



## Penzance Directional Waverider Buoy

<b>Location</b>			
OS	149662 E 29688 N		
WGS84	Latitude: 50° 06.862' N Longitude: 05° 30.184' W		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~10m CD	Buoy in situ in Mount's Bay. 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 <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	No. of days
January	1.19	10.3	5.2	185	6.6	31
February	1.64	11.0	5.5	186	5.7	27
March	0.68	10.5	4.7	180	5.7	31
April	0.66	8.6	4.7	178	6.9	30
May	0.39	7.4	4.2	179	8.3	31
June	0.41	7.2	3.9	169	13.3	30
July	0.31	7.2	4.1	184	17.0	31
August	0.47	7.4	4.2	186	16.1	31
September	0.39	9.3	4.2	172	16.8	30
October	0.83	8.1	4.4	183	15.6	31
November	0.94	8.9	5.1	180	13.2	25
December	0.61	9.8	4.6	182	11.9	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)
04-Feb-2014 19:00	6.06	10.0	8.3	179	-	HW	~4.6	-	-
14-Feb-2014 21:00	5.98	16.7	9.3	190	-	HW +4	~4.1	-	-
03-Feb-2014 12:00	4.19	10.5	7.8	183	-1.03	HW +5	5.5	0.51	0.57
06-Oct-2014 04:00	3.88	9.1	6.8	186	1.92	HW +2	4.1	0.30	0.36
12-Feb-2014 11:30	3.44	9.1	6.3	188	-0.37	HW -4	3.1	0.59	0.80

## 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)
2007	-	2.05	1.84	1.63	1.34	1.10	20-Jun-2007 09:00	2.96
2008	3.91	2.60	2.28	1.93	1.54	1.22	13-Jan-2008 11:30	4.54 <sup>+</sup>
2009	4.25	2.83	2.52	2.15	1.75	1.43	13-Nov-2009 18:30	4.64 <sup>+</sup>
2010	3.91	3.01	2.31	1.90	1.50	1.23	16-Jan-2010 03:30	4.70 <sup>+</sup>
2011	2.95	2.26	2.06	1.86	1.55	1.27	10-Jan-2011 15:00	3.32
2012	3.60	2.63	2.26	2	1.59	1.23	22-Nov-2012 14:30	4.27
2013	4.03	2.88	2.47	2.19	1.80	1.45	23-Dec-2013 12:30	4.24 <sup>+</sup>
2014	5.07	3.15	2.82	2.42	1.85	1.43	04-Feb-2014 19:00	6.06 <sup>+</sup>

\* i.e. 5 % of the H<sub>s</sub> values measured in 2007 exceeded 1.34 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.

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

## Distribution plots

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

- Annual time series of  $H_s$  (red line is 3.0 m storm threshold)
- Wave roses (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.

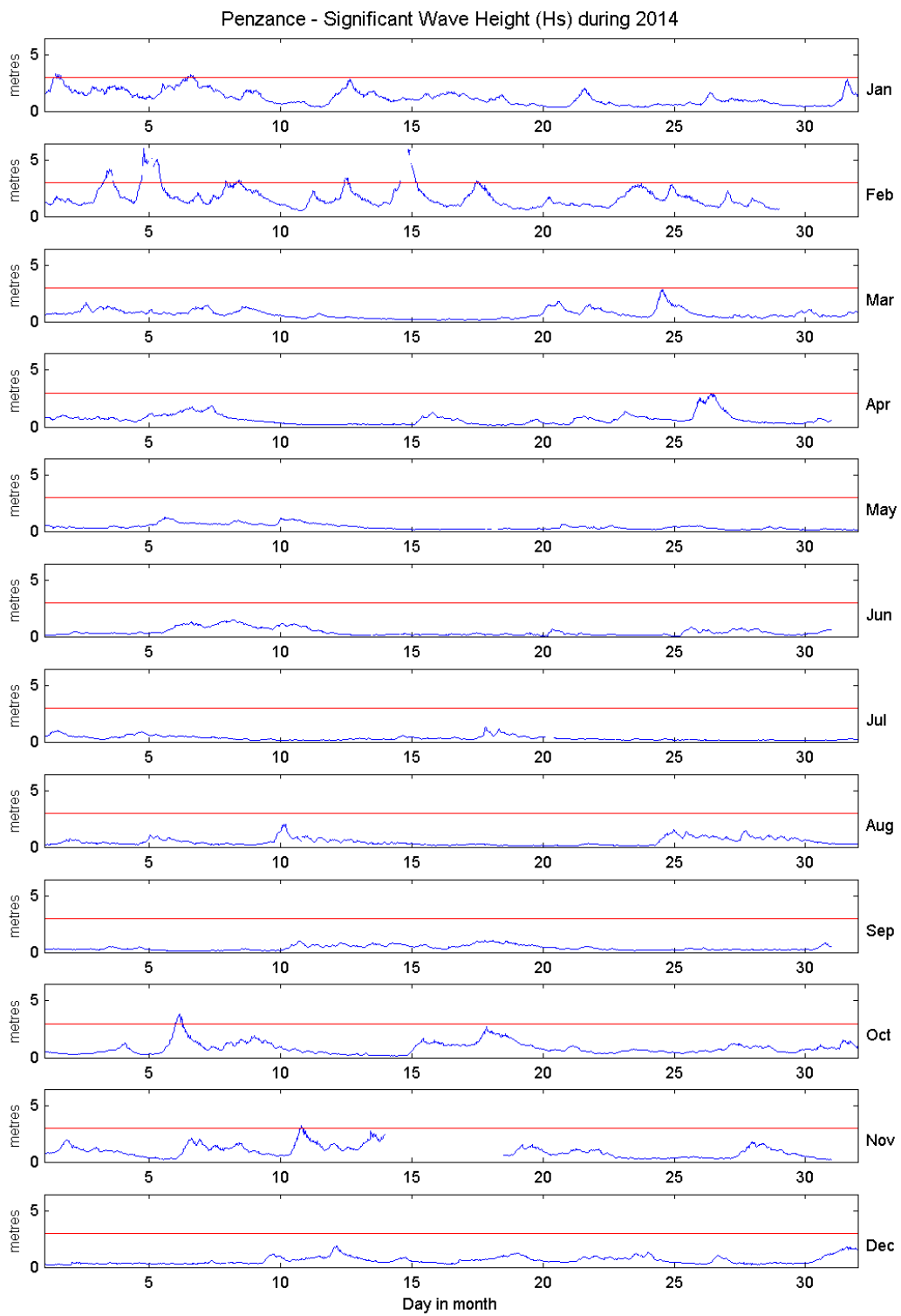
Return period (years)	Significant wave height (m)	Comments
1	4.5	Depth-limited at MLWS
2	4.8	
5	5.4	
10	5.8	
20	6.2	Depth-limited at MHWS
50	6.7	Depth-limited at HAT

## General

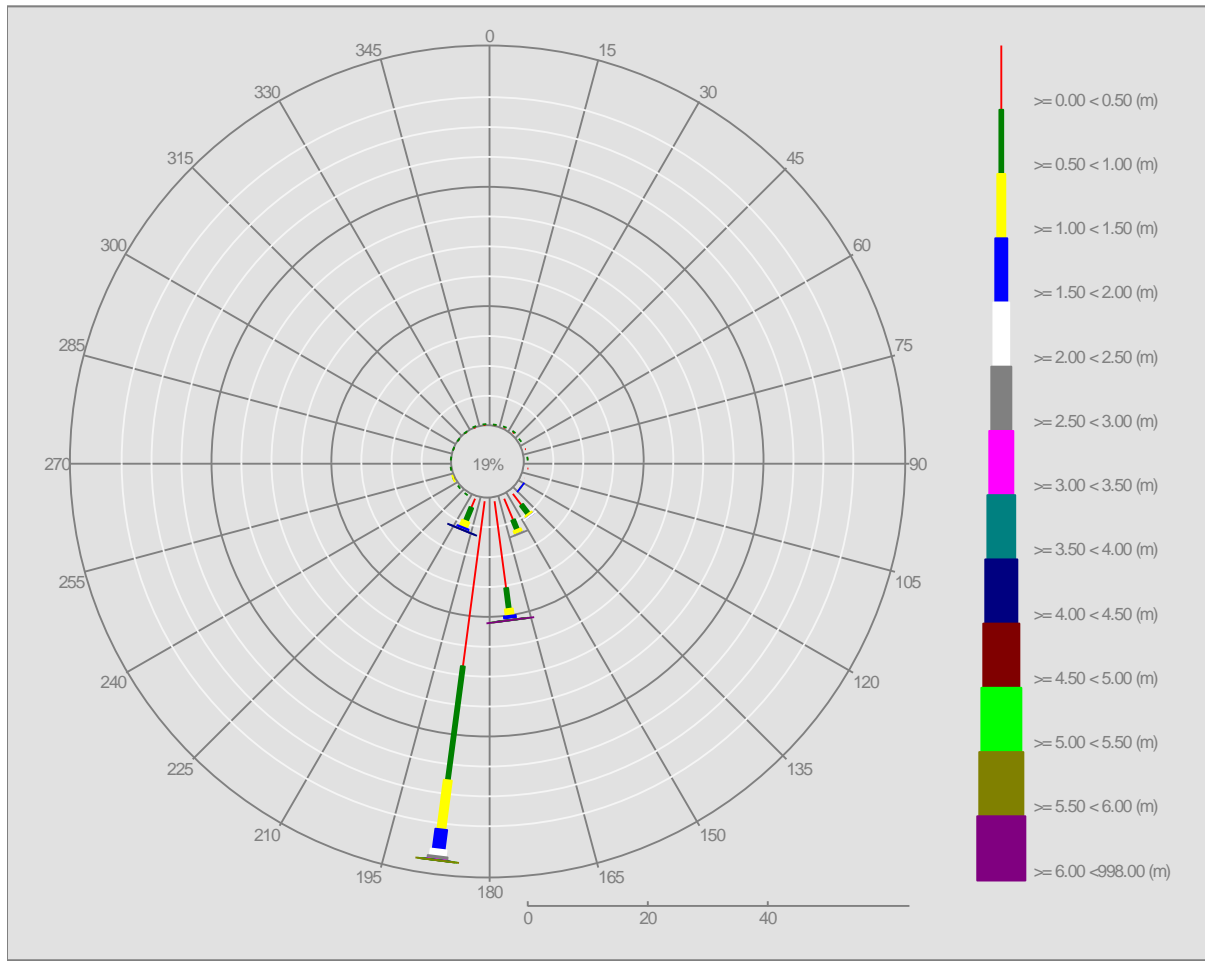
The buoy was first deployed on 6 April 2007 at which time the magnetic declination at the site was 3.9° west, changing by 0.15° east per year.

## Acknowledgements

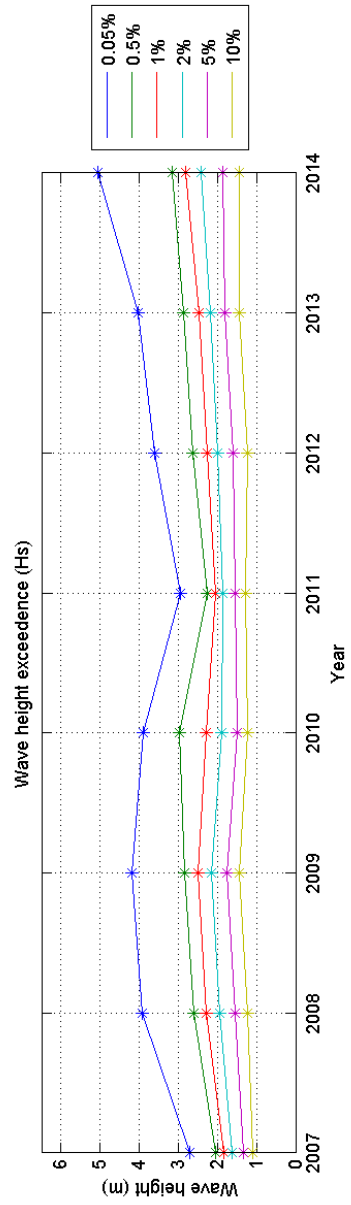
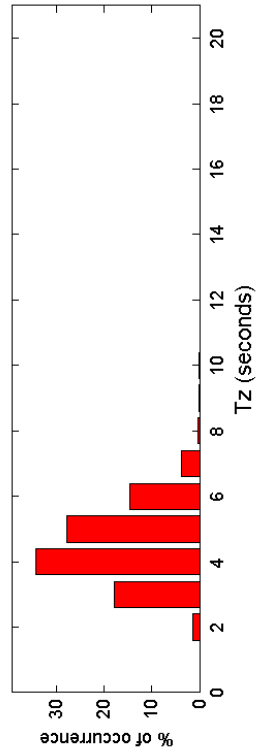
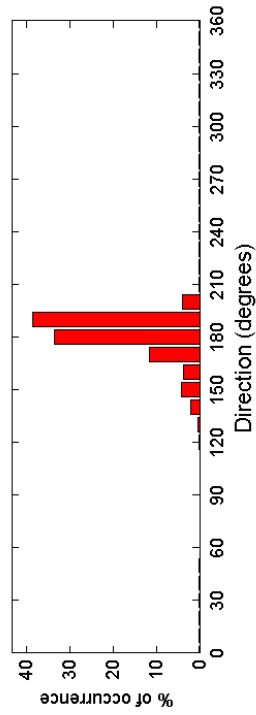
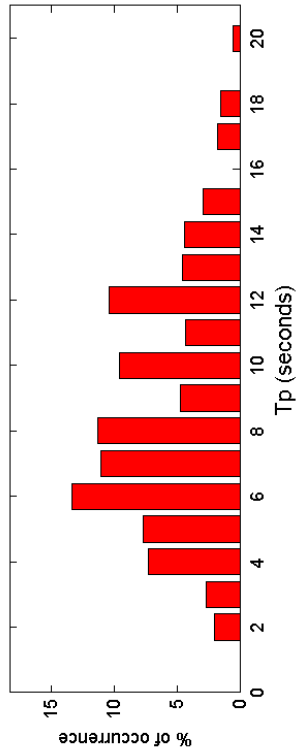
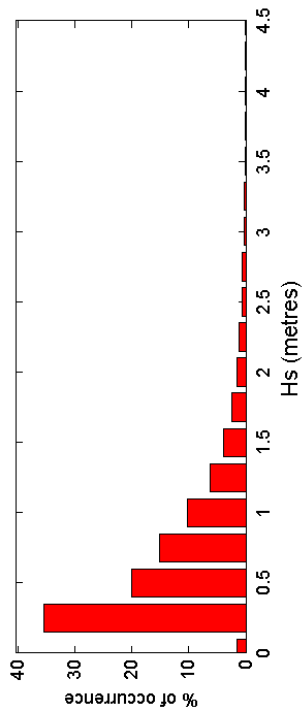
The shore station is kindly hosted by Penzance Harbourmaster. Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research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

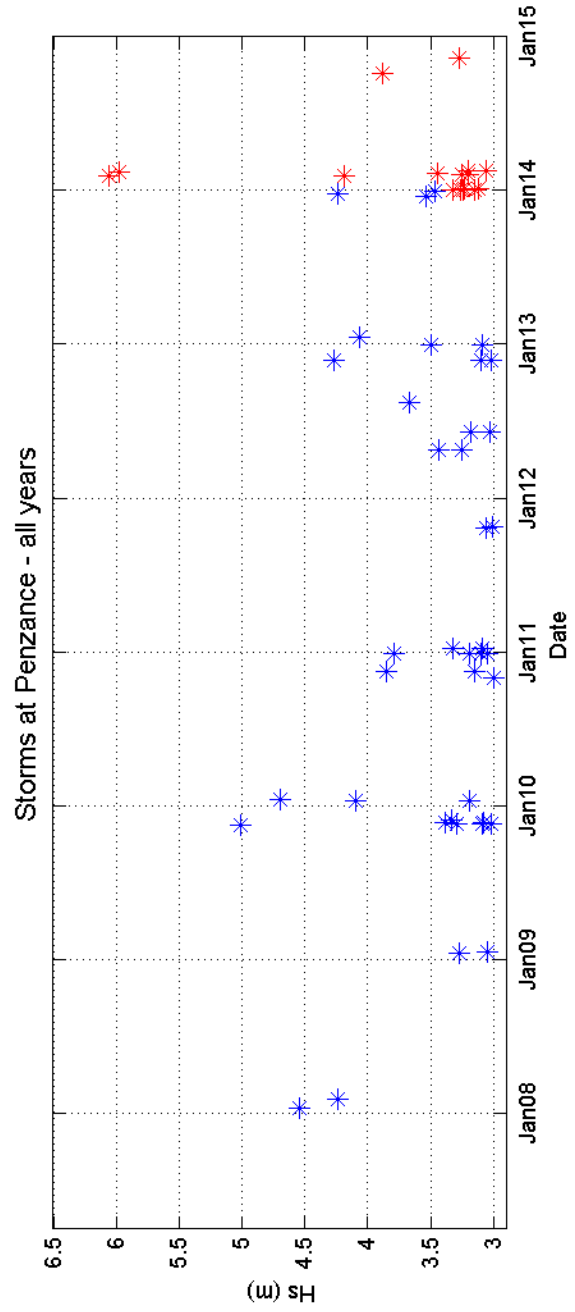
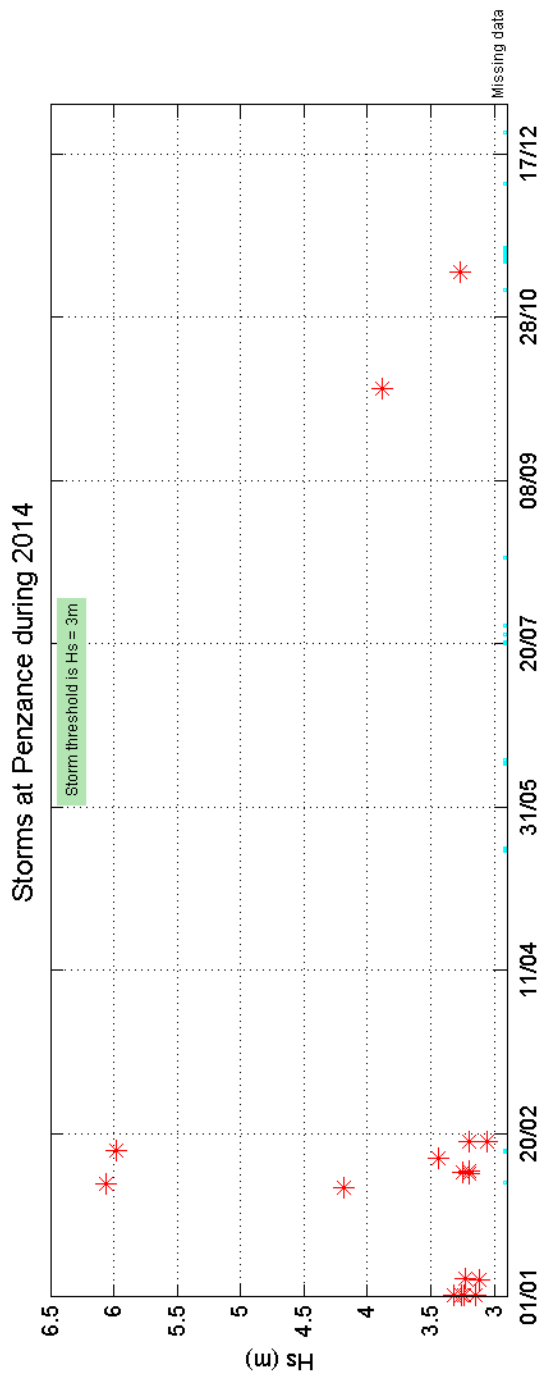


### Offshore Wave Hs (m) Penzance WB : 06/04/2007 - 31/12/2014



Penzance 2014





Penzance 2007 to 2014 - Joint distribution (% of occurrence)

