Boscombe Directional Waverider Buoy

Location			
OS	411410 E 90213 N		
WGS84	*Latitude:* 50° 42.69' 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
46	30 minutes

Monthly Averages - 2003

All times are GMT

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-
July	0.59	4.8	3.3	190	19.1	-	15
August	0.36	5.2	3.4	169	19.9	-	30
September	0.34	6.0	3.5	174	18.5	0	30
October	0.55	6.0	4.0	163	14.5	0	31
November	0.74	8.3	4.3	176	12.1	3	30
December	0.65	6.6	4.1	170	9.4	0	31

Monthly Averages - All Years (July 2003 – December 2019)

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.72	9.3	4.3	180	8.3	6
February	0.64	9.8	4.5	178	7.3	4
March	0.54	8.6	4.1	178	7.8	1
April	0.44	7.2	3.9	177	10.0	1
May	0.43	6.1	3.6	177	12.8	0
June	0.41	5.7	3.5	179	15.9	0
July	0.43	5.2	3.4	184	18.2	0
August	0.44	5.3	3.5	184	18.7	0
September	0.47	6.4	3.7	179	17.7	0
October	0.62	6.9	4.0	175	15.3	2
November	0.68	7.7	4.3	178	12.4	4
December	0.71	8.7	4.3	180	9.7	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)
14-Nov-2003 00:30:00	3.01	7.7	5.8	176	0.70	HW	0.72	0.29	0.31
29-Nov-2003 09:00:00	2.75	7.1	5.4	151	0.36	HW +2	0.81	0.14	0.25
22-Oct-2003 16:00:00	2.68	7.1	5.3	156	0.51	HW -3	0.80	0.13	0.16

** Tidal information is obtained from the National Network tide gauge at Bournemouth. 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	2.75	2.24	2.00	1.59	1.21	0.99	14-Nov-2003 00:30:00	3.01
2004	2.95	2.28	1.96	1.69	1.30	1.02	08-Jan-2004 09:30:00	3.62
2005	2.52	1.80	1.59	1.40	1.12	0.91	02-Nov-2005 00:30:00	2.84
2006	2.81	2.22	2.03	1.79	1.46	1.15	29-Dec-2006 22:30:00	3.14
2007	2.94	2.07	1.84	1.63	1.33	1.07	18-Nov-2007 13:30:00	3.19
2008	3.37	2.40	2.06	1.74	1.36	1.07	10-Mar-2008 07:00:00	3.84
2009	2.87	2.19	1.96	1.74	1.41	1.11	13-Nov-2009 23:00:00	3.10
2010	2.75	2.14	1.77	1.48	1.14	0.90	08-Nov-2010 08:00:00	3.21
2011	2.61	2.11	1.90	1.57	1.26	1.03	10-Jan-2011 22:30:00	2.88
2012	3.07	2.25	2.04	1.76	1.33	1.06	25-Apr-2012 08:30:00	3.34
2013	3.14	2.39	2.04	1.79	1.39	1.10	18-Dec-2013 19:30:00	3.35
2014	3.64	2.72	2.43	2.08	1.63	1.24	05-Feb-2014 00:30:00	3.95
2015	2.90	2.12	1.88	1.67	1.43	1.16	30-Dec-2015 07:30:00	3.13
2016	3.72	2.33	1.97	1.68	1.25	0.99	28-Mar-2016 03:00:00	4.53
2017	2.48	2.03	1.79	1.54	1.21	0.95	25-Dec-2017 20:00:00	3.19
2018	3.22	2.48	2.13	1.80	1.37	1.08	13-Feb-2018 11:00:00	3.46
2019	2.43	2.01	1.87	1.69	1.38	1.10	05-Apr-2019 05:30:00	2.62

*** i.e. 5 % of the H_s values measured in 2003 exceeded 1.21 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 records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Generalised Pareto Distribution (GPD).

Observation period	July 2003 to December 2019	
Return period (years)	**Significant wave height (m)**	**Comments**
0.25	2.57	No depth limitation
1	3.23	
2	3.50	
5	3.81	
10	4.01	
20	4.19	Depth-limited at MLWS
50	4.39	
100	4.52	

Distribution plots

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

- Annual time series of H_s (red line is 2.57 m storm alert threshold)
- Incidence of storm waves for 2003. 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 2003
- Wave rose (percentage of occurrence of direction vs. H_s) for all measured data
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

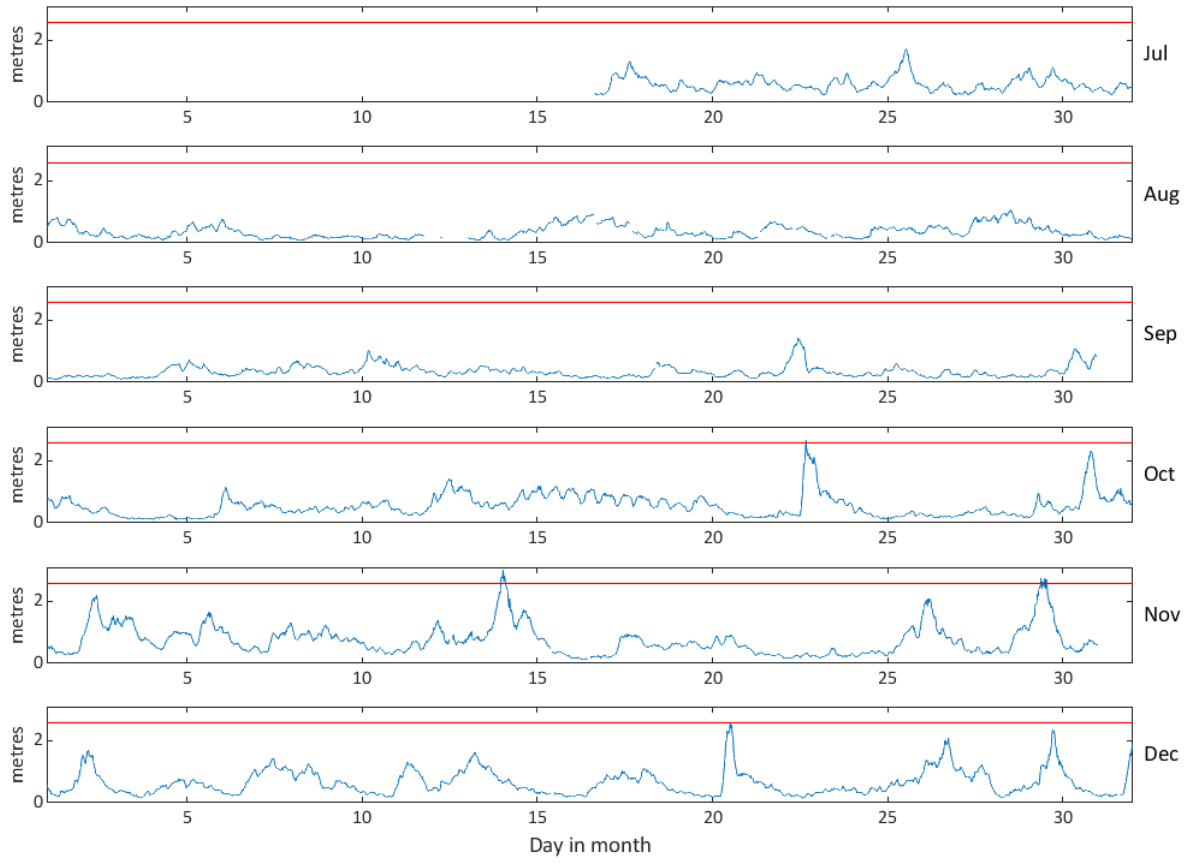
General

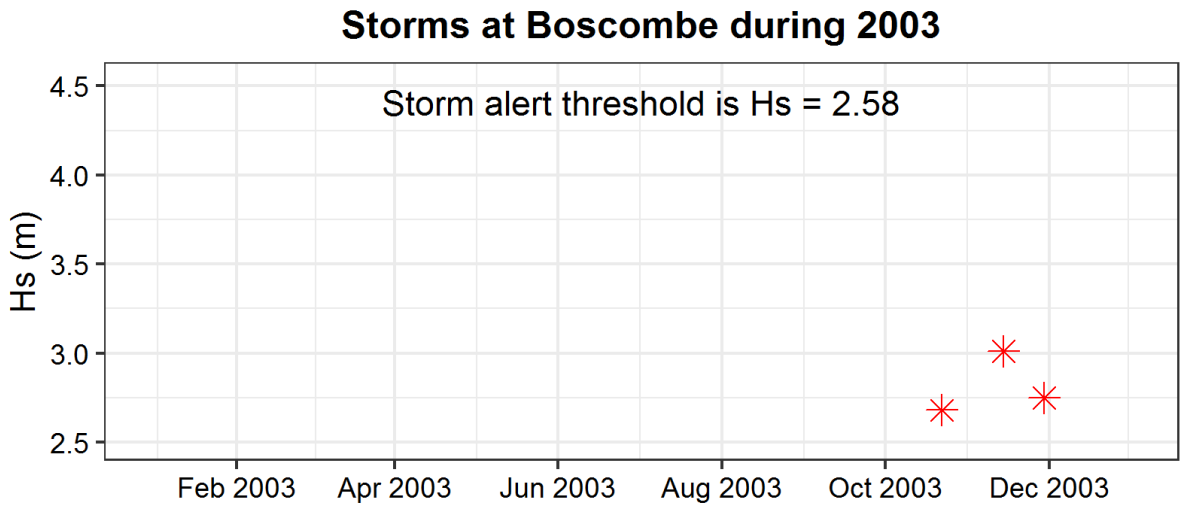
The buoy, owned by New Forest District Council, was first deployed on 16 July 2003, at which time the magnetic declination at the site was 3.2° west, changing by 0.15° east per year.

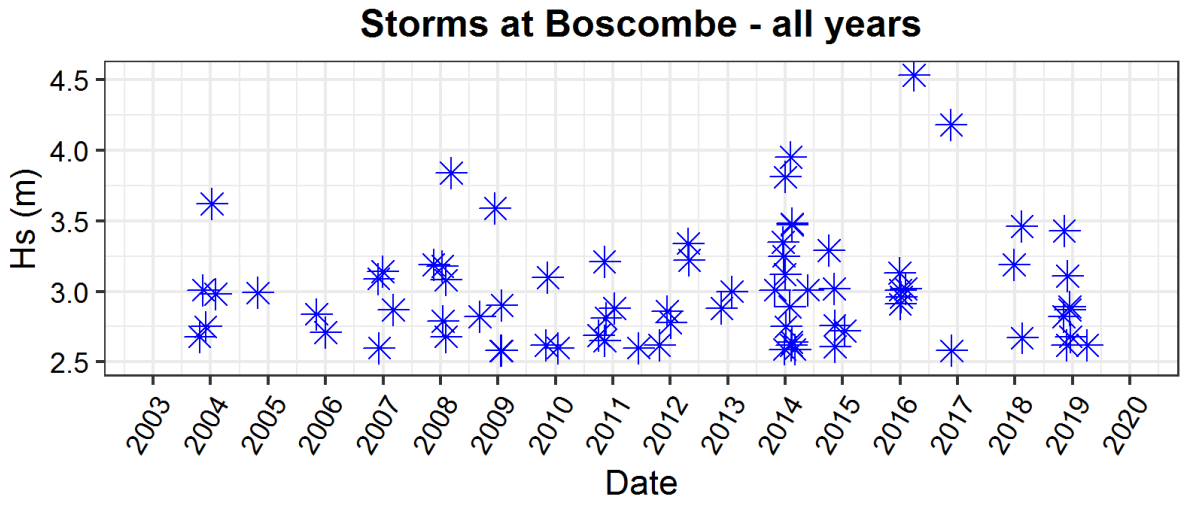
Acknowledgements

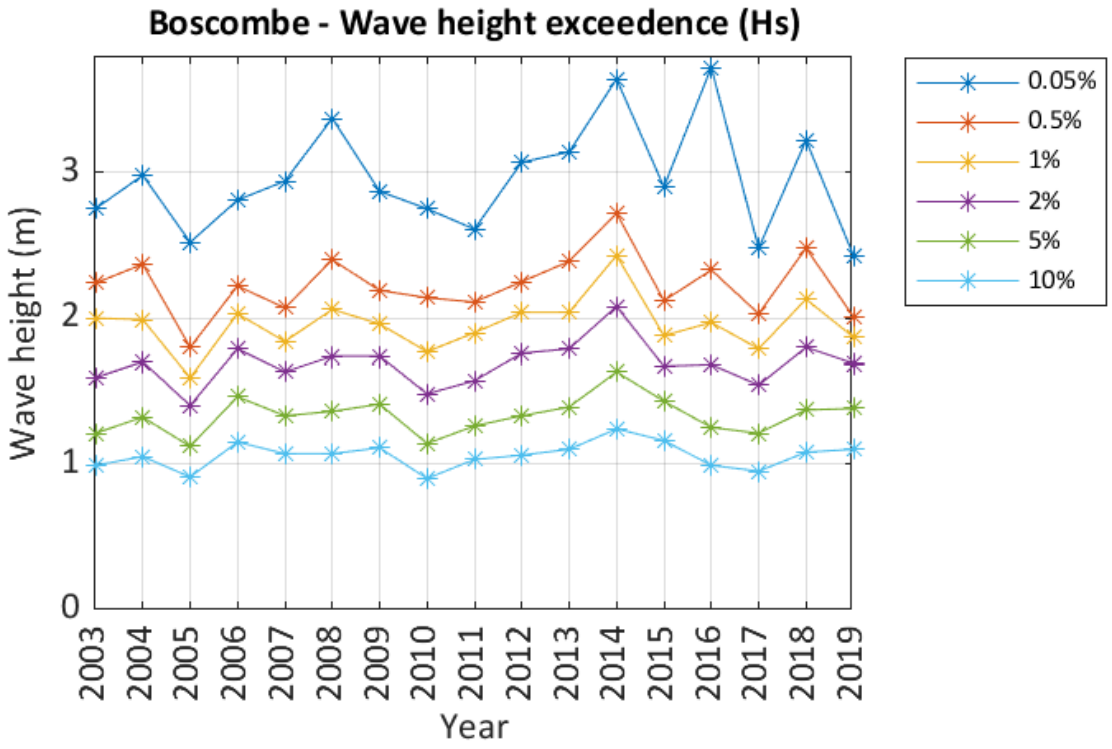
The shore station is kindly hosted by Boscombe Seafront Office.

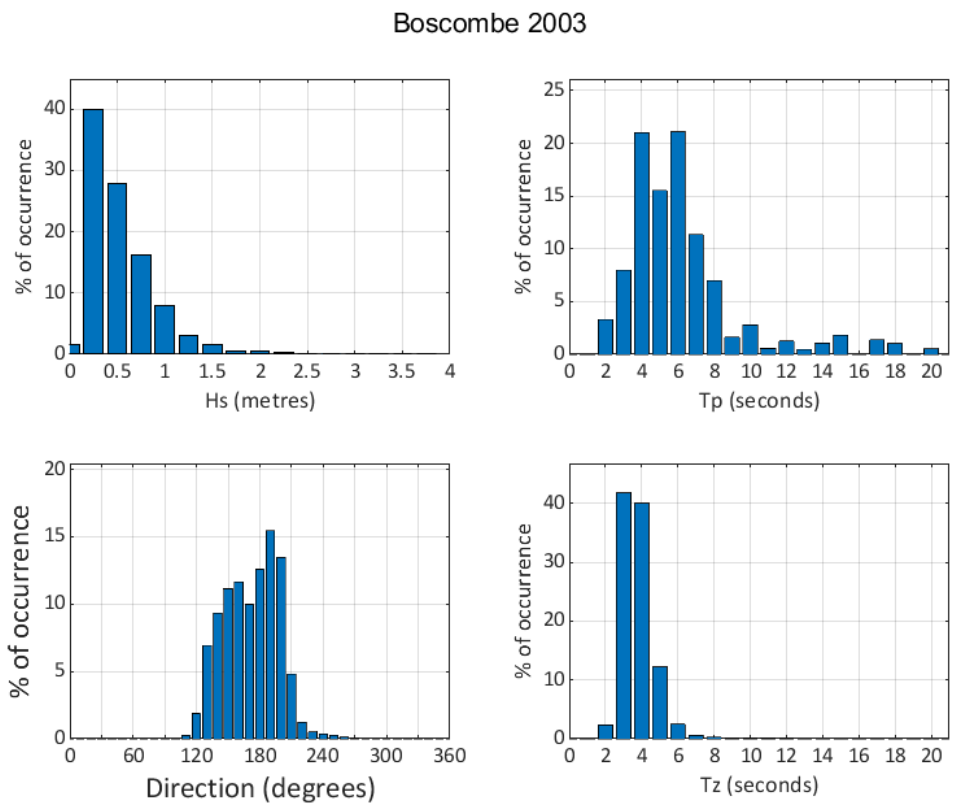
Tidal predictions were supplied by Fugro GB Marine Limited.

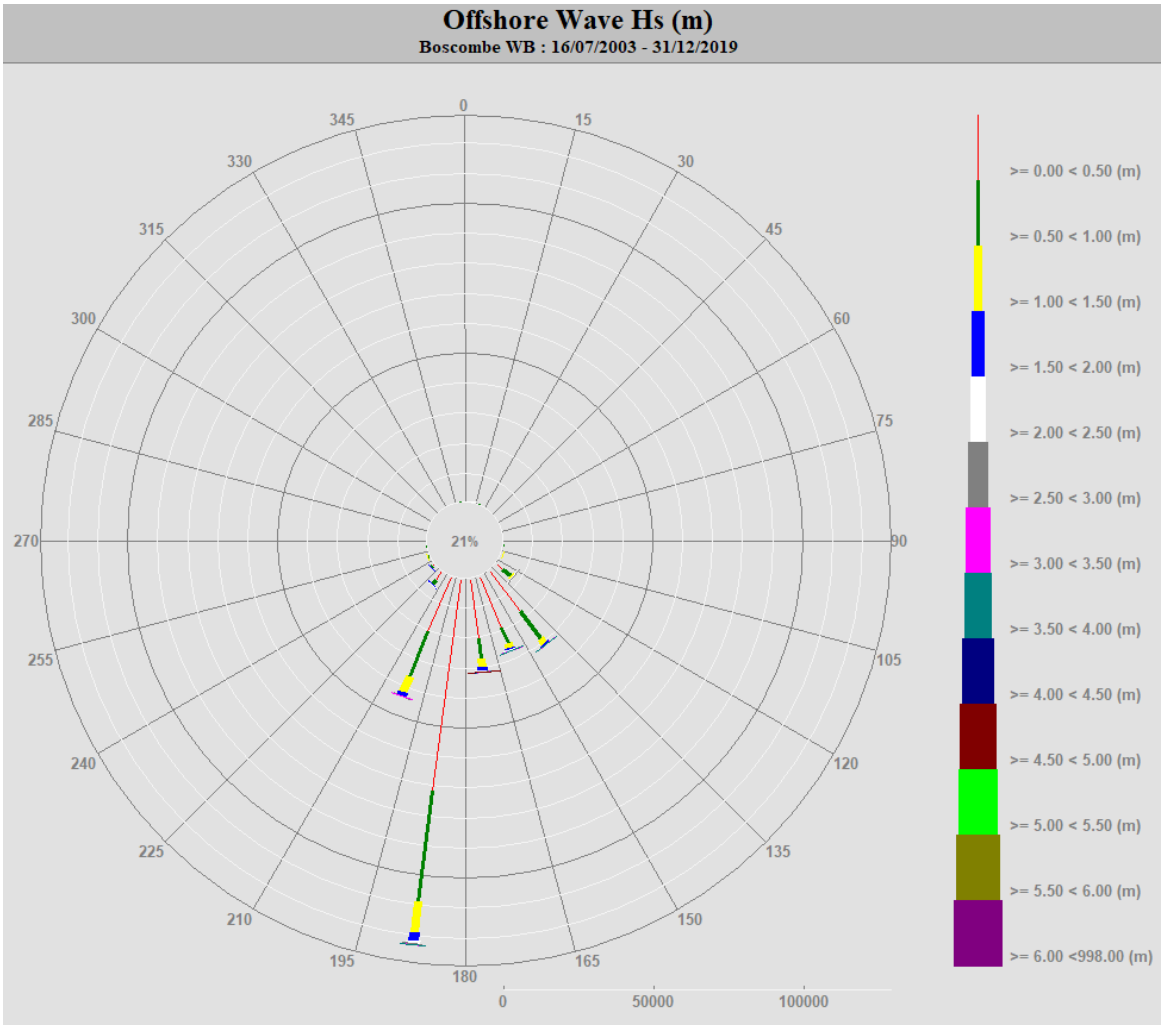

metres
2
0
5
10
15
20
25
30
Jul
Aug
Sep
Oct
Nov
Dec
Day in month

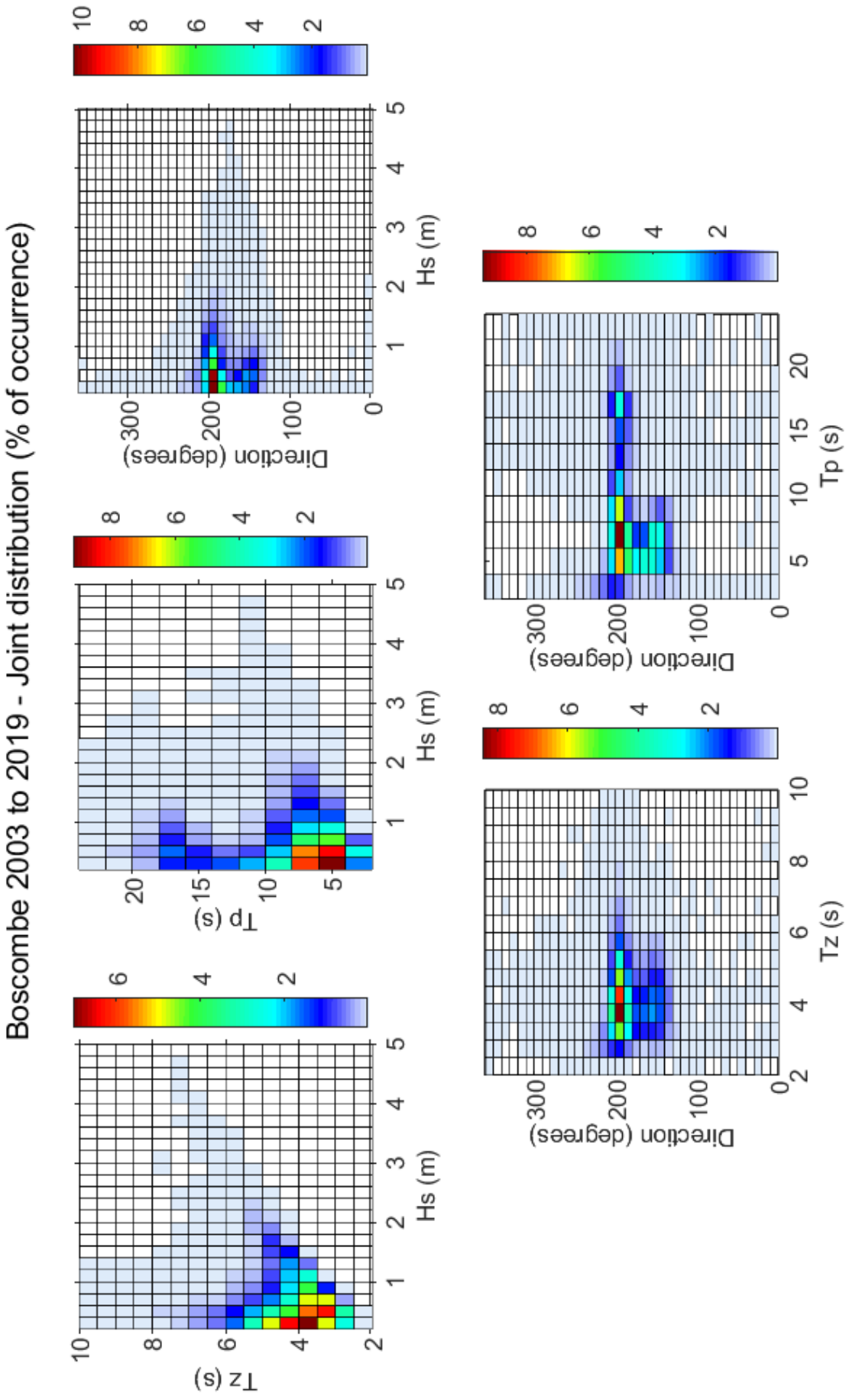

Storms at Boscombe during 2003
Storm alert threshold is Hs = 2.58
Hs (m)
4.5
4.0
3.5
3.0
2.5
Feb 2003
Apr 2003
Jun 2003
Aug 2003
Oct 2003
Dec 2003


Storms at Boscombe - all years
Hs (m)
4.5
4.0
3.5
3.0
2.5
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date


Boscombe - Wave height exceedence (Hs)
Wave height (m)
3
2
1
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
0.05%
0.5%
1%
2%
5%
10%


Boscombe 2003
% of occurrence
Hs (metres)
Tp (seconds)
Direction (degrees)
Tz (seconds)


Offshore Wave Hs (m)
Boscombe WB : 16/07/2003 - 31/12/2019
21%
>= 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)


Boscombe 2003 to 2019 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)