



Hornsea Directional Waverider Buoy

Location			
OS	535735 E 448779 N		
WGS84	Latitude: 53° 55.003' N Longitude: 00° 04.004' E		
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 - 2014

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	No. of days
January	1.05	7.2	4.2	90	6.7	30
February	0.94	6.0	3.8	121	6.0	27
March	0.80	7.9	4.0	81	6.7	31
April	0.77	6.9	4.0	73	8.2	29
May	0.73	6.5	4.1	72	10.4	30
June	0.66	6.4	4.3	57	12.8	29
July	0.57	5.0	3.5	80	15.3	31
August	0.73	6.4	3.8	95	15.4	30
September	0.58	7.0	4.1	54	15.0	29
October	0.87	6.5	3.8	96	13.8	31
November	1.08	7.3	4.4	82	11.7	30
December	0.88	9.1	4.0	70	9.1	30

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)
14-Oct-2014 05:00	3.40	8.3	5.9	44	~-1.1	HW -4	~4.6	-	-

* 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.

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

* 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 3.75 m storm threshold)
- Wave rose (percentage of occurrence of Direction vs. H_s) for all measured data
- Percentage of occurrence of H_s , T_p , T_z and Direction for 2014
- Incidence of storm waves for 2014. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

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.

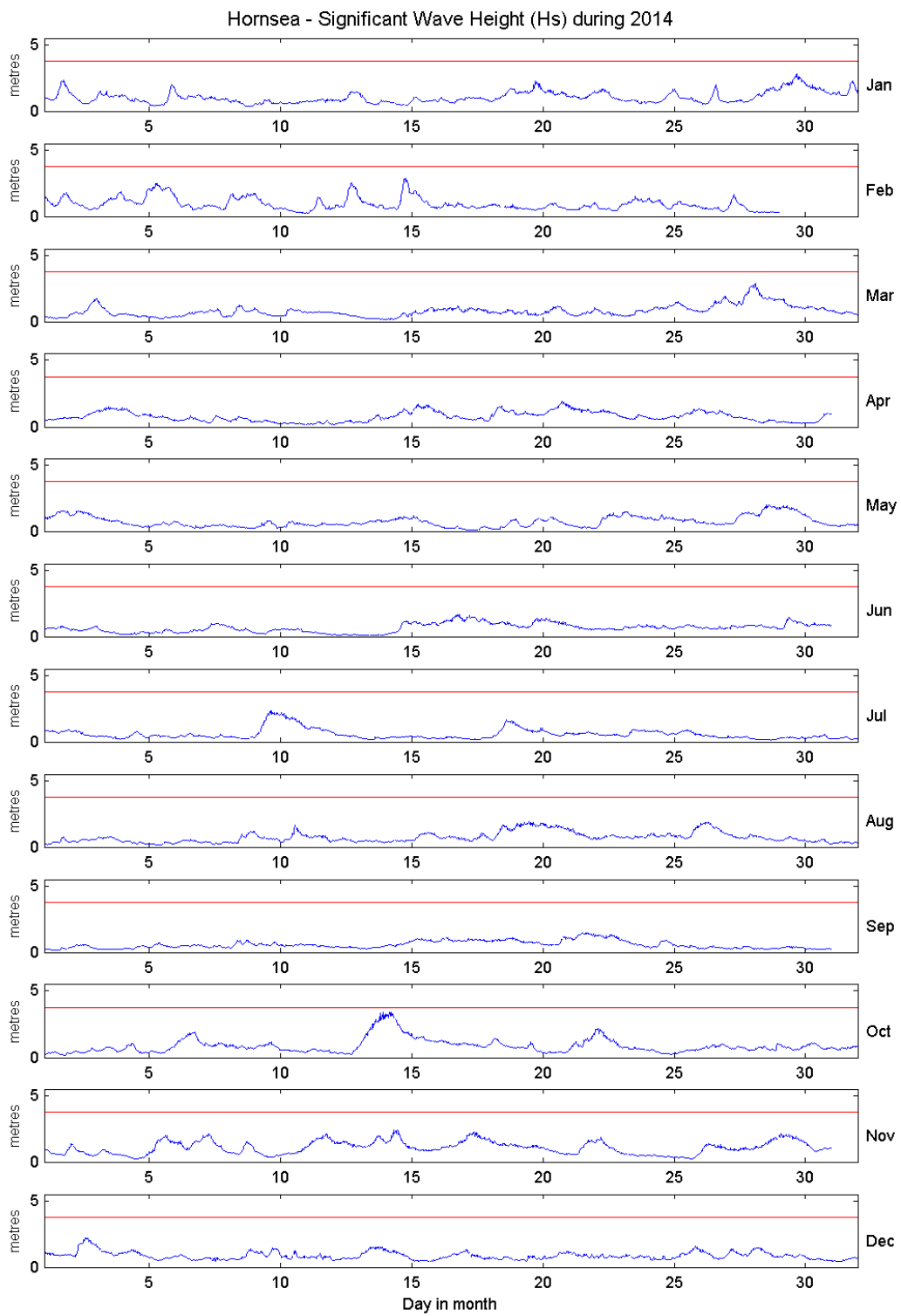
Return period (years)	Significant wave height (m)	Comments
1	4.4	No depth limitation
2	4.5	
5	4.7	
10	4.9	
20	5.1	Depth-limited at MLWS
50	5.2	

General

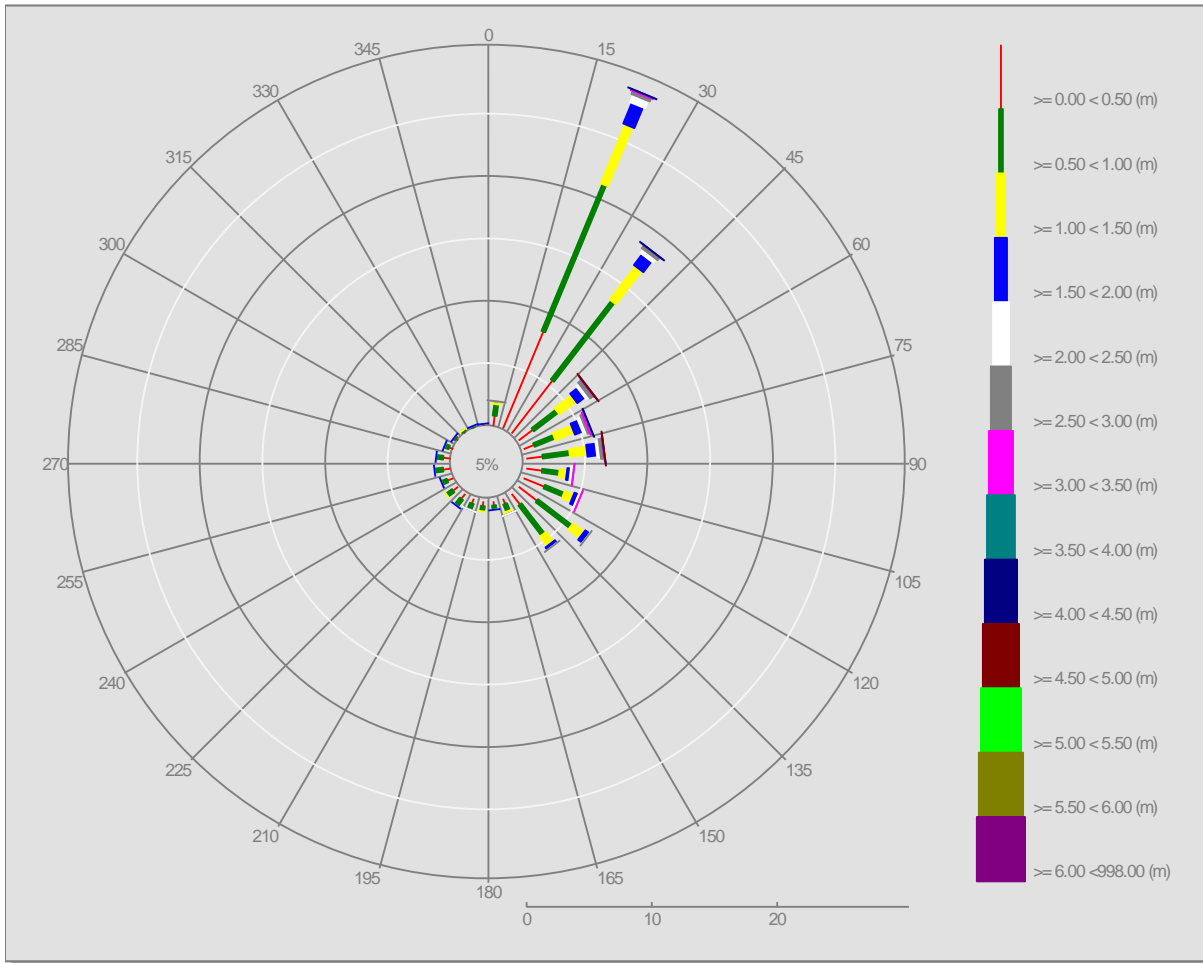
The buoy was deployed on 5 June 2008, at which time the magnetic declination at the site was 2.2° west, changing by 0.15° east per year.

Acknowledgements

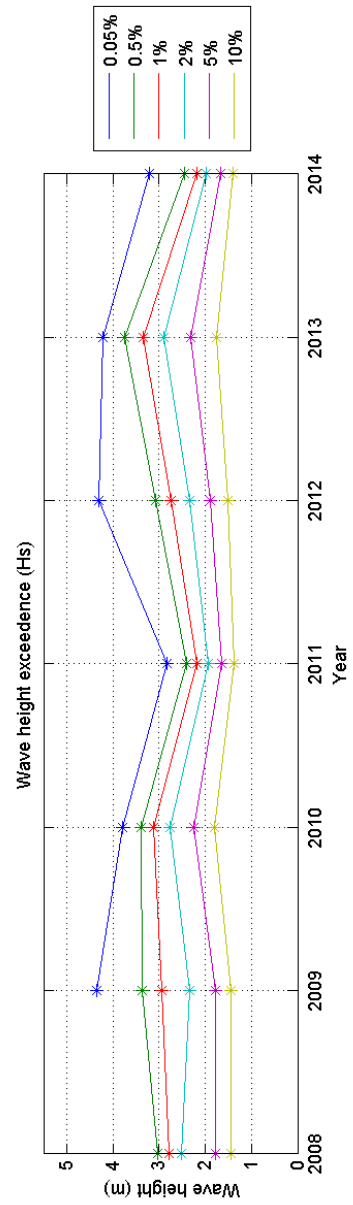
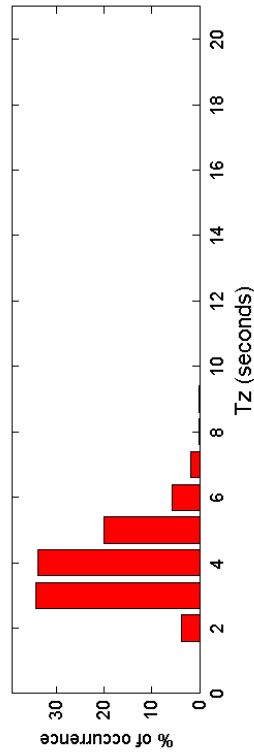
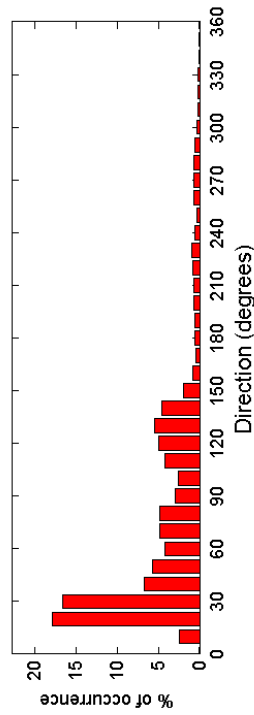
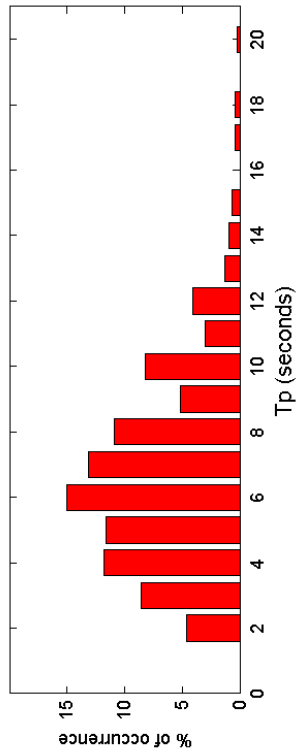
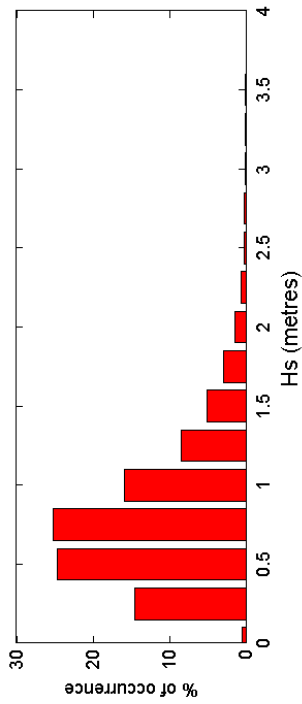
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.



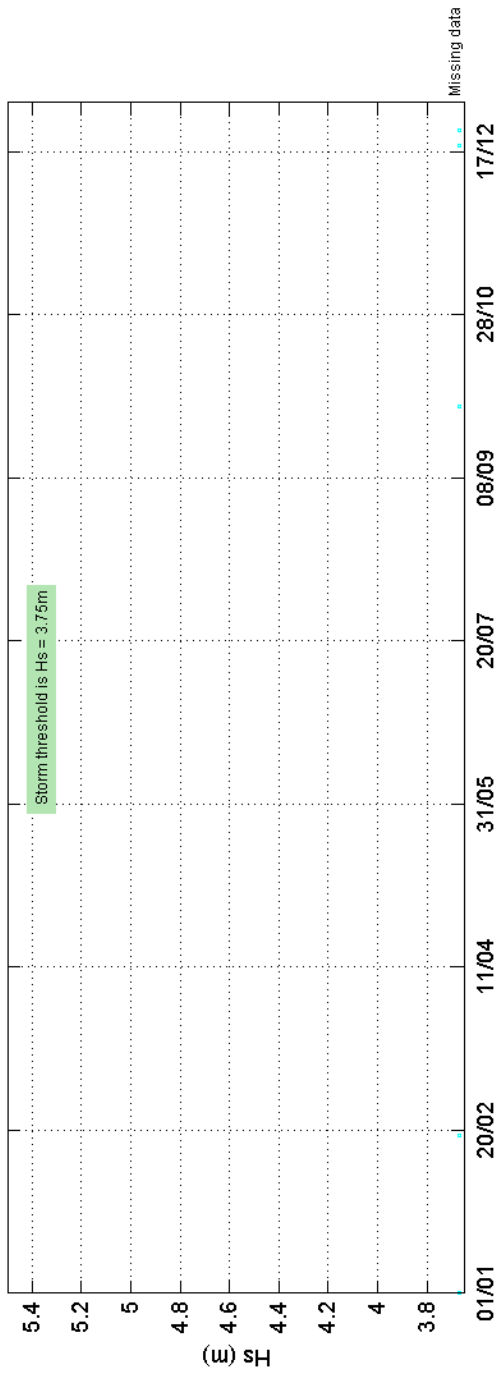
Offshore Wave Hs (m) Hornsea WB : 10/06/2008 - 31/12/2014



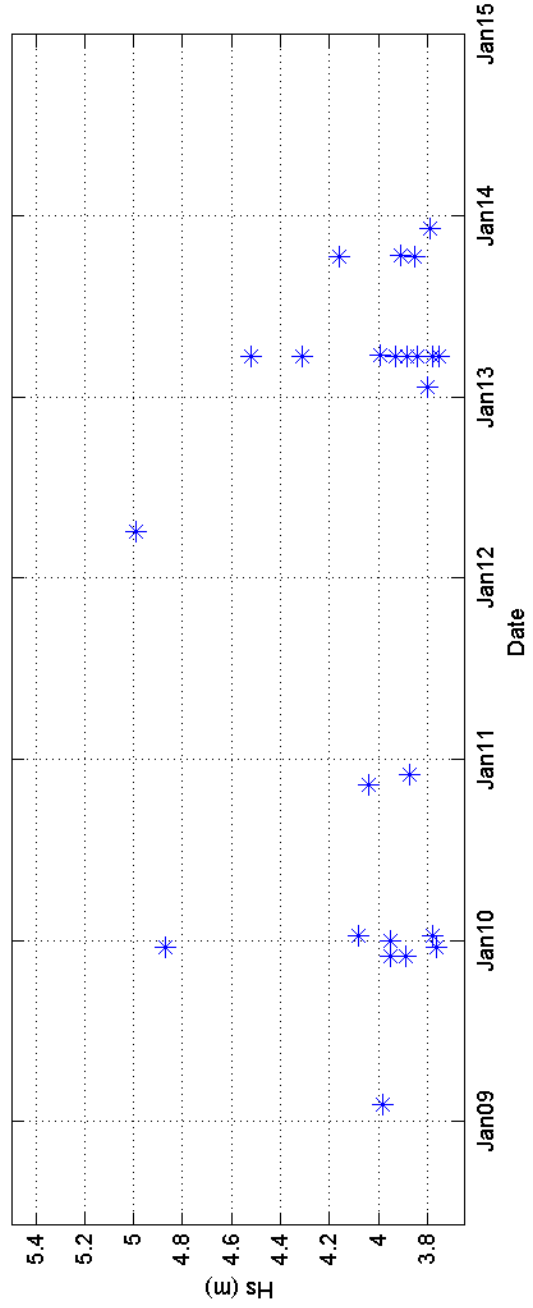
Hornsea 2014



Storms at Hornsea during 2014



Storms at Hornsea - all years



Hornsea 2008 to 2014 - Joint distribution (% of occurrence)

