



Hornsea Directional Waverider Buoy

Location			
OS	527071 E 448455 N		
WGS84	Latitude: 53° 55.00' N Longitude: 00° 04.01' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~12m CD	Buoy in situ off Hornsea beach. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
98	30 minutes

Monthly Averages - 2015

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	No. of days
January	0.83	9.1	3.9	91	6.8	31
February	0.96	9.6	4.3	63	5.6	27
March	0.80	7.0	3.9	109	6.1	30
April	0.62	8.9	4.2	54	7.5	29
May	0.63	6.6	3.6	101	9.6	31
June	0.56	6.4	3.7	83	11.8	29
July	0.69	6.4	4.0	73	13.8	30
August	0.55	5.4	3.5	95	14.8	30
September	0.80	7.1	4.4	56	13.8	30
October	0.85	6.6	4.1	82	12.9	31
November	0.75	7.1	3.6	103	11.4	30
December	0.90	7.0	3.8	104	9.3	30

Monthly Averages - All Years (June 2008 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)
January	1.02	8.0	4.3	79	6.2
February	1.01	8.0	4.4	72	5.4
March	0.86	8.4	4.4	72	6.0
April	0.76	7.6	4.2	69	7.5
May	0.73	6.5	3.9	85	9.7
June	0.66	6.4	4.0	71	12.2
July	0.62	6.1	3.8	77	14.2
August	0.59	5.9	3.6	90	14.9
September	0.71	6.9	3.9	79	14.2
October	0.94	7.5	4.1	82	12.8
November	1.00	7.8	4.2	80	10.7
December	1.01	8.2	4.3	77	8.0

Storm Analysis

Date/Time	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	Water level elevation* (OD)	Tidal stage (hours re. HW)	Tidal range (m)	Tidal surge* (m)	Max. surge* (m)
21-Nov-2015 08:30	3.76	11.8	6.3	23	-	HW -5	~4.3	-	-
01-Feb-2015 04:00	3.39	12.5	6.6	25	-	HW	~4.1	-	-

Annual Statistics

Year	Annual H _s exceedance* (m)						Annual Maximum H _s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A _{max} (m)
2008	-	3.03	2.78	2.52	1.77	1.44	22-Nov-2008 13:30	3.78
2009	4.34	3.37	2.93	2.34	1.77	1.44	17-Dec-2009 14:30	4.87
2010	3.78	3.39	3.12	2.77	2.24	1.80	10-Jan-2010 04:00	4.08
2011	2.83	2.41	2.17	1.93	1.65	1.38	23-Jul-2011 21:00	2.99
2012	4.30	3.08	2.73	2.34	1.88	1.51	04-Apr-2012 04:30	4.99
2013	4.22	3.74	3.34	2.90	2.32	1.76	23-Mar-2013 07:00	4.52
2014	3.21	2.44	2.17	1.97	1.67	1.40	14-Oct-2014 05:00	3.40
2015	3.39	2.41	2.14	1.92	1.56	1.31	21-Nov-2015 08:30	3.76

* i.e. 5% of the H_s values measured in 2008 exceeded 1.77 m

Distribution plots

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

- Annual time series of H_s (red line is 3.25 m storm threshold)
- Incidence of storm waves for 2015. 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 2015
- Joint distribution of all parameters for all measured data, given as percentage of occurrence
- Wave rose (percentage of occurrence of direction vs. H_s) for all measured data

* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Immingham). The surge shown is the residual at the time of the highest H_s. The maximum tidal surge is the largest positive surge during the storm event.

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 3-hourly records and are calculated for periods up to 10 times the record length, using a Weibull distribution.

Return period (years)	Significant wave height (m)	Comments
1	4.4	No depth limitation
2	4.6	
5	4.9	
10	5.1	Depth-limited at MLWS
20	5.3	
50	5.6	

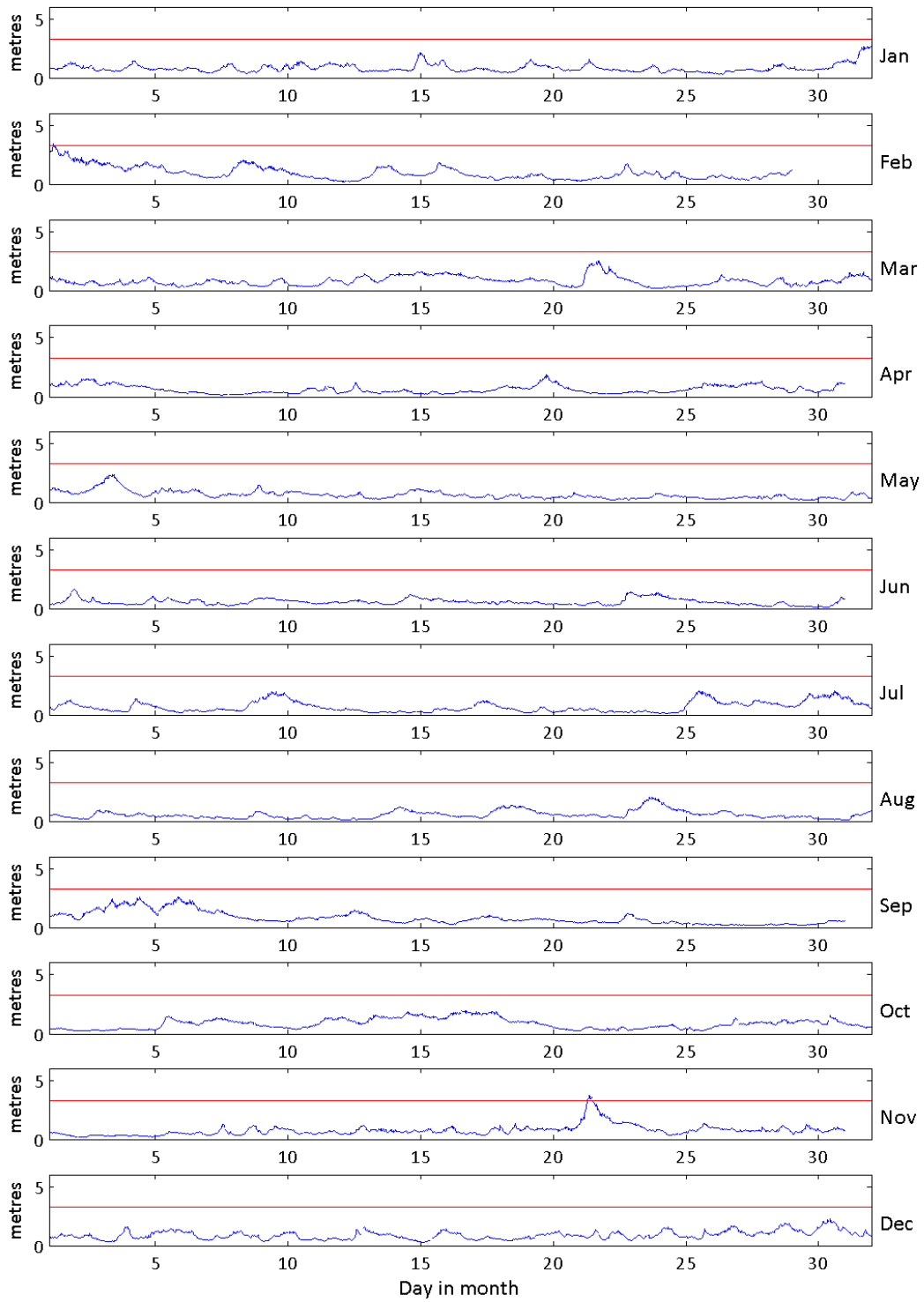
General

The buoy was deployed on 5 June 2008, at which time the magnetic declination at the site was 2.2° west, changing by 0.15° east per year.

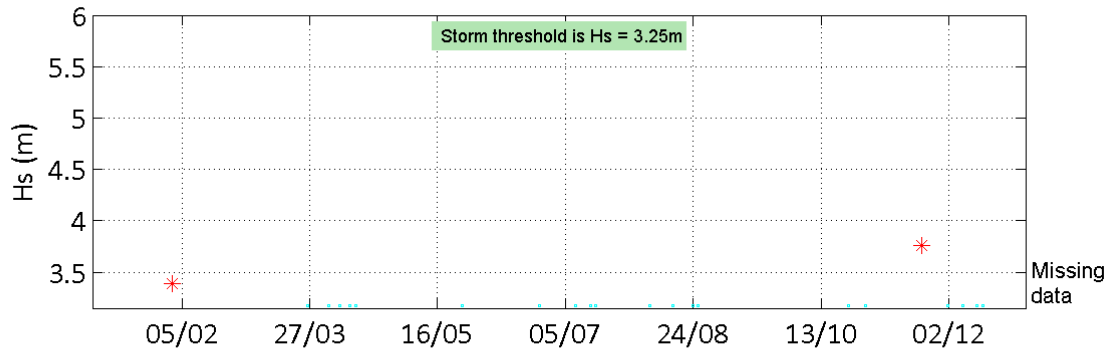
Acknowledgements

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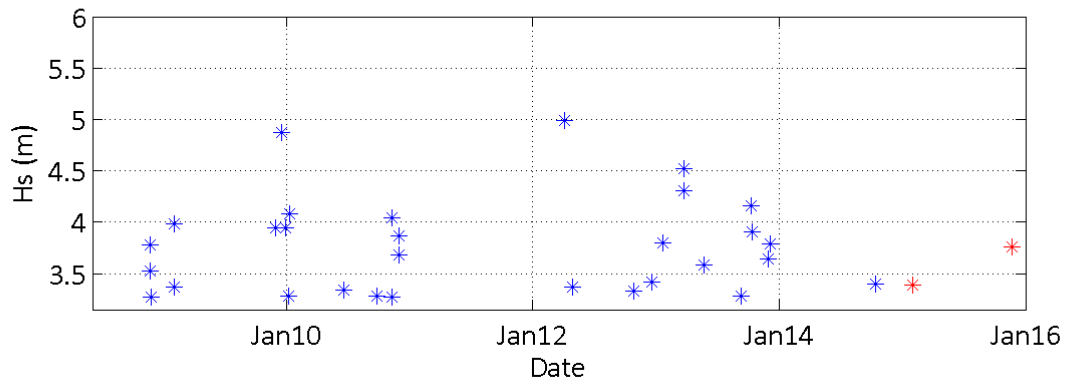
Hornsea - Significant Wave Height (Hs) during 2015



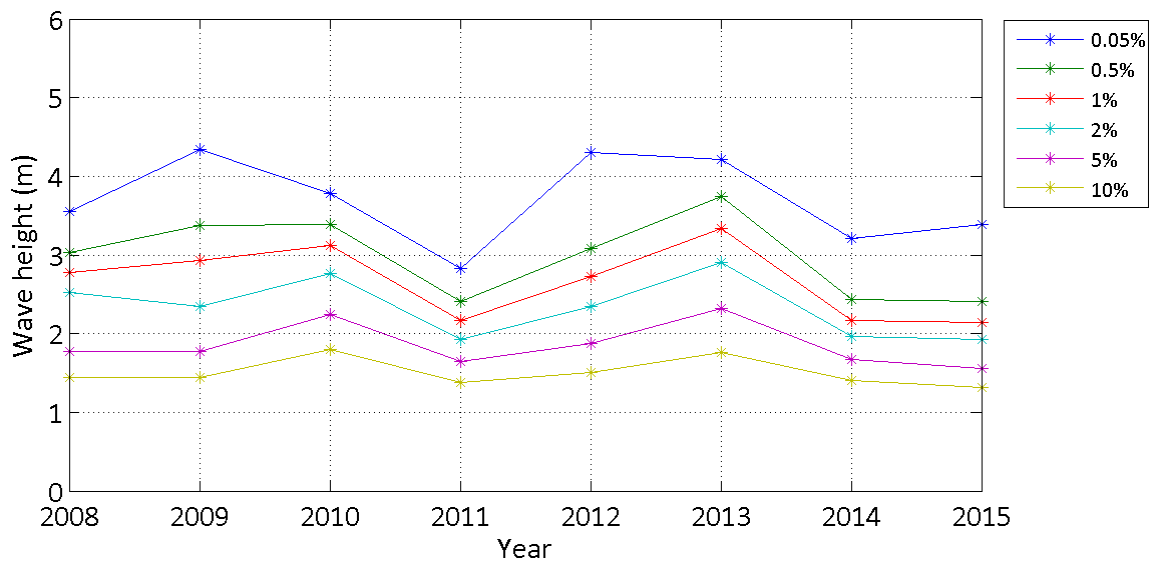
Storms at Hornsea during 2015



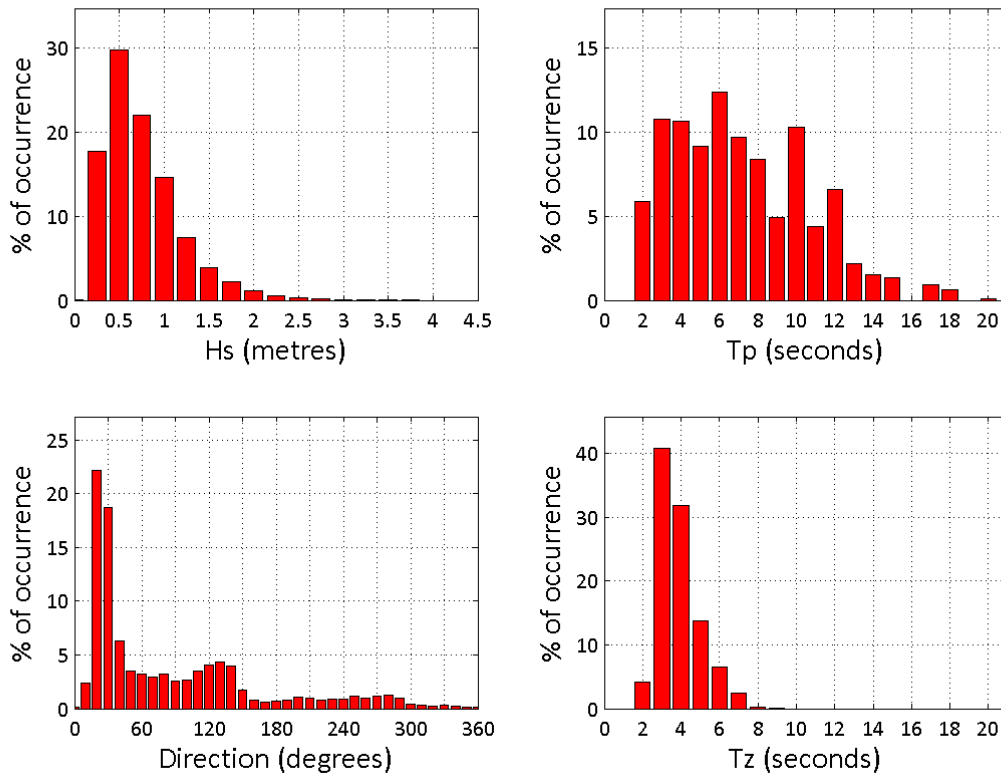
Storms at Hornsea - all years



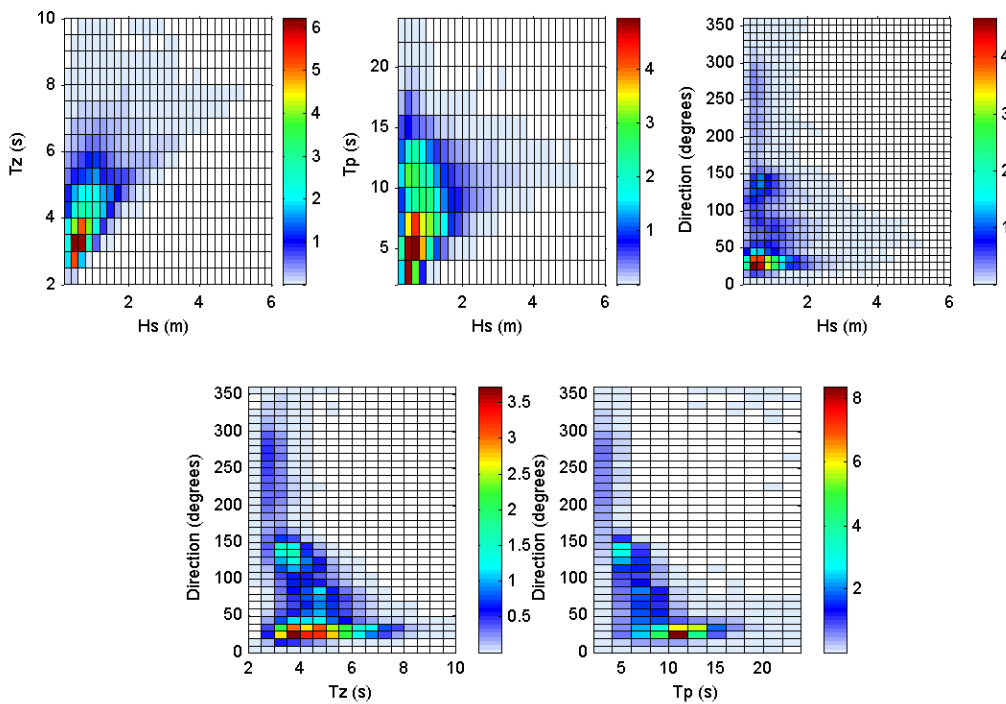
Hornsea - Wave height exceedance (H_s)



Hornsea 2015



Hornsea 2008 to 2015 - Joint distribution (% of occurrence)



Offshore Wave Hs (m)
Hornsea WB : 10/06/2008 - 31/12/2015

