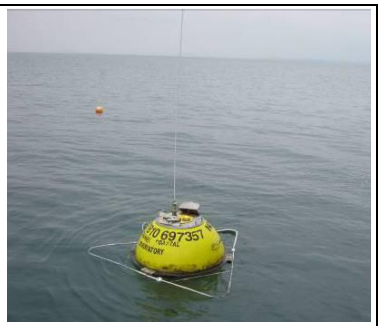
Morecambe Bay Directional Waverider Buoy

Location			
OS	330193 E 455389 N		
WGS84	*Latitude:* 53° 59.389' N *Longitude:* 03° 3.970' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ in Morecambe Bay. Photo courtesy of Fugro EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
92	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	0.85	5.1	3.6	204	6.4	31
February	1.12	6.2	4.0	215	6.2	28
March	0.64	5.5	3.4	186	7.6	23
April	0.46	4.7	3.1	188	10.1	30
May	0.47	4.0	3.0	180	13.0	31
June	0.33	3.9	2.9	211	16.1	27
July	0.45	3.9	3.0	212	18.3	29
August	0.76	4.6	3.4	209	17.6	29
September	0.31	4.3	2.9	190	17.3	28
October	0.90	5.4	3.7	198	14.1	26
November	0.54	5.1	3.2	189	10.8	25
December	1.11	6.0	4.0	218	8.2	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)
12-Feb-2014 21:30	4.46	11.1	7.1	225	-	HW	~6.3	-	-
10-Dec-2014 14:00	3.82	9.1	6.6	224	4.33	HW	6.9	0.25	0.72
11-Dec-2014 01:30	3.65	9.1	6.1	221	4.32	HW	6.7	0.48	0.59
21-Oct-2014 11:00	3.32	9.1	6.3	226	3.16	HW +1	6.9	0.31	1.41
03-Jan-2014 12:00	3.32	10.5	6.0	224	6.25	HW	9.5	0.82	1.12

Annual Statistics

Year	Annual H_s exceedance* (m)						Annual Maximum H_s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A_{max} (m)
2011	-	-	-	2.47	2.04	1.65	13-Dec-2011 12:00	3.65
2012	3.02	2.47	2.23	1.97	1.59	1.27	22-Feb-2012 12:00	3.38
2013	3.74	2.66	2.37	2.09	1.63	1.32	27-Dec-2013 06:30	4.38
2014	3.64	2.73	2.50	2.20	1.80	1.42	12-Feb-2014 21:30	4.46

** i.e. 5 % of the H_s values measured in 2011 exceeded 2.04 m*

Distribution plots

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

- Annual time series of H_s (red line is 3.0 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

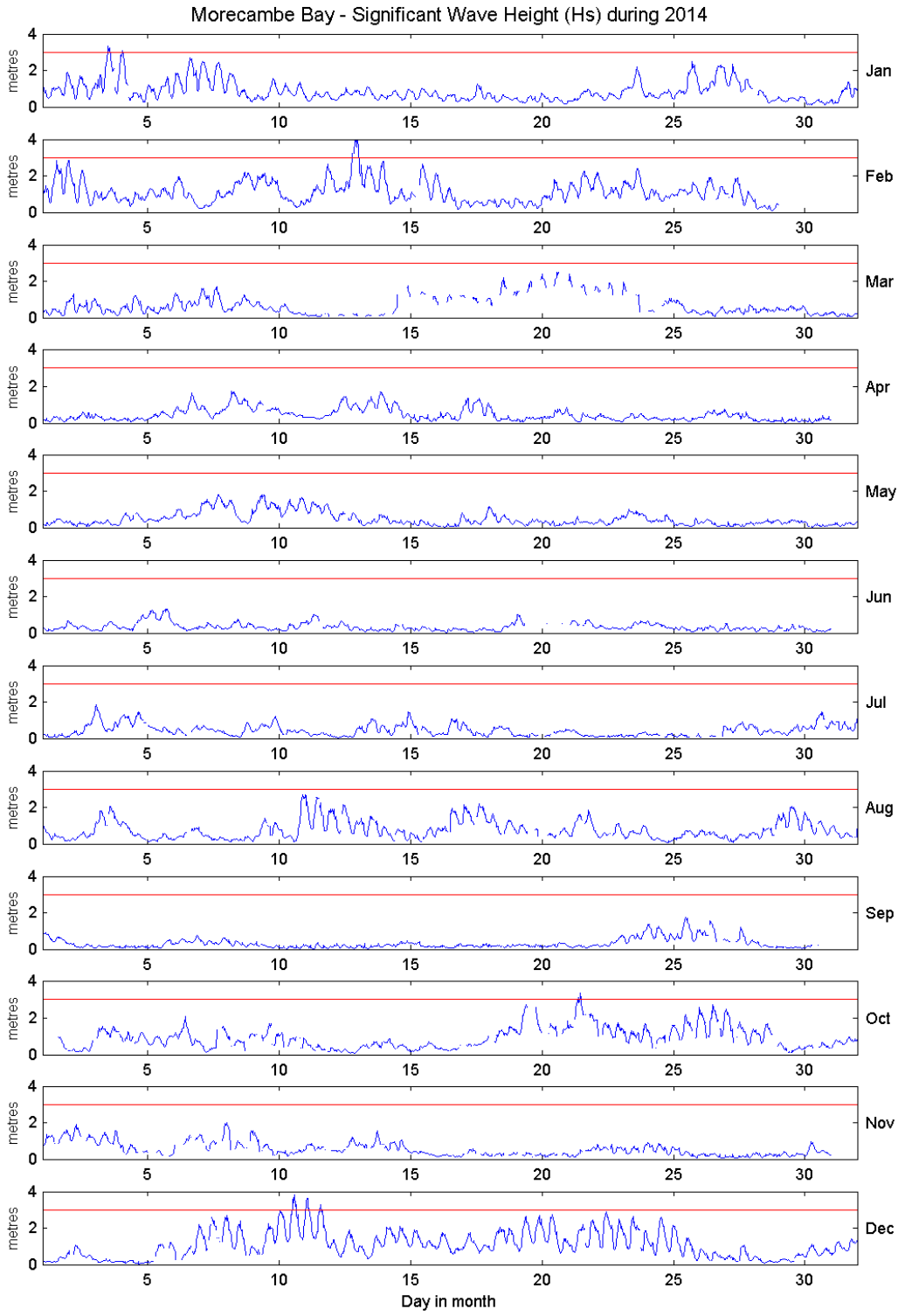
General

The wave buoy was deployed on 29 June 2011, at which time the magnetic declination at the site was 3.0° west, changing by 0.16° east per year. There is a notable tidal signature to significant wave heights at this location, given the water depth of the buoy (~10m CD) and the spring tidal range (~8.5m).

** Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Heysham). 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.*

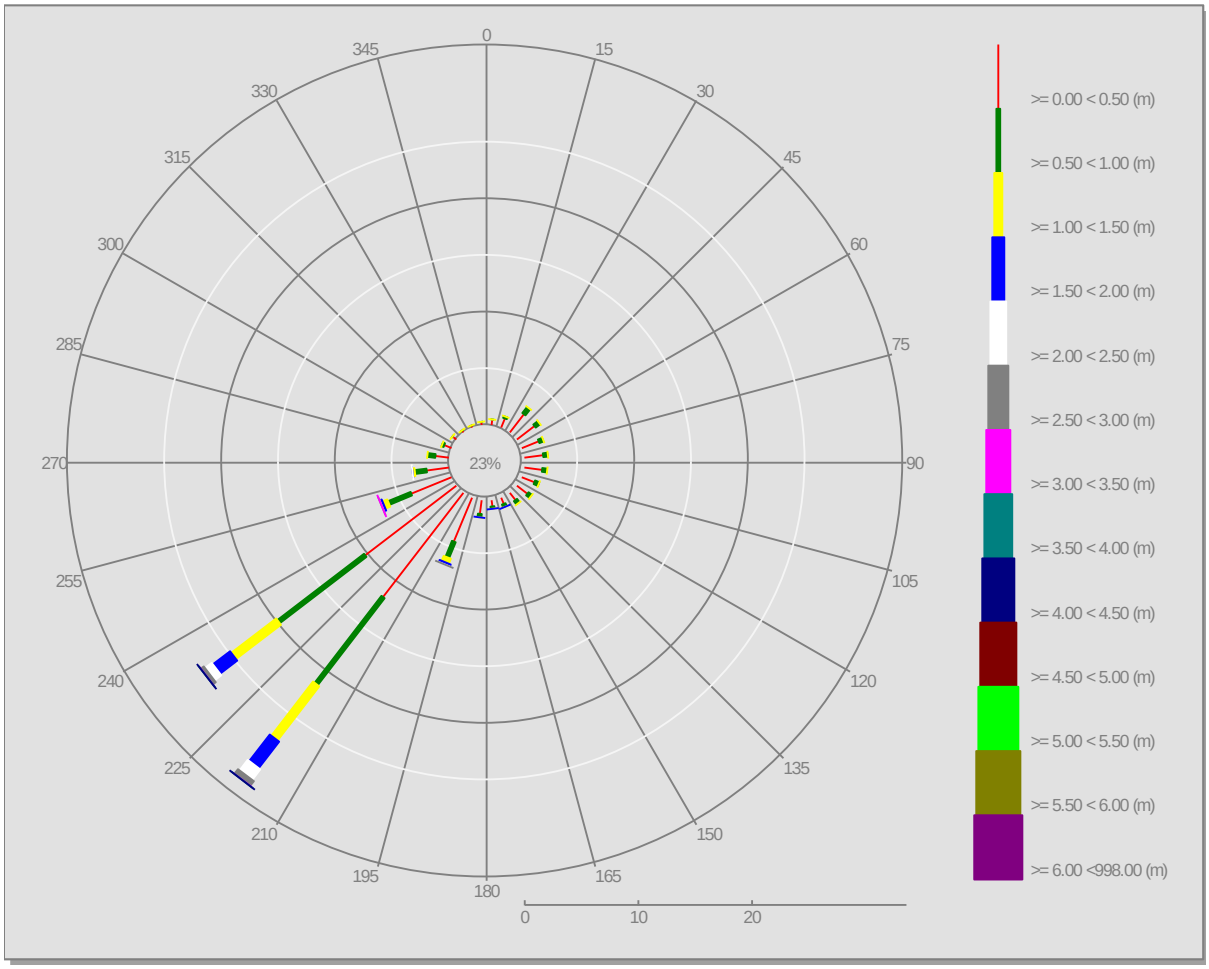
Acknowledgements

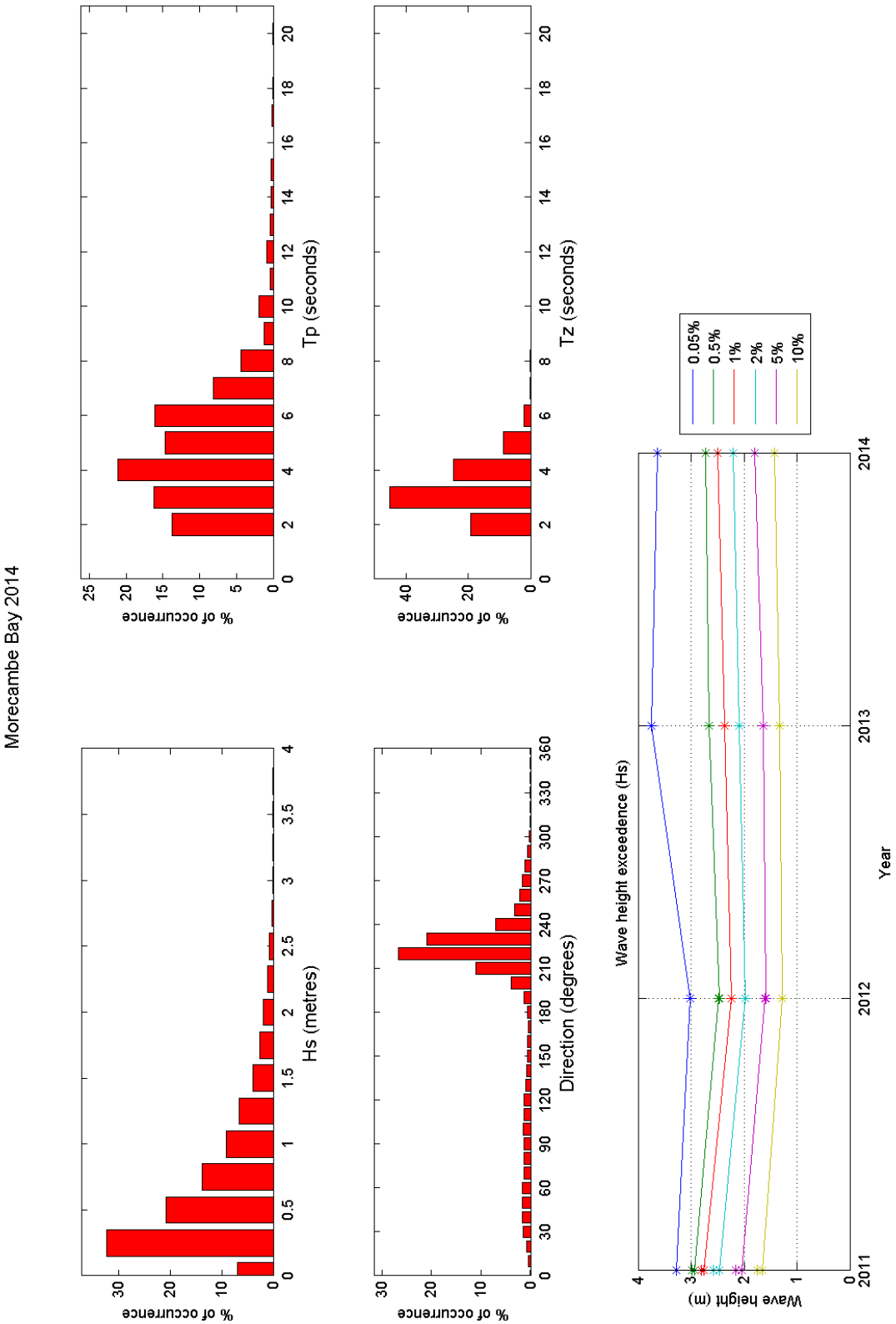
The shore station is kindly hosted by Café Cove, Cleveleys. Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

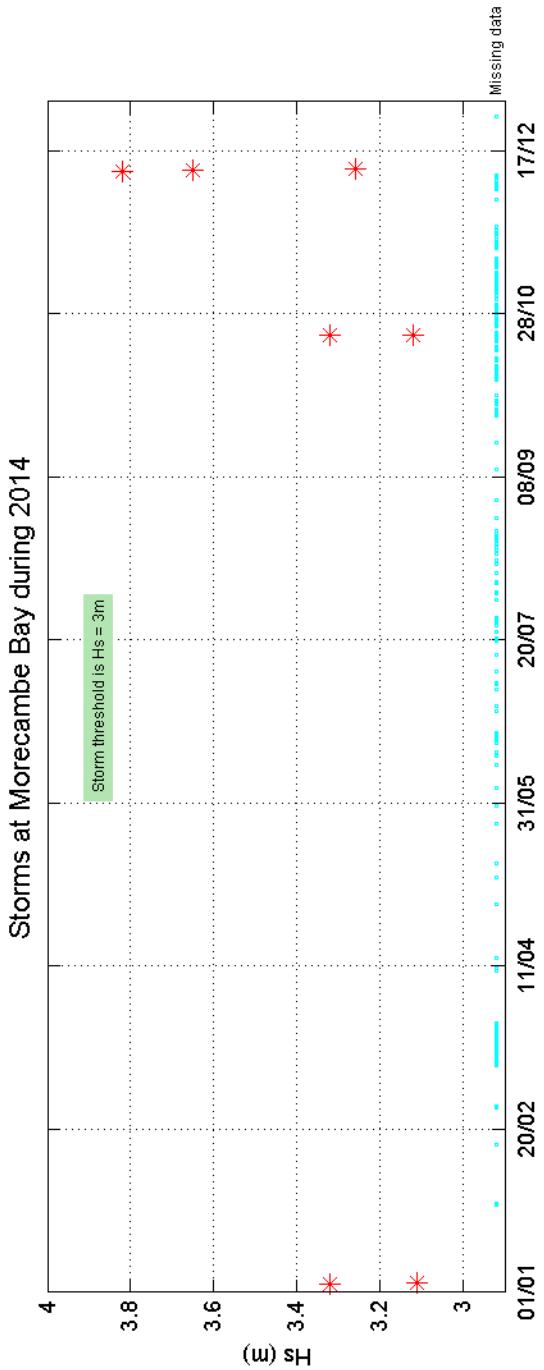

Morecambe Bay - Significant Wave Height (Hs) during 2014
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
2
4
5
10
15
20
25
30
Day in month

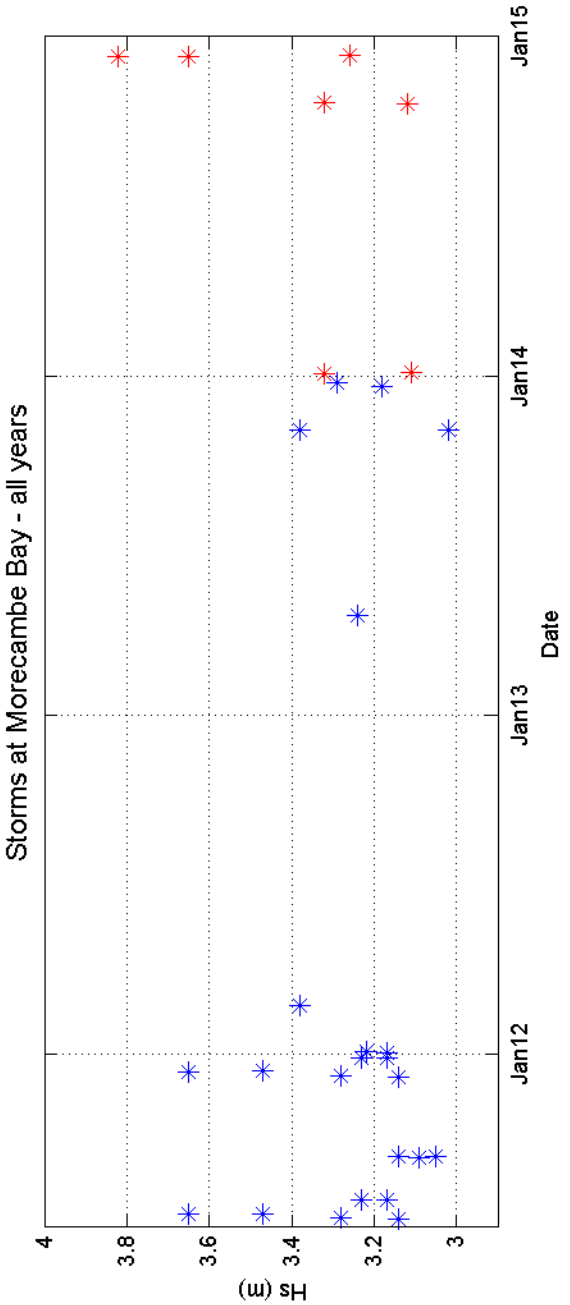
Offshore Wave Hs (m)

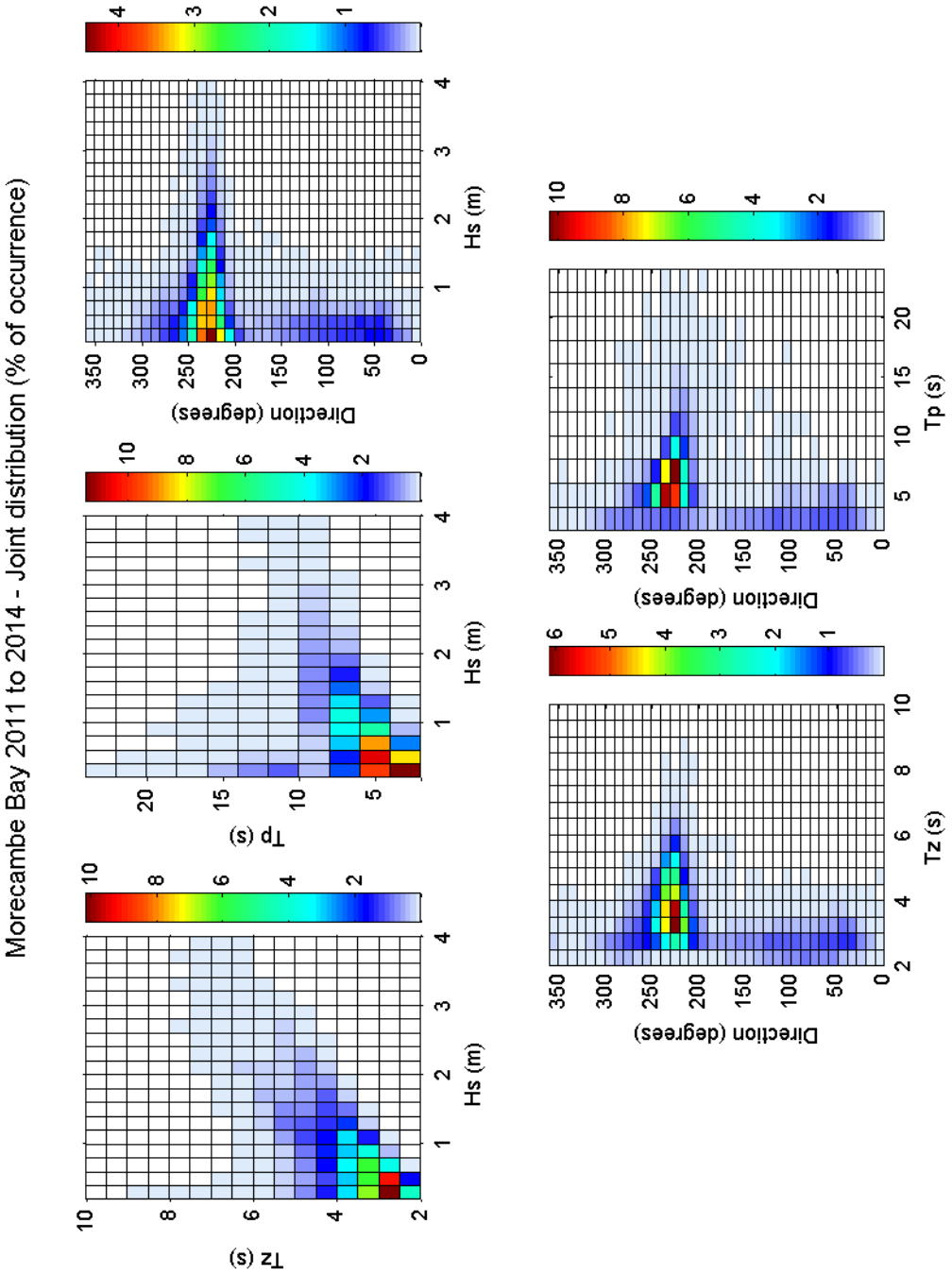
Morecambe Bay WB : 30/06/2011 - 31/12/2014




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


Storms at Morecambe Bay during 2014
Storm threshold is Hs = 3m
Missing data
Hs (m)
4
3.8
3.6
3.4
3.2
3
01/01
20/02
11/04
31/05
20/07
08/09
28/10
17/12


Storms at Morecambe Bay - all years
Hs (m)
4
3.8
3.6
3.4
3.2
3
Jan12
Jan13
Jan14
Jan15
Date


Morecambe Bay 2011 to 2014 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)