



Porthleven Directional Waverider Buoy

Location			
OS	163395 E 23270 N		
WGS84	Latitude: 50° 03.74' 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 EMU Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
98	30 minutes

Monthly Averages - 2016

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	2.37	11.0	6.2	233	10.6	21	31
February	1.88	11.5	6.3	236	10.0	24	29
March	1.30	11.5	6.2	240	9.6	12	31
April	1.11	10.7	5.2	225	10.2	15	30
May	0.72	9.9	5.3	229	12.0	6	31
June	0.81	9.0	5.4	240	13.8	3	29
July	0.79	9.0	4.8	239	15.0	4	31
August	0.93	9.2	4.9	236	15.8	6	31
September	1.23	10.2	5.5	239	16.3	20	30
October	0.83	10.6	5.5	235	14.8	7	31
November	0.88	10.1	5.1	234	13.1	11	28
December	1.42	11.5	6.1	232	11.7	18	29

Monthly Averages - All Years (October 2011 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.87	11.2	6.0	237	10.3	22
February	1.23	11.9	6.0	238	9.3	13
March	1.17	11.6	6.0	236	9.3	12
April	1.09	10.6	5.5	236	10.0	8
May	0.93	9.2	4.9	234	11.7	7
June	0.95	9.1	4.9	231	13.7	4
July	0.80	8.6	4.7	232	15.6	2
August	1.00	8.8	4.9	234	15.9	4
September	0.72	10.0	5.1	230	15.7	3
October	1.33	10.0	5.5	231	14.8	13
November	1.54	10.6	6.0	237	13.0	14
December	2.15	10.7	5.9	236	11.5	22

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)
08-Feb-2016 13:00	6.14	15.4	9.1	241	-0.99	HW -4	4.56	0.04	0.12
02-Jan-2016 09:30	5.61	14.3	9.1	225	1.70	HW	2.23	0.19	0.55
06-Feb-2016 16:30	5.48	11.1	8.0	221	1.88	HW +1	3.70	0.38	0.47
26-Jan-2016 18:00	5.08	10.0	7.7	226	2.42	HW	4.36	0.17	0.30
27-Jan-2016 06:00	4.94	11.1	7.7	231	2.38	HW -1	4.46	0.05	0.20

* 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 ⁺

** 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 and 3-hourly records and are calculated for periods up to 10 times the record length, using a Weibull distribution.

0.5-hourly records October 2011 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	7.0	Depth-limited at MHWS
2	7.2	
5	7.6	Depth-limited at HAT
10	7.8	
20	8.0	
50	8.3	

3-hourly records October 2011 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	6.4	Depth-limited at MLWS
2	6.8	
5	7.3	Depth-limited at MHWS
10	7.6	Depth-limited at HAT
20	8.0	
50	8.5	

Distribution plots

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

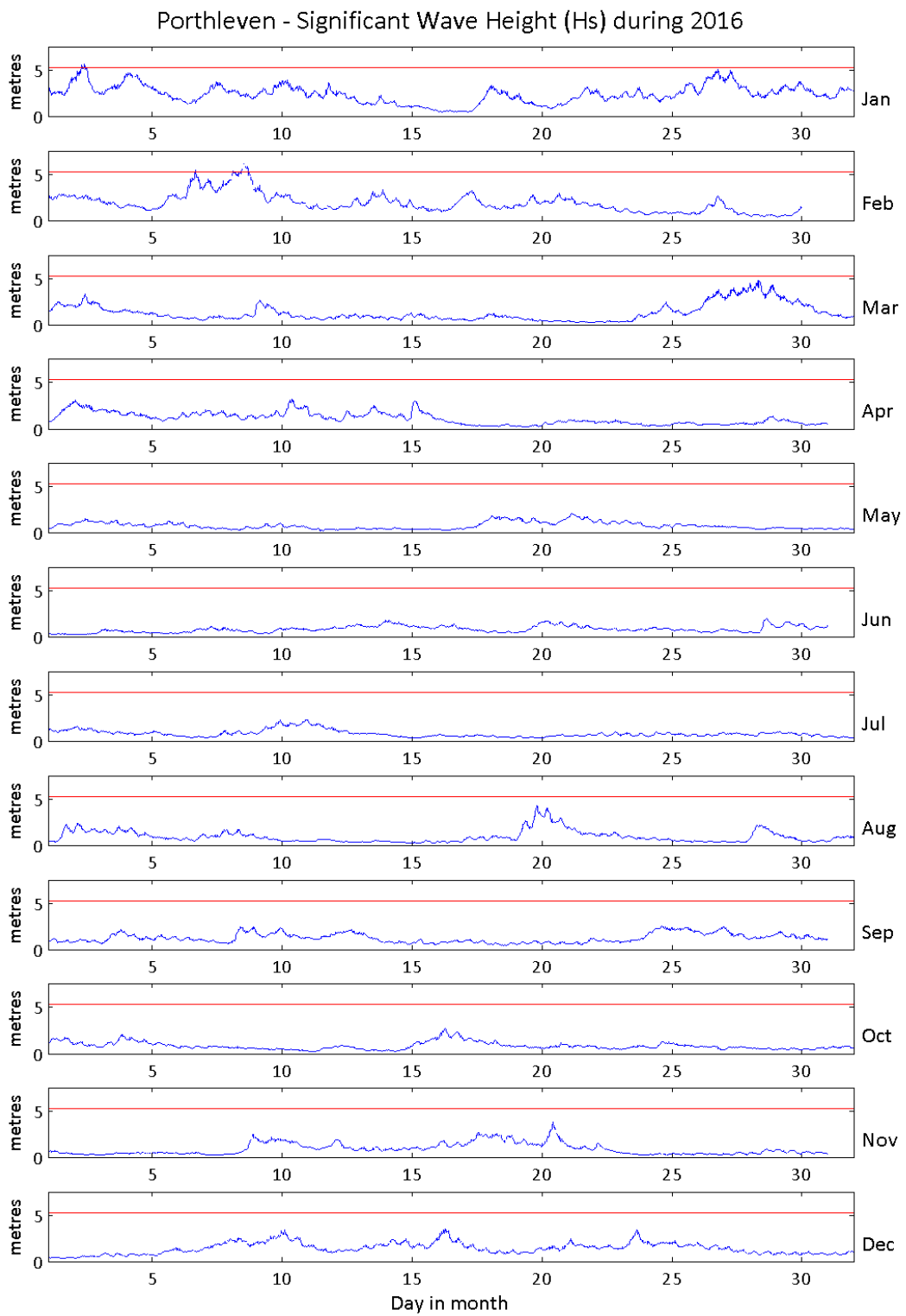
- Annual time series of H_s (red line is 5.25 m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s , T_p , T_z and Direction for 2016
- 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

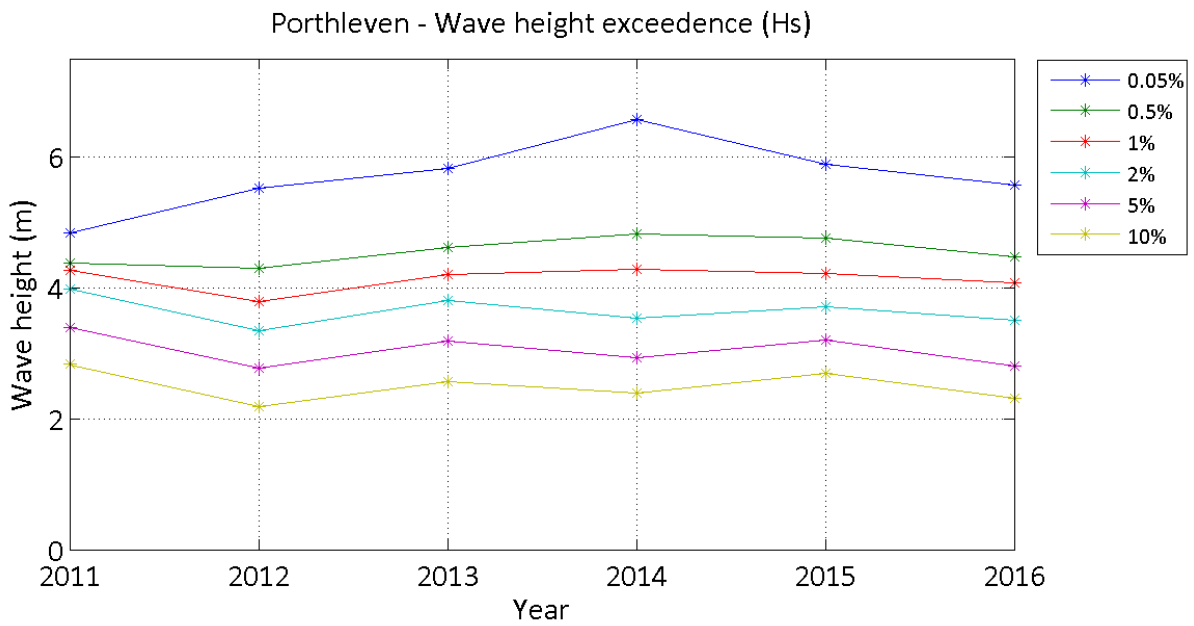
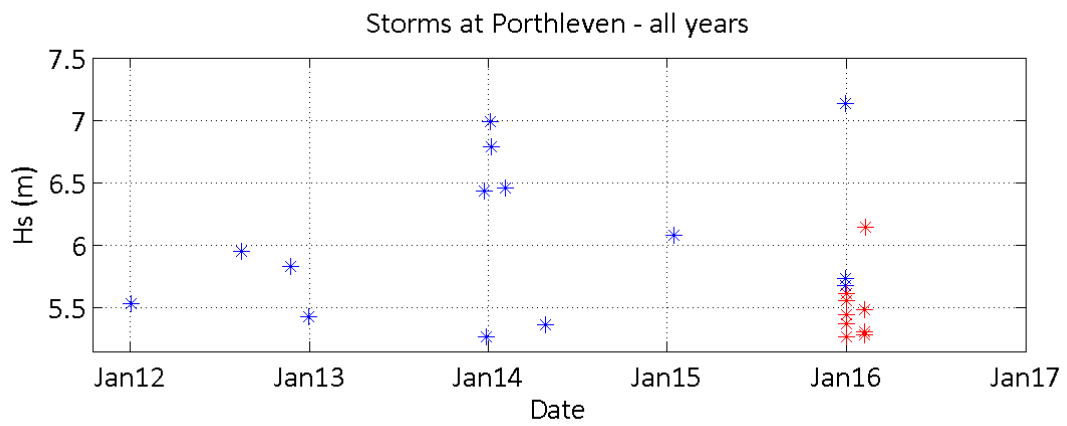
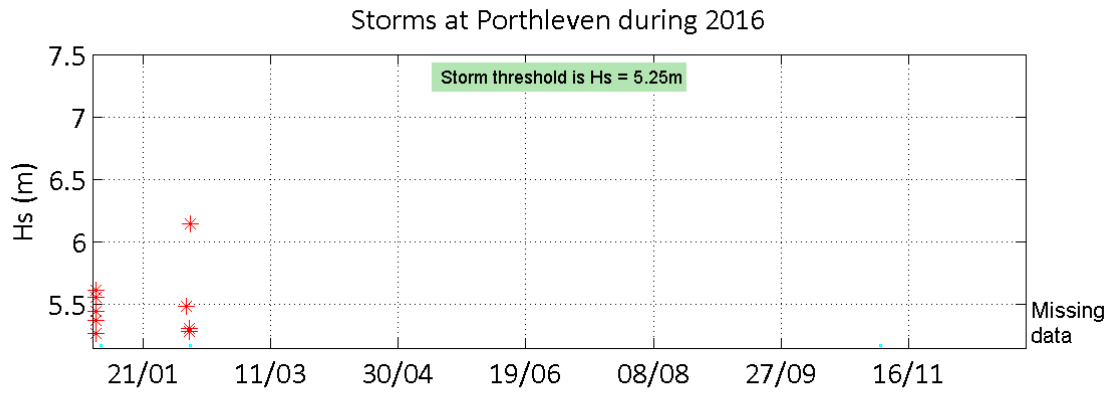
General

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.

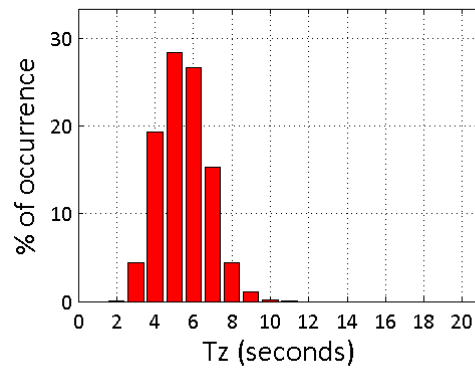
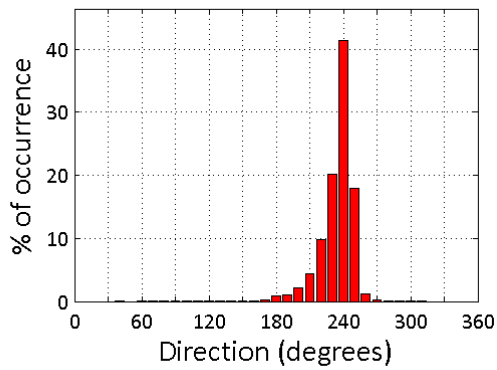
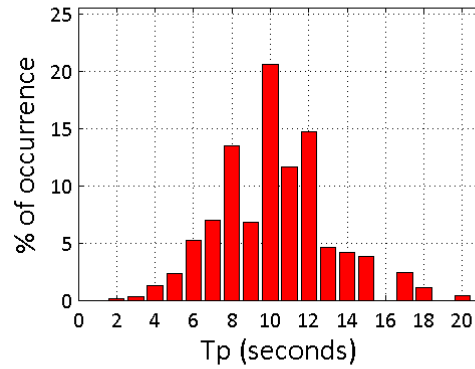
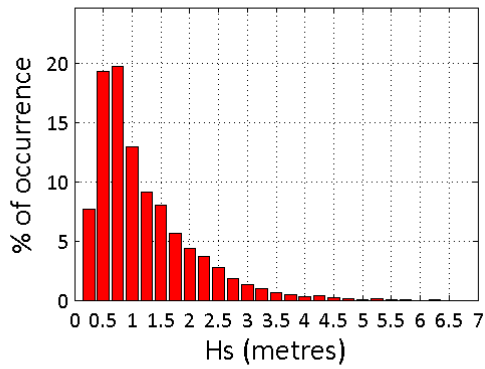
Acknowledgements

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Porthleven 2016



Porthleven 2011 to 2016 - Joint distribution (% of occurrence)

