



Milford-on-Sea Directional Waverider Buoy

Location			
OS	427245 E 90318 N		
WGS84	Latitude: 50° 42.71' N Longitude: 01° 36.93' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off Milford on Sea. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
95	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	1.18	10.3	4.7	211	9.3	23	30
February	0.99	10.4	4.9	210	8.5	13	28
March	0.77	10.3	4.6	212	7.9	8	21
April	0.53	8.3	4.1	212	9.8	2	30
May	0.38	7.4	3.9	214	12.7	0	31
June	0.48	7.1	3.9	210	15.7	0	29
July	0.57	5.5	3.4	216	17.7	1	30
August	0.59	6.4	3.7	214	19.0	3	30
September	0.61	7.9	4.1	213	18.8	2	29
October	0.39	9.4	4.3	201	15.1	0	30
November	0.56	6.9	3.9	204	11.6	1	30
December	0.63	10.7	4.9	200	9.2	6	30

Monthly Averages - All Years (November 2005 – December 2015)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.87	10.3	4.7	210	7.8	12
February	0.75	11.3	4.8	209	6.9	8
March	0.60	9.9	4.5	210	7.7	3
April	0.47	8.7	4.1	210	9.9	1
May	0.54	6.9	3.8	211	12.7	1
June	0.49	6.7	3.8	212	15.7	1
July	0.56	6.0	3.6	215	18.0	1
August	0.58	5.8	3.6	217	18.5	1
September	0.52	7.3	3.8	212	17.4	1
October	0.68	8.0	4.2	213	15.3	3
November	0.80	8.7	4.4	212	12.3	5
December	0.90	9.4	4.6	212	9.3	13

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)
08-Feb-2016 17:30	3.48	12.5	6.9	212	-0.55	HW -5	2.09	0.31	0.59
28-Mar-2016 05:00	3.46	11.8	6.9	217	0.81	HW +1	2.62	0.77	1.03
08-Feb-2016 12:00	3.33	16.7	6.9	205	1.33	HW +1	2.37	0.39	0.70
07-Feb-2016 22:30	3.25	9.1	6.2	215	1.38	HW	2.21	0.42	0.49
06-Feb-2016 21:00	3.00	11.1	6.3	217	1.46	HW	1.82	0.68	0.68

* Tidal information is obtained from the step gauge on the Royal Lynton Yacht Club. 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)
1996	-	-	-	-	-	-	28-Oct-1996 21:00	4.05
1997	3.08	2.39	2.15	1.97	1.59	1.20	24-Feb-1997 23:00	3.32
1998	2.89	2.47	2.28	2.00	1.66	1.37	27-Oct-1998 13:00	3.21
1999	3.01	2.32	2.11	1.85	1.56	1.29	24-Dec-1999 22:00	3.23
2000	3.90	2.85	2.50	2.19	1.74	1.41	31-Dec-2000 19:00	4.09
2001	3.71	2.63	2.24	1.91	1.52	1.20	01-Jan-2001 00:00	4.07
2002	3.54	2.92	2.61	2.35	1.96	1.62	15-Oct-2002 18:00	4.06
2003	2.82	2.20	2.02	1.76	1.37	1.12	14-Nov-2003 15:00	2.92
2004	3.21	2.49	2.29	2.05	1.69	1.42	31-Jan-2004 17:00	3.44
2005	3.09	1.86	1.72	1.56	1.28	1.05	02-Dec-2005 18:30	3.53
2006	2.89	2.46	2.31	2.10	1.73	1.41	03-Dec-2006 06:30	3.51
2007	3.21	2.53	2.25	2.04	1.74	1.46	18-Jan-2007 12:00	3.64
2008	3.09	2.40	2.16	1.96	1.70	1.42	10-Mar-2008 20:00	3.42
2009	3.26	2.60	2.36	2.05	1.69	1.39	14-Nov-2009 15:00	4.08
2010	2.68	2.17	1.91	1.59	1.29	1.04	31-Mar-2010 06:00	2.96
2011	2.85	2.21	2.03	1.84	1.53	1.30	13-Dec-2011 01:00	3.24
2012	3.39	2.33	2.14	1.93	1.61	1.31	03-Jan-2012 10:30	3.93
2013	3.48	2.58	2.35	2.07	1.67	1.32	28-Oct-2013 05:30	3.93
2014	4.04	3.12	2.73	2.25	1.81	1.49	14-Feb-2014 22:30	4.50
2015	2.96	2.51	2.33	2.16	1.85	1.54	31-Dec-2015 04:00	3.43
2016	3.24	2.50	2.20	1.94	1.56	1.29	08-Feb-2016 17:30	3.48

** i.e. 5 % of the H_s values measured in 2004 exceeded 1.69 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 May 1996 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	4.1	No depth limitation
2	4.3	
5	4.5	Depth-limited at MLWS
10	4.7	
20	4.9	
50	5.1	
100	5.3	

3-hourly records May 1996 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	3.7	No depth limitation
2	3.9	
5	4.2	
10	4.4	Depth-limited at MLWS
20	4.6	
50	4.9	
100	5.1	

Distribution plots

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

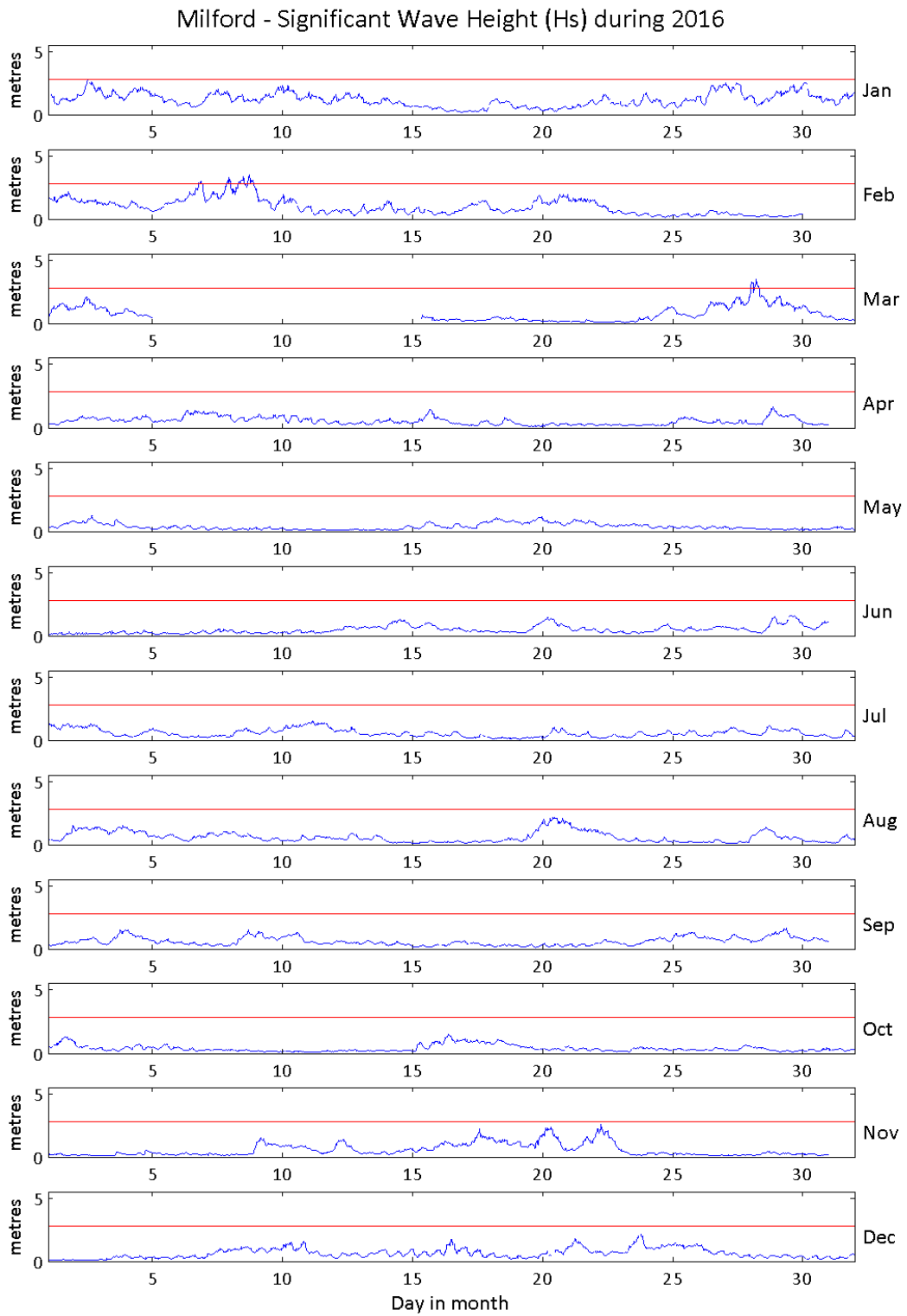
- Annual time series of H_s (red line is 2.8 m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s , T_p , 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 17 November 2005

General

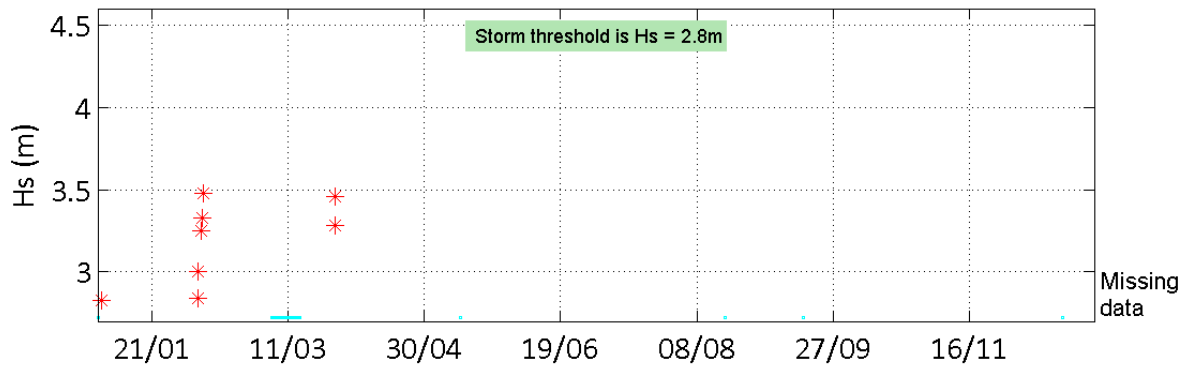
The buoy, owned by New Forest District Council, was first deployed on 20 May 1996. It was replaced with a Directional Waverider on 17 November 2005, at which time the magnetic declination at the site was 2.6° west, changing by 0.15° east per year.

Acknowledgements

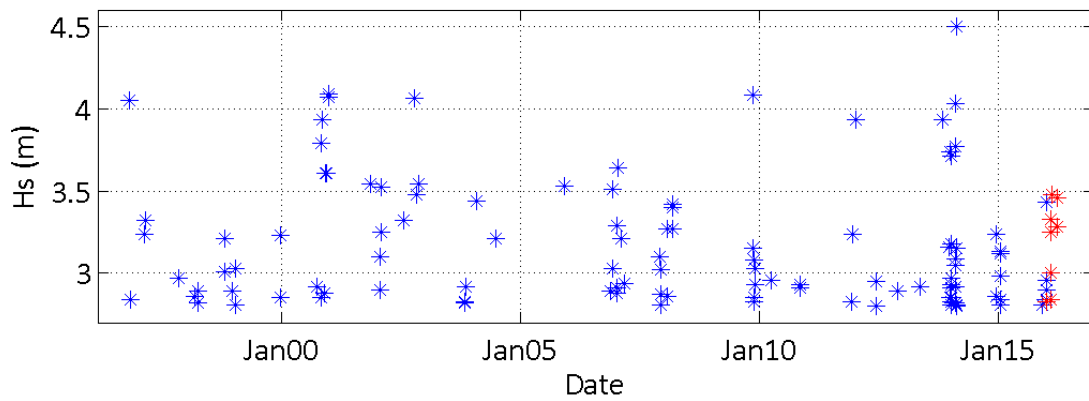
Tidal predictions for Lymington were supplied by Fugro EMU Limited.



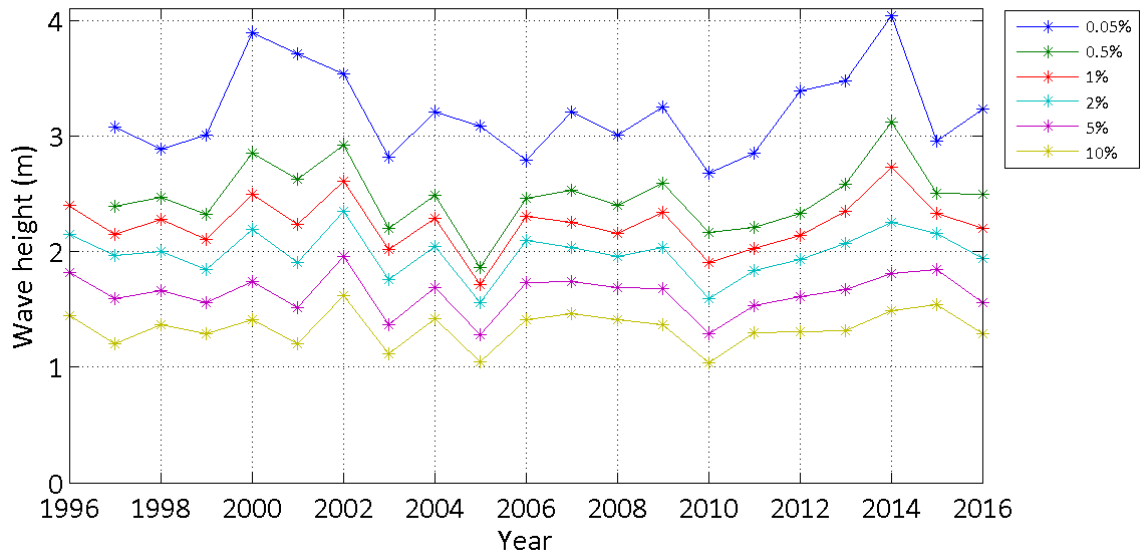
Storms at Milford during 2016



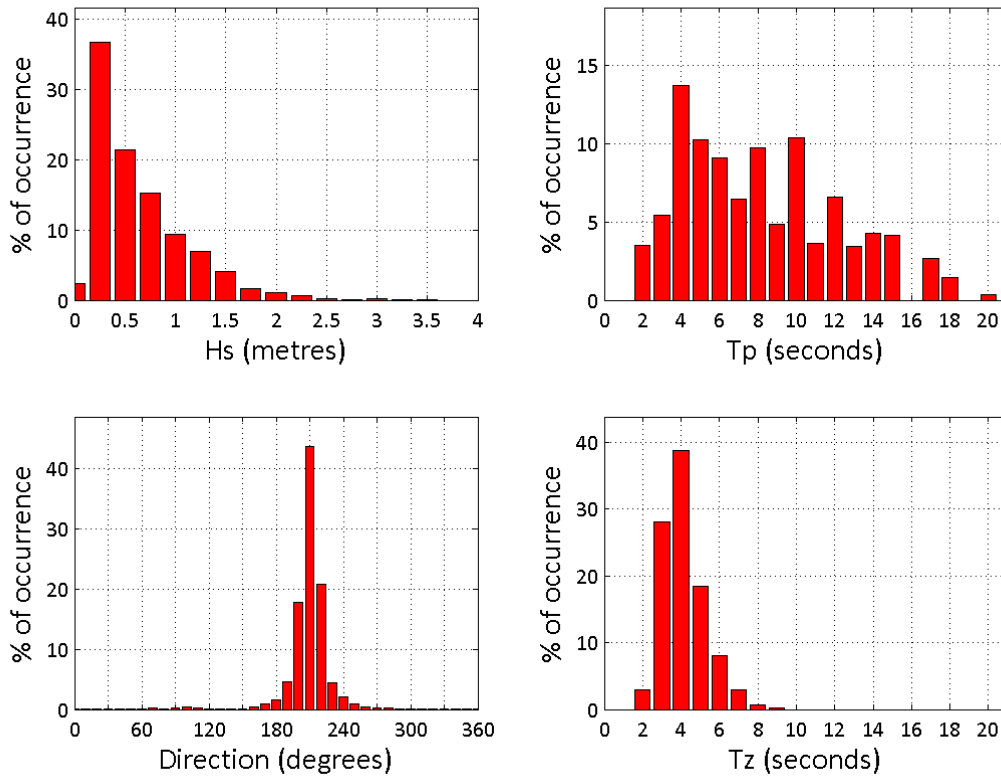
Storms at Milford - all years



Milford - Wave height exceedance (H_s)



Milford 2016



Milford 1996 to 2016 - Joint distribution (% of occurrence)

