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)

Data Quality

Recovery rate (%)	Sample interval
98	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	1.26	8.0	4.4	212	8.4	30
February	0.86	8.2	4.0	191	6.4	27
March	0.84	8.7	4.0	197	7.7	30
April	0.61	7.5	3.8	183	9.9	29
May	0.82	5.9	3.7	204	12.5	30
June	0.64	5.9	3.5	194	15.4	29
July	0.76	5.8	3.6	211	18.0	30
August	0.60	5.4	3.4	195	18.3	30
September	0.74	4.9	3.4	177	16.9	29
October	0.71	5.9	3.5	170	14.7	30
November	1.34	7.5	4.3	210	13.4	29
December	1.71	7.9	4.7	206	11.5	30

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

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)
January	1.14	8.0	4.2	196	7.9
February	0.93	8.4	4.1	194	6.9
March	0.78	7.8	3.9	190	7.3
April	0.62	6.9	3.7	187	9.8
May	0.67	5.8	3.5	189	12.7
June	0.61	5.7	3.5	191	15.7
July	0.64	5.3	3.4	204	18.1
August	0.65	5.2	3.4	208	18.8
September	0.70	6.0	3.5	192	17.6
October	0.93	6.3	3.8	192	15.3
November	1.05	6.9	4.0	200	12.6
December	1.11	7.4	4.1	199	9.5

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 04:00	3.98	8.3	6.5	200	-	HW -2	~2.6	-	0.51
30-Dec-2015 13:30	3.79	7.7	6.3	184	2.18	HW	3.8	-0.11	0.20
29-Nov-2015 12:30	3.68	9.1	6.3	218	2.93	HW -1	5.1	0.26	0.36
30-Nov-2015 15:00	3.50	10.0	6.6	221	2.61	HW +1	4.8	0.26	0.46

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

** 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.

** Tidal information is obtained from the nearest recording tide gauge (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 positive surge during the storm event.*

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 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 from 01 April 2004

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.

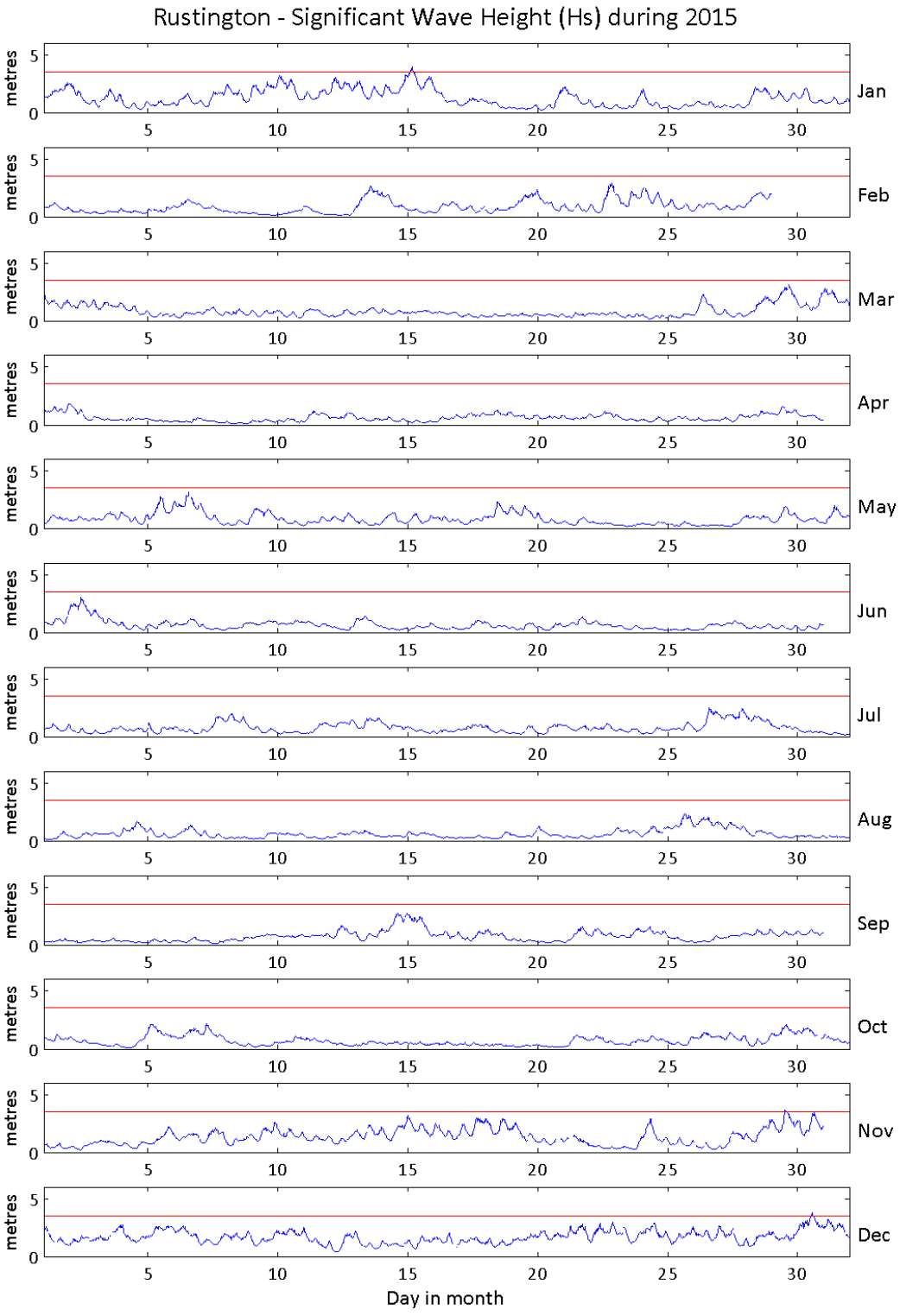
Return period (years)	Significant wave height (m)	Comments
1	4.3	No depth limitation
2	4.5	
5	4.8	Depth-limited at MLWS
10	5.1	
20	5.3	
50	5.6	
100	5.8	

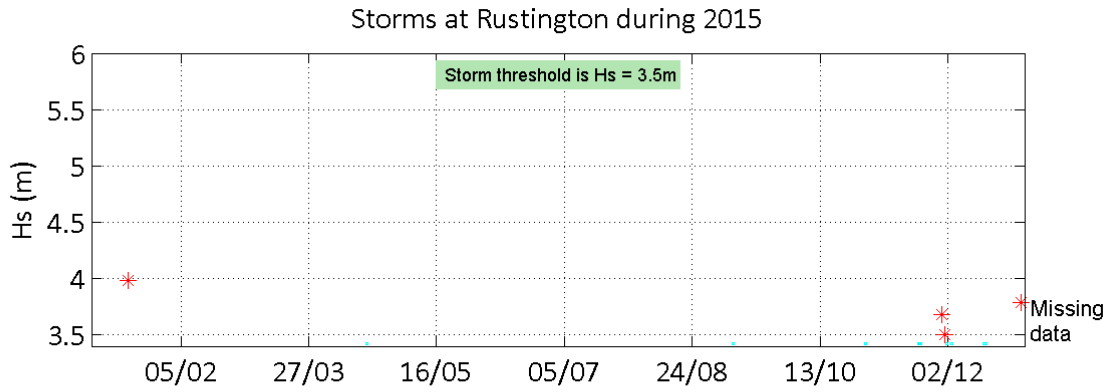
General

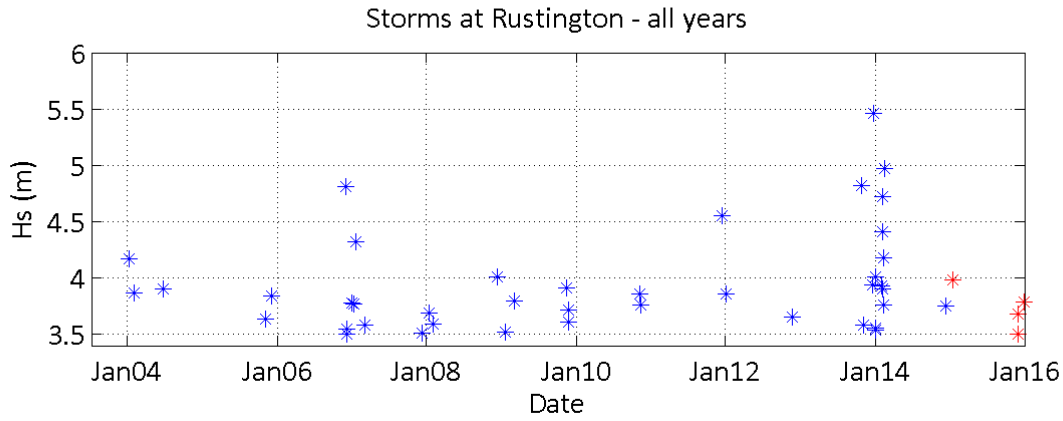
The buoy was first deployed on 15 July 2003, at which time the magnetic declination at the site was 2.7° west, changing by 0.14° east per year.

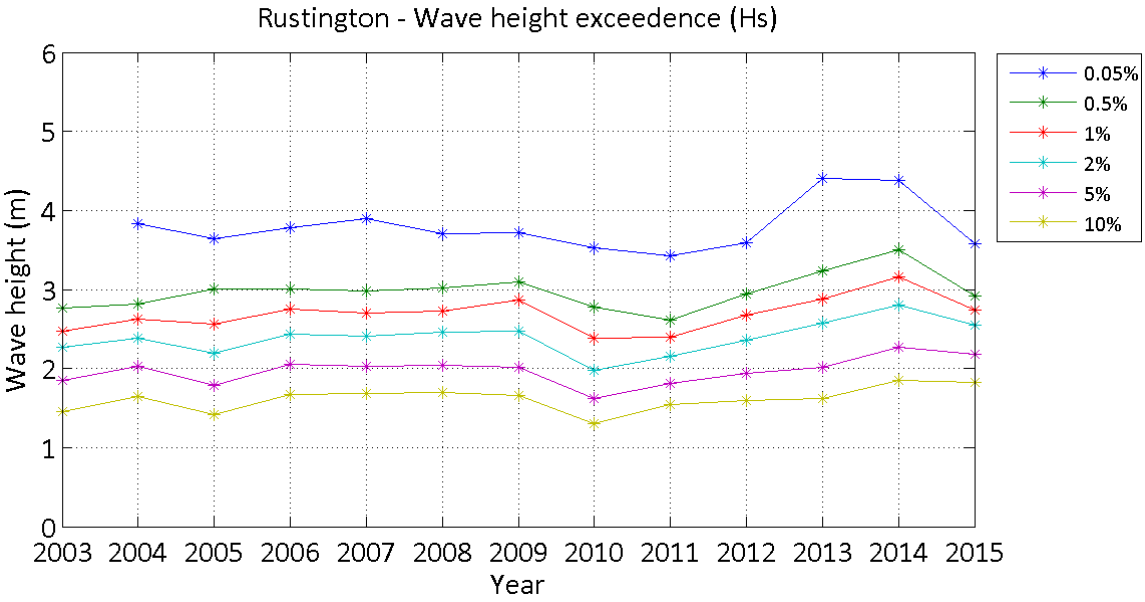
Acknowledgements

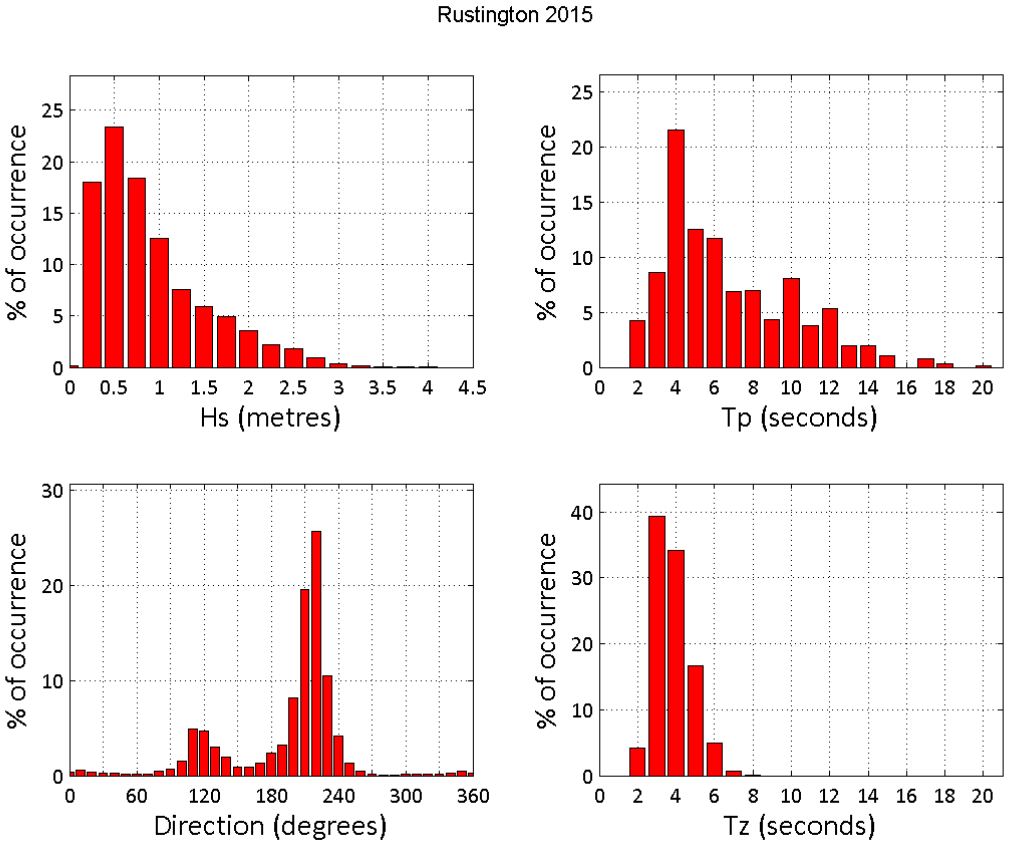
TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.

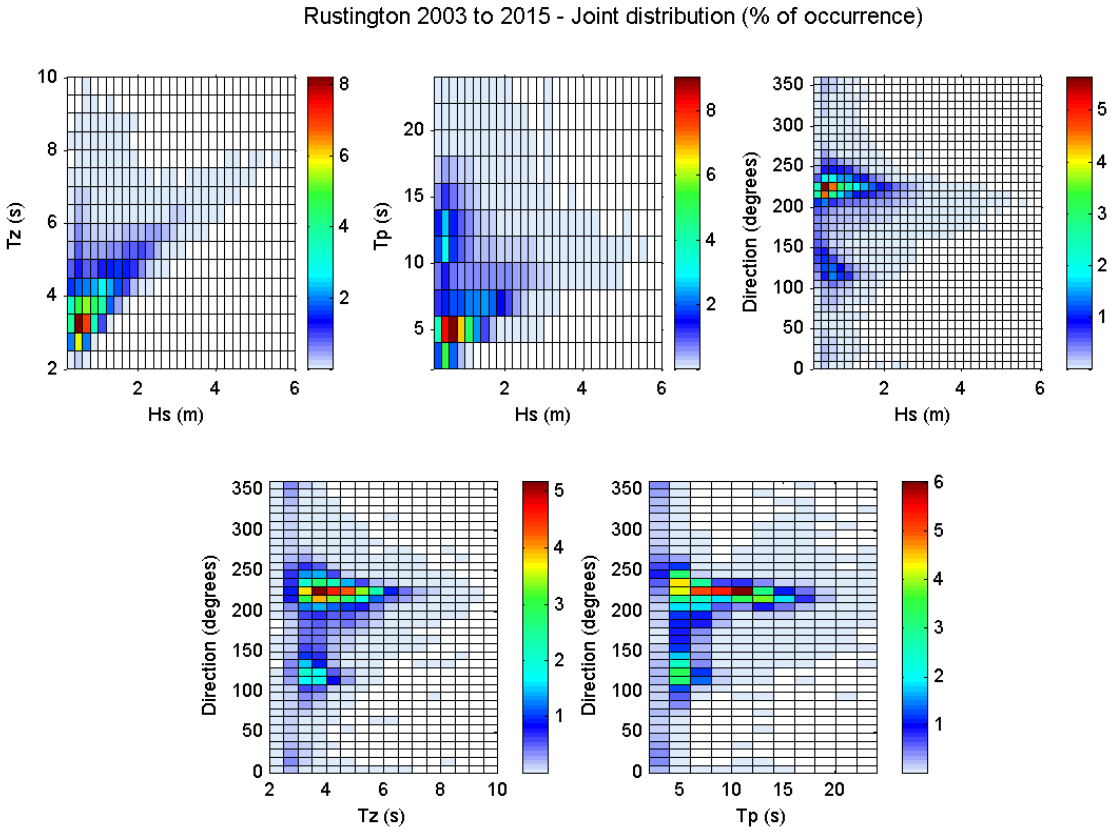

Rustington - Significant Wave Height (Hs) during 2015
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month


Storms at Rustington during 2015
Storm threshold is Hs = 3.5m
Hs (m)
6
5.5
5
4.5
4
3.5
05/02
27/03
16/05
05/07
24/08
13/10
02/12
Missing data


Storms at Rustington - all years
Hs (m)
6
5.5
5
4.5
4
3.5
Jan04
Jan06
Jan08
Jan10
Jan12
Jan14
Jan16
Date


Rustington - Wave height exceedence (Hs)
Wave height (m)
6
5
4
3
2
1
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
0.05%
0.5%
1%
2%
5%
10%


Rustington 2015
% of occurrence
Hs (metres)
Tp (seconds)
Direction (degrees)
Tz (seconds)


Rustington 2003 to 2015 - Joint distribution (% of occurrence)
Tz (s)
Hs (m)
Tp (s)
Direction (degrees)

Offshore Wave Hs (m)

Rustington WB : 01/04/2004 - 31/12/2015