



Rustington Directional Waverider Buoy

Location			
OS	506370 E 93833 N		
WGS84	Latitude: 50° 44.06' N Longitude: 00° 29.64' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off Rustington beach. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
98	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	1.51	8.2	4.6	204	9.1	21	30
February	1.22	8.9	4.5	216	8.1	12	28
March	0.87	8.2	3.9	193	7.9	6	30
April	0.69	6.7	3.8	200	10.1	2	29
May	0.53	5.6	3.2	181	12.9	0	30
June	0.61	6.2	3.6	198	15.6	0	29
July	0.66	5.2	3.3	219	17.7	3	31
August	0.72	5.7	3.5	202	18.8	4	31
September	0.70	7.3	3.7	214	19.1	5	29
October	0.70	6.4	3.4	170	15.5	1	30
November	0.95	5.7	3.7	188	12.3	1	29
December	0.85	8.5	4.2	194	10.2	9	30

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

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal Seas (%)
January	1.14	8.0	4.2	196	7.9	12
February	0.93	8.4	4.1	194	6.9	10
March	0.78	7.8	3.9	190	7.3	4
April	0.62	6.9	3.7	187	9.8	2
May	0.67	5.8	3.5	189	12.7	1
June	0.61	5.7	3.5	191	15.7	1
July	0.64	5.3	3.4	204	18.1	1
August	0.65	5.2	3.4	208	18.8	1
September	0.70	6.0	3.5	192	17.6	1
October	0.93	6.3	3.8	192	15.3	4
November	1.05	6.9	4.0	200	12.6	6
December	1.11	7.4	4.1	199	9.5	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)
28-Mar-2016 02:30	4.91	9.1	7.3	191	2.96	HW +1	4.88	0.50	1.14
20-Nov-2016 05:30	4.65	9.1	7.1	174	1.94	HW +2	4.16	0.81	0.90
22-Nov-2016 04:00	4.35	8.3	6.6	208	2.06	HW -1	3.14	0.27	0.44
07-Feb-2016 23:30	4.06	9.1	6.7	217	2.86	HW +1	5.30	0.20	0.38
08-Feb-2016 13:00	3.98	10.5	6.9	214	2.11	HW +2	5.70	0.56	0.80
06-Feb-2016 22:30	3.95	9.1	6.8	208	2.76	HW +1	5.05	0.30	0.30

* Tidal information is obtained from The National Network gauges on West Pier and/or Newhaven and/or the tide gauge on Arun Platform. 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	-	2.76	2.47	2.27	1.85	1.45	29-Nov-2003 13:00	3.34
2004	3.83	2.82	2.62	2.38	2.03	1.65	08-Jan-2004 11:30	4.17
2005	3.64	3.01	2.56	2.19	1.79	1.42	02-Dec-2005 19:00	3.84
2006	3.78	3.01	2.75	2.44	2.05	1.67	03-Dec-2006 08:00	4.81
2007	3.89	2.98	2.70	2.41	2.03	1.69	18-Jan-2007 10:00	4.32
2008	3.70	3.02	2.74	2.46	2.05	1.70	13-Dec-2008 12:00	4.01
2009	3.72	3.09	2.87	2.47	2.01	1.66	14-Nov-2009 13:00	3.91
2010	3.53	2.78	2.38	1.98	1.62	1.30	08-Nov-2010 11:00	3.86
2011	3.43	2.61	2.39	2.15	1.81	1.54	13-Dec-2011 00:30	4.55 ⁺
2012	3.59	2.94	2.67	2.36	1.94	1.59	03-Jan-2012 09:30	3.86
2013	4.40	3.24	2.88	2.57	2.02	1.62	24-Dec-2013 02:30	5.46 ⁺
2014	4.38	3.50	3.16	2.80	2.27	1.85	15-Feb-2014 00:30	4.97 ⁺
2015	3.58	2.92	2.74	2.55	2.18	1.82	15-Jan-2015 04:00	3.98
2016	4.35	3.19	2.82	2.46	1.97	1.58	28-Mar-2016 02:30	4.91 ⁺

** i.e. 5 % of the H_s values measured in 2003 exceeded 1.85 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 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	4.8	Depth-limited at MLWS
2	5.0	
5	5.3	
10	5.5	
20	5.7	Depth-limited at MHWS
50	6.0	Depth-limited at HAT
100	6.2	

3-hourly records July 2003 – December 2016		
Return period (years)	Significant wave height (m)	Comments
1	4.3	No depth limitation
2	4.6	Depth-limited at MLWS
5	4.9	
10	5.1	
20	5.4	
50	5.7	Depth-limited at MHWS
100	5.9	Depth-limited at HAT

Distribution plots

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

- Annual time series of H_s (red line is 3.5 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

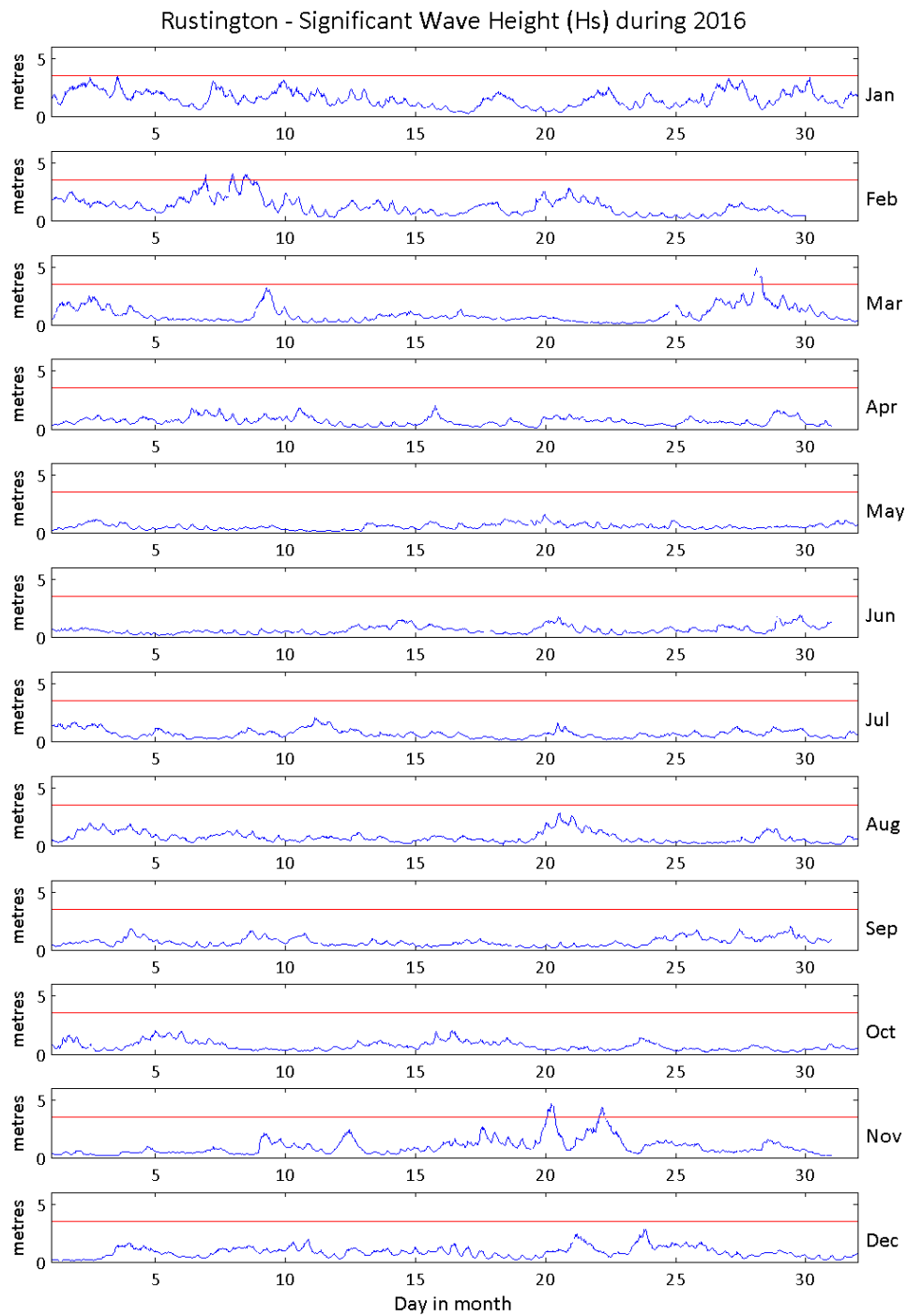
General

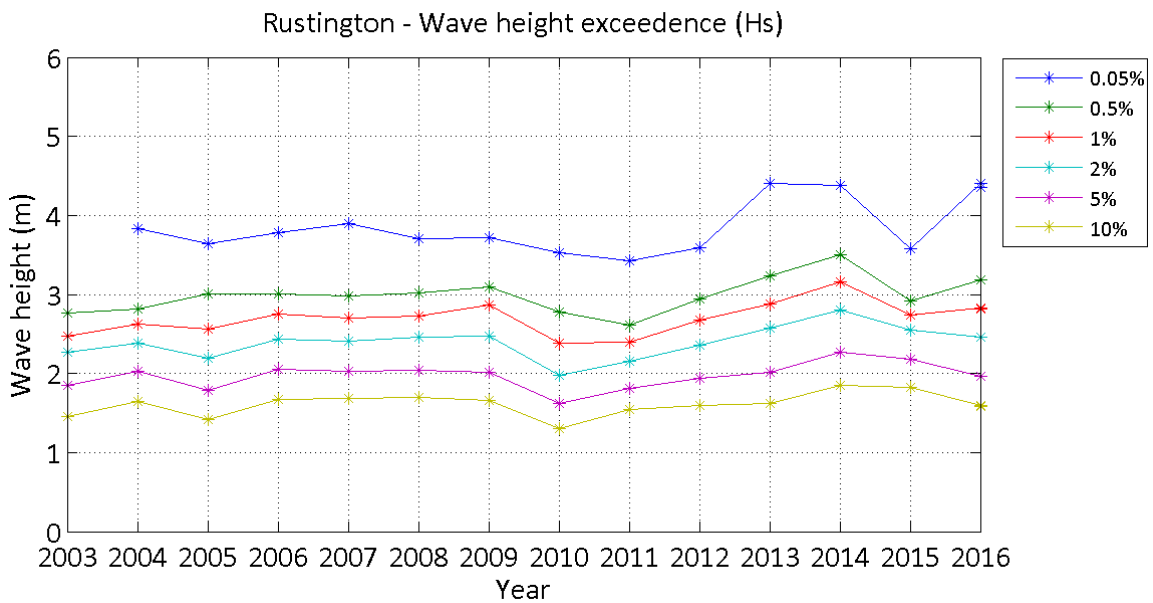
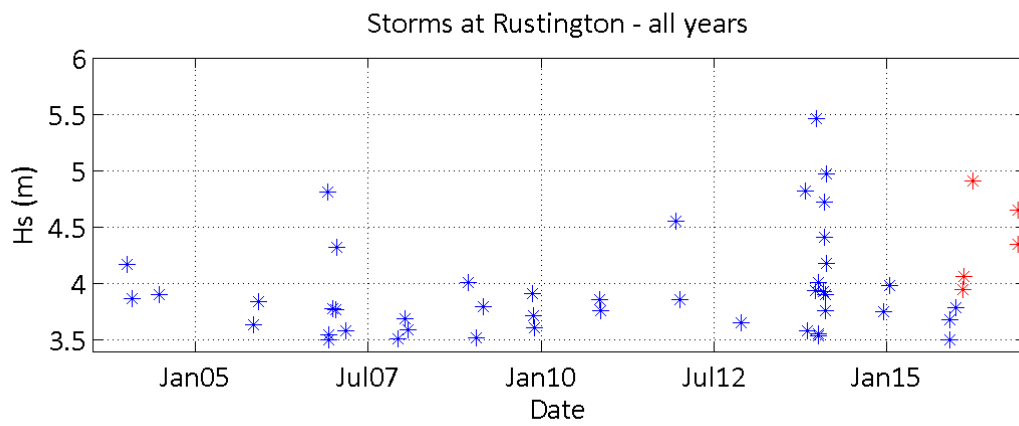
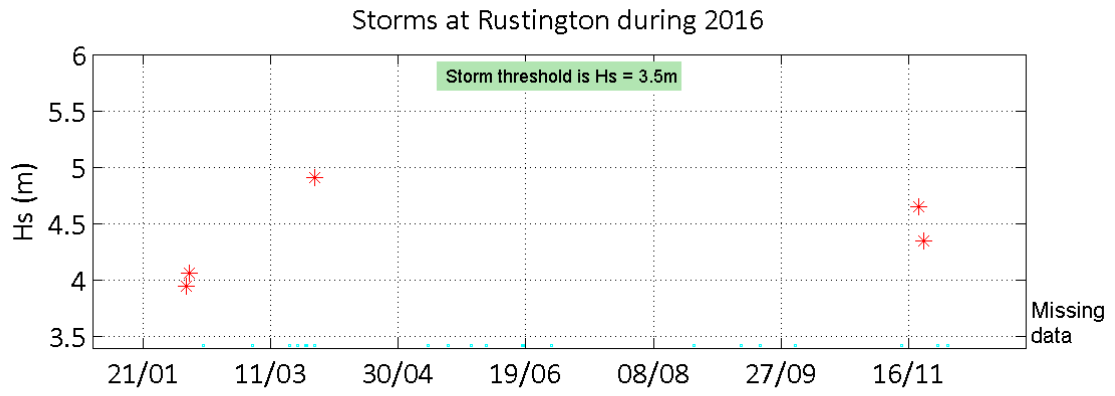
The buoy, owned by Adur & Worthing Councils, was first deployed on 15 July 2003, at which time the magnetic declination at the site was 2.7° west, changing by 0.14° east per year.

Acknowledgements

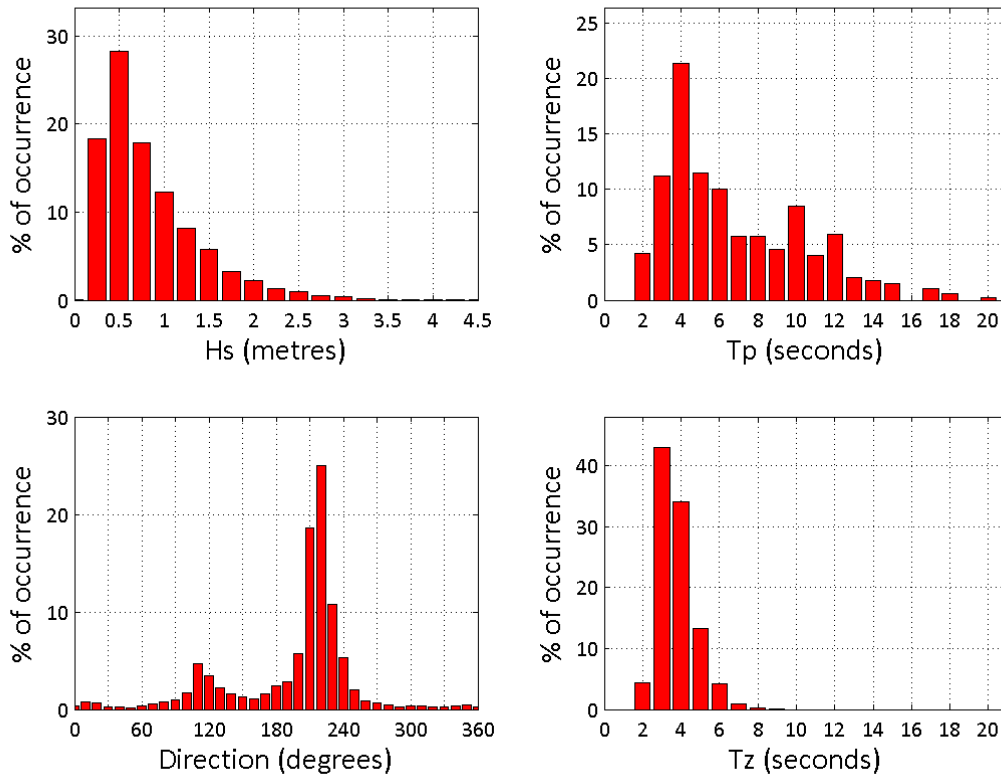
Tidal predictions were produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool).

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.





Rustington 2016



Rustington 2003 to 2016 - Joint distribution (% of occurrence)

