Goodwin Sands Directional Waverider Buoy

Location			
OS	643171 E 155848 N		
WGS84	*Latitude:* 51° 14.996' N *Longitude:* 01° 28.994' E		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ over the Goodwin Sands. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
98	30 minutes

Monthly Averages - 2014

All times are GMT

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	No. of days
January	1.04	5.9	3.9	168	9.2	31
February	1.17	5.9	4.0	182	8.6	28
March	0.57	5.3	3.6	139	9.0	30
April	0.49	4.9	3.5	127	10.8	30
May	0.56	5.2	3.5	130	12.7	31
June	0.46	4.8	3.4	113	15.6	29
July	0.52	4.6	3.3	121	18.1	30
August	0.60	5.0	3.4	162	18.3	30
September	0.46	4.8	3.4	99	18.0	30
October	0.73	5.1	3.6	170	16.6	30
November	0.79	5.1	3.6	138	14.1	29
December	0.85	6.0	3.7	151	10.2	30

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)
06-Jan-2014 01:30	3.01	6.7	5.0	187	2.36	HW	4.9	~-0.4	~0.1
08-Feb-2014 05:00	3.00	6.7	5.0	193	1.76	HW	3.7	~0.0	~0.2
15-Feb-2014 00:00	2.92	7.1	4.8	186	-	HW	~4.7	-	-
01-Jan-2014 22:00	2.79	6.7	4.8	187	2.19	HW -1	5.0	~-0.1	~0.2
03-Nov-2014 07:00	2.75	6.7	5.0	184	2.27	HW -1	3.7	~0.3	~0.4

Annual Statistics

Year	Annual H_s exceedance* (m)						Annual Maximum H_s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A_{max} (m)
2008	-	1.99	1.86	1.69	1.42	1.20	05-Oct-2008 04:00	2.37
2009	2.45	2.07	1.90	1.73	1.46	1.24	28-Nov-2009 06:00	2.57
2010	2.59	2.02	1.86	1.65	1.39	1.19	11-Nov-2010 10:30	2.81
2011	2.81	2.00	1.74	1.56	1.34	1.16	13-Dec-2011 02:00	3.16
2012	2.60	2.08	1.9	1.72	1.43	1.20	03-Jan-2012 13:00	3.00
2013	3.33	2.34	2.04	1.79	1.48	1.25	24-Dec-2013 02:30	3.69
2014	2.73	2.37	2.20	1.92	1.56	1.29	06-Jan-2014 01:30	3.01

** i.e. 5 % of the H_s values measured in 2008 exceeded 1.42 m*

Distribution plots

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

- Annual time series of H_s (red line is 2.5 m storm threshold)
- Wave roses (percentage of occurrence of direction vs H_s) for all measured data
- Percentage of occurrence of H_s, T_p, T_z and Direction for 2014
- Incidence of storm waves for 2014. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

* *Tidal information is obtained from the nearest recording tide gauge (the Wave Radar REX at Deal 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.*

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.

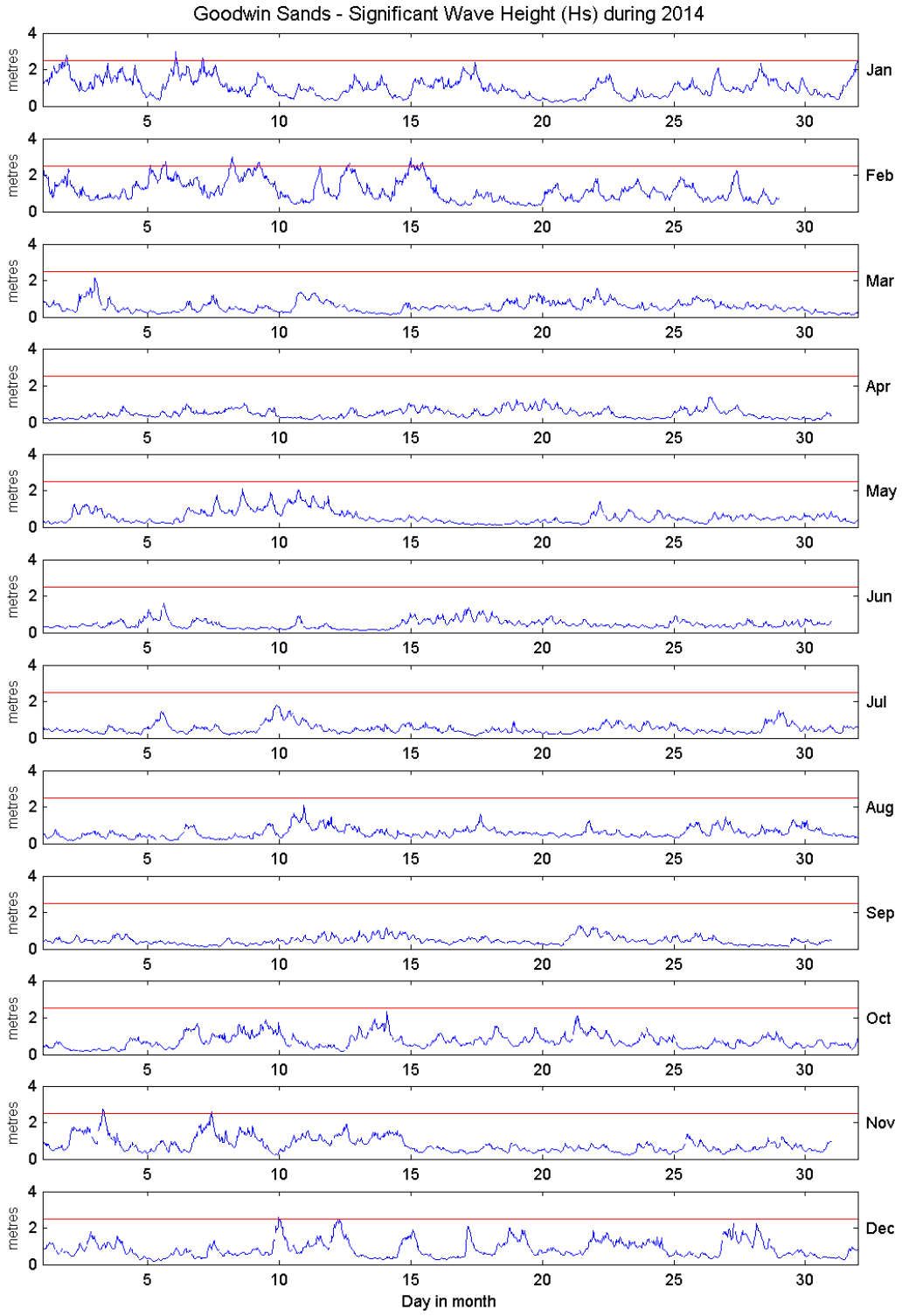
Return period (years)	Significant wave height (m)	Comments
1	3.1	No depth limitation
2	3.3	
5	3.6	
10	3.7	Depth-limited at MLWS
20	3.9	
50	4.1	

General

The buoy was first deployed on 4 June 2008, at which time the magnetic declination at the site was 1.3° west, changing by 0.14° east per year.

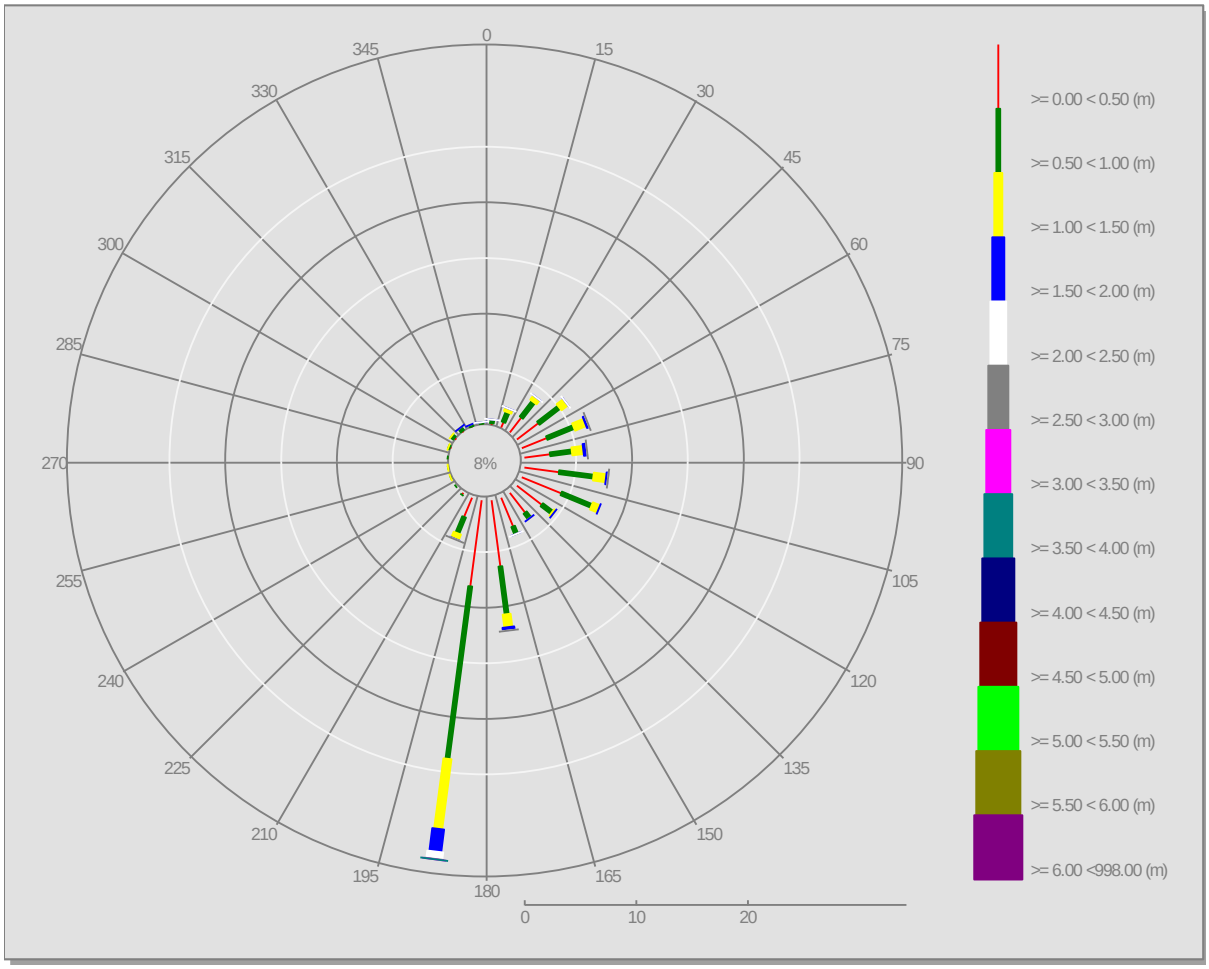
Acknowledgements

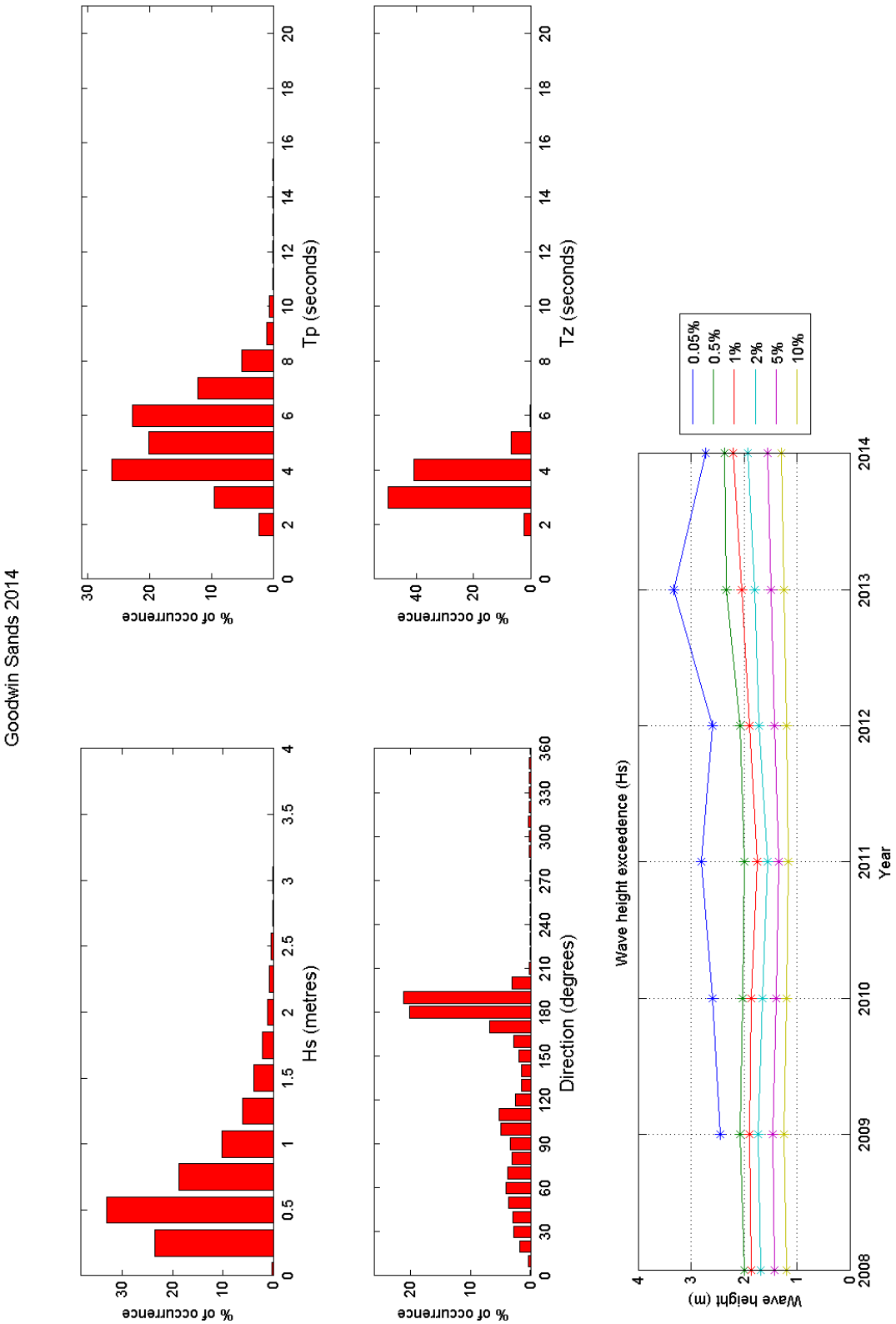
The shore station for the Waverider is kindly hosted by Ramsgate Harbourmaster. TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.

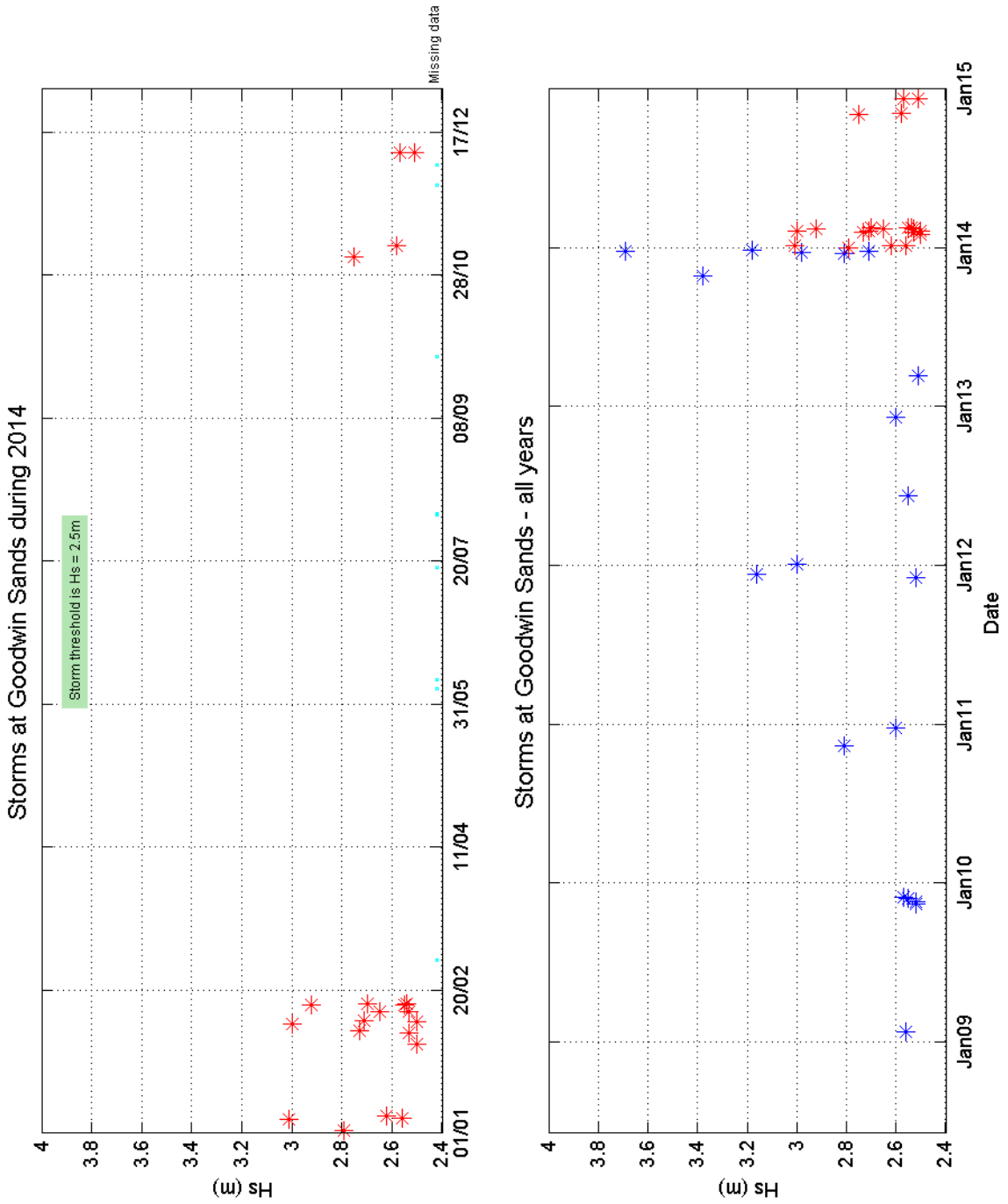

Goodwin Sands - Significant Wave Height (Hs) during 2014
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
2
4
5
10
15
20
25
30
Day in month

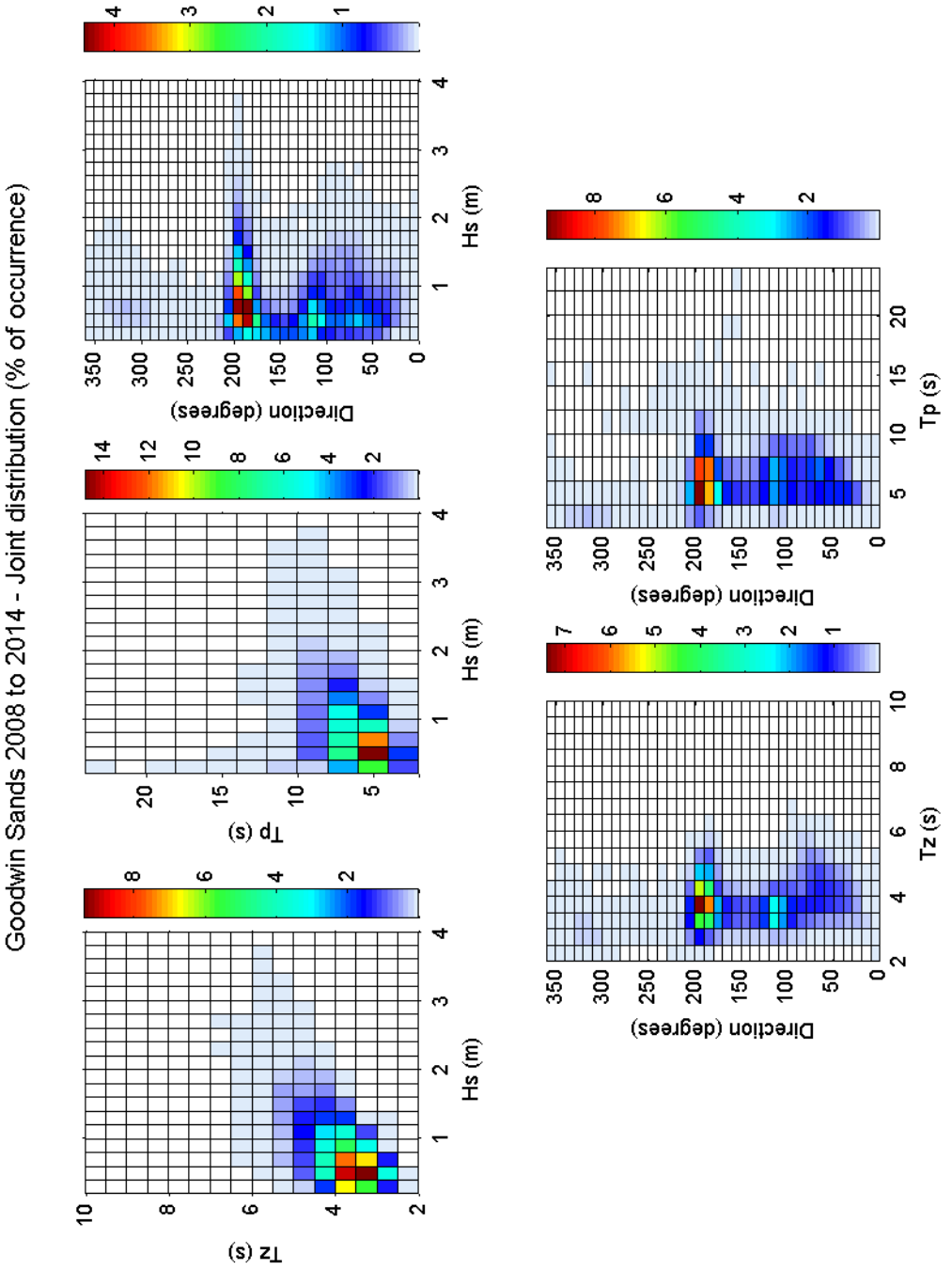
Offshore Wave Hs (m)

Goodwin Sands WB : 13/06/2008 - 31/12/2014




Goodwin Sands 2014
% of occurrence
Hs (metres)
Direction (degrees)
Tp (seconds)
Tz (seconds)
Wave height exceedence (Hs)
Wave height (m)
Year
0.05%
0.5%
1%
2%
5%
10%


Storms at Goodwin Sands during 2014
Storm threshold is Hs = 2.5m
Missing data
Hs (m)
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
01/01
20/02
11/04
31/05
20/07
08/09
28/10
17/12
Storms at Goodwin Sands - all years
Hs (m)
Jan09
Jan10
Jan11
Jan12
Jan13
Jan14
Jan15
Date


Goodwin Sands 2008 to 2014 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)