



West Bay Directional Waverider Buoy

Location			
OS	347096 E 88467 N		
WGS84	Latitude: 50° 41.61' N Longitude: 02° 45.02' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off West Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
99	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	1.36	8.7	4.9	213	9.6	31
February	0.85	10.0	5.0	202	7.4	28
March	0.83	10.3	4.9	208	8.3	31
April	0.56	9.2	4.4	203	10.5	30
May	0.89	7.0	4.0	211	12.2	31
June	0.60	6.6	3.8	200	14.3	30
July	0.77	6.6	3.8	210	17.0	31
August	0.67	7.0	4.2	206	17.1	31
September	0.65	6.7	3.8	197	16.4	30
October	0.72	9.1	4.6	195	14.7	31
November	1.41	7.5	4.7	214	13.6	29
December	2.16	8.6	5.3	211	12.1	31

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

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)
January	1.22	9.5	5.0	208	8.7
February	1.06	10.5	5.2	207	7.9
March	0.81	9.6	4.7	206	8.3
April	0.66	8.9	4.5	205	9.9
May	0.65	7.4	4.1	205	12.1
June	0.64	7.5	4.1	206	14.5
July	0.69	6.5	3.9	210	16.5
August	0.72	6.5	3.9	211	17.4
September	0.66	7.5	4.1	204	16.8
October	0.93	7.9	4.5	206	15.2
November	1.14	8.4	4.8	208	12.7
December	1.29	8.9	5.0	209	9.9

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)
15-Jan-2015 02:30	6.24	10.0	8.2	210	-	HW +2	~1.4	-	-
30-Dec-2015 14:30	5.13	10.0	7.7	208	-0.77	HW +5	3.1	0.32	0.67
31-Dec-2015 03:00	4.56	9.1	7.3	215	-	HW -6	~2.3	-	-

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	4.70	3.69	3.30	2.91	2.45	2.03	06-Mar-2007 02:30	5.61 ⁺
2008	4.73	3.60	3.16	2.74	2.20	1.71	10-Mar-2008 13:30	5.05
2009	4.85	3.59	3.29	2.92	2.30	1.83	14-Nov-2009 15:30	6.00 ⁺
2010	4.00	2.95	2.66	2.37	1.82	1.46	11-Nov-2010 09:00	4.29
2011	4.34	3.10	2.82	2.44	2.04	1.67	13-Dec-2011 01:00	4.84
2012	4.83	3.39	2.97	2.59	2.17	1.71	03-Jan-2012 11:00	5.55
2013	5.19	3.72	3.29	2.88	2.27	1.81	24-Dec-2013 01:00	6.42 ⁺
2014	6.05	4.17	3.77	3.16	2.48	2.01	05-Feb-2014 11:30	7.08 ⁺
2015	4.76	3.47	3.22	2.94	2.49	2.06	15-Jan-2015 02:30	6.24

* i.e. 5 % of the H_s values measured in 2007 exceeded 2.45 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.

Distribution plots

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

- Annual time series of H_s (red line is 4.2 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 step gauge at West Bay Harbour). The surge shown is the residual at the time of the highest H_s. The maximum tidal surge is the largest positive 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.

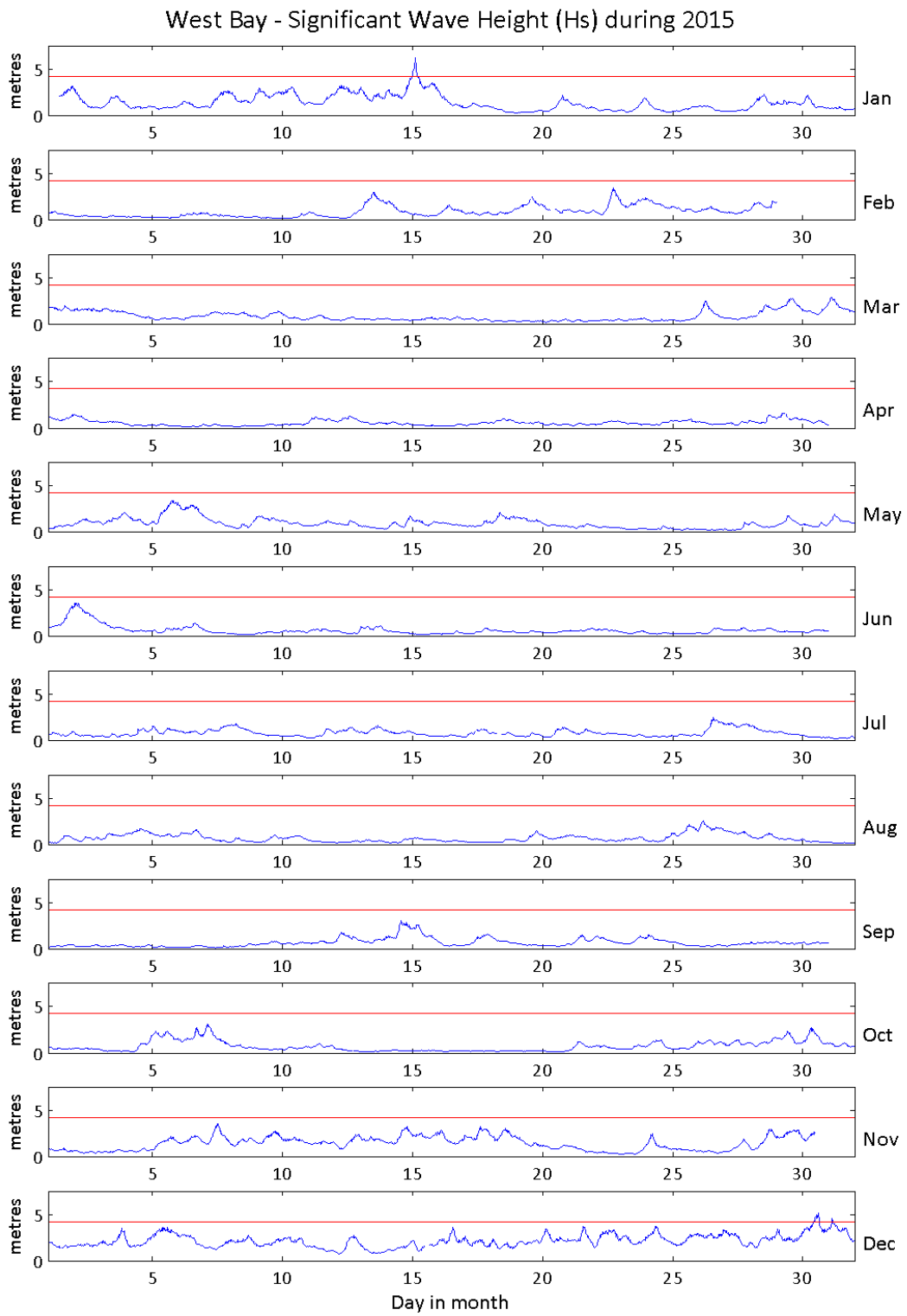
Return period (years)	Significant wave height (m)	Comments
1	5.5	Depth-limited at MHWS
2	5.9	Depth-limited at HAT
5	6.5	
10	6.9	
20	7.3	
50	7.8	

General

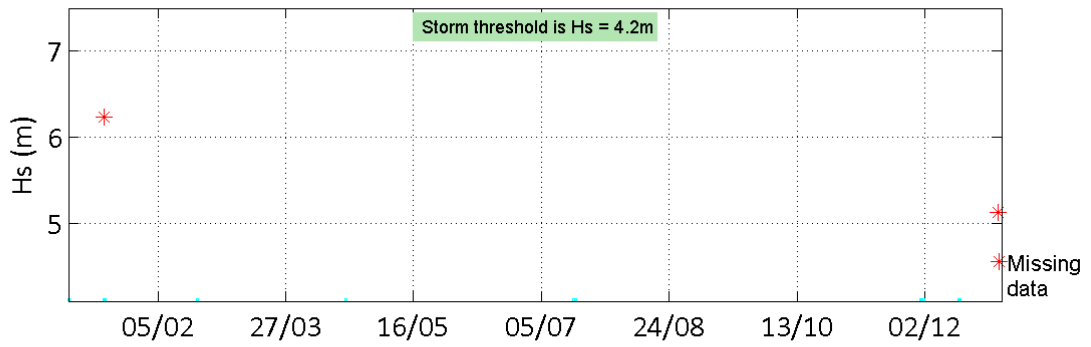
The buoy was first deployed on 19 November 2006, at which time the magnetic declination at the site was 3.0° west, changing by 0.15° east per year.

Acknowledgements

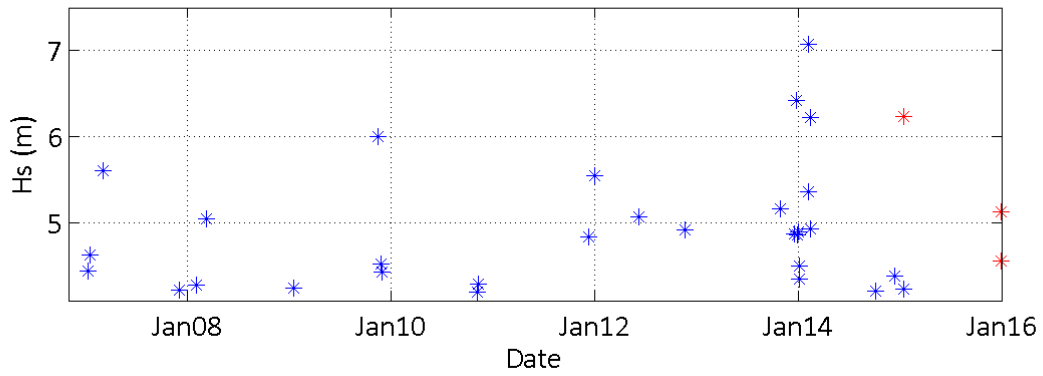
TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.



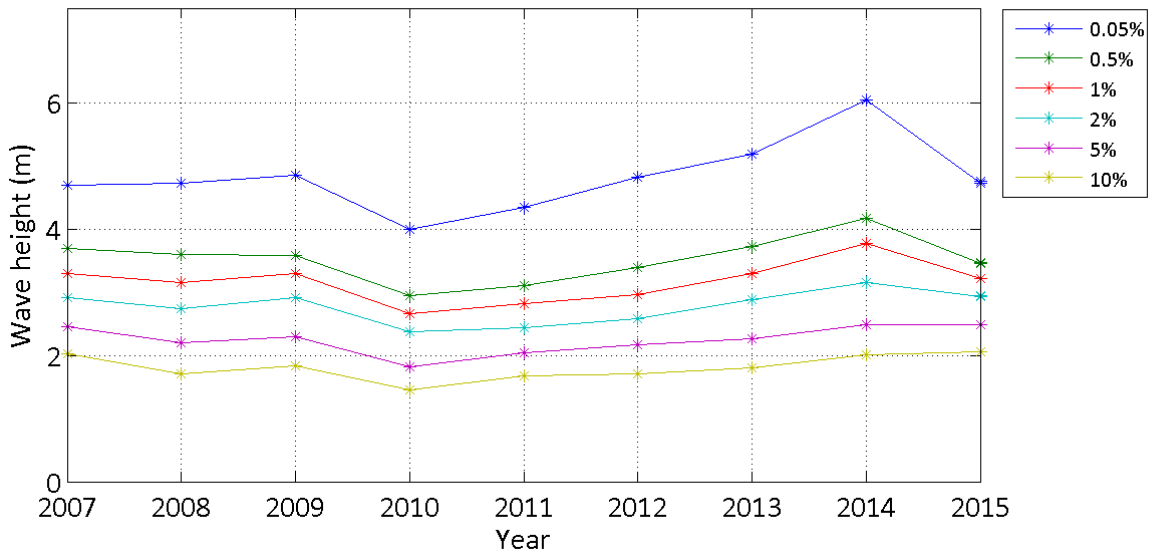
Storms at West Bay during 2015



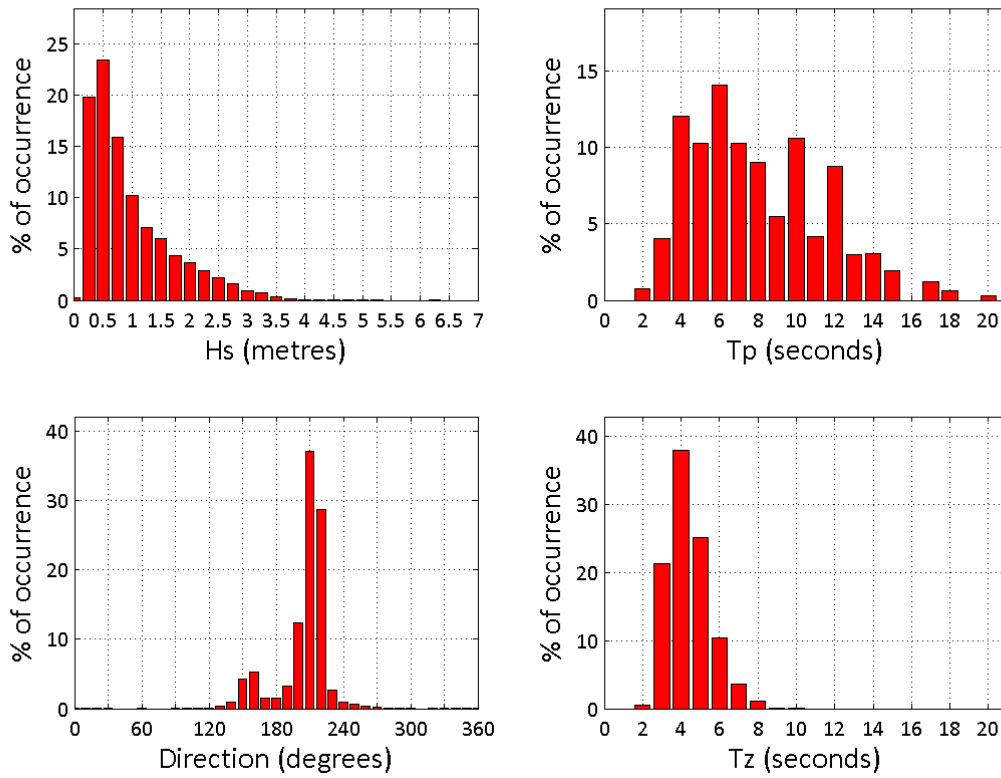
Storms at West Bay - all years



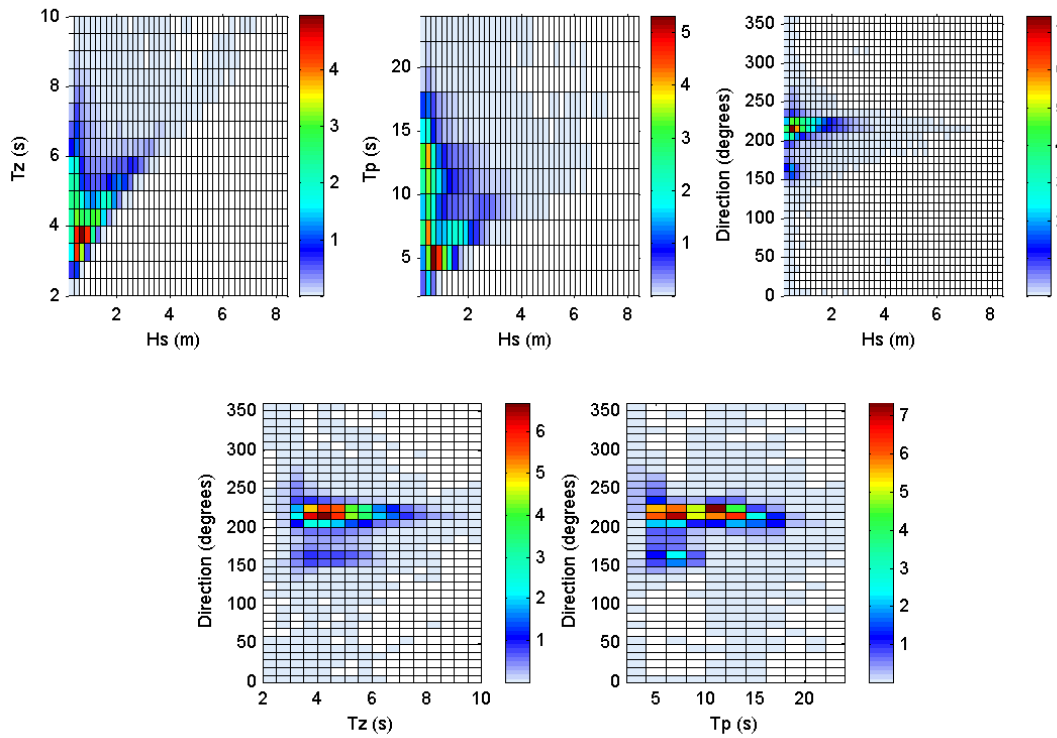
West Bay - Wave height exceedence (H_s)



West Bay 2015



West Bay 2006 to 2015 - Joint distribution (% of occurrence)



Offshore Wave Hs (m) West Bay WB : 19/11/2006 - 31/12/2015

