



Sandown Bay Directional Waverider Buoy

Location			
OS	461642 E 83782 N		
WGS84	Latitude: 50° 39.03' N Longitude: 01° 07.77' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~11m CD	Buoy in situ in Sandown Bay. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
100	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	0.91	7.2	4.2	171	9.8	3	31
February	0.73	7.9	4.1	167	8.6	3	29
March	0.57	6.8	3.9	159	8.0	1	31
April	0.44	5.7	3.7	163	9.7	0	30
May	0.33	4.9	3.3	160	12.4	0	31
June	0.35	5.4	3.5	168	15.3	0	30
July	0.34	5.2	3.3	180	17.4	0	31
August	0.40	5.4	3.5	170	18.8	0	31
September	0.41	5.7	3.5	173	19.0	0	30
October	0.57	5.4	3.6	141	15.7	0	31
November	0.65	5.7	3.9	155	12.6	0	30
December	0.54	7.5	3.9	162	10.1	0	31

Monthly Averages - All Years (July 2003 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.69	6.8	3.9	162	8.0	1
February	0.59	7.1	3.9	159	7.0	2
March	0.51	6.5	3.7	158	7.3	0
April	0.41	5.8	3.6	156	9.4	0
May	0.42	5.4	3.5	160	12.1	0
June	0.37	5.3	3.5	162	15.0	0
July	0.37	5.1	3.4	169	17.5	0
August	0.38	5.1	3.4	171	18.6	0
September	0.44	5.5	3.5	160	17.8	0
October	0.61	5.7	3.7	162	15.6	0
November	0.63	6.0	3.9	163	12.8	0
December	0.66	6.4	3.9	165	9.8	1

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)
28-Mar-2016 04:30	4.22	10.0	7.0	169	1.24	HW +3	2.98	0.76	0.84
20-Nov-2016 03:00	3.99	9.1	6.6	146	2.37	HW -1	3.47	0.54	0.61
03-Jan-2016 13:00	3.30	7.7	5.9	170	-0.06	HW -5	1.33	0.06	0.29
02-Jan-2016 10:00	2.92	7.1	5.6	166	-0.13	HW +6	2.00	0.34	0.41
22-Nov-2016 02:30	2.79	8.3	5.7	173	0.75	HW -3	1.98	0.20	0.43
07-Jan-2016 04:30	2.60	6.7	5.3	177	-0.02	HW -5	2.46	0.52	0.58
09-Mar-2016 05:00	2.55	6.7	5.3	179	-0.98	HW -6	3.51	0.50	0.52

* Tidal information is obtained from the WaveRadar REX on Sandown Pier and the National Network gauge at Portsmouth. 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)
2003	-	2.21	2.02	1.65	1.35	1.13	29-Nov-2003 09:00	2.79
2004	2.64	2.11	1.82	1.61	1.29	0.97	08-Jan-2004 10:30	3.17
2005	3.23	2.15	1.69	1.44	1.11	0.86	02-Dec-2005 18:00	3.79
2006	2.47	1.97	1.80	1.61	1.33	1.10	30-Dec-2006 00:00	2.75
2007	3.06	1.91	1.64	1.44	1.18	0.96	18-Nov-2007 16:00	3.22
2008	3.11	2.23	1.91	1.64	1.26	0.99	10-Mar-2008 11:30	3.63
2009	2.56	2.07	1.81	1.61	1.31	1.01	18-Nov-2009 03:00	2.70
2010	2.66	2.06	1.8	1.52	1.13	0.89	09-Nov-2010 21:00	2.93
2011	2.52	1.92	1.62	1.37	1.12	0.90	12-Dec-2011 23:30	2.87
2012	2.55	2.06	1.84	1.62	1.24	0.96	25-Apr-2012 08:30	2.87
2013	3.24	2.31	1.97	1.73	1.34	1.08	24-Dec-2013 03:00	3.51
2014	3.24	2.61	2.25	1.91	1.46	1.11	05-Feb-2014 03:00	3.40
2015	2.51	1.91	1.67	1.51	1.26	1.05	30-Dec-2015 08:30	2.76
2016	3.93	2.34	1.97	1.66	1.29	1.02	28-Mar-2016 02:30	4.22

** i.e. 5 % of the H_s values measured in 2003 exceeded 1.35 m

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 July 2003 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	3.9	No depth limitation
2	4.1	
5	4.5	
10	4.7	Depth-limited at MLWS
20	4.9	
50	5.2	
100	5.4	

3-hourly records July 2003 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	3.3	No depth limitation
2	3.6	
5	3.9	
10	4.1	
20	4.4	
50	4.7	Depth-limited at MLWS
100	4.9	

Distribution plots

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

- Annual time series of H_s (red line is 2.5 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 from 01 April 2004

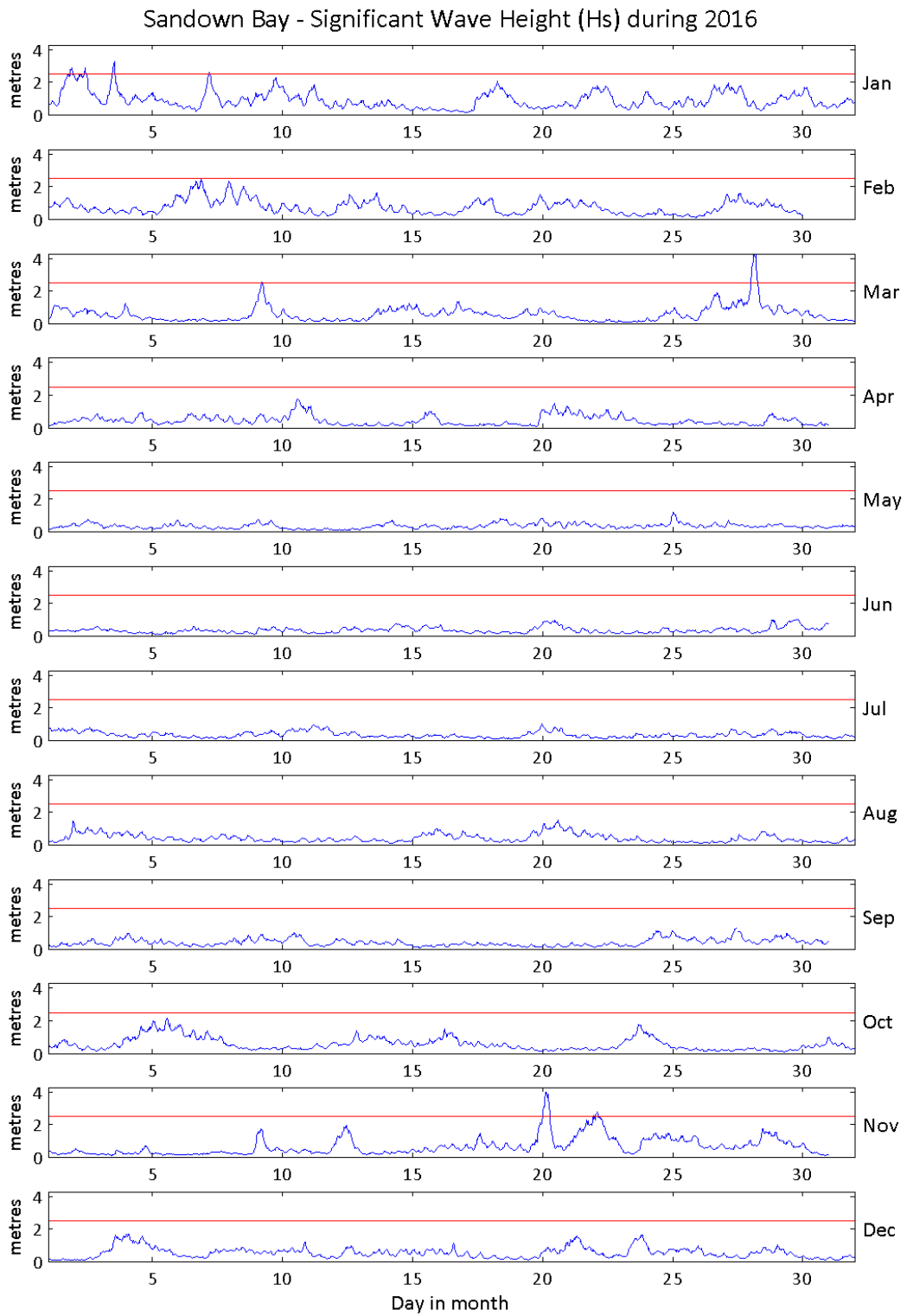
General

The buoy, owned by New Forest District Council, was first deployed on 16 July 2003, at which time the magnetic declination at the site was 2.9° west, changing by 0.14° east per year.

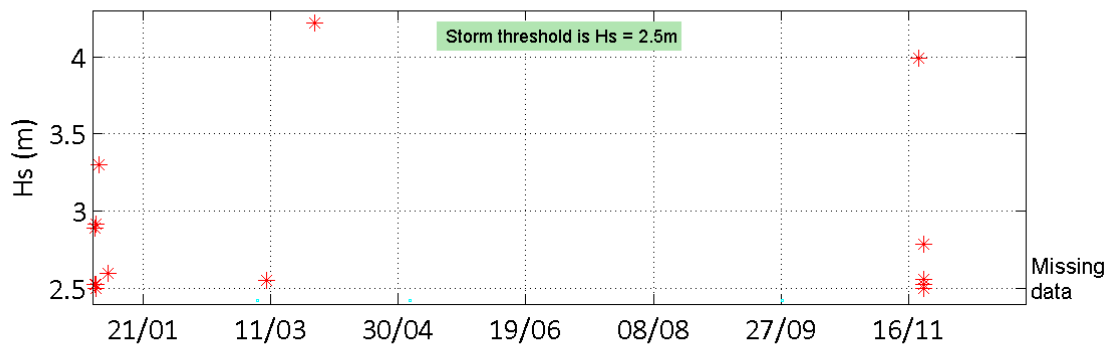
Acknowledgements

The shore station is kindly hosted by Sandown Golf Club.

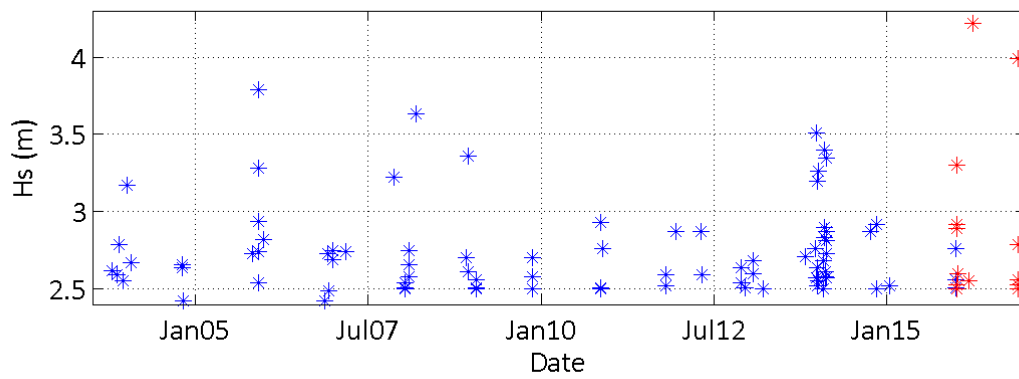
Tidal predictions were produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool).



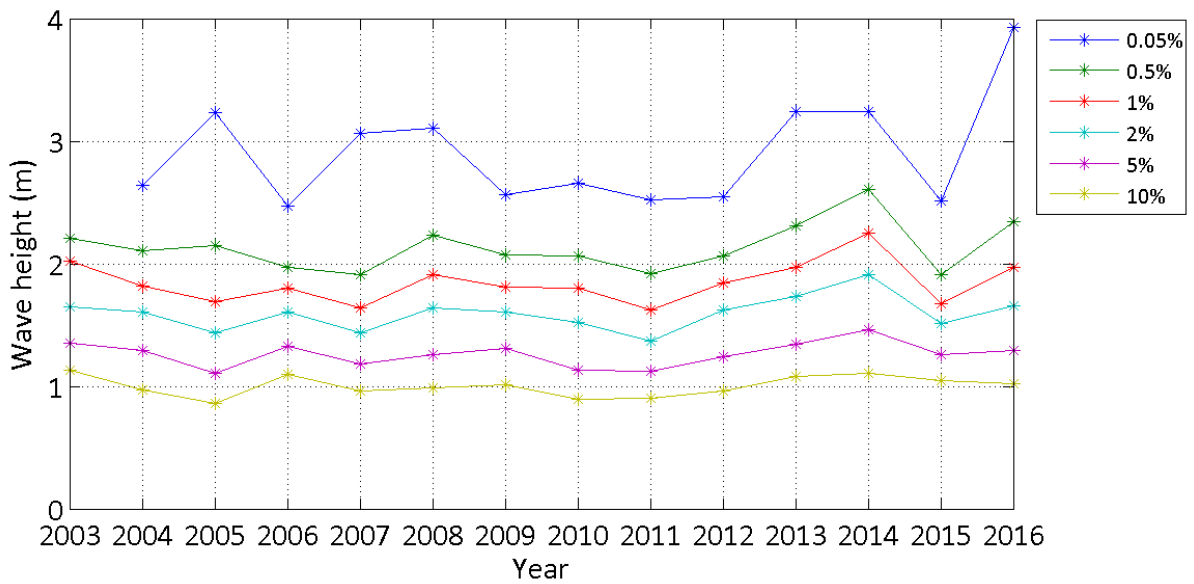
Storms at Sandown Bay during 2016



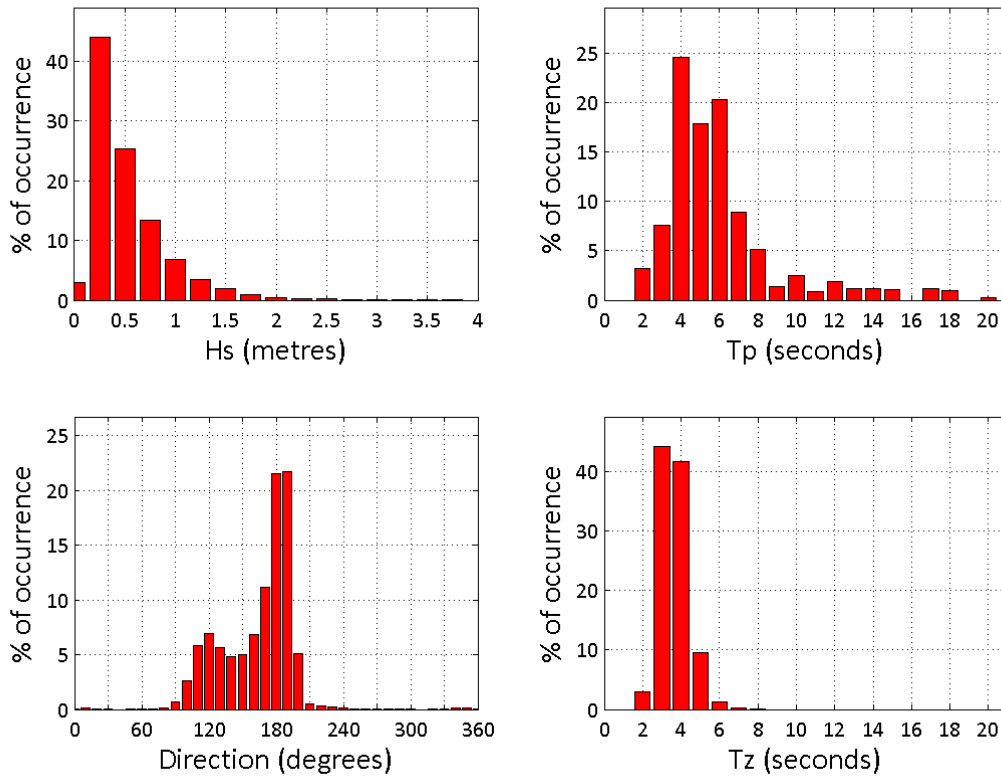
Storms at Sandown Bay - all years



Sandown Bay - Wave height exceedance (Hs)



Sandown Bay 2016



Sandown Bay 2003 to 2016 - Joint distribution (% of occurrence)

