Boscombe Directional Waverider Buoy

Location			
OS	411404 E 90210 N		
WGS84	*Latitude:* 50° 42.68' N *Longitude:* 01° 50.39' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off Boscombe beach. 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	0.97	8.9	4.3	181	9.6	7	31
February	0.78	9.5	4.6	182	8.8	5	29
March	0.55	9.1	4.4	181	8.1	4	31
April	0.46	6.9	3.9	178	10.0	1	30
May	0.33	6.1	3.6	175	12.6	0	31
June	0.37	6.2	3.7	185	15.7	0	30
July	0.41	5.4	3.3	189	17.7	0	31
August	0.46	5.9	3.5	184	18.9	1	31
September	0.49	6.8	3.7	183	18.8	0	30
October	0.49	6.6	3.9	164	15.3	0	31
November	0.57	6.5	4.2	169	11.9	0	30
December	0.58	9.4	4.4	179	9.6	1	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	0.75	9.4	4.4	180	8.1	6
February	0.61	9.9	4.5	178	7.1	3
March	0.52	8.7	4.1	178	7.6	1
April	0.43	7.3	3.9	178	9.9	1
May	0.45	6.1	3.6	178	12.6	0
June	0.41	5.7	3.5	180	15.7	0
July	0.44	5.4	3.4	184	17.9	0
August	0.44	5.4	3.5	184	18.6	0
September	0.46	6.5	3.7	178	17.6	0
October	0.64	6.8	3.9	177	15.2	2
November	0.69	7.8	4.3	180	12.5	3
December	0.72	8.7	4.3	182	9.6	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)
28-Mar-2016 03:30	4.53	9.1	7.1	172	1.17	HW	1.28	0.78	0.78
20-Nov-2016 04:00	4.18	9.1	6.9	166	1.15	HW + 1	1.12	0.57	0.88
06-Feb-2016 20:00	3.02	7.7	5.6	187	1.06	HW + 1	1.28	0.59	0.64
03-Jan-2016 12:30	3.01	7.7	5.9	173	0.48	HW + 1	0.22	0.23	0.37
07-Jan-2016 04:30	2.96	6.7	5.5	172	0.94	HW - 2	0.75	0.48	0.55
01-Jan-2016 19:30	2.91	7.1	5.5	142	0.37	HW - 1	0.52	0.40	0.56

** Tidal information is obtained from the WaveRadar REX on Swanage Pier. The surge shown is the residual at the time of the highest Hs. 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	-	2.17	1.95	1.53	1.19	0.98	14-Nov-2003 11:00	2.79
2004	2.98	2.28	1.96	1.69	1.30	1.02	08-Jan-2004 09:30	3.62
2005	2.62	1.81	1.59	1.40	1.11	0.90	02-Nov-2005 01:00	2.84
2006	2.82	2.24	2.03	1.82	1.47	1.17	29-Dec-2006 23:00	3.14
2007	2.94	2.07	1.84	1.63	1.33	1.07	18-Nov-2007 14:00	3.19
2008	3.08	2.32	2.02	1.71	1.34	1.05	10-Mar-2008 07:00	3.84
2009	2.87	2.18	1.93	1.72	1.39	1.10	13-Nov-2009 23:30	3.10
2010	2.75	2.13	1.76	1.48	1.14	0.90	08-Nov-2010 08:30	3.21
2011	2.61	2.11	1.91	1.57	1.26	1.04	10-Jan-2011 22:30	2.88
2012	3.06	2.25	2.04	1.76	1.34	1.07	25-Apr-2012 10:30	3.31
2013	3.14	2.40	2.04	1.78	1.38	1.09	18-Dec-2013 20:00	3.35
2014	3.64	2.72	2.43	2.08	1.63	1.24	05-Feb-2014 01:00	3.95
2015	2.90	2.13	1.89	1.68	1.44	1.17	30-Dec-2015 08:00	3.13
2016	3.72	2.41	1.98	1.69	1.25	0.99	28-Mar-2016 03:30	4.53

*** i.e. 5 % of the H_s values measured in 2003 exceeded 1.19 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	4.0	Depth-limited at MLWS
2	4.2	
5	4.5	Depth-limited at HAT
10	4.7	
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	3.4	No depth limitation
2	3.6	
5	3.9	
10	4.1	Depth-limited at MLWS
20	4.3	
50	4.6	
100	4.8	

Distribution plots

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

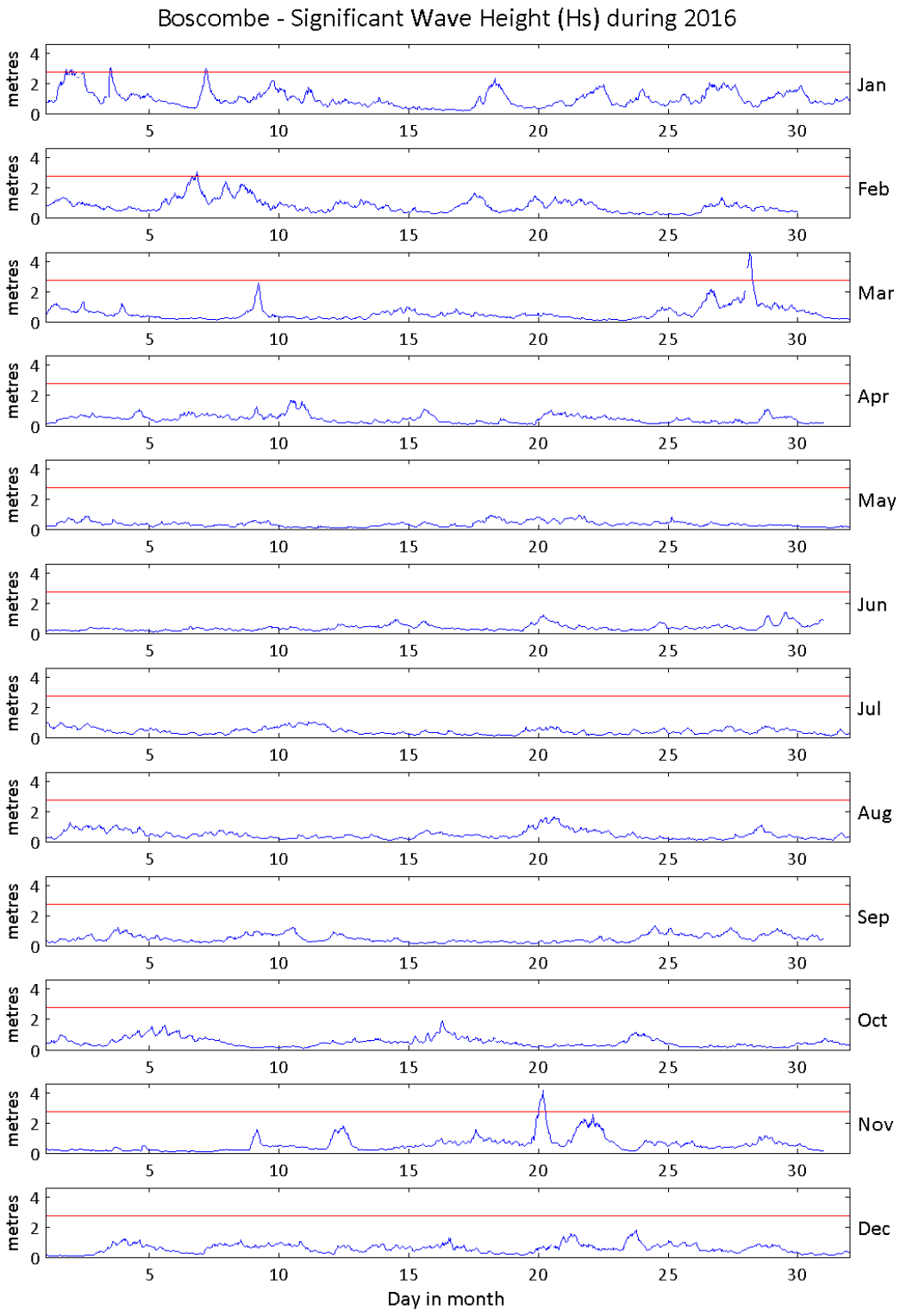
- Annual time series of H_s (red line is 2.75 m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, T_p, 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

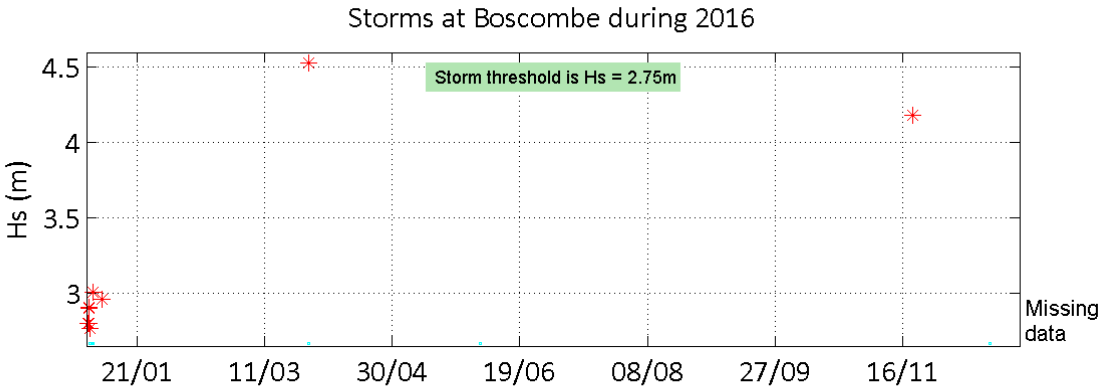
General

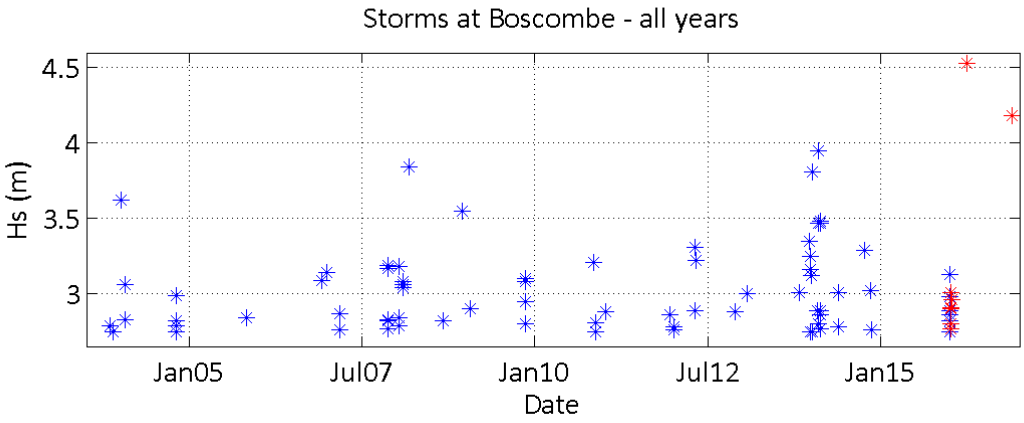
The buoy, owned by New Forest District Council, was first deployed on 11 July 2003, at which time the magnetic declination at the site was 3.2° west, changing by 0.15° east per year.

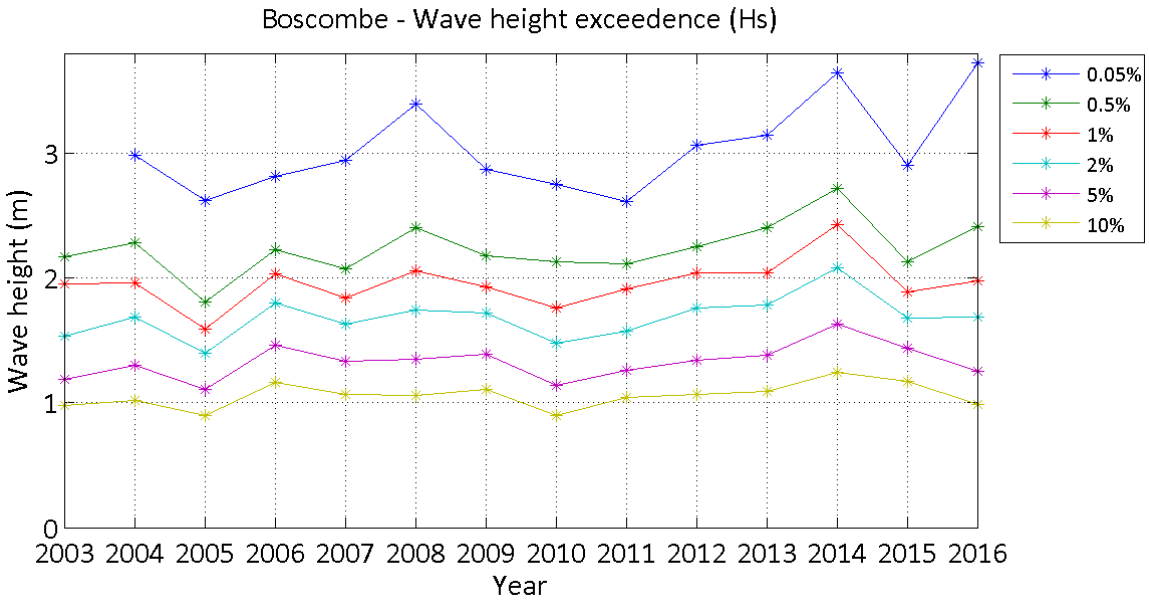
Acknowledgements

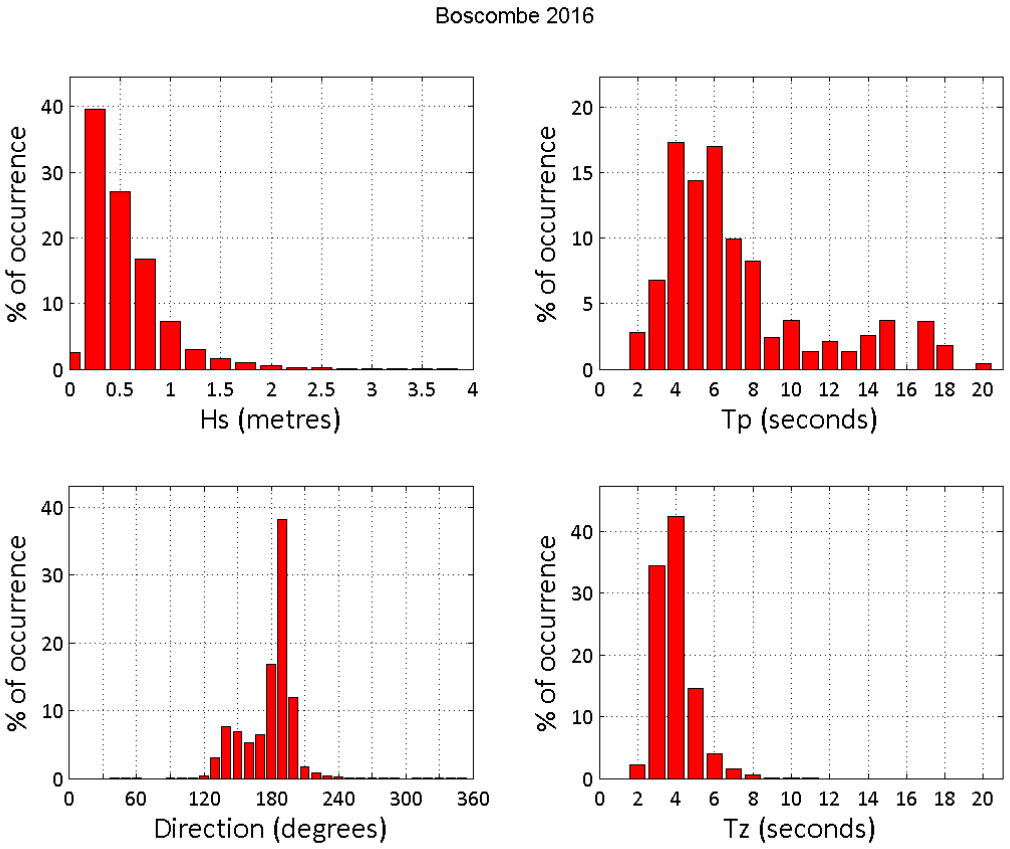
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

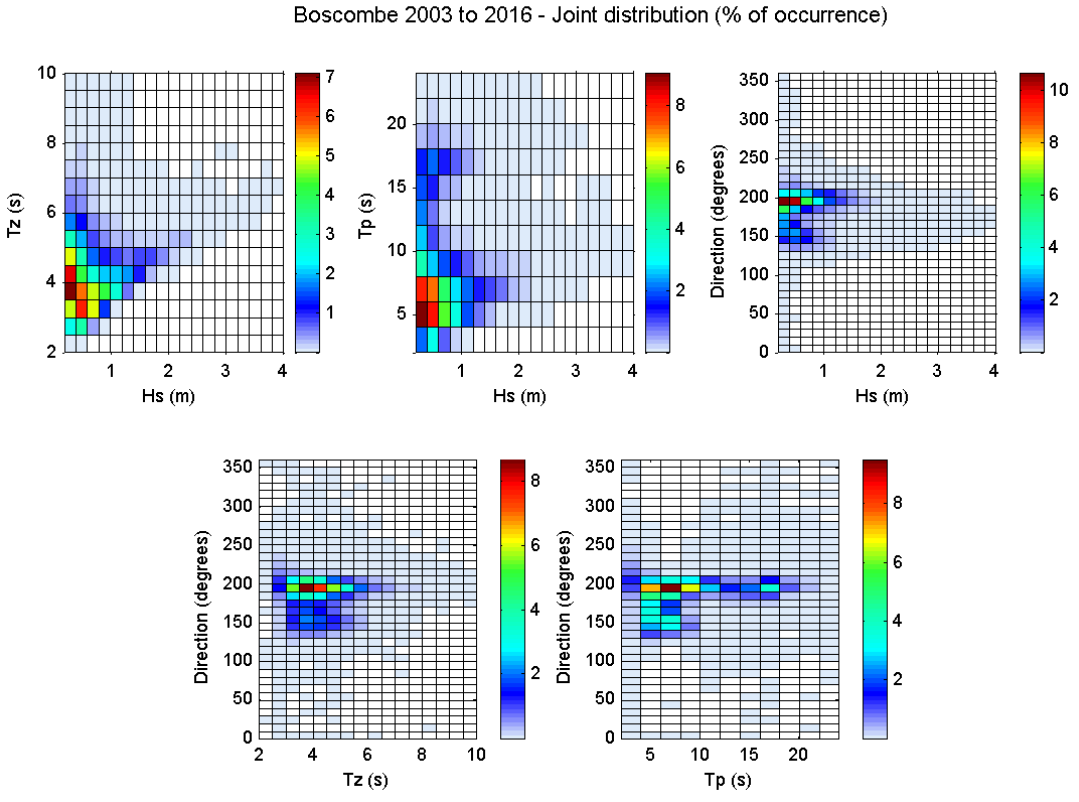

Boscombe - Significant Wave Height (Hs) during 2016
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
2
4
5
10
15
20
25
30
Day in month

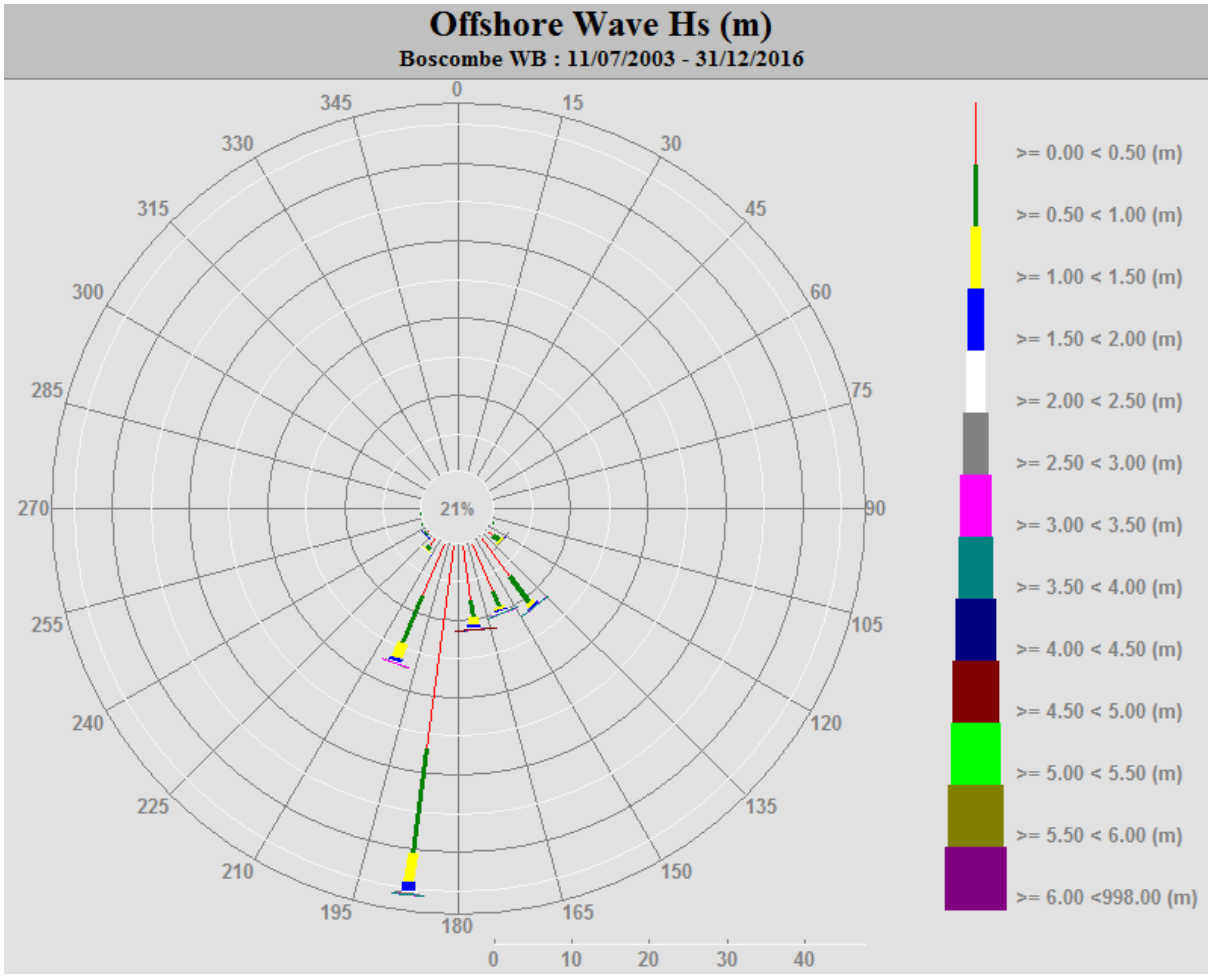

Storms at Boscombe during 2016
Storm threshold is Hs = 2.75m
Hs (m)
4.5
4
3.5
3
Missing data
21/01
11/03
30/04
19/06
08/08
27/09
16/11


Storms at Boscombe - all years
Hs (m)
4.5
4
3.5
3
Jan05
Jul07
Jan10
Jul12
Jan15
Date


Boscombe - Wave height exceedence (Hs)
Wave height (m)
0
1
2
3
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Year
0.05%
0.5%
1%
2%
5%
10%


Boscombe 2016
% of occurrence
Hs (metres)
Tp (seconds)
Direction (degrees)
Tz (seconds)


Boscombe 2003 to 2016 - Joint distribution (% of occurrence)
Tz (s)
Hs (m)
Tp (s)
Direction (degrees)
Tz (s)
Tp (s)


Offshore Wave Hs (m)
Boscombe WB : 11/07/2003 - 31/12/2016
0
15
30
45
60
75
90
105
120
135
150
165
180
195
210
225
240
255
270
285
300
315
330
345
21%
0
10
20
30
40
>= 0.00 < 0.50 (m)
>= 0.50 < 1.00 (m)
>= 1.00 < 1.50 (m)
>= 1.50 < 2.00 (m)
>= 2.00 < 2.50 (m)
>= 2.50 < 3.00 (m)
>= 3.00 < 3.50 (m)
>= 3.50 < 4.00 (m)
>= 4.00 < 4.50 (m)
>= 4.50 < 5.00 (m)
>= 5.00 < 5.50 (m)
>= 5.50 < 6.00 (m)
>= 6.00 <998.00 (m)