West Bay Directional Waverider Buoy

Location			
OS	347123 E 88451 N		
WGS84	*Latitude:* 50° 41.597' N *Longitude:* 02° 44.999' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ off West Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
100	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	1.68	9.3	5.2	210	9.7	31
February	2.17	10.3	5.6	212	9.0	27
March	0.87	10.1	4.9	208	9.4	31
April	0.74	9.2	4.6	206	10.9	30
May	0.66	6.8	4.0	204	12.8	31
June	0.46	7.3	4.0	203	15.6	30
July	0.43	6.8	3.8	212	17.5	31
August	0.79	5.8	3.8	214	17.8	31
September	0.40	9.5	4.4	201	17.7	30
October	1.09	7.1	4.2	207	16.0	31
November	1.17	8.7	5.2	201	13.5	30
December	1.03	8.1	4.7	212	10.7	31

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)
05-Feb-2014 11:30	7.08	16.7	9.3	211	2.27	HW +1	~2.9	~0.9	~1.3
15-Feb-2014 03:30	6.22	18.2	9.1	210	-	HW -3	~3.2	-	-
08-Feb-2014 13:00	5.36	12.5	8.0	217	-	HW +1	~1.3	-	-
12-Feb-2014 14:00	4.93	9.1	7.1	208	-	HW -3	~2.3	-	-
01-Jan-2014 14:30	4.90	-	7.8	-	-	HW -4	~3.5	-	-

Annual Statistics

Year	Annual H_s exceedance* (m)						Annual Maximum H_s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A_{max} (m)
2007	4.70	3.69	3.30	2.91	2.45	2.03	06-Mar-2007 02:30	5.61+
2008	4.73	3.60	3.16	2.74	2.20	1.71	10-Mar-2008 13:30	5.05
2009	4.85	3.59	3.29	2.92	2.30	1.83	14-Nov-2009 15:30	6.00+
2010	4.00	2.95	2.66	2.37	1.82	1.46	11-Nov-2010 09:00	4.29
2011	4.34	3.10	2.82	2.44	2.04	1.67	13-Dec-2011 01:00	4.84
2012	4.83	3.39	2.97	2.59	2.17	1.71	03-Jan-2012 11:00	5.55
2013	5.19	3.72	3.29	2.88	2.27	1.81	24-Dec-2013 01:00	6.42+
2014	6.05	4.17	3.77	3.16	2.48	2.01	05-Feb-2014 11:30	7.08+

** i.e. 5 % of the H_s values measured in 2007 exceeded 2.45 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.

Distribution plots

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

- Annual time series of H_s (red line is 4.0 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 step gauge at West Bay Harbour). The surge shown is the residual at the time of the highest Hs. 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.

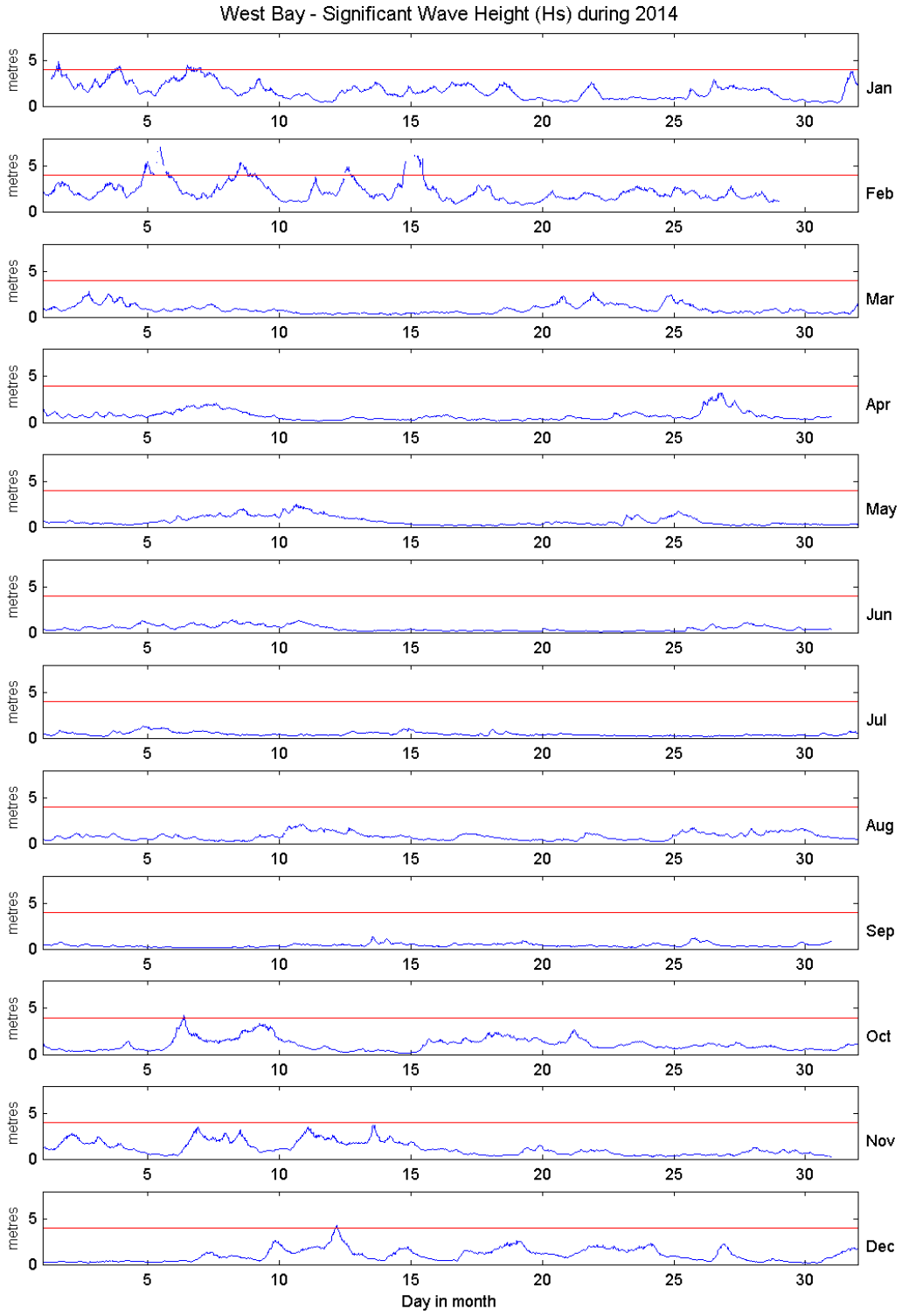
Return period (years)	Significant wave height (m)	Comments
1	5.6	Depth-limited at MHWS
2	6.0	Depth-limited at HAT
5	6.5	
10	7.0	
20	7.4	
50	7.9	

General

The buoy was first deployed on 19 November 2006, at which time the magnetic declination at the site was 3.0° west, changing by 0.15° east per year.

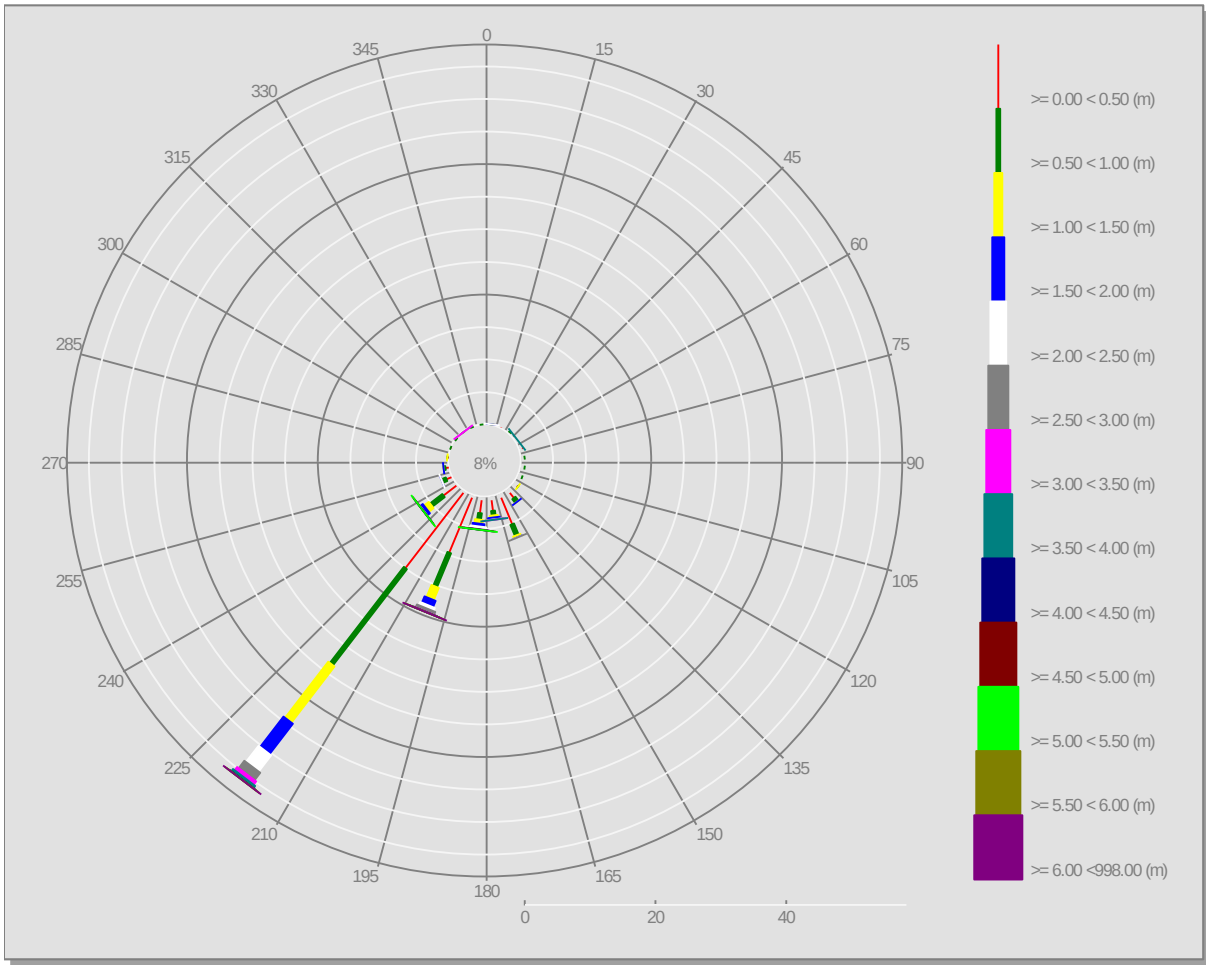
Acknowledgements

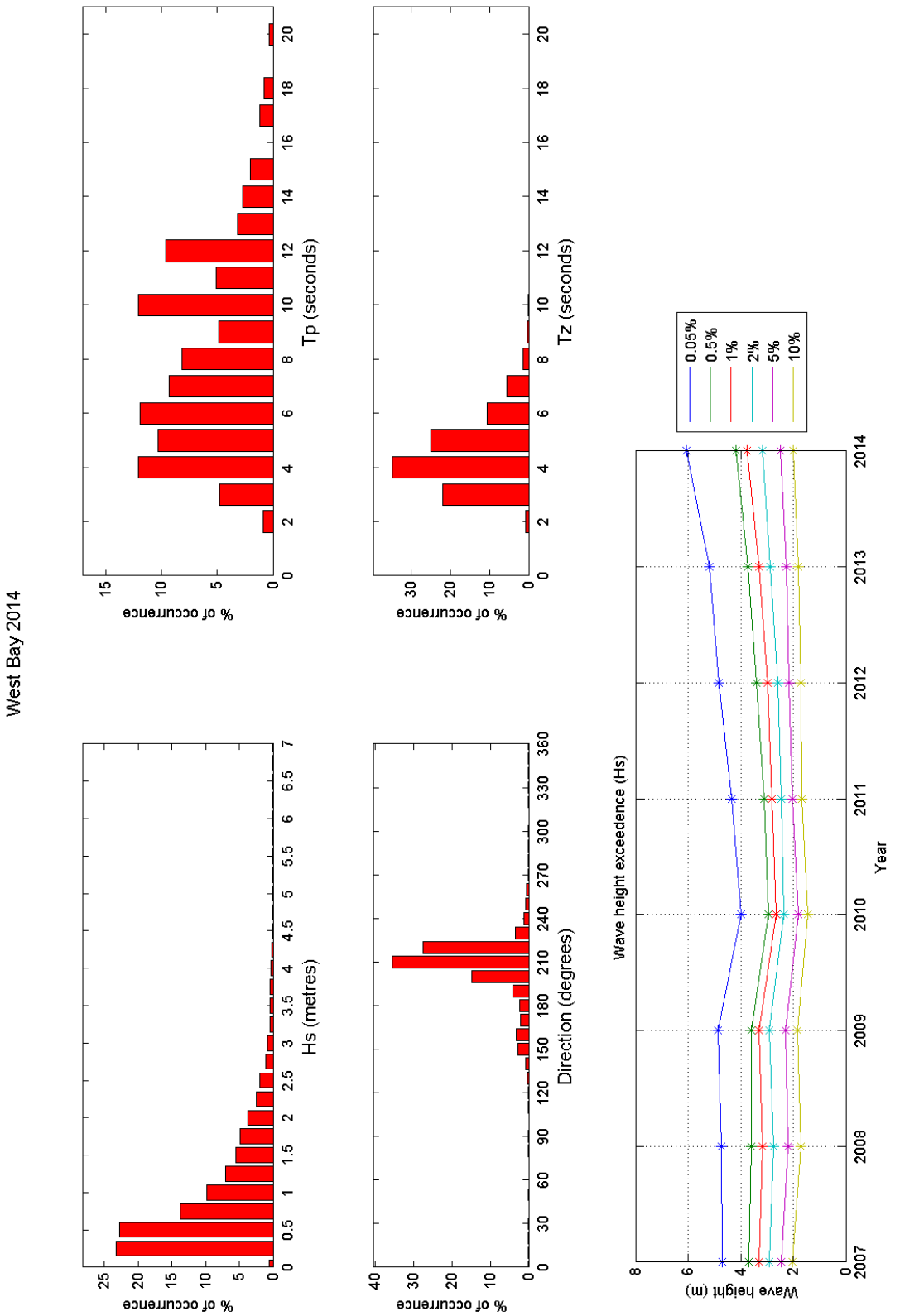
TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.

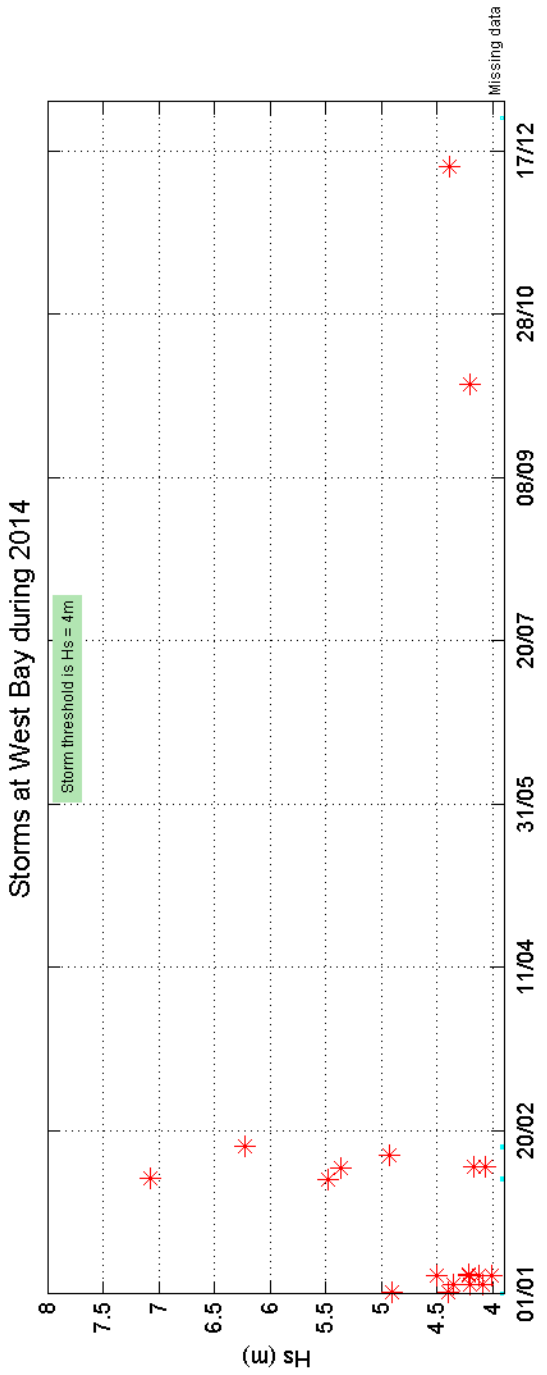

West Bay - Significant Wave Height (Hs) during 2014
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month

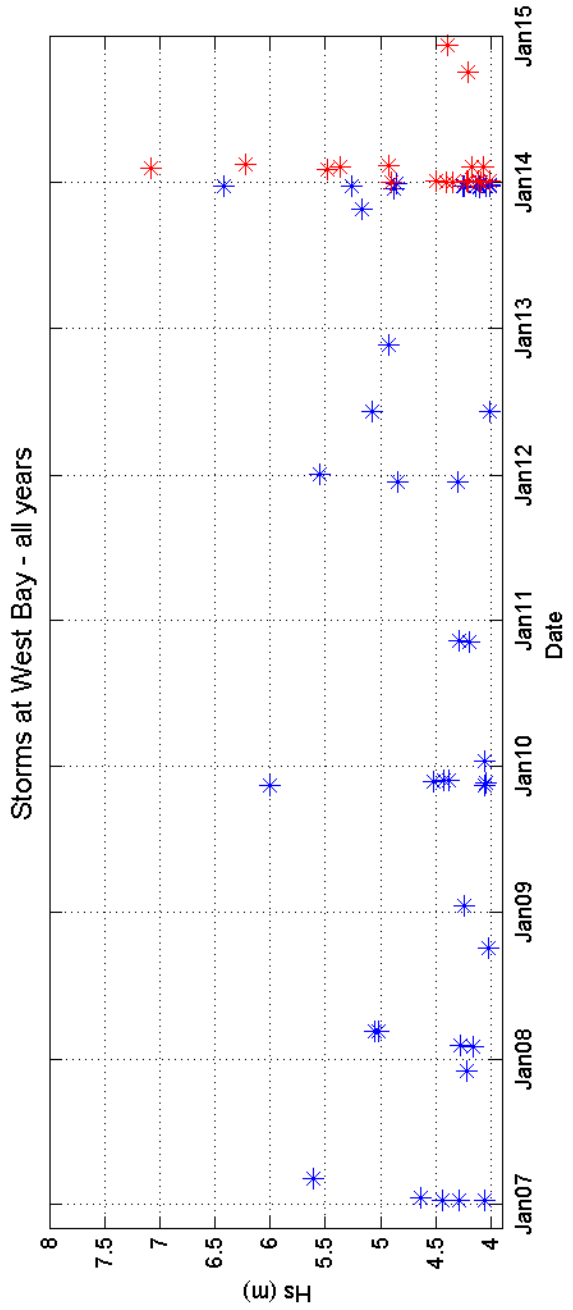
Offshore Wave Hs (m)

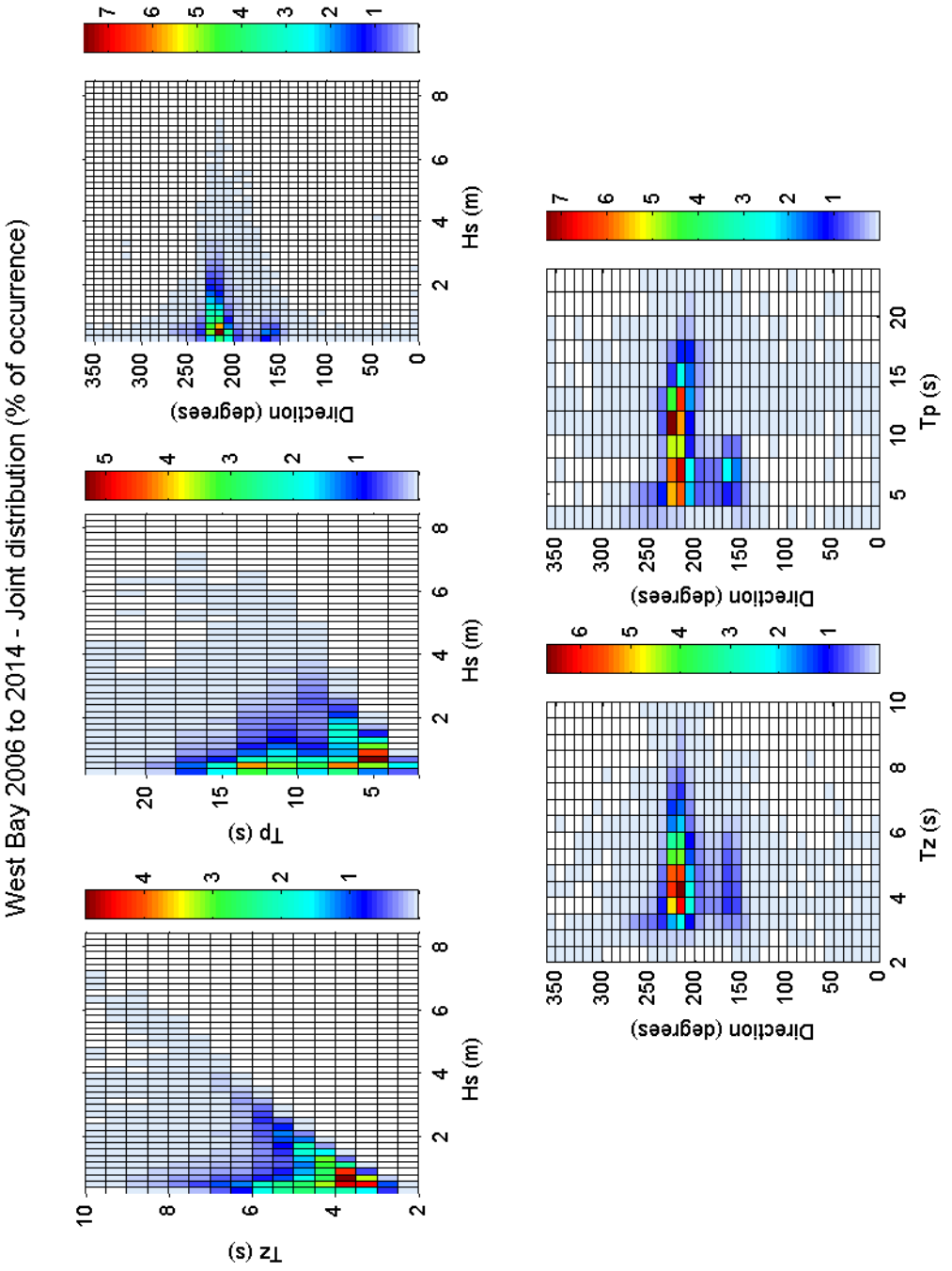
West Bay WB : 19/11/2006 - 31/12/2014




West Bay 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 West Bay during 2014
Storm threshold is Hs = 4m
Missing data
Hs (m)
8
7.5
7
6.5
6
5.5
5
4.5
4
01/01
20/02
11/04
31/05
20/07
08/09
28/10
17/12


Storms at West Bay - all years
Hs (m)
8
7.5
7
6.5
6
5.5
5
4.5
4
Jan07
Jan08
Jan09
Jan10
Jan11
Jan12
Jan13
Jan14
Jan15
Date


West Bay 2006 to 2014 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)