



## Bideford Bay Directional Waverider Buoy

<b>Location</b>			
OS	240622 E 131189 N		
WGS84	Latitude: 51° 03.471' N Longitude: 04° 16.537' W		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~11m CD	Buoy in situ in Bideford Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

### Data Quality

Recovery rate (%)	Sample interval
99	30 minutes

### Monthly Averages - 2014

*All times are GMT*

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	No. of days
January	2.10	12.7	7.0	283	9.3	30
February	2.52	12.9	7.3	283	8.3	27
March	1.38	12.0	6.8	283	9.0	31
April	0.83	11.1	5.9	282	10.5	30
May	0.95	9.2	5.3	285	12.8	31
June	0.54	8.3	4.7	282	15.5	30
July	0.64	7.8	4.8	284	17.8	31
August	0.99	7.5	4.5	284	17.8	31
September	0.50	10.3	5.5	287	17.6	30
October	1.37	10.0	5.7	284	16.0	31
November	1.35	11.7	6.8	282	13.7	30
December	1.80	10.2	5.8	284	11.1	31

## 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)
09-Feb-2014 01:30	7.36	15.4	10.5	280	2.36	HW	3.4	0.45	1.19
12-Feb-2014 19:00	6.84	15.4	10.3	286	1.83	HW +2	5.8	0.43	1.46
03-Jan-2014 16:00	6.27	15.4	9.5	280	-	HW -4	~9.3	-	-
06-Jan-2014 18:00	6.18	22.2	10.3	290	-	HW -4	~7.6	-	-
05-Feb-2014 17:30	6.16	14.3	9.5	280	-1.53	HW -4	5.9	0.67	1.15
15-Feb-2014 01:30	5.91	16.7	10.0	277	-1.68	HW -5	7.0	0.92	1.07
01-Feb-2014 18:30	5.89	13.3	9.1	284	-	HW	~9.8	-	-

## 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)
2009	-	-	3.86	3.55	3.09	2.56	22-Nov-2009 15:30	5.16 <sup>+</sup>
2010	4.55	3.04	2.75	2.43	2.02	1.65	11-Nov-2010 17:30	5.52 <sup>+</sup>
2011	4.78	4.05	3.77	3.46	2.90	2.43	15-Dec-2011 07:30	5.14 <sup>+</sup>
2012	5.02	4.1	3.66	3.16	2.56	2.05	04-Jan-2012 23:00	5.82 <sup>+</sup>
2013	5.64	4.36	4.05	3.70	3.01	2.36	27-Dec-2013 10:00	6.93 <sup>+</sup>
2014	6.18	4.80	4.44	3.90	3.02	2.45	09-Feb-2014 01:30	7.36 <sup>+</sup>

\* i.e. 5 % of the H<sub>s</sub> values measured in 2009 exceeded 3.09 m

<sup>+</sup> 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.

\* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Ilfracombe). 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.

## 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	6.0	Depth-limited at MLWS
2	6.4	
5	6.8	
10	7.2	
20	7.6	
50	8.0	

## Distribution plots

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

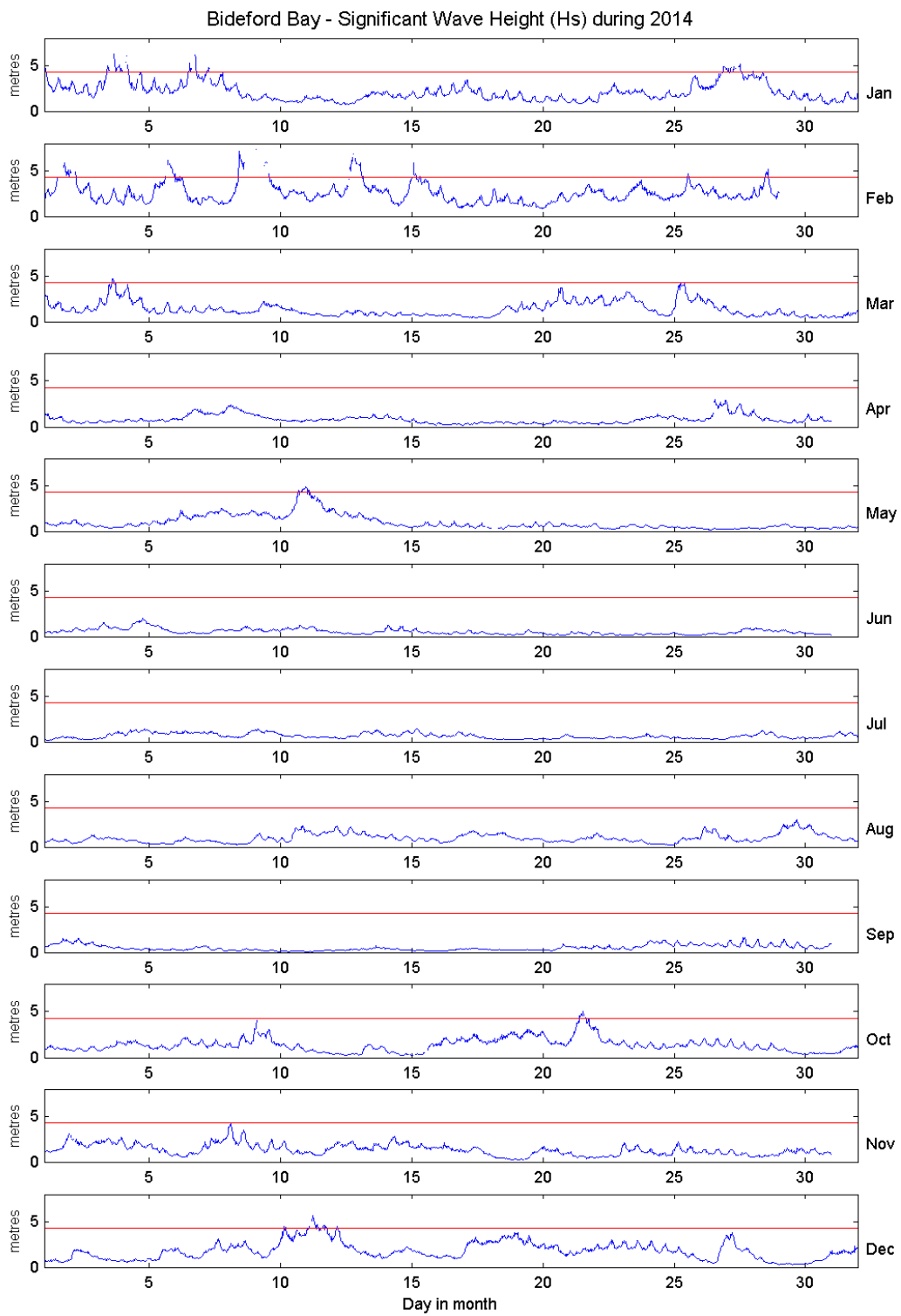
- Annual time series of  $H_s$  (red line is 4.25 m storm threshold)
- Wave rose (percentage of occurrence of Direction vs.  $H_s$ ) for all measured data
- Percentage of occurrence of  $H_s$ ,  $T_p$ ,  $T_z$  and Direction for 2014
- Incidence of storm waves for 2014. Storm events are defined using 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

## General

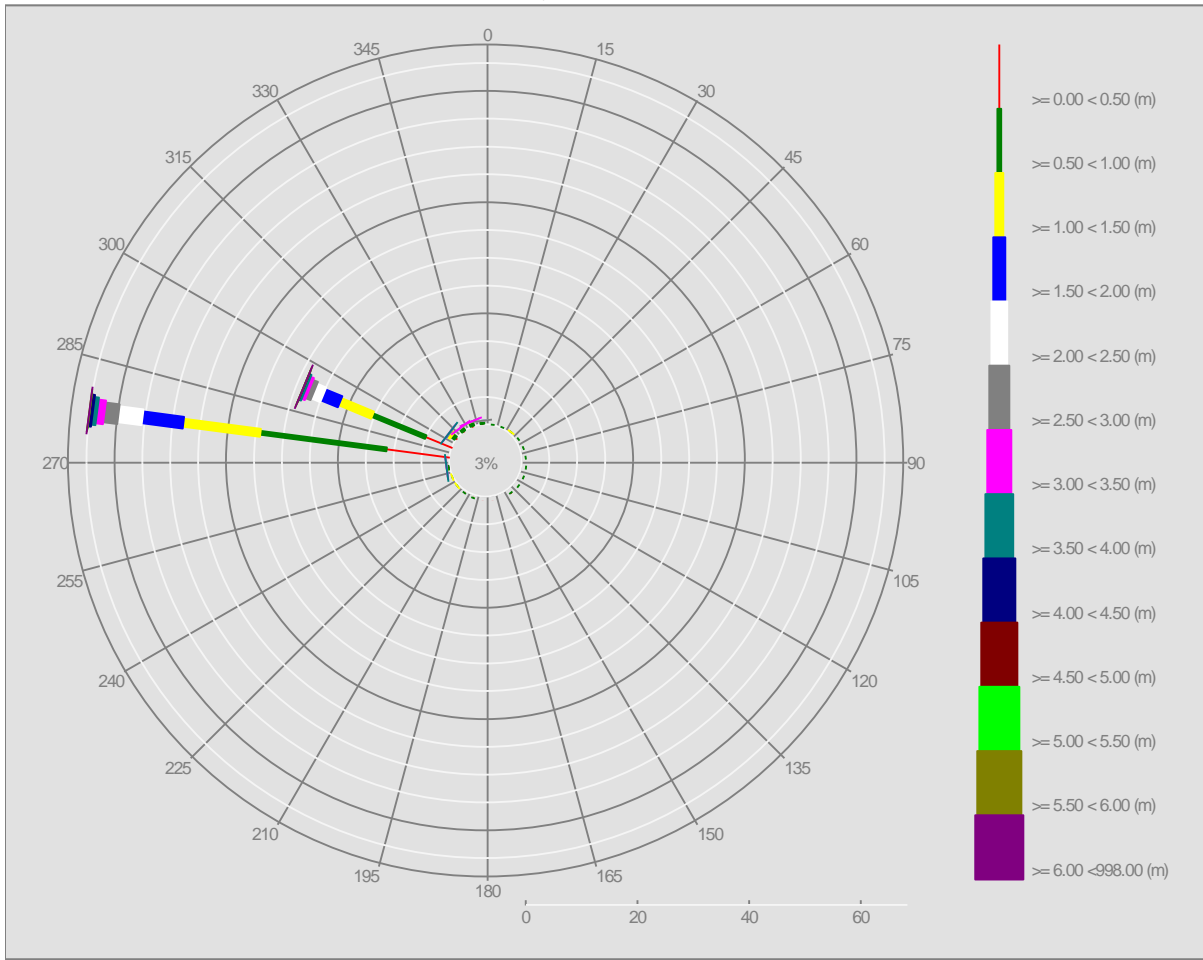
The buoy was first deployed on 17 June 2009, at which time the magnetic declination at the site was 3.3° west, changing by 0.15° east per year.

## Acknowledgements

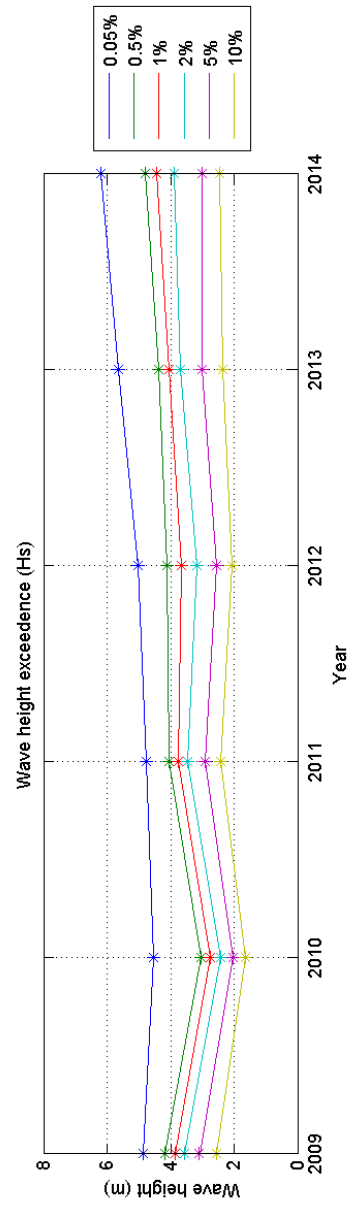
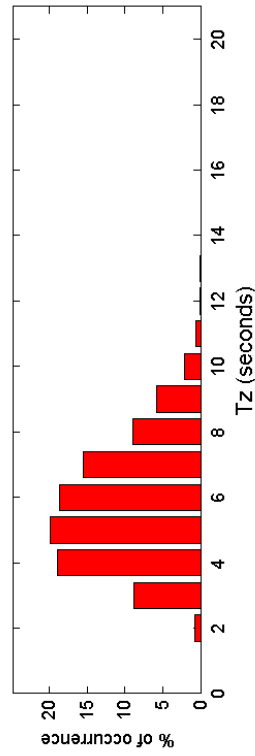
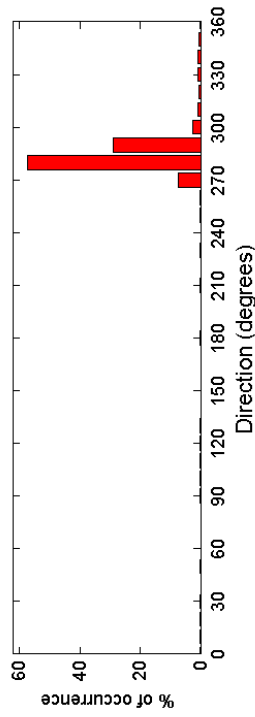
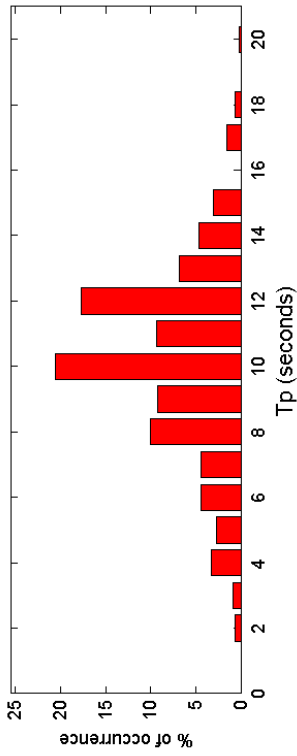
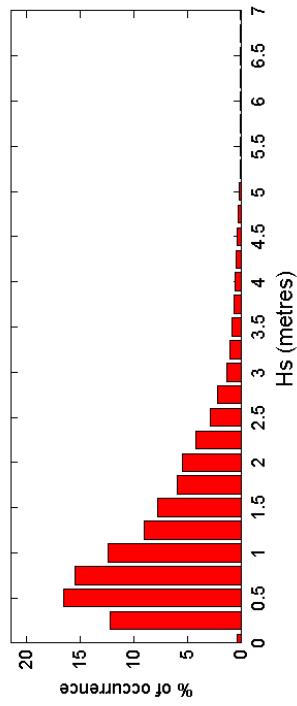
Until August 2012, the shore station was sited at Braddick's Holiday Park, by kind permission of Mr Braddick. The shore station is now kindly hosted by Appledore Lifeboat Station. Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

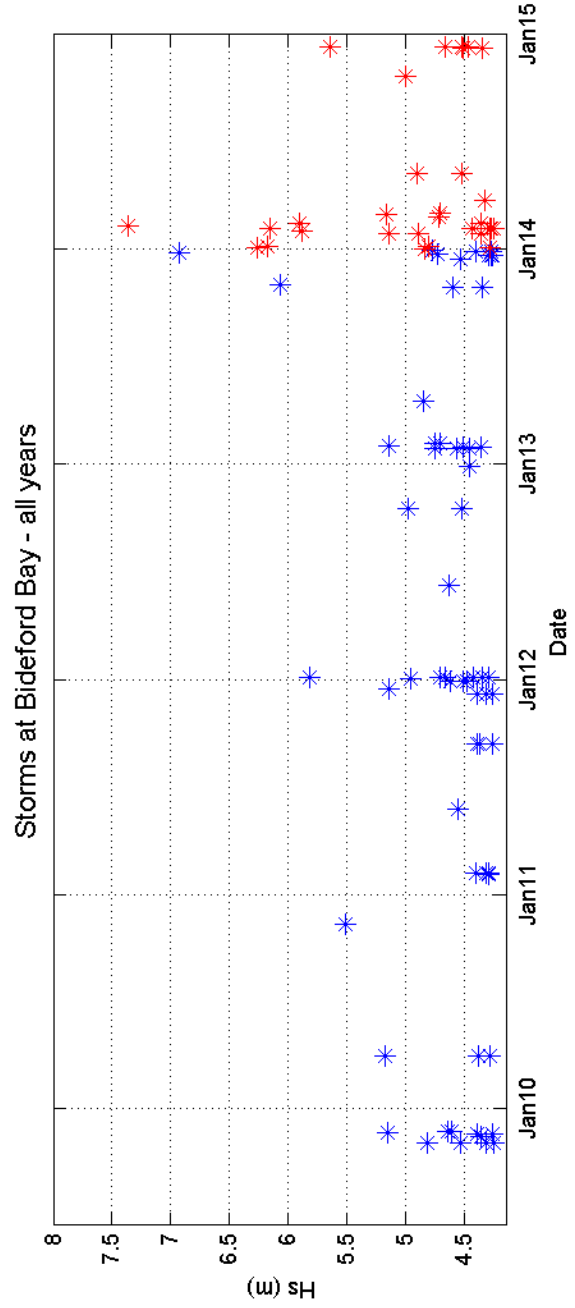
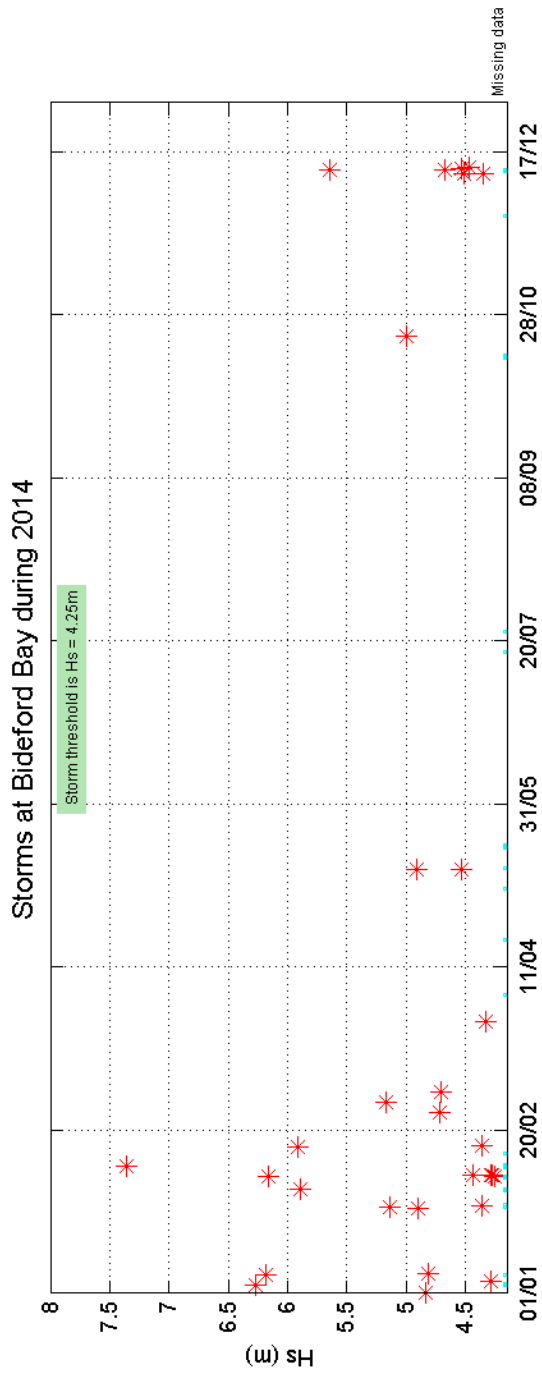


### Offshore Wave Hs (m) Bideford Bay WB : 17/06/2009 - 31/12/2014



Bideford Bay 2014





Bideford Bay 2009 to 2014 - Joint distribution (% of occurrence)

