



Penzance Directional Waverider Buoy

Location			
OS	149654 E 29682 N		
WGS84	Latitude: 50° 06.86' N Longitude: 05° 30.19' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~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
97	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	0.88	10.2	4.7	187	10.6	30
February	0.63	10.3	4.6	176	9.3	28
March	0.61	10.5	4.6	181	9.5	31
April	0.49	8.6	3.9	172	10.8	30
May	0.60	8.7	4.3	184	12.1	31
June	0.39	7.8	4.0	174	13.8	30
July	0.53	7.3	4.1	183	15.4	31
August	0.52	8.1	4.3	184	15.5	31
September	0.46	7.7	4.0	173	15.5	30
October	0.69	8.4	4.5	174	14.7	29
November	0.91	8.3	4.3	190	13.7	27
December	1.68	8.5	5.1	188	12.4	27

Monthly Averages - All Years (April 2007 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)
January	0.93	10.1	5.0	184	9.4
February	0.82	10.4	4.9	181	8.6
March	0.63	9.6	4.4	179	8.8
April	0.55	9.0	4.4	177	10.1
May	0.49	8.2	4.1	180	11.7
June	0.47	8.0	4.1	180	13.7
July	0.47	7.1	4.1	184	15.0
August	0.49	7.5	4.2	183	15.3
September	0.44	8.3	4.2	178	15.2
October	0.71	8.4	4.4	181	14.4
November	0.78	9.1	4.6	186	12.5
December	0.94	9.5	4.8	183	10.7

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)
30-Dec-2015 08:30	4.60	10.0	7.5	186	2.42	HW +1	4.1	0.44	0.55
15-Jan-2015 00:00	3.65	10.5	6.9	196	1.69	HW +1	2.3	0.56	0.56

Annual Statistics

Year	Annual H _s exceedance* (m)						Annual Maximum H _s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A _{max} (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 ⁺
2009	4.25	2.83	2.52	2.15	1.75	1.43	14-Nov-2009 09:30	5.01 ⁺
2010	3.91	3.01	2.31	1.90	1.50	1.23	16-Jan-2010 03:30	4.70 ⁺
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	2.00	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 ⁺
2014	5.07	3.15	2.82	2.42	1.85	1.43	04-Feb-2014 19:00	6.06 ⁺
2015	3.94	2.62	2.39	2.14	1.72	1.41	30-Dec-2015 08:30	4.60

* i.e. 5 % of the H_s 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.

Distribution plots

The distribution of wave parameters are shown in the accompanying graphs 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 Newlyn). 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.

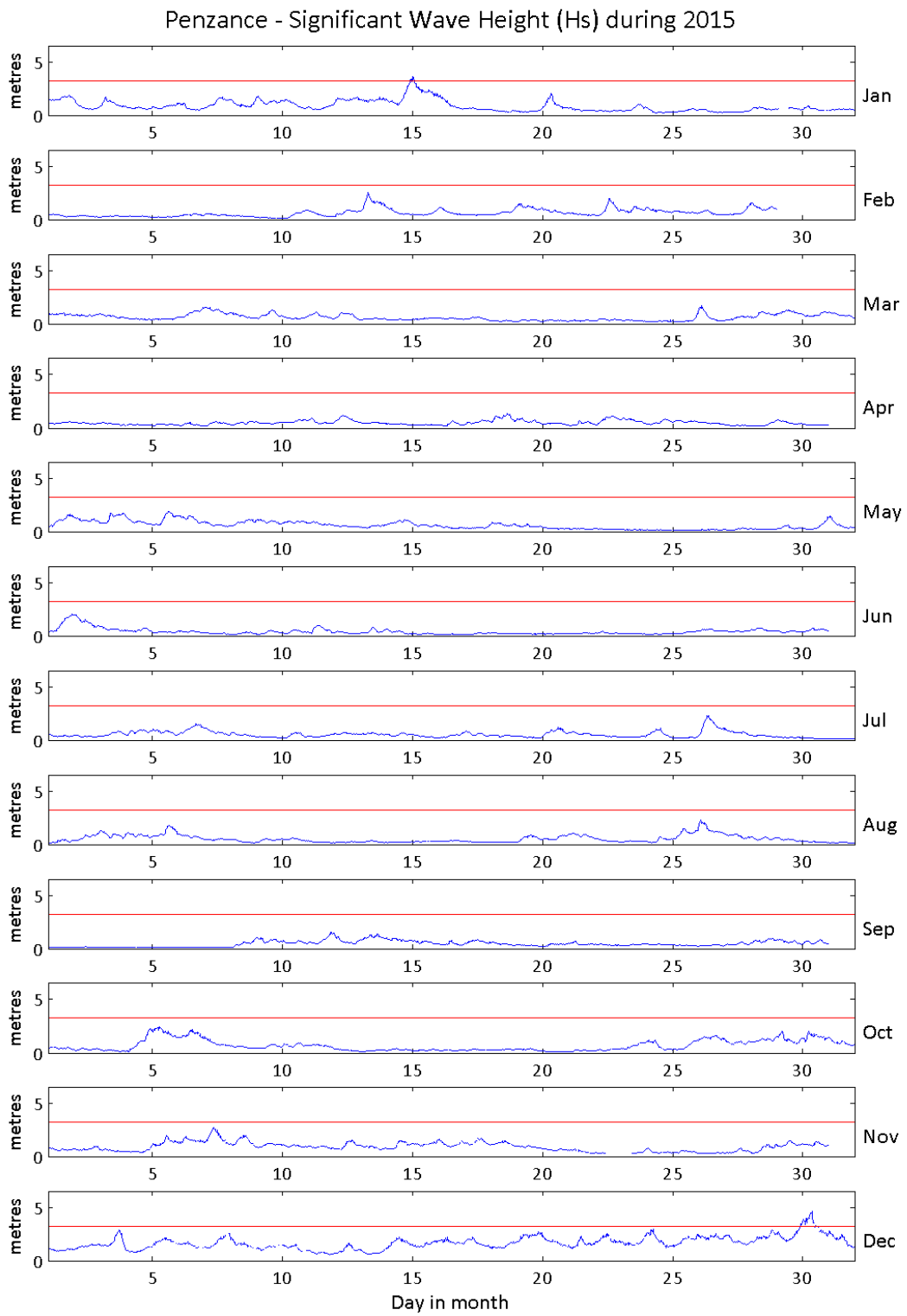
Return period (years)	Significant wave height (m)	Comments
1	4.4	Depth-limited at MLWS
2	4.8	
5	5.3	
10	5.7	
20	6.1	Depth-limited at MHWS
50	6.6	Depth-limited at HAT

General

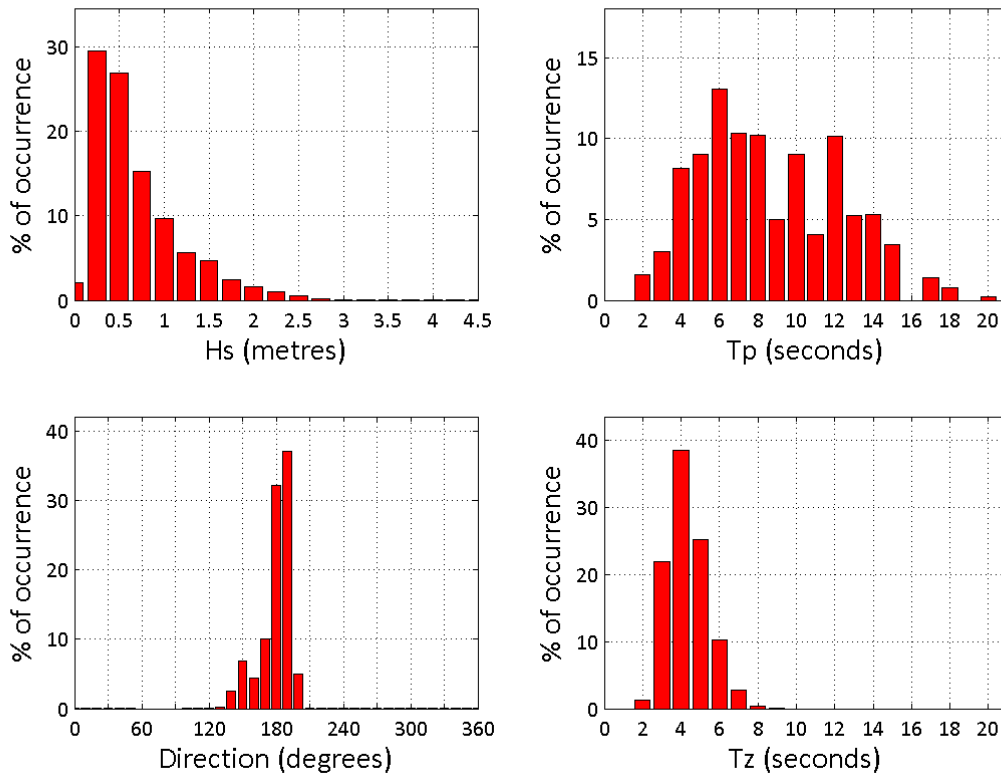
The buoy was first deployed on 6 April 2007 at which time the magnetic declination at the site was 3.9° west, changing by 0.15° east per year.

Acknowledgements

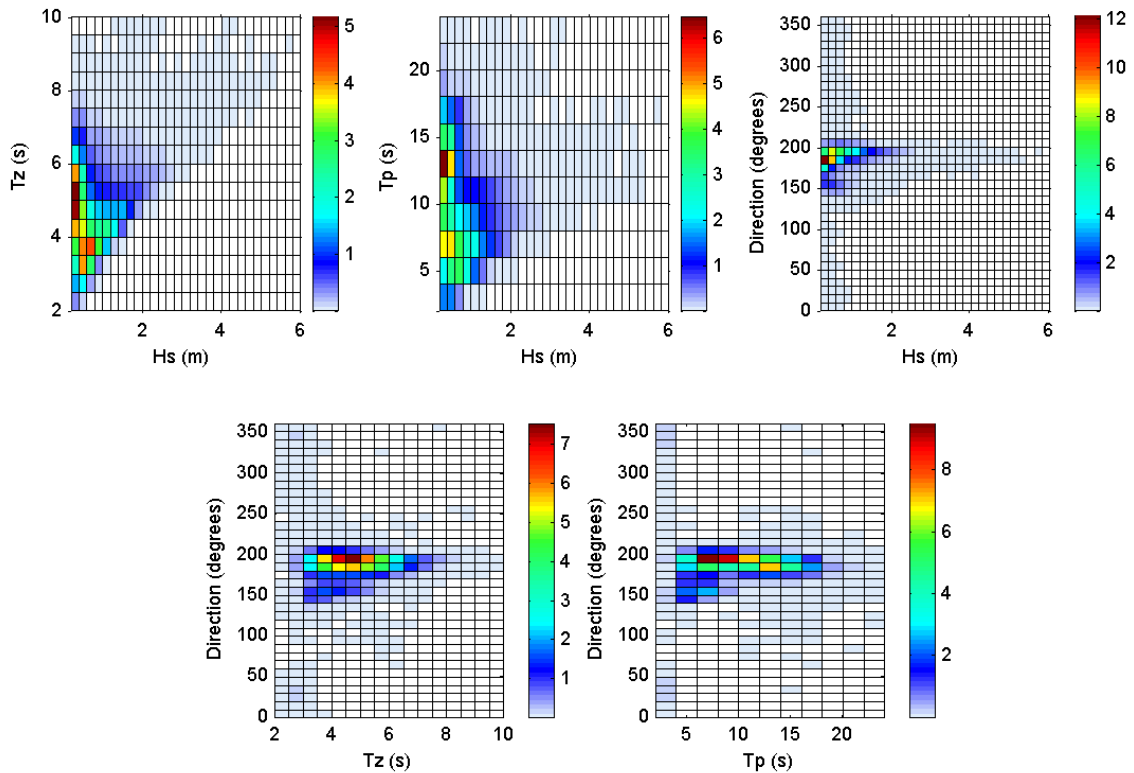
The shore station is kindly hosted by Penzance Harbourmaster. Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research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



Penzance 2015



Penzance 2007 to 2015 - Joint distribution (% of occurrence)



Offshore Wave Hs (m) Penzance WB : 06/04/2007 - 31/12/2015

