



Weston Bay Directional Waverider Buoy

Location			
OS	329174 E 162073 N		
WGS84	Latitude: 51° 21.20' N Longitude: 03° 01.11' W		
Instrument type		Buoy in situ in Weston Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)
Datawell Directional Waverider Mk III			
Water depth	~13m CD		

Data Quality

Recovery rate (%)	Sample interval
100	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	0.63	5.2	3.5	254	7.0	31
February	0.38	5.0	3.2	233	5.4	28
March	0.48	5.3	3.3	228	6.8	31
April	0.32	5.3	3.1	223	10.1	30
May	0.53	4.5	3.2	244	12.6	31
June	0.45	4.5	3.1	235	15.4	30
July	0.50	4.6	3.1	246	18.0	31
August	0.35	4.6	3.1	238	17.8	31
September	0.34	4.2	2.9	217	16.4	30
October	0.29	4.4	2.9	206	14.2	31
November	0.70	5.4	3.5	244	12.2	30
December	0.63	4.9	3.5	244	10.3	31

Monthly Averages - All Years (September 2009 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)
January	0.45	5.0	3.3	229	6.2
February	0.41	5.1	3.3	228	5.7
March	0.32	4.9	3.1	215	6.9
April	0.34	4.7	3.1	222	9.5
May	0.43	4.5	3.1	232	12.5
June	0.39	4.3	3.1	232	15.8
July	0.40	4.5	3.1	243	18.3
August	0.41	4.5	3.1	244	18.4
September	0.38	4.6	3.1	230	16.9
October	0.41	4.5	3.1	230	14.7
November	0.50	5.0	3.3	228	11.6
December	0.54	4.9	3.4	235	7.9

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)
17-Nov-2015 21:30	2.61	5.9	4.8	262	-	HW	7.3	0.26	0.94
31-Mar-2015 03:00	2.47	5.9	4.7	260	-	HW -1	6.6	0.68	0.72
09-Jan-2015 20:30	2.39	5.6	4.5	256	-	HW -1	9.1	0.30	0.42
29-Mar-2015 12:00	2.28	5.9	4.4	263	-	HW -2	4.5	0.46	0.81
10-Jan-2015 09:30	2.18	6.3	4.4	264	-	HW	9.4	0.59	0.62

Annual Statistics

Year	Annual H _s exceedance* (m)						Annual Maximum H _s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A _{max} (m)
2009	-	-	-	1.42	1.20	1.02	14-Nov-2009 15:30	2.42
2010	2.28	1.45	1.23	1.07	0.85	0.69	12-Nov-2010 00:00	2.77
2011	1.85	1.64	1.52	1.36	1.14	0.93	13-Dec-2011 08:00	2.02
2012	2.16	1.69	1.49	1.27	1.01	0.84	05-Jan-2012 06:00	2.33
2013	1.81	1.47	1.37	1.24	1.03	0.83	02-Nov-2013 19:00	2.16
2014	2.21	1.82	1.58	1.37	1.07	0.86	12-Feb-2014 15:30	2.55
2015	2.32	1.80	1.63	1.44	1.18	0.98	17-Nov-2015 21:30	2.61

* i.e. 5 % of the H_s values measured in 2009 exceeded 1.20 m

Distribution plots

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

- Annual time series of H_s (red line is 1.9 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 Hinkley Point). 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.

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.

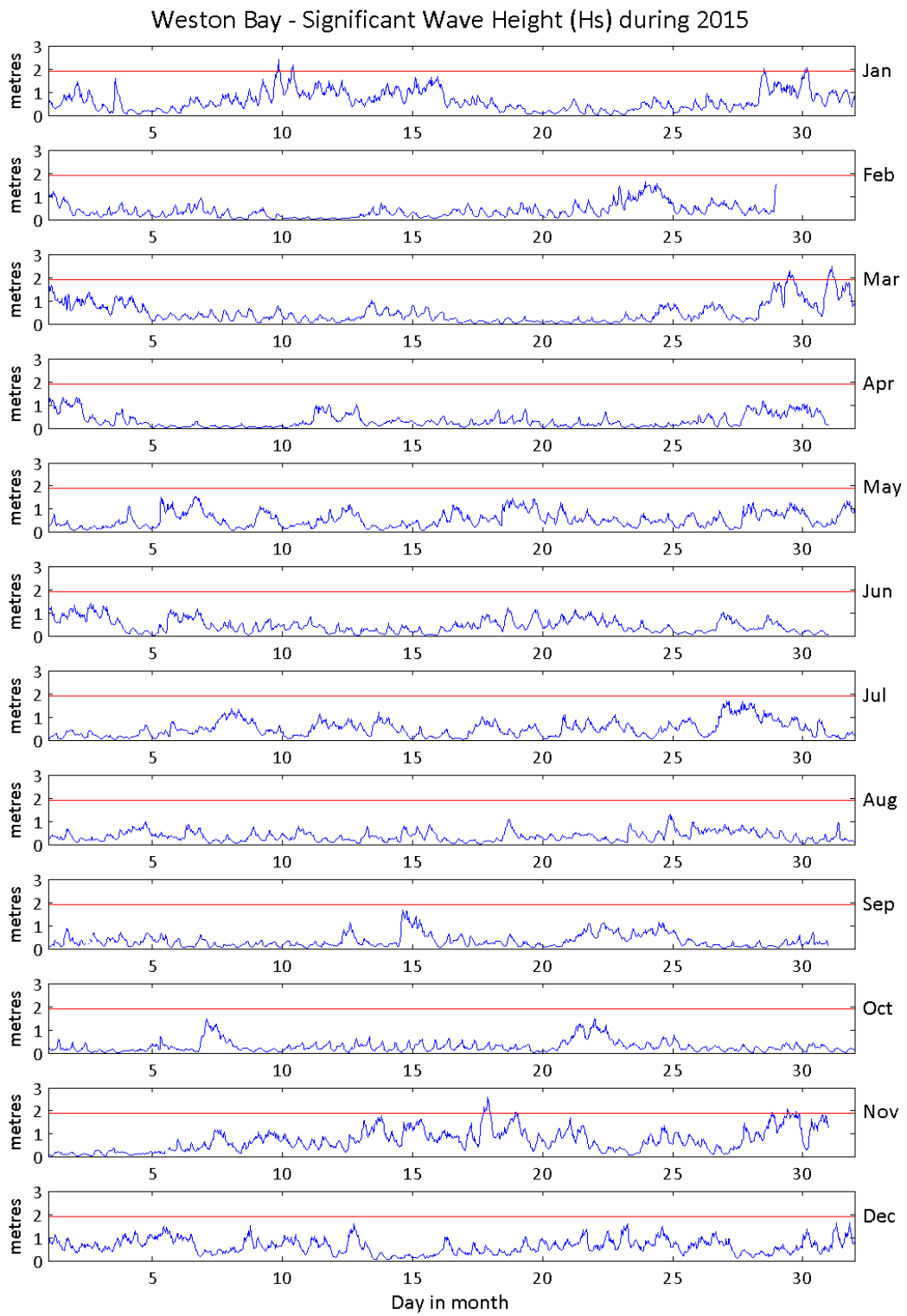
Return period (years)	Significant wave height (m)	Comments
1	2.5	No depth limitation
2	2.6	
5	2.8	
10	2.9	
20	3.1	
50	3.2	

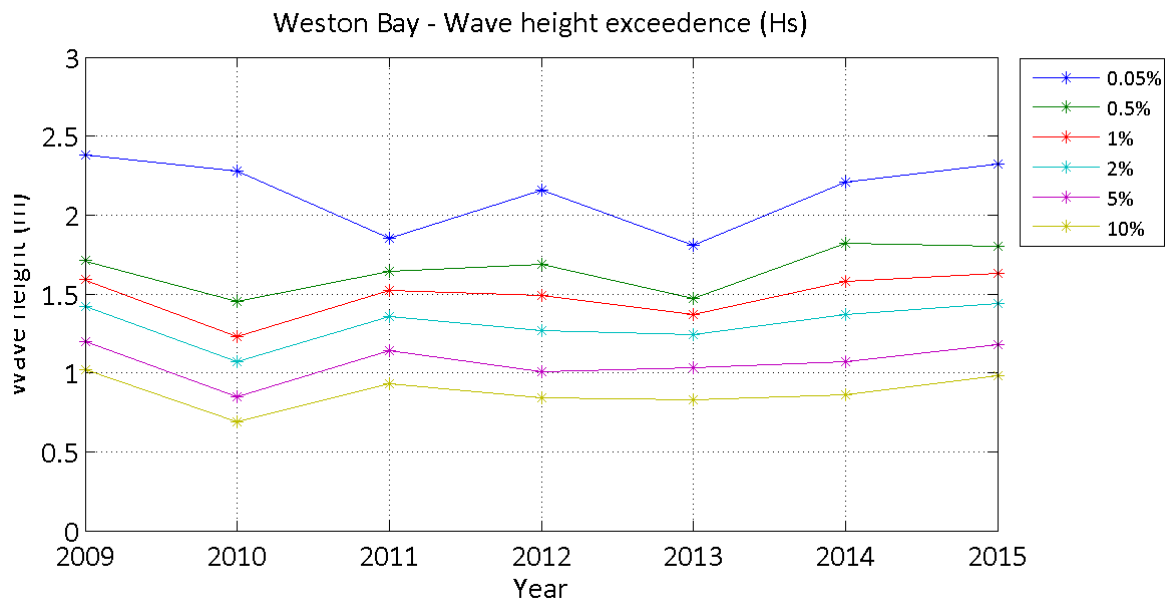
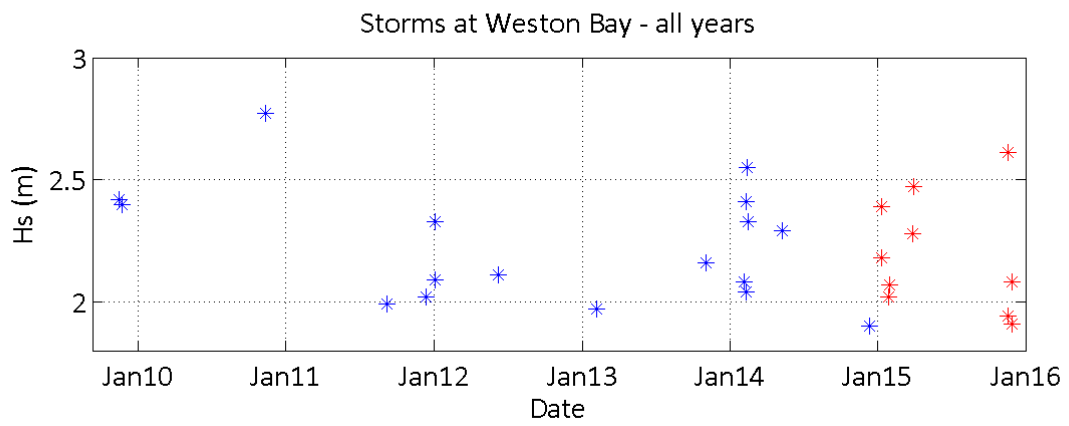
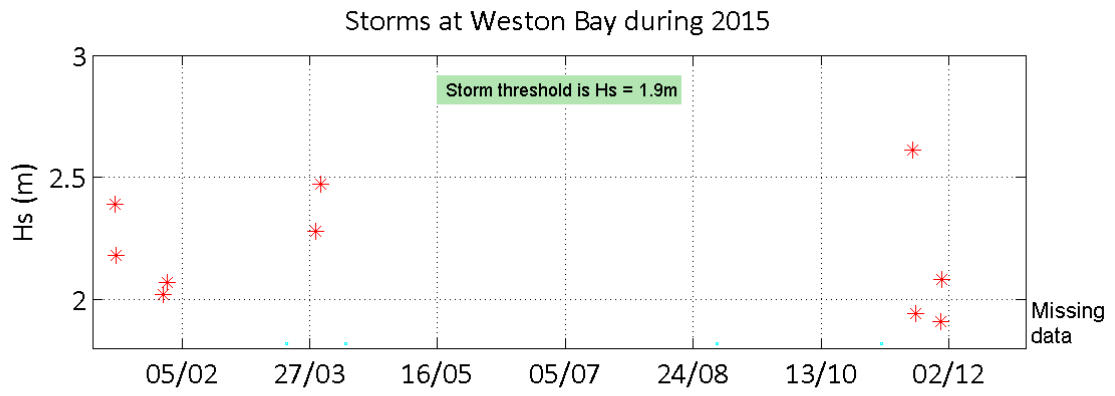
General

The buoy was first deployed on 11 September 2009, at which time the magnetic declination at the site was 2.8° west, changing by 0.15° east per year. There is a notable tidal signature to significant wave heights at this location, given the water depth of the buoy (~13 m CD) and the spring tidal range (~10.9 m).

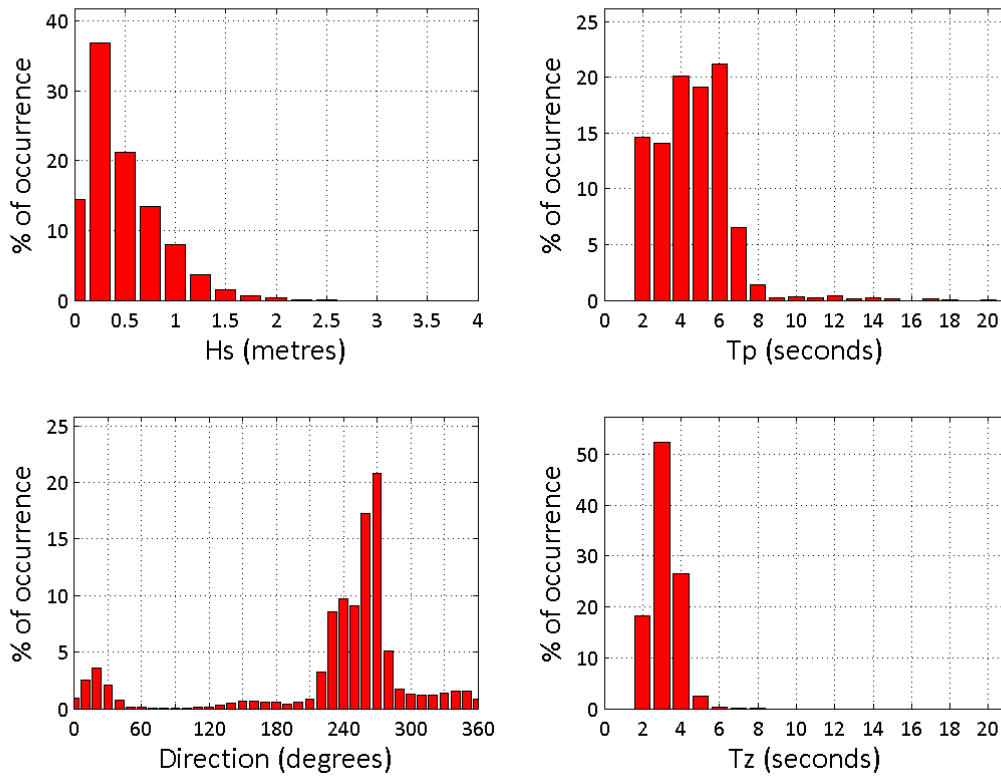
Acknowledgements

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.





Weston Bay 2015



Weston Bay 2009 to 2015 - Joint distribution (% of occurrence)

