



Weymouth Directional Waverider Buoy

Location			
OS	370856 E 80452 N		
WGS84	Latitude: 50° 37.38' N Longitude: 02° 24.80' W		
Instrument type		Buoy in situ in Weymouth Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping, image ©2016 Getmapping plc)
Datawell Directional Waverider Mk III			
Water depth	~10 m CD		

Data Quality

Recovery rate (%)	Sample interval
99	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	0.81	7.6	4.3	158	10.0	2	30
February	0.65	8.3	4.2	157	9.3	3	29
March	0.50	7.4	4.0	155	8.7	1	31
April	0.42	6.0	3.9	157	10.0	0	30
May	0.31	5.3	3.4	149	12.1	0	31
June	0.30	5.9	3.7	158	14.7	0	30
July	0.30	5.3	3.4	165	16.7	0	31
August	0.36	5.6	3.5	160	18.2	0	31
September	0.39	5.7	3.6	161	18.3	0	30
October	0.54	5.9	3.8	140	15.8	0	31
November	0.55	6.0	4.1	153	13.0	0	30
December	0.50	8.3	4.0	154	11.1	0	31

Monthly Averages - All Years (December 2006 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.64	7.8	4.2	157	8.7	2
February	0.57	8.5	4.2	155	7.8	1
March	0.46	7.1	3.9	154	8.2	1
April	0.41	6.5	3.7	150	9.8	0
May	0.39	5.6	3.6	155	12.0	0
June	0.36	5.7	3.6	155	14.6	0
July	0.35	5.4	3.5	162	16.7	0
August	0.36	5.3	3.5	160	17.5	0
September	0.40	5.7	3.6	154	17.1	0
October	0.53	6.3	3.8	155	15.5	0
November	0.58	6.6	4.0	157	13.1	1
December	0.62	7.2	4.1	157	10.3	2

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)
20-Nov-2016 02:00	3.87	9.1	6.9	149	-0.13	HW +4	1.1	-	-
28-Mar-2016 02:30	3.77	9.1	7.0	153	-0.53	HW -6	1.7	-	-
01-Jan-2016 21:30	2.84	7.1	5.7	138	0.27	HW -1	0.9	-	-
06-Feb-2016 19:30	2.49	7.7	5.6	165	0.27	HW +2	1.2	-	-

* Tidal information is obtained from the predicted tide levels (Admiralty Total Tide).

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	2.29	1.72	1.43	1.24	1.03	0.85	18-Nov-2007 13:30	2.56
2008	2.57	1.95	1.75	1.46	1.10	0.89	03-Feb-2008 13:00	2.74
2009	2.17	1.75	1.63	1.48	1.18	0.90	13-Nov-2009 23:30	2.62
2010	2.54	1.84	1.54	1.29	1.00	0.81	17-Nov-2010 10:00	2.81
2011	2.16	1.77	1.54	1.26	1.03	0.85	24-Oct-2011 00:00	2.30
2012	2.82	1.81	1.60	1.38	1.08	0.86	30-Apr-2012 05:00	3.34
2013	2.47	1.89	1.66	1.47	1.20	0.97	18-Dec-2013 20:30	2.70
2014	3.17	2.30	1.97	1.65	1.28	0.99	05-Feb-2014 00:30	4.02 ⁺
2015	2.43	1.71	1.52	1.31	1.11	0.95	30-Dec-2015 11:30	2.72
2016	3.25	1.95	1.66	1.44	1.12	0.87	20-Nov-2016 02:00	3.87

** i.e. 5 % of the H_s values measured in 2007 exceeded 1.03 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.

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 December 2006 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	3.6	No depth limitation
2	3.9	
5	4.2	Depth-limited at MLWS
10	4.5	
20	4.7	
50	5.1	Depth-limited at MHWS
100	5.3	

3-hourly records December 2006 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	3.0	No depth limitation
2	3.2	
5	3.6	
10	3.8	
20	4.0	
50	4.3	Depth-limited on MLWS
100	4.6	

Distribution plots

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

- Annual time series of H_s (red line is 2.25 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

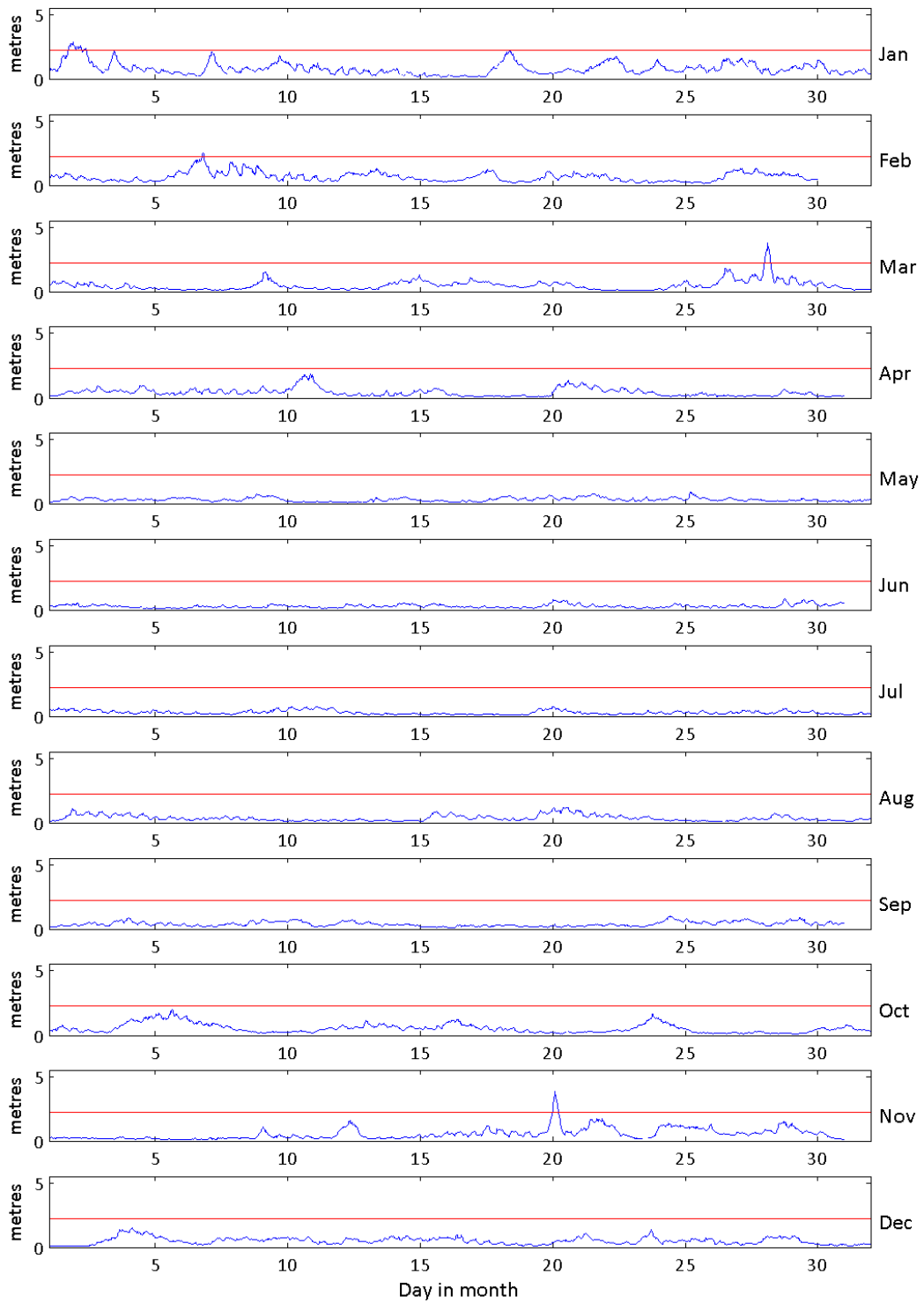
General

The buoy, owned by New Forest District Council, was first deployed on 18 December 2006, at which time the magnetic declination at the site was 2.9° west, changing by 0.15° east per year.

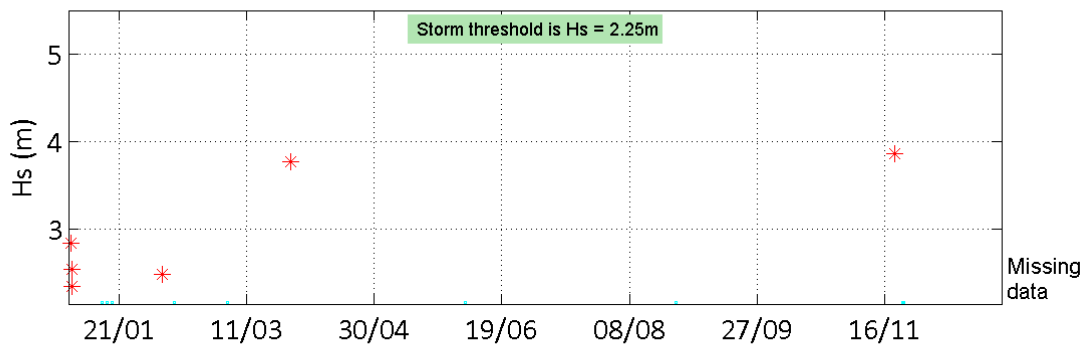
Acknowledgements

The shore station is kindly hosted by the Weymouth and Portland National Sailing Academy.

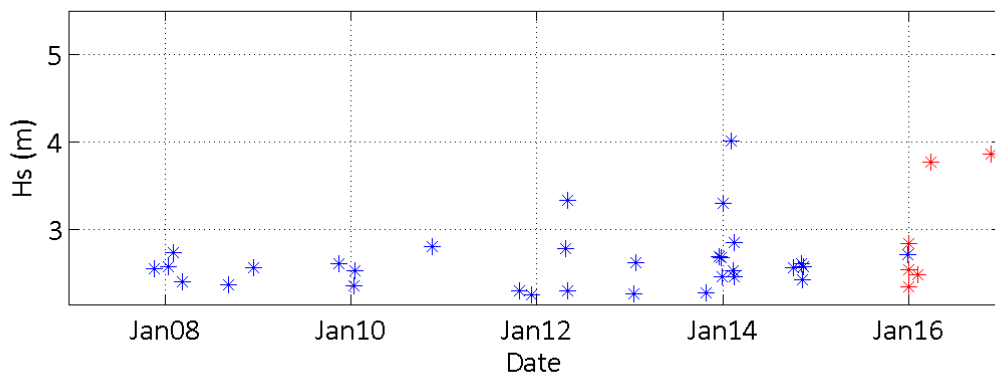
Weymouth - Significant Wave Height (Hs) during 2016



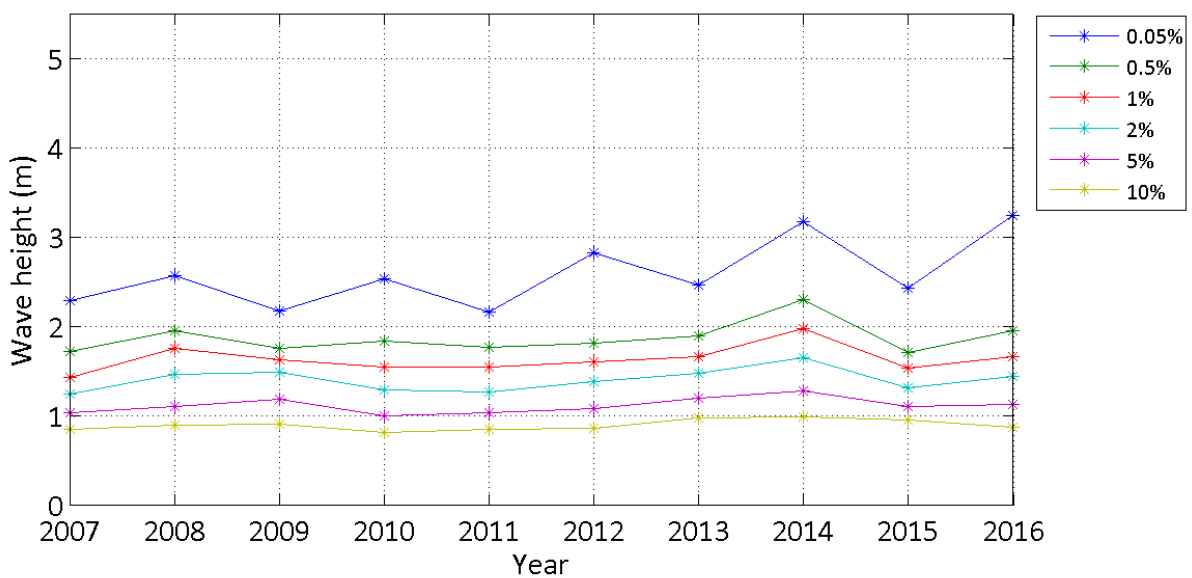
Storms at Weymouth during 2016



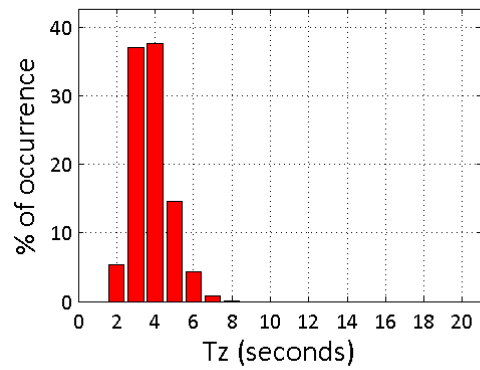
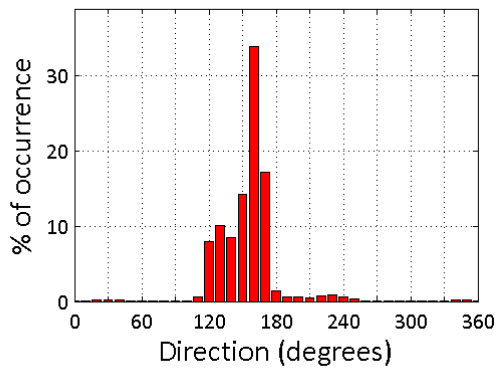
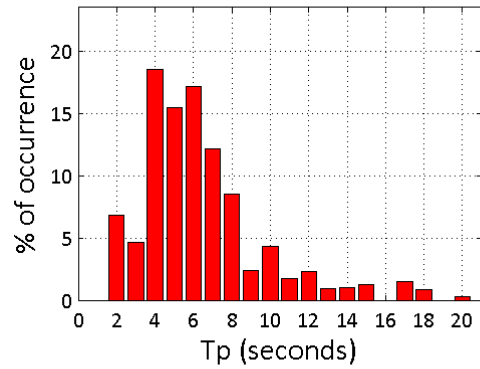
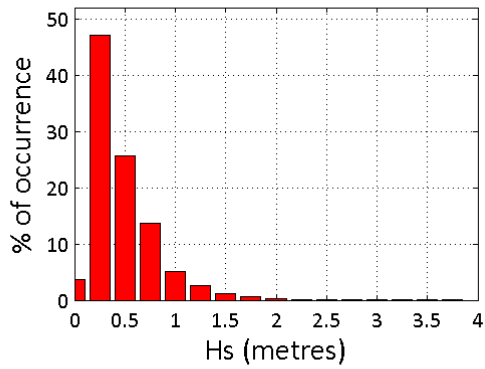
Storms at Weymouth - all years



Weymouth - Wave height exceedence (Hs)



Weymouth 2016



Weymouth 2006 to 2016 - Joint distribution (% of occurrence)

