



West Bay Directional Waverider Buoy

Location			
OS	347050 E 88507 N		
WGS84	Latitude: 50° 41.63' N Longitude: 02° 45.06' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off West Bay. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Image ©2016 Getmapping plc)

Data Quality

Recovery rate (%)	Sample interval
100	30 minutes

Monthly Averages - 2017

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	0.72	8.8	4.2	206	8.9	5	31
February	1.16	10.2	5.1	205	8.3	10	28
March	1.02	8.8	4.7	205	9.7	6	31
April	0.41	8.4	4.0	202	11.3	1	30
May	0.62	8.4	4.3	202	13.2	1	31
June	0.73	7.4	4.2	208	15.8	4	30
July	0.68	6.1	3.8	207	17.2	0	31
August	0.65	5.7	3.8	211	17.7	1	31
September	0.91	7.0	4.4	211	16.9	2	30
October	1.04	7.7	4.4	212	15.5	4	31
November	0.80	7.4	4.2	214	12.9	2	30
December	1.07	8.7	4.5	214	10.1	5	31

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

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.27	9.4	5.0	208	8.9	13
February	1.09	10.4	5.2	207	8.1	11
March	0.81	9.6	4.8	206	8.3	5
April	0.67	8.9	4.5	206	9.9	3
May	0.63	7.5	4.1	205	12.1	1
June	0.63	7.5	4.2	206	14.6	1
July	0.69	6.4	3.8	210	16.6	1
August	0.72	6.5	3.9	210	17.4	1
September	0.67	7.5	4.1	205	17.0	2
October	0.90	7.9	4.5	205	15.2	5
November	1.11	8.3	4.7	207	12.7	7
December	1.25	9.0	5.0	209	9.9	12

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)
03-Feb-2017 00:00	5.31	15.4	9.3	210	1.42	HW -2	2.35	0.47	0.63
16-Oct-2017 20:00	4.50	14.3	8.0	210	-0.26	HW +5	2.95	0.15	0.46
21-Oct-2017 11:30	4.25	10.0	7.1	210	-0.51	HW -4	3.54	0.50	0.57
31-Dec-2017 03:30	3.86	10.0	6.7	221	1.93	HW	2.75	0.40	0.54
22-Nov-2017 22:30	3.86	8.3	6.3	217	1.33	HW +2	2.47	0.36	0.47

* Tidal information is obtained from 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 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)
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
2016	4.80	3.68	3.21	2.61	2.06	1.61	28-Mar-2016 03:30	5.54 ⁺
2017	4.28	3.34	2.97	2.54	2.00	1.58	03-Feb-2017 00:00	5.31 ⁺

** 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.

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	November 2006 to June 2017	
Return period (years)	Significant wave height (m)	Comments
0.25	4.31	No depth limitation
1	5.42	Depth-limited at MLWS
2	5.97	Depth-limited at HAT
5	6.68	
10	7.22	
20	7.76	
50	8.46	
100	8.98	

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

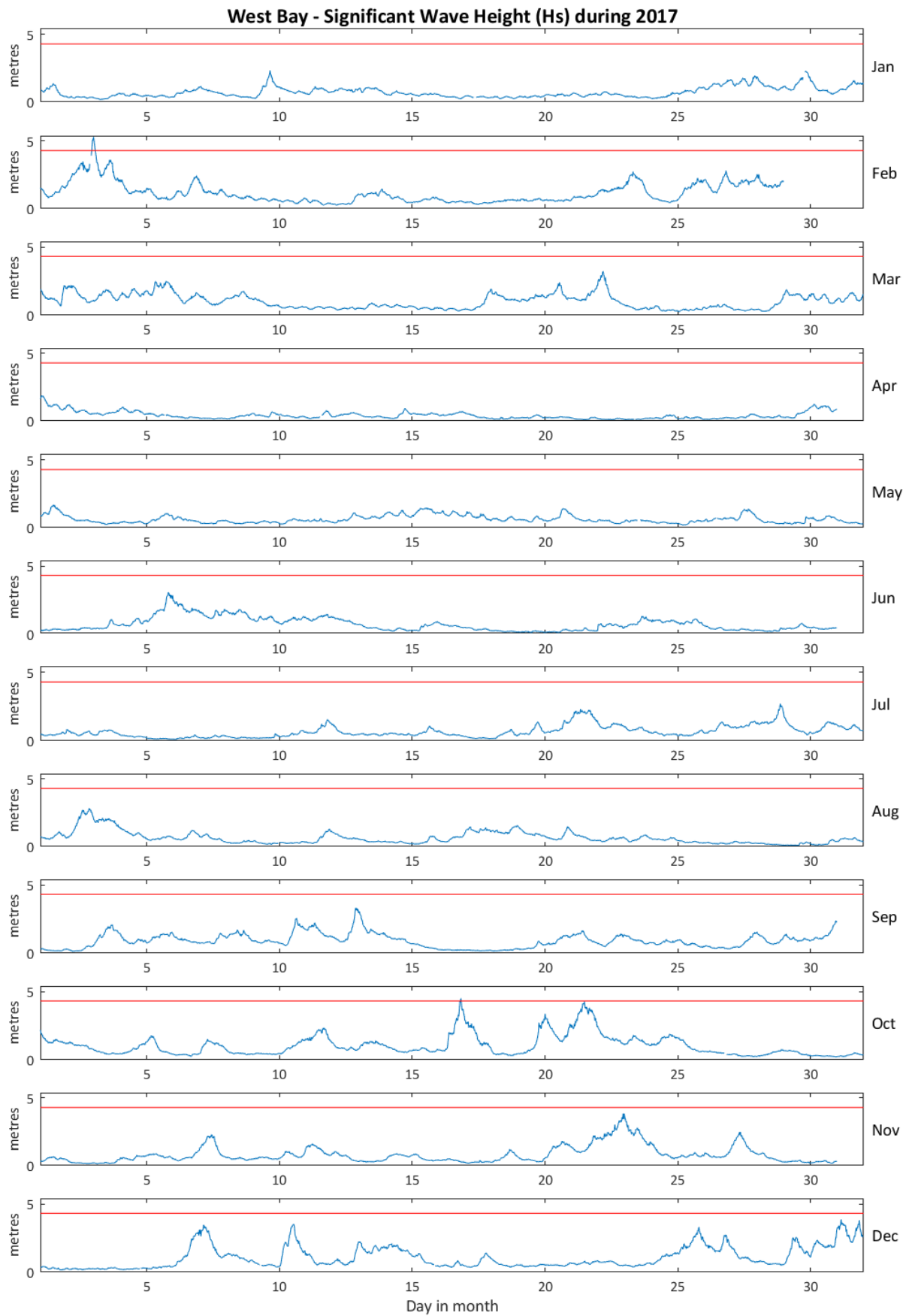
General

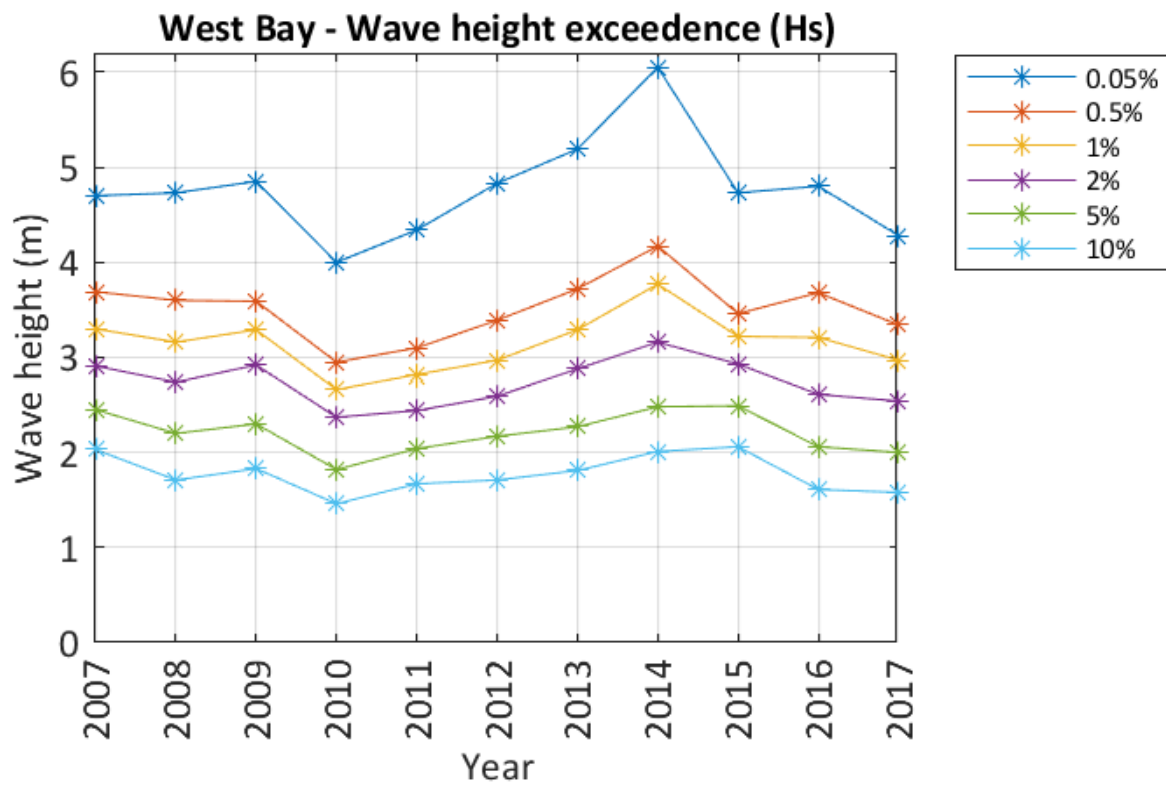
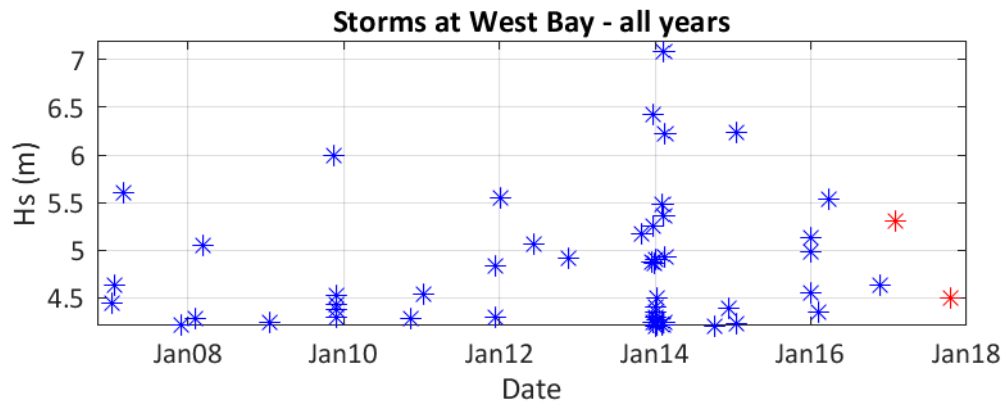
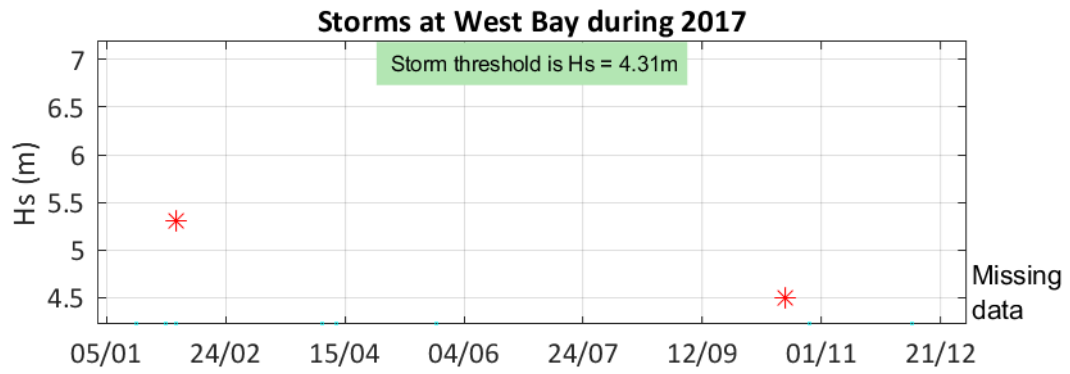
The buoy, owned by Teignbridge District Council, was first deployed on 19 November 2006, at which time the magnetic declination at the site was 3.0° west, changing by 0.15° east per year.

Acknowledgements

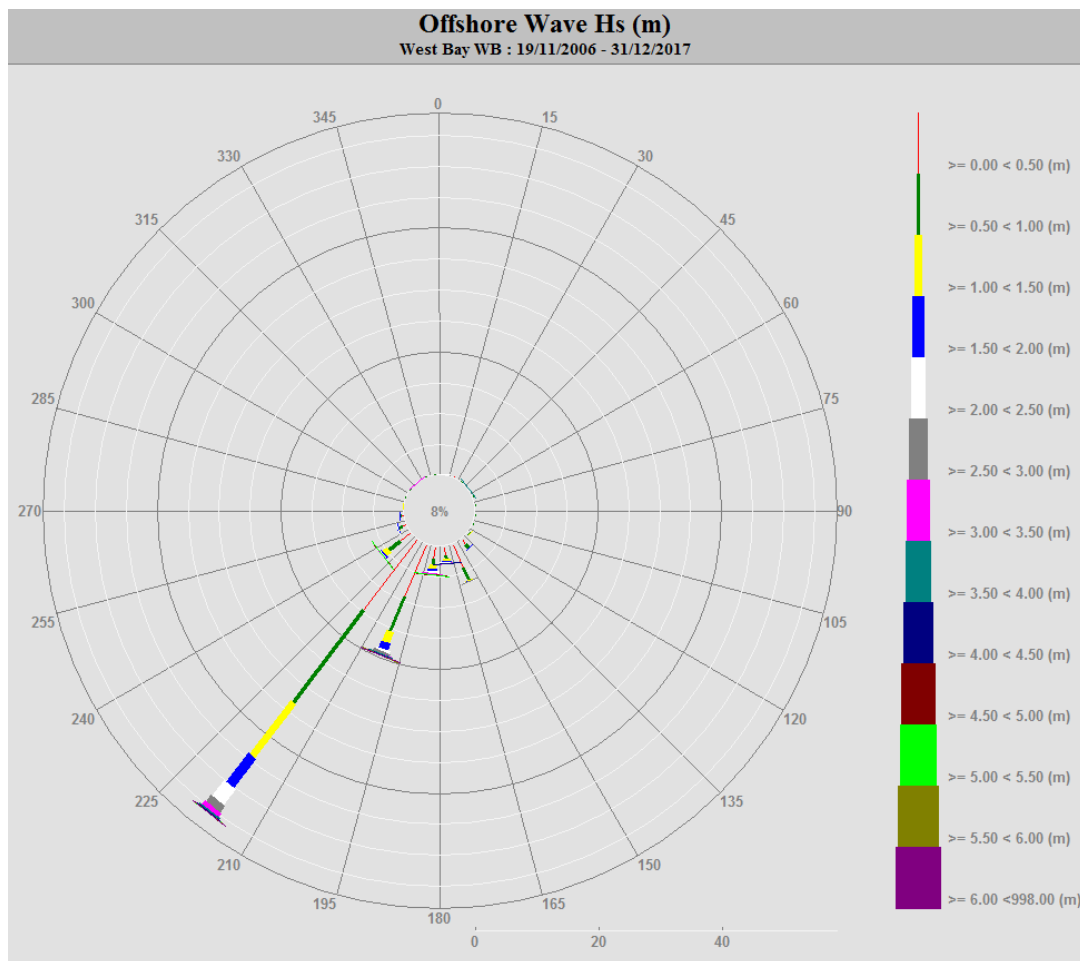
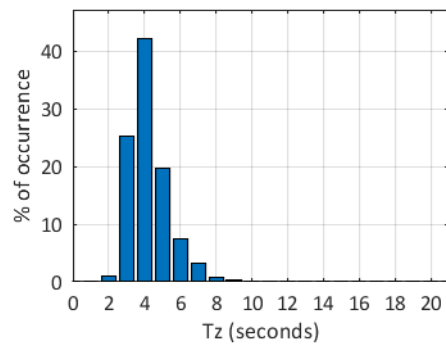
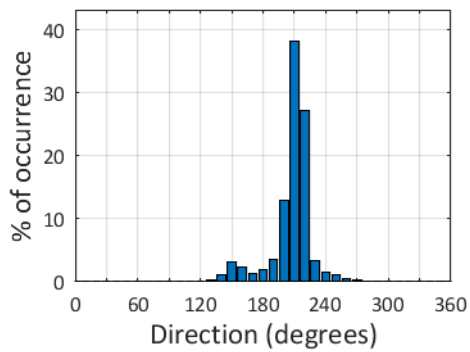
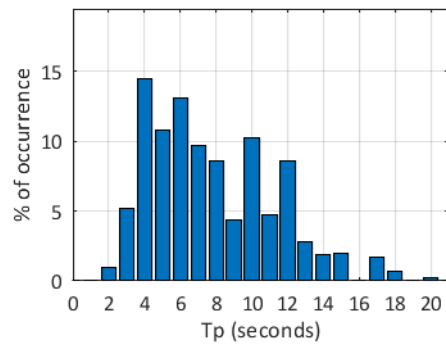
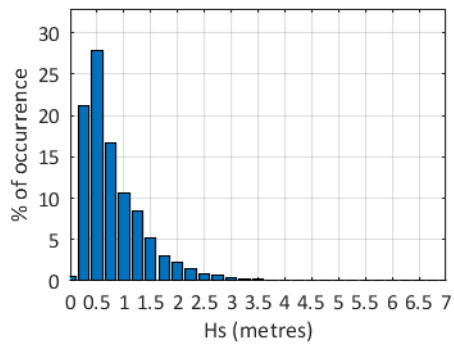
The shore station and tide gauge are kindly hosted by West Bay Harbourmaster.

Tidal predictions were supplied by Fugro GB Marine Limited.





West Bay 2017



West Bay 2006 to 2017 - Joint distribution (% of occurrence)

