



## Weymouth Directional Waverider Buoy

<b>Location</b>			
OS	370799 E 80412 N		
WGS84	Latitude: 50° 37.36' N Longitude: 02° 24.85' W		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~10 m CD	Buoy in situ in Weymouth Bay. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 Getmapping plc)

## Data Quality

<b>Recovery rate (%)</b>	<b>Sample interval</b>
100	30 minutes

## Monthly Averages - 2017

*All times are GMT*

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	0.45	6.4	3.8	152	9.5	0	31
February	0.62	8.5	4.2	157	8.6	3	28
March	0.54	8.1	4.1	159	9.3	0	31
April	0.26	6.3	3.7	151	11.1	0	30
May	0.40	5.8	3.6	147	13.0	0	31
June	0.36	6.1	3.6	160	16.0	0	30
July	0.36	4.9	3.5	159	17.9	0	31
August	0.31	5.0	3.4	161	18.1	0	31
September	0.43	6.3	3.8	159	17.2	0	30
October	0.46	6.6	3.8	163	15.7	2	31
November	0.35	6.1	4.0	165	13.3	0	30
December	0.47	7.2	4.2	167	10.2	0	31

## Monthly Averages - All Years (December 2006 – December 2016)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.65	7.7	4.2	157	8.8	2
February	0.58	8.5	4.2	156	8.0	1
March	0.47	7.1	3.9	154	8.3	1
April	0.41	6.4	3.8	151	9.8	0
May	0.38	5.6	3.6	154	12.0	0
June	0.35	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	17.6	0
September	0.40	5.7	3.6	155	17.2	0
October	0.53	6.2	3.8	154	15.5	0
November	0.58	6.5	4.0	157	13.1	1
December	0.61	7.3	4.1	156	10.4	2

## 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)
03-Feb-2017 16:30	2.40	7.1	5.4	139	-0.53	HW -6	1.30	-	-
25-Dec-2017 22:30	2.24	7.1	5.1	165	0.57	HW	1.00	-	-
05-Jun-2017 20:30	2.14	6.7	5.1	160	-0.03	HW +3	1.00	-	-
23-Nov-2017 00:00	1.90	7.7	5.1	166	0.40	HW +3	1.29	0.31	0.42
13-Feb-2017 20:30	1.87	7.7	4.9	127	1.17	HW	2.10	-	-

\* Tidal information is obtained from the National Network tide gauge at Weymouth and/or from the predicted tide levels (Admiralty Total Tide).

## 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	2.29	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 <sup>+</sup>
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
2017	2.07	1.65	1.50	1.30	1.01	0.78	03-Feb-2017 16:30	2.40

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2007 exceeded 1.03 m

<sup>+</sup>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 records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Weibull distribution.

Observation period	December 2006 to December 2017	
Return period (years)	Significant wave height (m)	Comments
0.25	2.33	No depth limitation
1	3.01	
2	3.36	
5	3.83	
10	4.20	Depth-limited at MLWS
20	4.58	
50	5.09	Depth-limited at MHWS
100	5.47	

## Distribution plots

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

- Annual time series of  $H_s$  (red line is 4.31 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

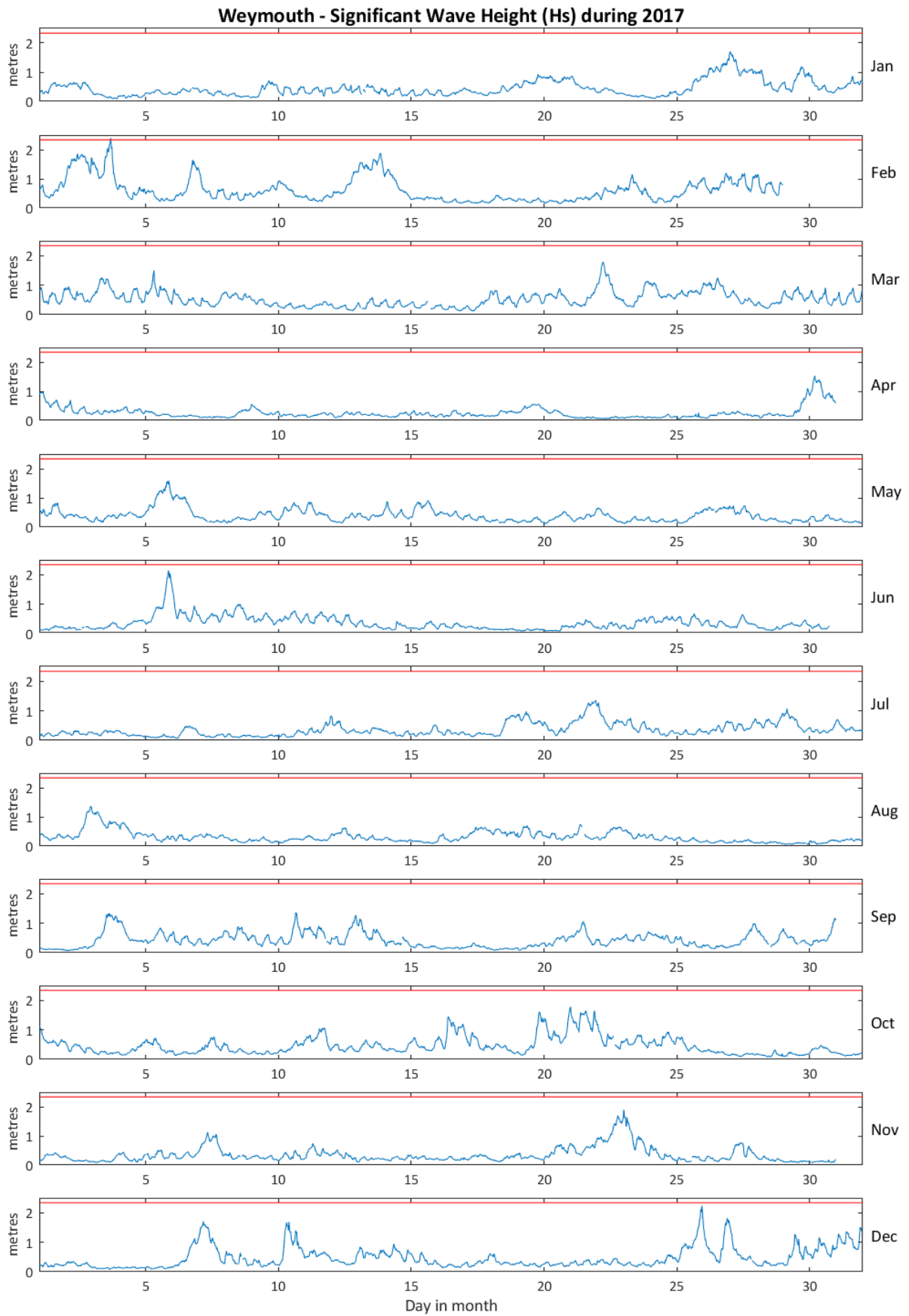
## General

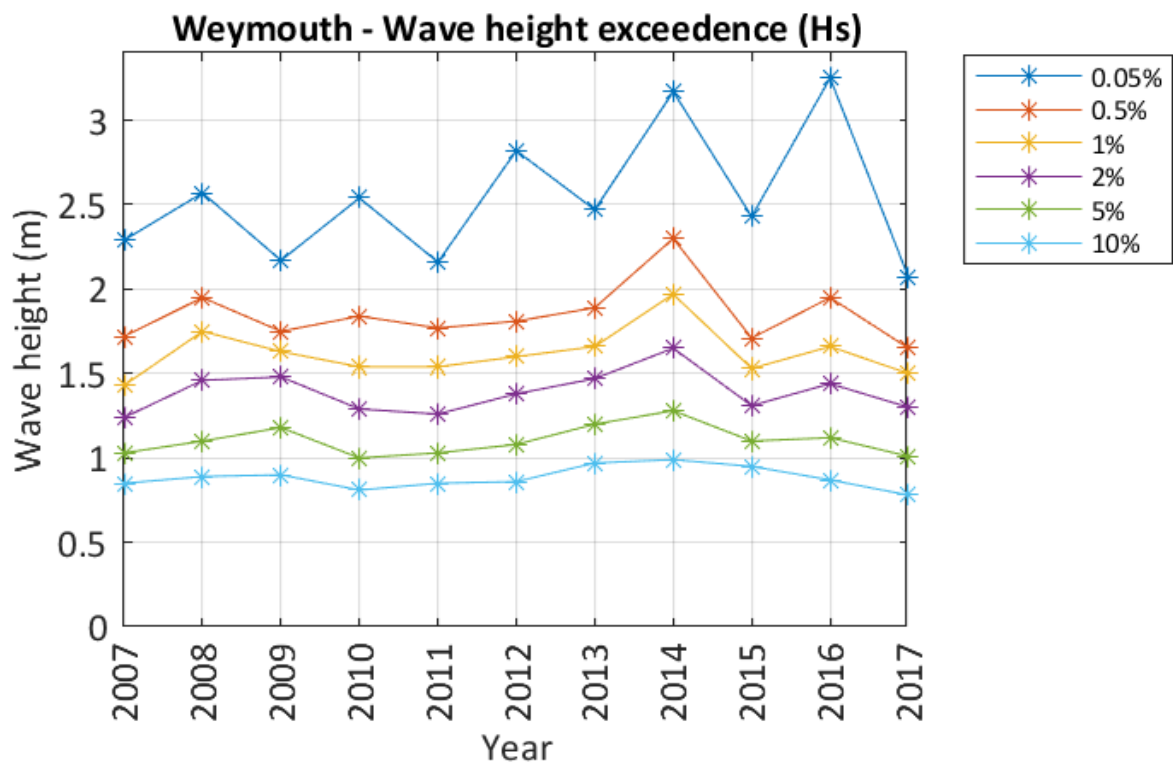
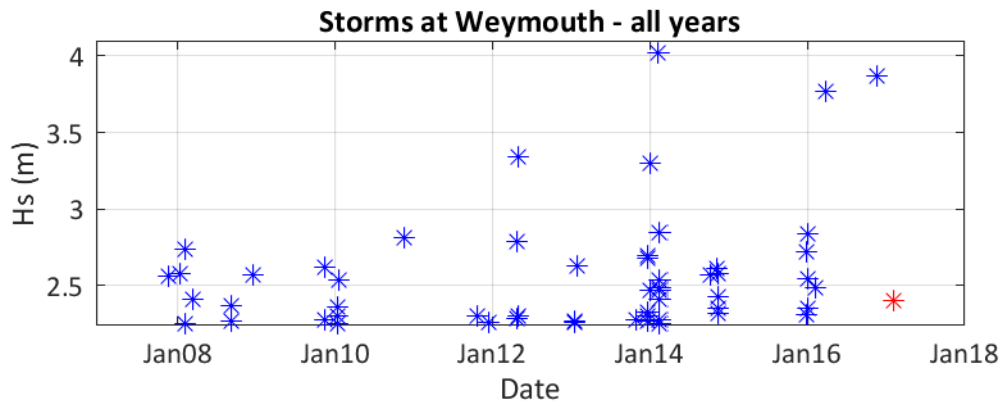
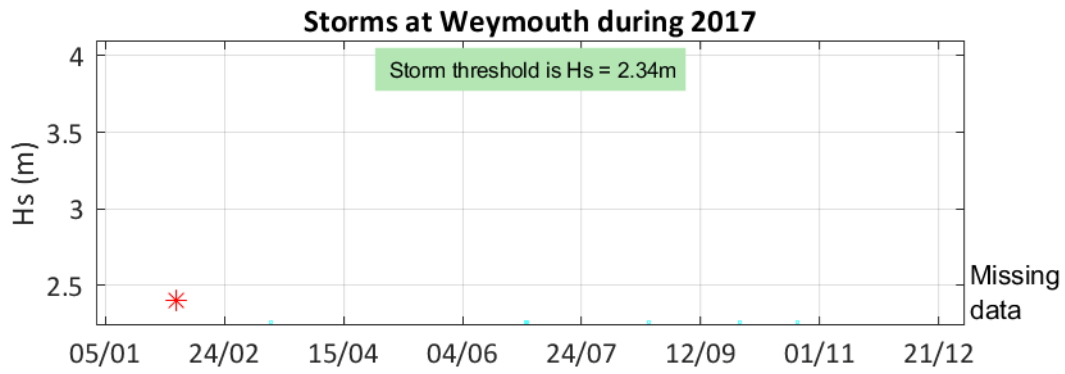
The buoy, owned by New Forest District Council, was first deployed on 18 December 2006, at which time the magnetic declination at the site was 2.9° west, changing by 0.15° east per year.

## Acknowledgements

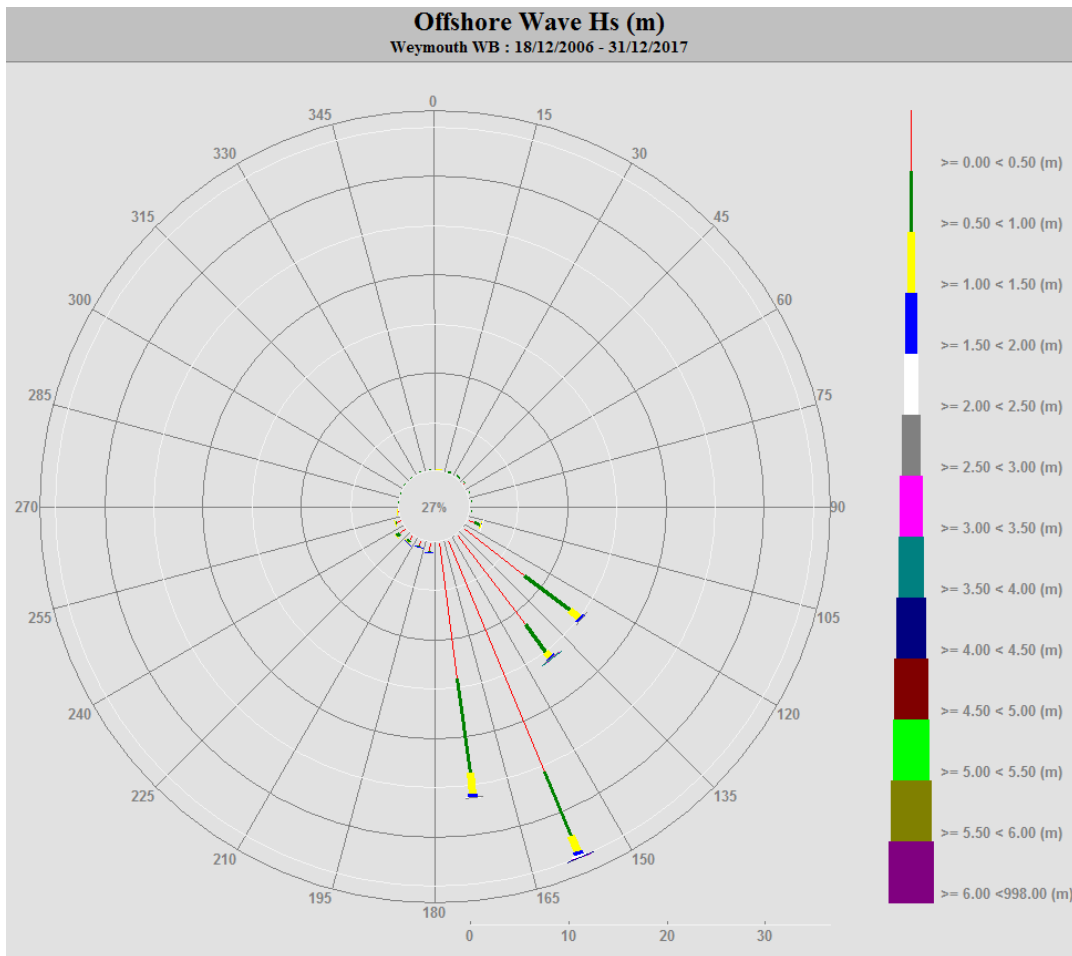
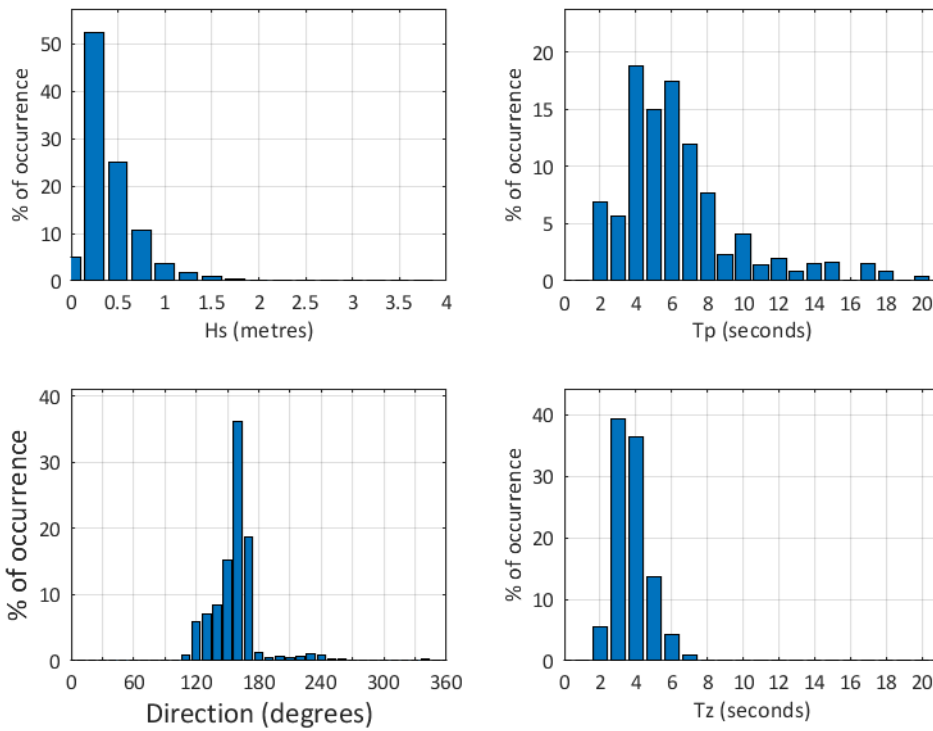
The shore station is kindly hosted by the Weymouth and Portland National Sailing Academy.

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





Weymouth 2017



Weymouth 2006 to 2017 - Joint distribution (% of occurrence)

