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 EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
100	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	0.76	9.3	4.3	188	8.9	31
February	0.56	9.7	4.7	176	6.7	28
March	0.52	10.1	4.1	184	7.8	31
April	0.41	7.9	3.8	178	10.3	30
May	0.56	5.8	3.5	181	12.6	31
June	0.42	5.6	3.4	180	15.4	30
July	0.49	5.5	3.4	185	17.9	31
August	0.43	5.6	3.5	181	18.0	31
September	0.49	5.5	3.6	170	16.8	30
October	0.52	7.5	4.1	166	14.6	31
November	0.80	7.3	4.0	187	13.3	30
December	1.19	8.1	4.1	185	12.0	31

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

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)
January	0.75	9.4	4.4	180	8.1
February	0.61	9.9	4.5	178	7.1
March	0.52	8.7	4.1	178	7.6
April	0.43	7.3	3.9	178	9.9
May	0.45	6.1	3.6	178	12.6
June	0.41	5.7	3.5	180	15.7
July	0.44	5.4	3.4	184	17.9
August	0.44	5.4	3.5	184	18.6
September	0.46	6.5	3.7	178	17.6
October	0.64	6.8	3.9	177	15.2
November	0.69	7.8	4.3	180	12.5
December	0.72	8.7	4.3	182	9.6

Storm Analysis

Date/Time	H_s (m)	T_p (s)	T_z (s)	Dir. (º)	Water level elevation* (OD)	Tidal stage (hours re. HW)	Tidal range (m)	Tidal surge* (m)	Max. surge* (m)
30-Dec-2015 08:00	3.13	7.7	5.7	183	-	HW -2	~1.1	-	-

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

** i.e. 5 % of the H_s values measured in 2003 exceeded 1.19 m*

Distribution plots

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

- Annual time series of H_s (red line is 2.75m 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

** Tidal information is obtained from the nearest recording tide gauge (the National Network gauge on Bournemouth Pier). 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.*

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.

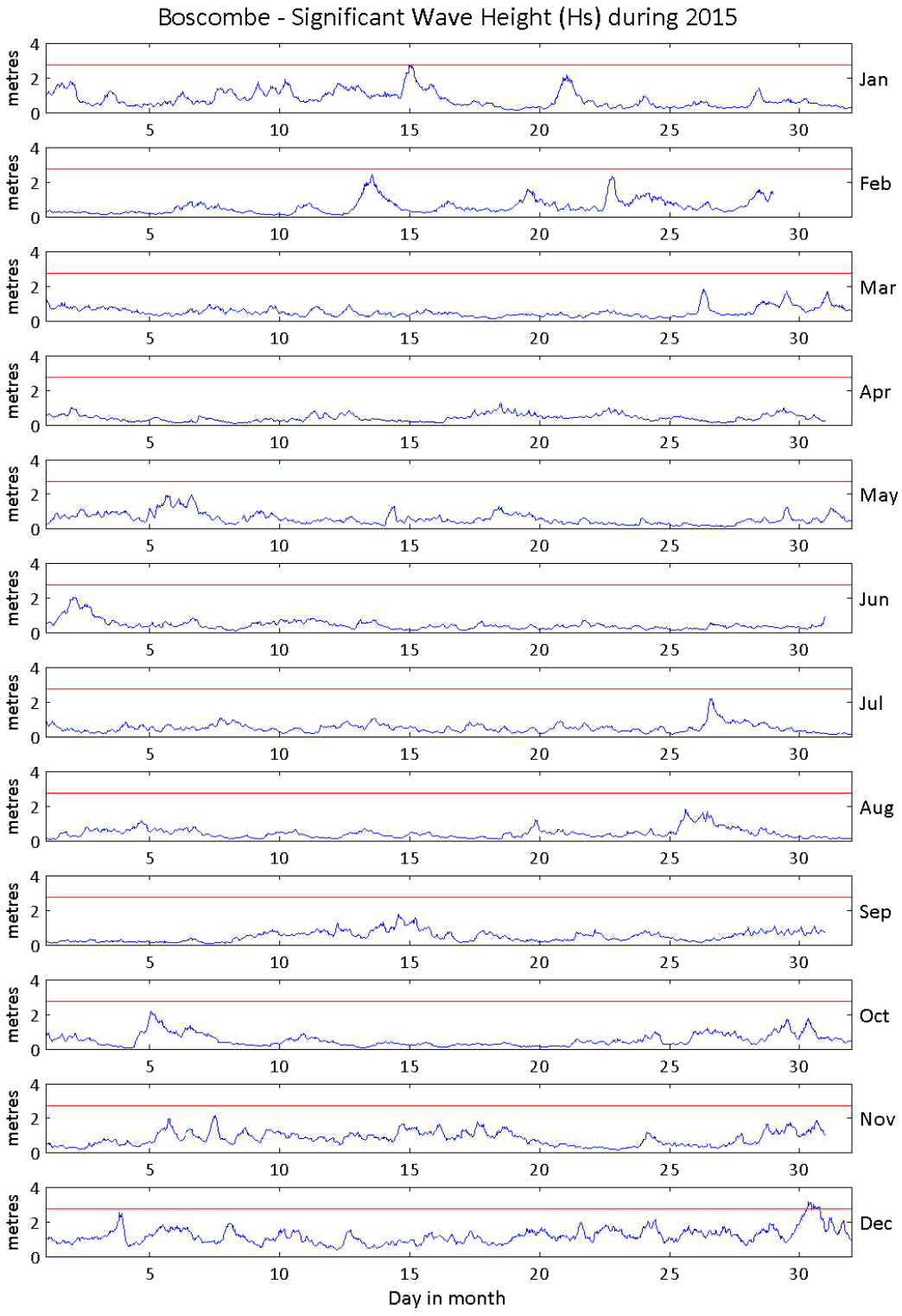
Return period (years)	Significant wave height (m)	Comments
1	3.3	No depth limitation
2	3.5	
5	3.7	
10	3.9	
20	4.1	Depth-limited at MLWS
50	4.3	
100	4.5	

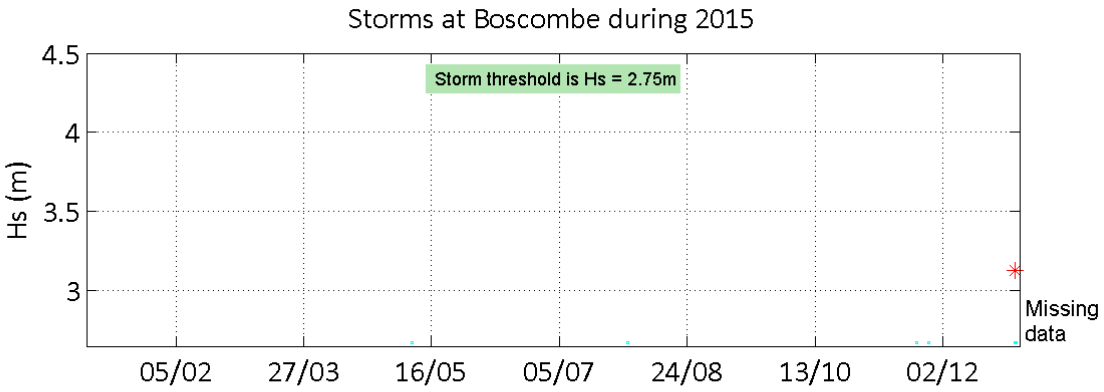
General

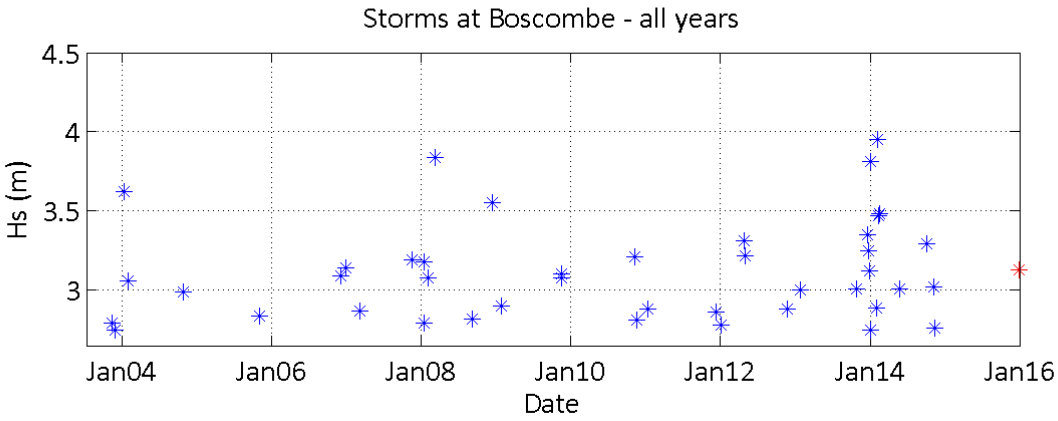
The buoy was first deployed on 11 July 2003, at which time the magnetic declination at the site was 3.2° west, changing by 0.15° east per year.

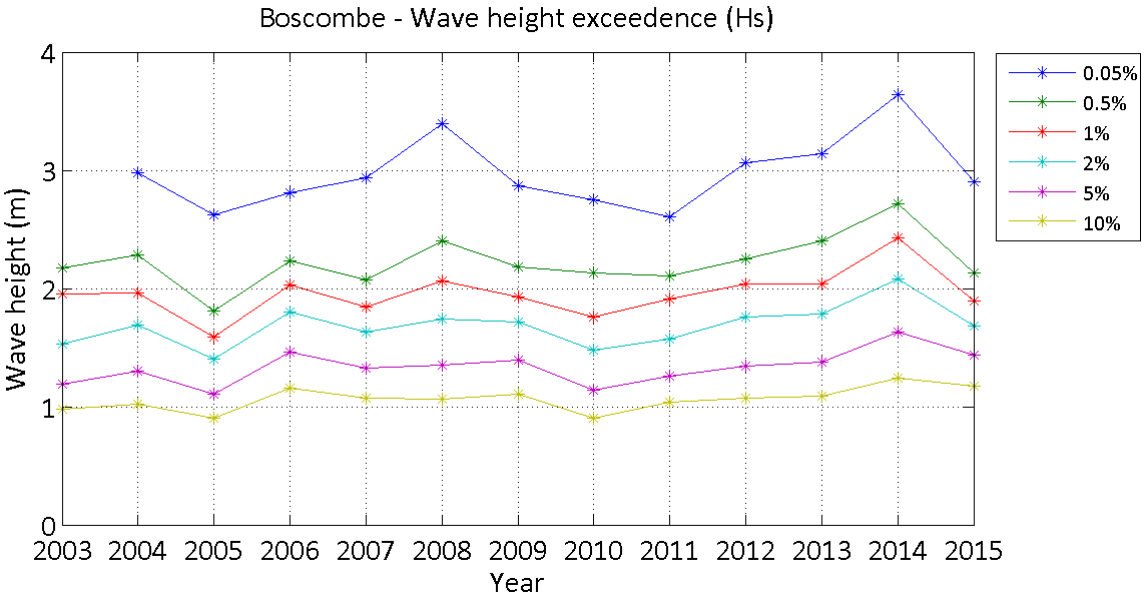
Acknowledgements

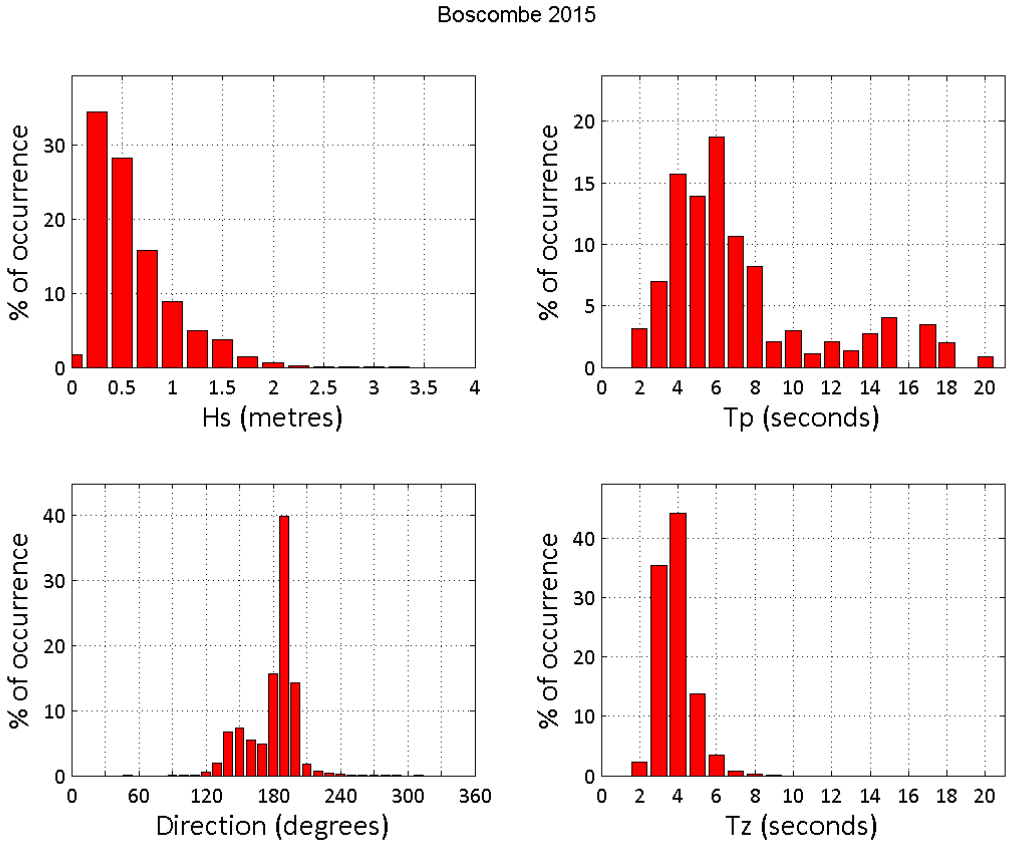
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

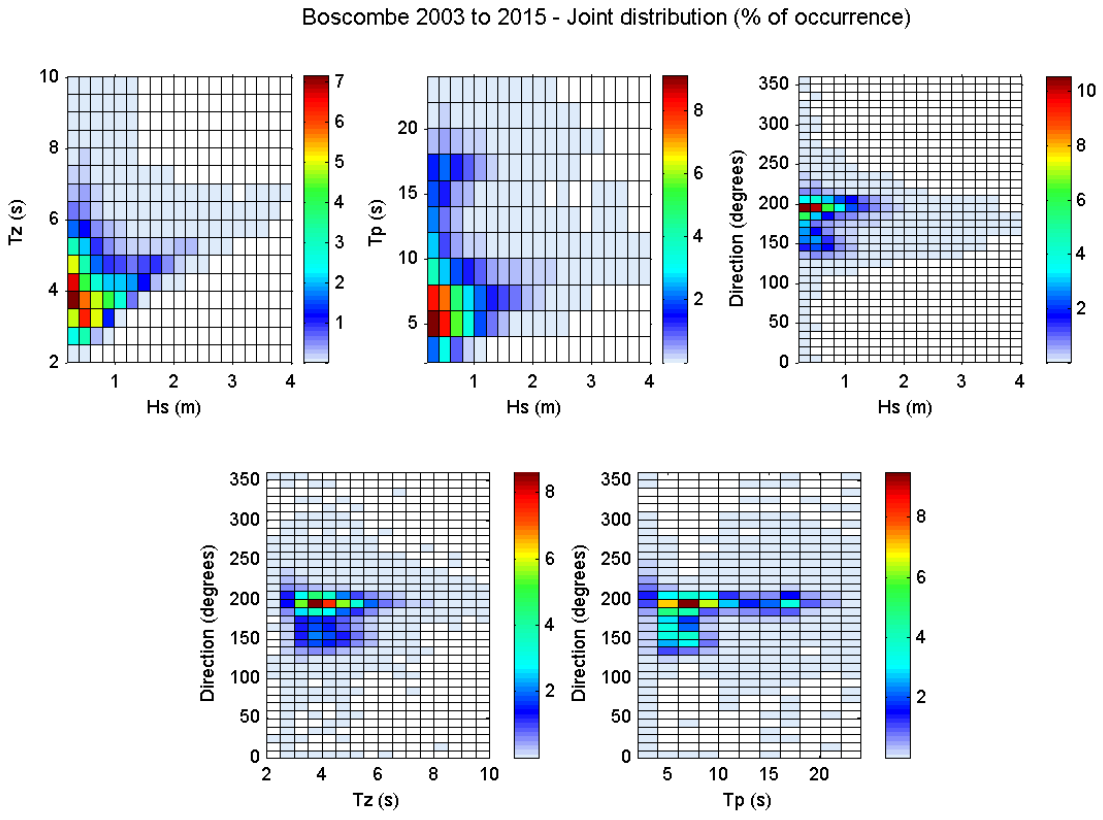

Boscombe - Significant Wave Height (Hs) during 2015
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
2
4
5
10
15
20
25
30
Day in month


Storms at Boscombe during 2015
Storm threshold is Hs = 2.75m
Hs (m)
4.5
4
3.5
3
Missing data
05/02
27/03
16/05
05/07
24/08
13/10
02/12


Storms at Boscombe - all years
Hs (m)
4.5
4
3.5
3
Jan04
Jan06
Jan08
Jan10
Jan12
Jan14
Jan16
Date


Boscombe - Wave height exceedence (Hs)
Wave height (m)
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%


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


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

Offshore Wave Hs (m)

Boscombe WB : 11/07/2003 - 31/12/2015