



Porthleven Directional Waverider Buoy

Location			
OS	163399 E 23295 N		
WGS84	Latitude: 50° 03.76' N Longitude: 05° 18.44' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~15m CD	Buoy in situ off Porthleven. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
92	30 minutes

Monthly Averages - 2017

*All times are**GMT*

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	1.20	10.7	5.6	235	10.5	14	29
February	1.84	11.6	6.0	233	10.1	23	25
March	1.57	10.6	5.7	236	10.2	26	28
April	0.62	10.9	5.2	233	11.4	3	27
May	0.92	10.1	5.4	232	12.6	4	29
June	1.05	9.3	5.2	241	14.5	7	30
July	0.82	8.2	4.6	236	15.5	3	31
August	0.84	7.9	4.7	240	15.6	1	31
September	1.28	9.1	5.2	237	15.3	12	30
October	0.87	9.5	5.0	240	14.6	10	15
November	1.05	9.6	4.9	238	13.1	12	30
December	1.47	10.2	5.3	234	11.2	17	31

Monthly Averages - All Years (October 2011 – December 2016)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.97	11.1	6.0	236	10.3	22
February	1.39	11.8	6.0	237	9.5	16
March	1.20	11.6	6.0	237	9.4	12
April	1.10	10.7	5.4	234	10.0	9
May	0.89	9.4	5.0	233	11.7	7
June	0.92	9.1	5.0	232	13.7	4
July	0.79	8.7	4.7	233	15.5	2
August	0.99	8.9	4.9	234	15.9	4
September	0.82	10.0	5.1	232	15.8	6

October	1.24	10.1	5.5	232	14.8	12
November	1.44	10.6	5.8	236	13.0	14
December	2.03	10.8	6.0	235	11.5	21

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)
02-Feb-2017 22:30	8.51	16.7	10.5	233	1.45	HW +2	3.86	0.36	0.39
05-Mar-2017 17:00	5.97	28.6	10.5	87	-1.25	HW -5	3.16	0.11	0.11
31-Dec-2017 02:30	4.77	10.0	7.4	232	~2.45	HW	~4.00	~0.25	~0.25

* Tidal information is obtained from 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 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)
2011	-	-	-	3.98	3.40	2.83	13-Dec-2011 06:00	4.84
2012	5.52	4.3	3.79	3.35	2.78	2.19	15-08-2012 18:30	5.95 ⁺
2013	5.82	4.61	4.20	3.81	3.18	2.56	23-Dec-2013 21:30	6.43 ⁺
2014	6.57	4.83	4.28	3.54	2.93	2.39	03-Jan-2014 18:30	6.99 ⁺ ***
2015	5.89	4.76	4.22	3.71	3.20	2.69	30-Dec-2015 08:00	7.13 ⁺
2016	5.57	4.48	4.08	3.51	2.80	2.31	08-Feb-2016 13:00	6.14 ⁺
2017	6.01	3.93	3.36	2.98	2.51	2.14	02-Feb-2017 22:30	8.51 ⁺

** i.e. 5% of the H_s values measured in 2011 exceeded 3.40 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.

*** The buoy was badly damaged at the height of the storms in early February 2014 and accordingly may have missed even higher wave conditions later that month.

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 0.5 hourly records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Weibull distribution.

Observation period	October 2011 to June 2017	
Return period (years)	Significant wave height (m)	Comments
0.25	5.17	No depth limitation
1	6.21	Depth-limited at MLWS
2	6.70	
5	7.32	Depth-limited at MHWS
10	7.78	Depth-limited at HAT
20	8.22	
50	8.79	

Distribution plots

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

- Annual time series of H_s (red line is 5.17 m storm alert threshold)
- Incidence of storm waves for 2017. 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 2017
- Wave rose (percentage of occurrence of direction vs. H_s) for all measured data
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

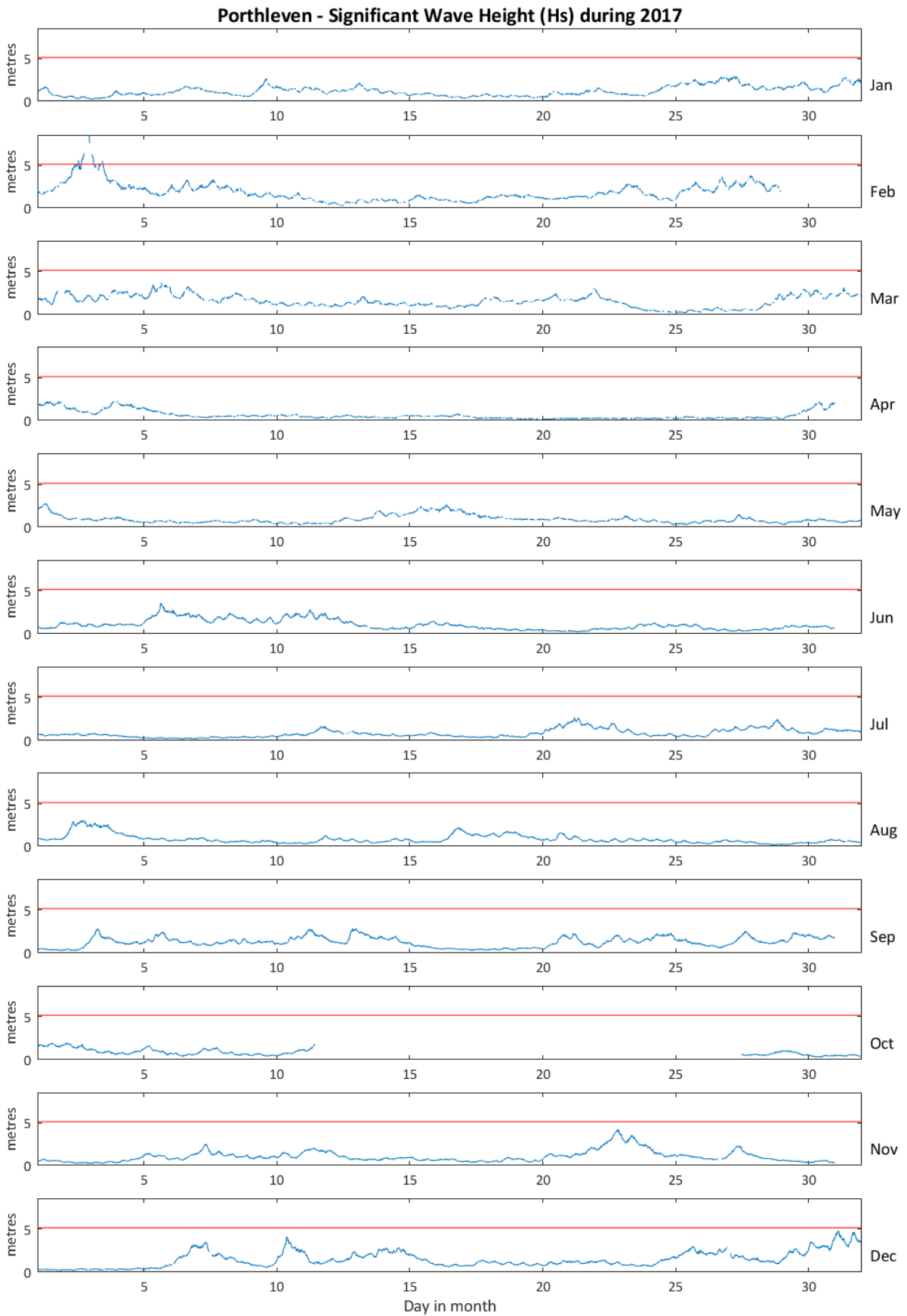
General

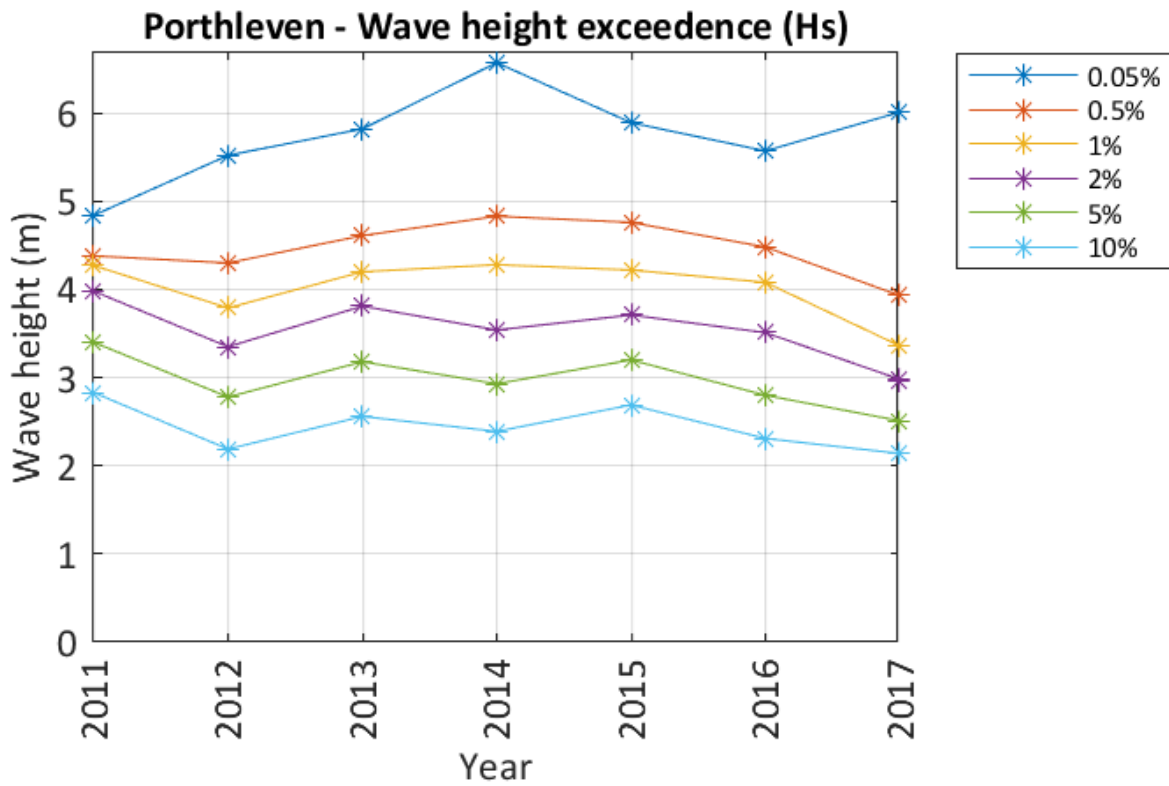
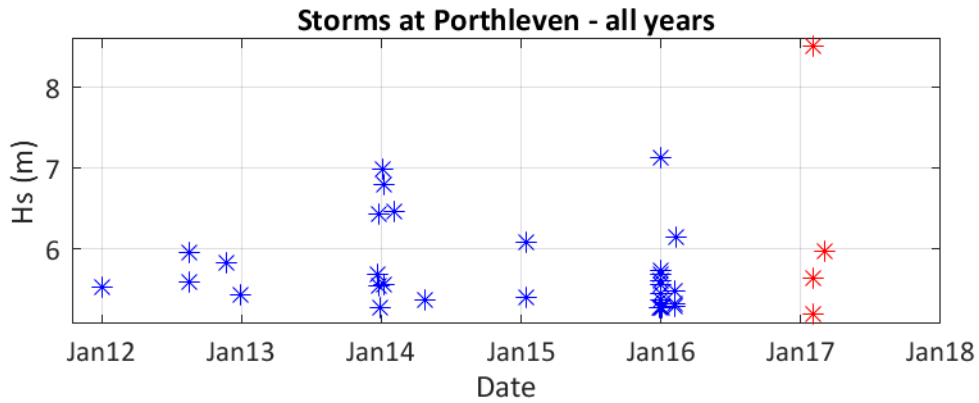
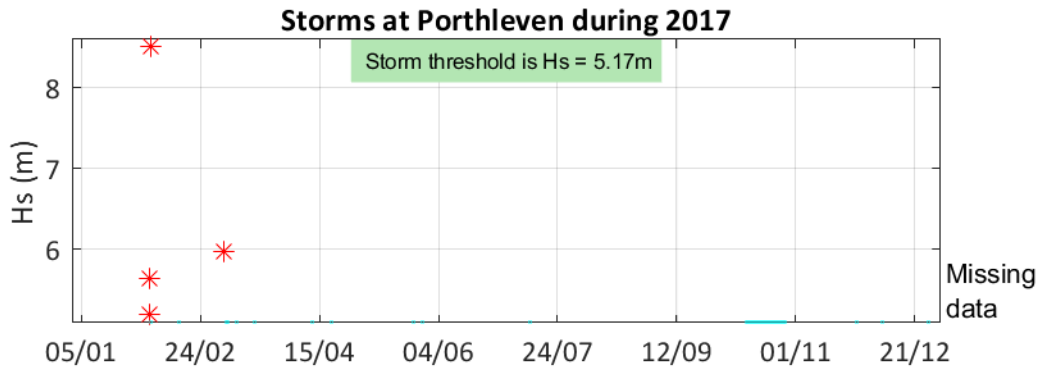
The buoy, owned by Teignbridge District Council, was first deployed on 17 October 2011, at which time the magnetic declination at the site was 3.2° west, changing by 0.15° east per year.

Acknowledgements

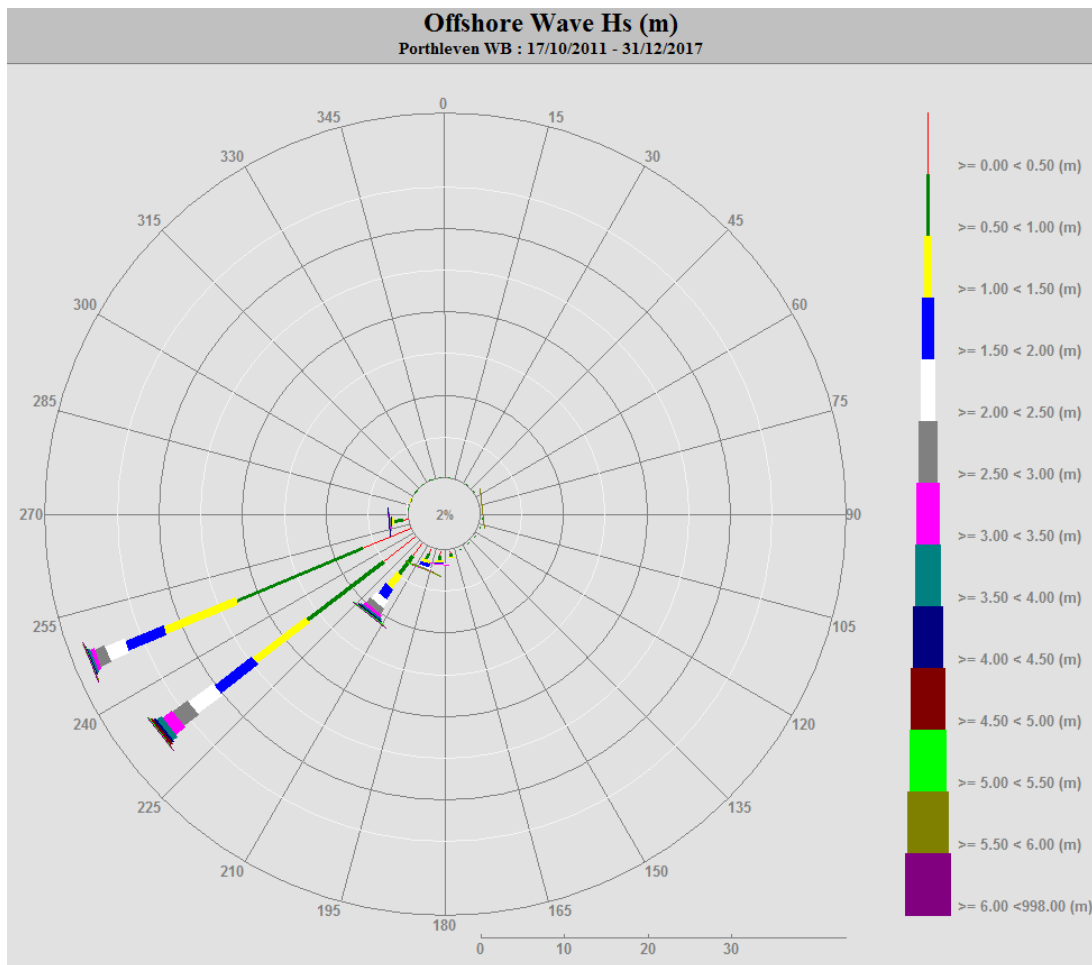
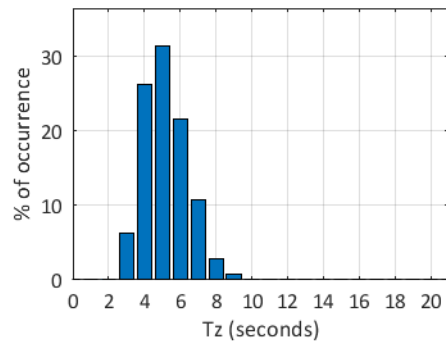
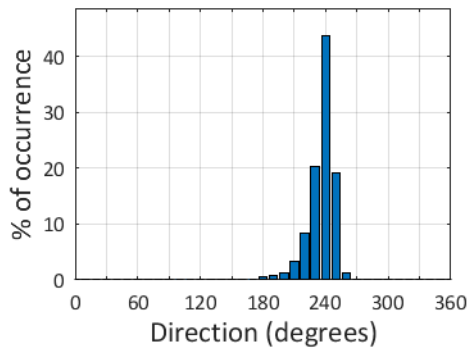
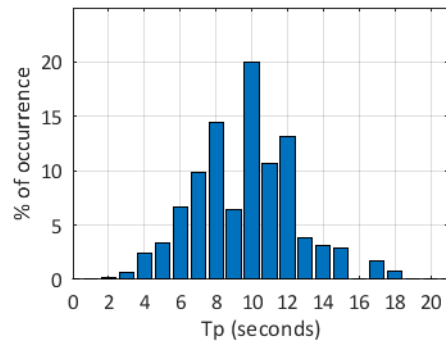
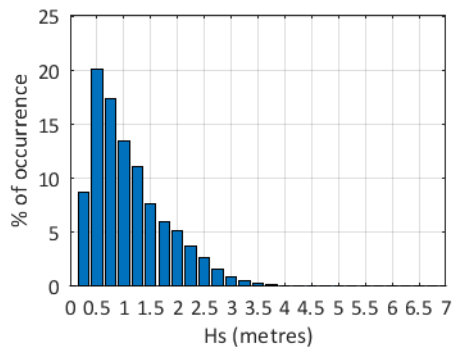
The shore station is kindly hosted by Penzance Harbourmaster.

Tidal data at Newlyn were provided by the British Oceanographic Data Centre from the UK national tide gauge network, owned and operated by the Environment Agency.





Porthleven 2017



Porthleven 2011 to 2017 - Joint distribution (% of occurrence)

