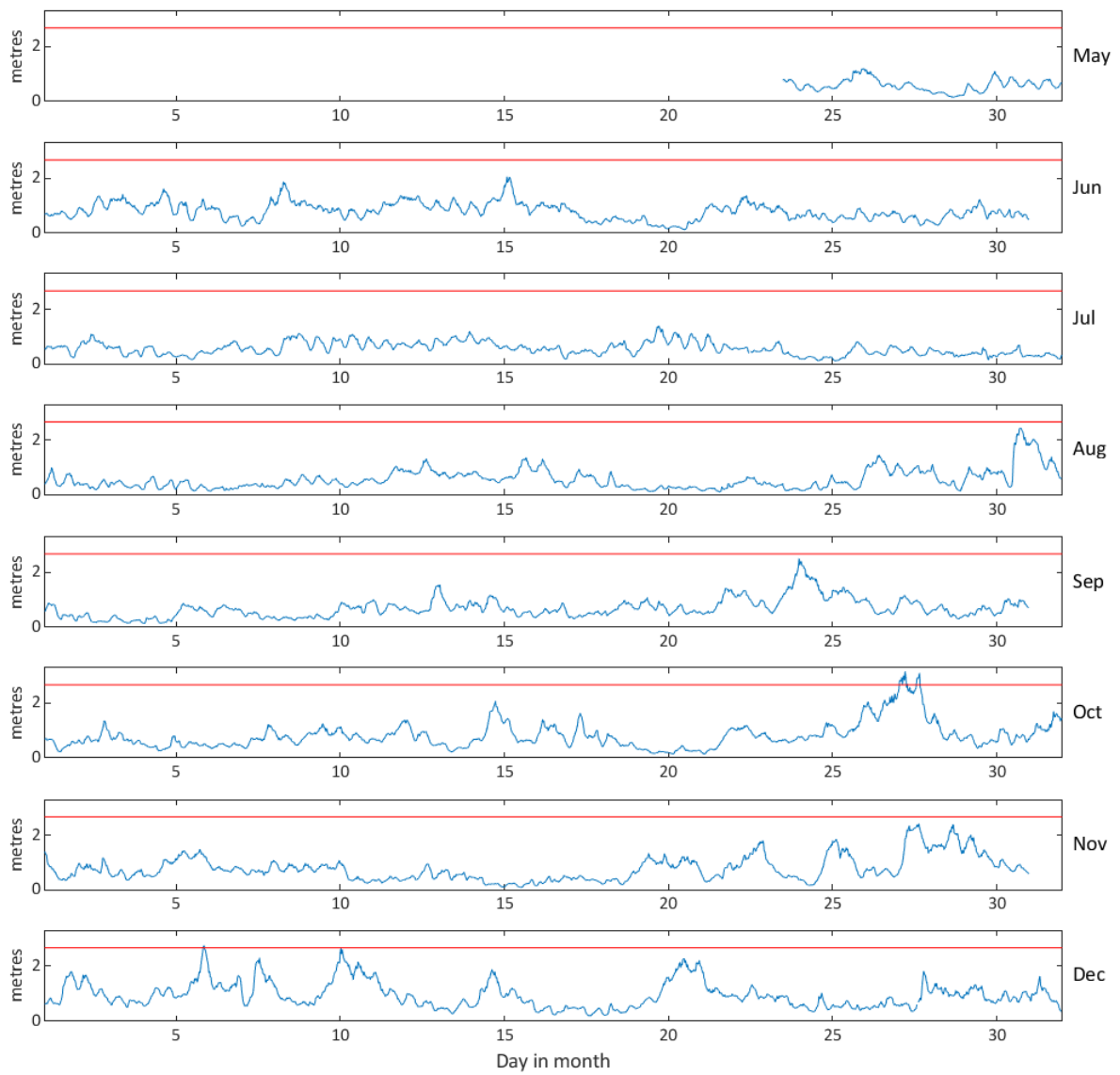
## General

The buoy, owned by the Environment Agency, was first deployed on 04 September 2012, at which time the magnetic declination at the site was 1.43° west, changing by 0.18° east per year.

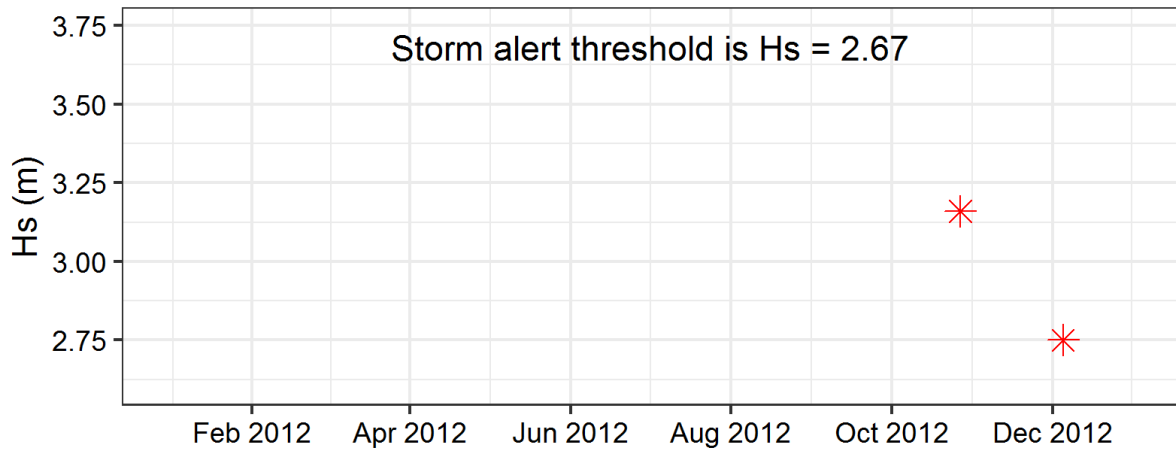
## Acknowledgements

The shore station is kindly hosted by Mablethorpe RNLI Lifeboat Station.

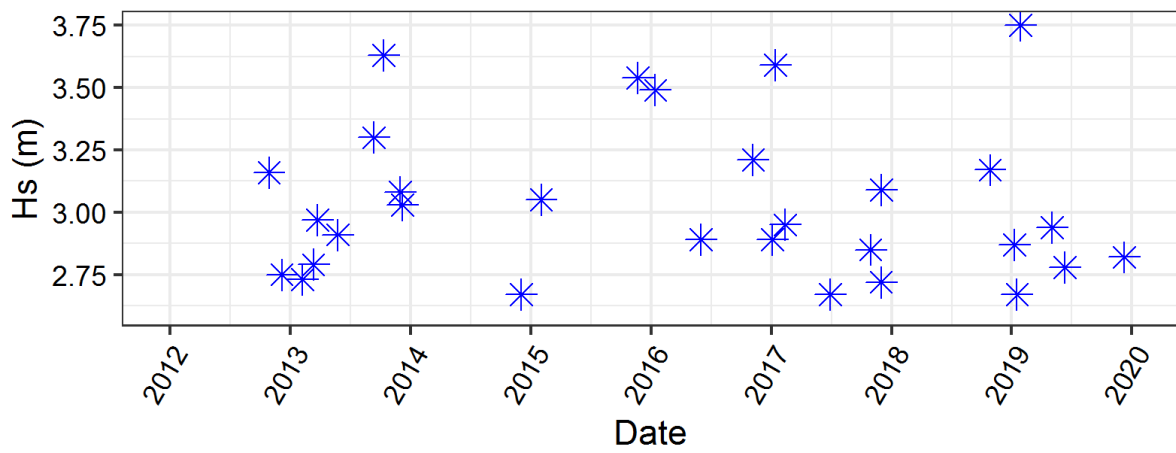
### Chapel Point - Significant Wave Height (Hs) during 2012



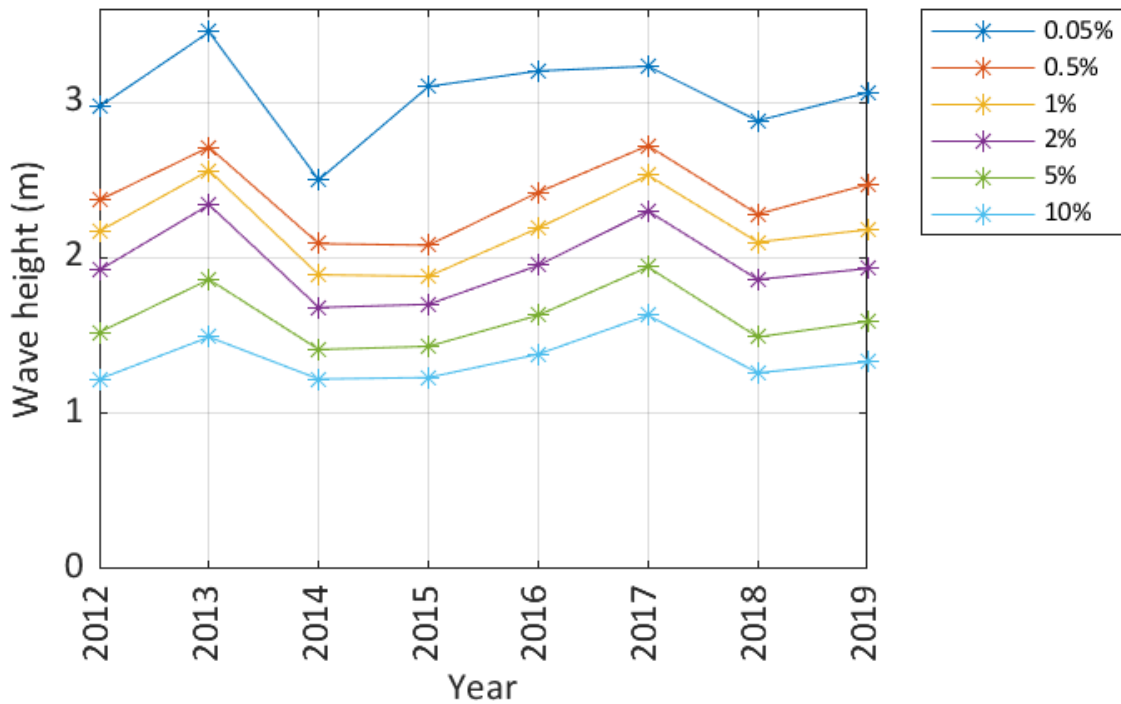
### Storms at Chapel Point during 2012



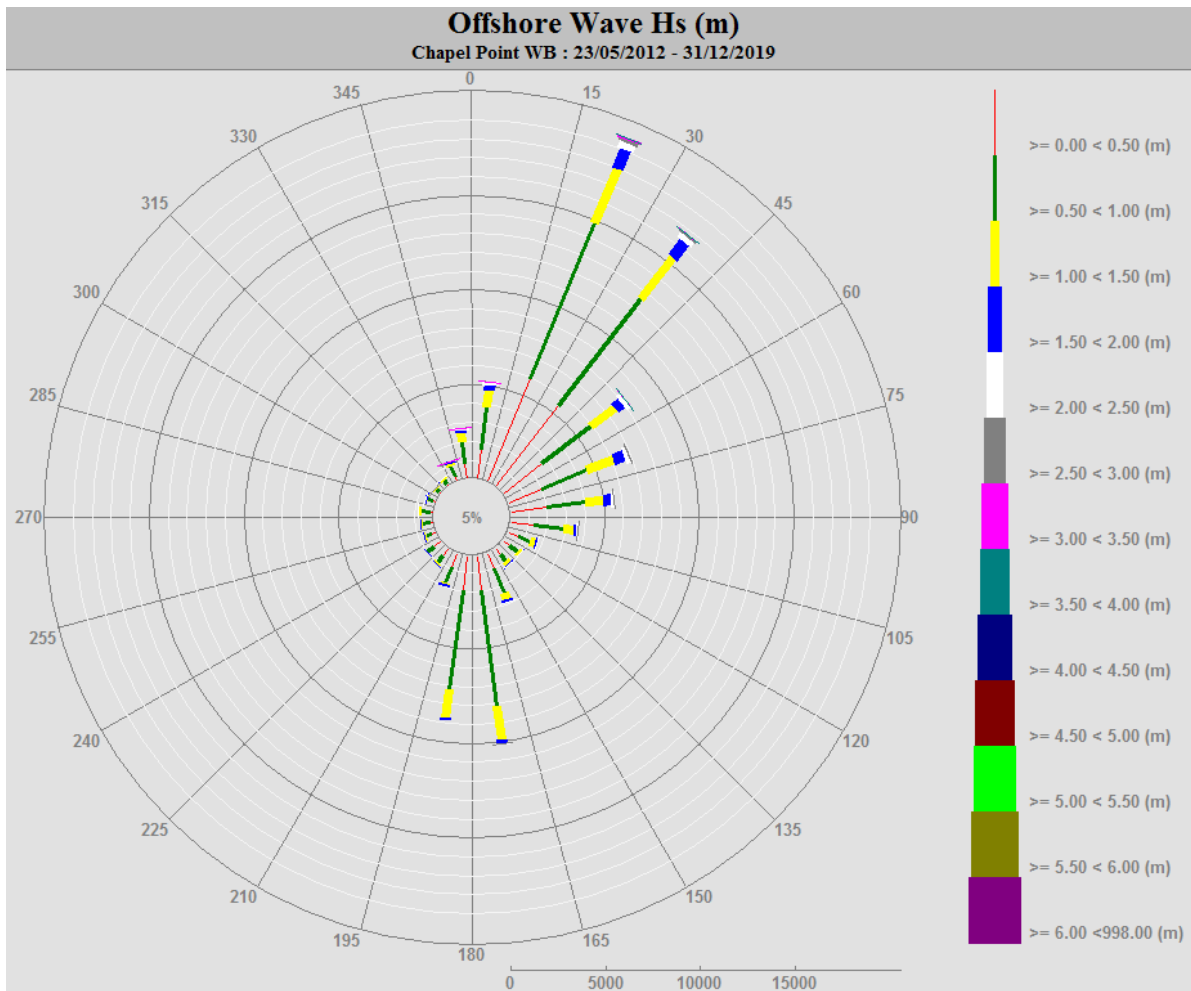
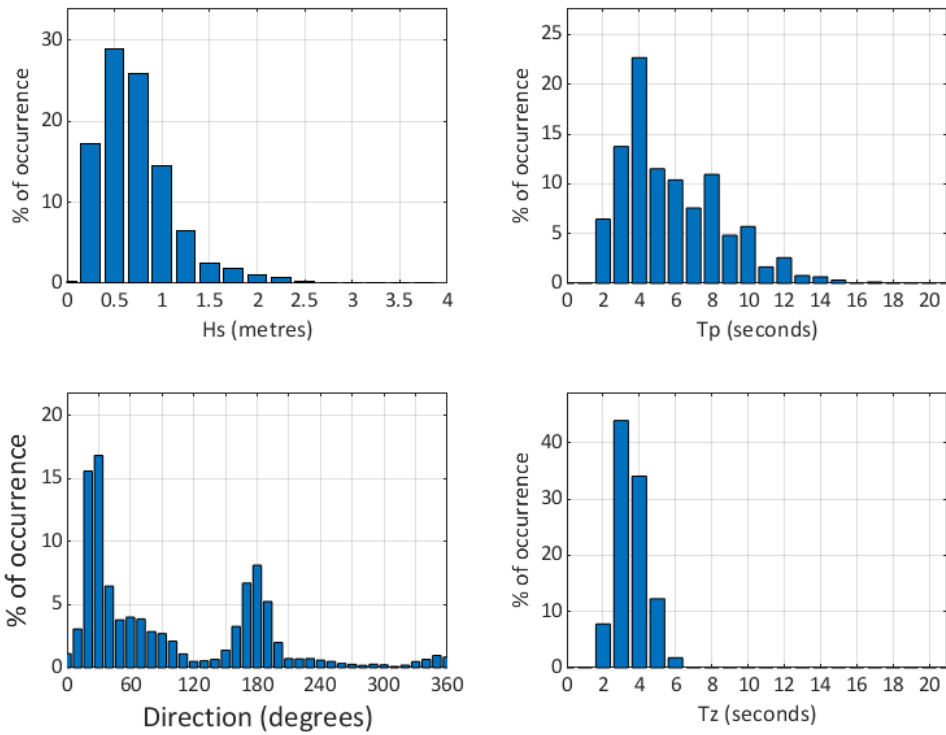
### Storms at Chapel Point - all years



### Chapel Point - Wave height exceedance ( $H_s$ )



### Chapel Point 2012



Chapel Point 2013 to 2019 - Joint distribution (% of occurrence)

