# West Bay Directional Waverider Buoy

Location
*OS:* 347123 E 88451 N
*WGS84:* *Latitude:* 50° 41.59' N *Longitude:* 002° 44.99' W

Water Depth
Approx. 10m CD

Instrument Type
Datawell Directional Waverider Buoy Mk III

Data Quality

| C1 (%) | Sample interval |
|---|---|
| 99 | 30 minutes |

Monthly Means *All times GMT*

| Month | $H_s$ (m) | $T_p$ (s) | $T_z$ (s) | Direction (°) | SST (°C) | No. of days |
|---|---|---|---|---|---|---|
| January | 0.80 | 10.4 | 5.3 | 203 | 6.5 | 30 |
| February | 0.95 | 11.0 | 5.6 | 208 | 6.5 | 28 |
| March | 0.84 | 9.8 | 4.8 | 206 | 6.9 | 31 |
| April | 0.59 | 8.7 | 4.7 | 199 | 8.9 | 30 |
| May | 0.41 | 8.1 | 4.3 | 200 | 11.4 | 31 |
| June | 0.39 | 9.4 | 4.3 | 201 | 14.5 | 30 |
| July | 0.68 | 6.0 | 3.8 | 214 | 17.0 | 31 |
| August | 0.68 | 6.2 | 3.9 | 213 | 16.9 | 31 |
| September | 0.71 | 8.5 | 4.0 | 207 | 16.9 | 30 |
| October | 0.94 | 7.4 | 4.7 | 203 | 14.8 | 30 |
| November | 1.00 | 8.9 | 5.0 | 198 | 12.1 | 30 |
| December | 0.65 | 8.6 | 5.1 | 201 | 5.1 | 30 |

*Tables and plots of these values, together with the minimum and maximum values and the standard deviation are available on the website.*

| Highest storm events in 2010 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date/Time | $H_s$ | $T_p$ | $T_z$ | Dir. | Water level elevation* (OD) | Tidal stage (hours re. HW) | Tidal range (m) | Tidal surge* (m) | Max. surge* (m) |
| 11-Nov-2010 09:00 | 4.29 | 8.3 | 6.7 | 210 | 1.81 | HW | 2.55 | 0.39 | 0.66 |
| 08-Nov-2010 06:30 | 4.20 | 8.3 | 6.5 | 200 | 1.86 | HW -1 | 3.53 | 0.13 | 0.64 |
| 16-Jan-2010 08:00 | 4.06 | 8.3 | 6.7 | 190 | 1.87 | HW -1 | 2.95 | 0.30 | 0.54 |

* *Tidal information is obtained from the nearest recording tide gauge (the wave radar at West Bay Harbour). 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.*

| Year | Annual $H_s$ exceedance* (m) | | | | | | Annual Maximum $H_s$ | |
|---|---|---|---|---|---|---|---|---|
| | 0.05% | 0.5% | 1% | 2% | 5% | 10% | Date | $A_{max}$ (m) |
| 2007 | 4.88 | 3.70 | 3.31 | 2.92 | 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 | 5.24 | 3.63 | 3.31 | 2.94 | 2.31 | 1.84 | 14-Nov-2009 13:00 | 5.80 |
| 2010 | 4.00 | 2.95 | 2.66 | 2.37 | 1.82 | 1.46 | 11-Nov-2010 09:00 | 4.29 |

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

## Distribution plots

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

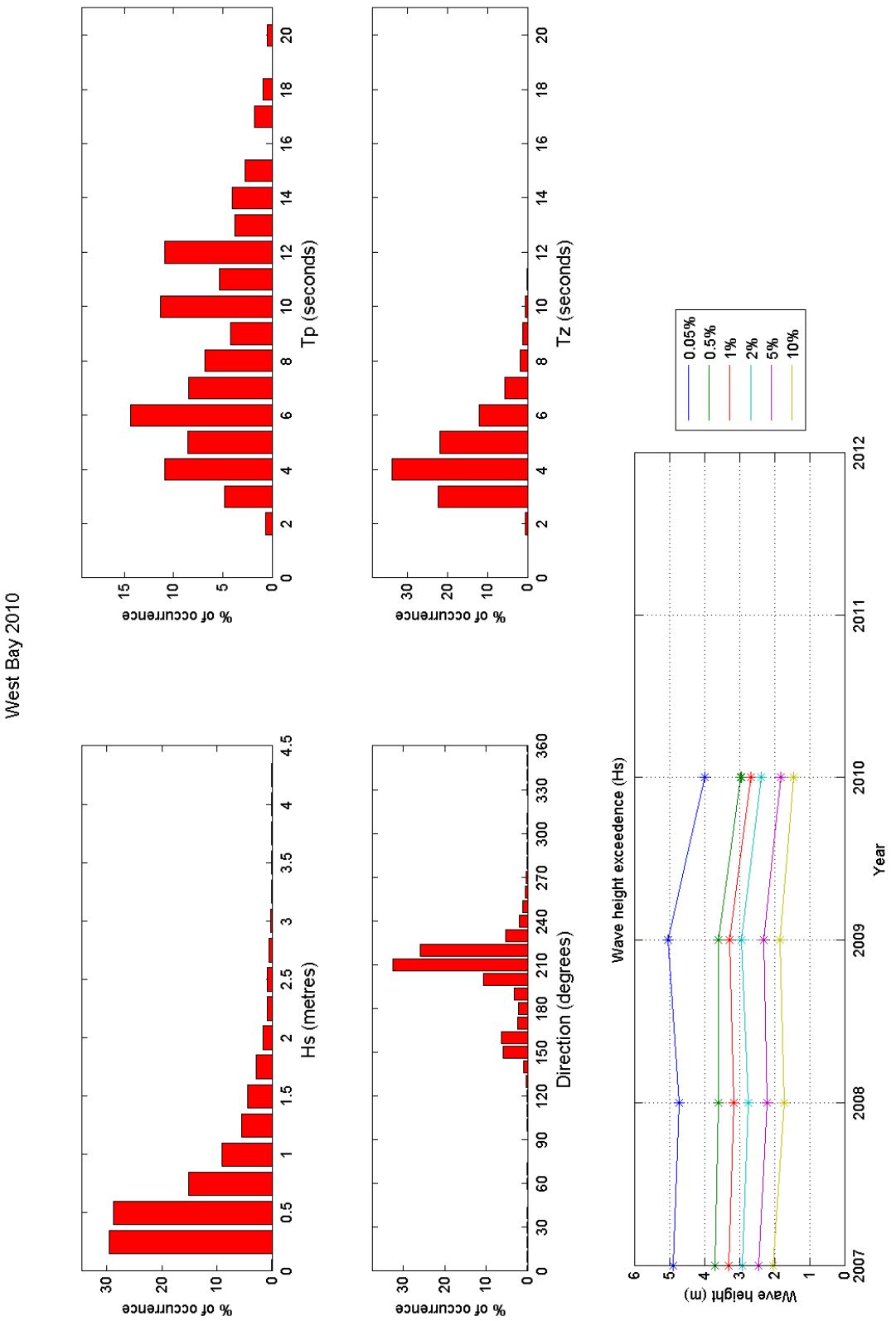
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction for 2010
- Percentage wave height exceedance (all recorded years)
- Joint distribution of all parameters for 2010, given both as number of observations and as percentage of occurrence
- Cumulative joint distribution of parameters from start of records (percentage of occurrence only)
- Wave roses (Direction vs. $H_s$ and vs. $T_p$) for all measured data
- Incidence of storms during 2010 and for all previous years. Storms are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm is shown.
- Annual time series of $H_s$ (red line is storm threshold)

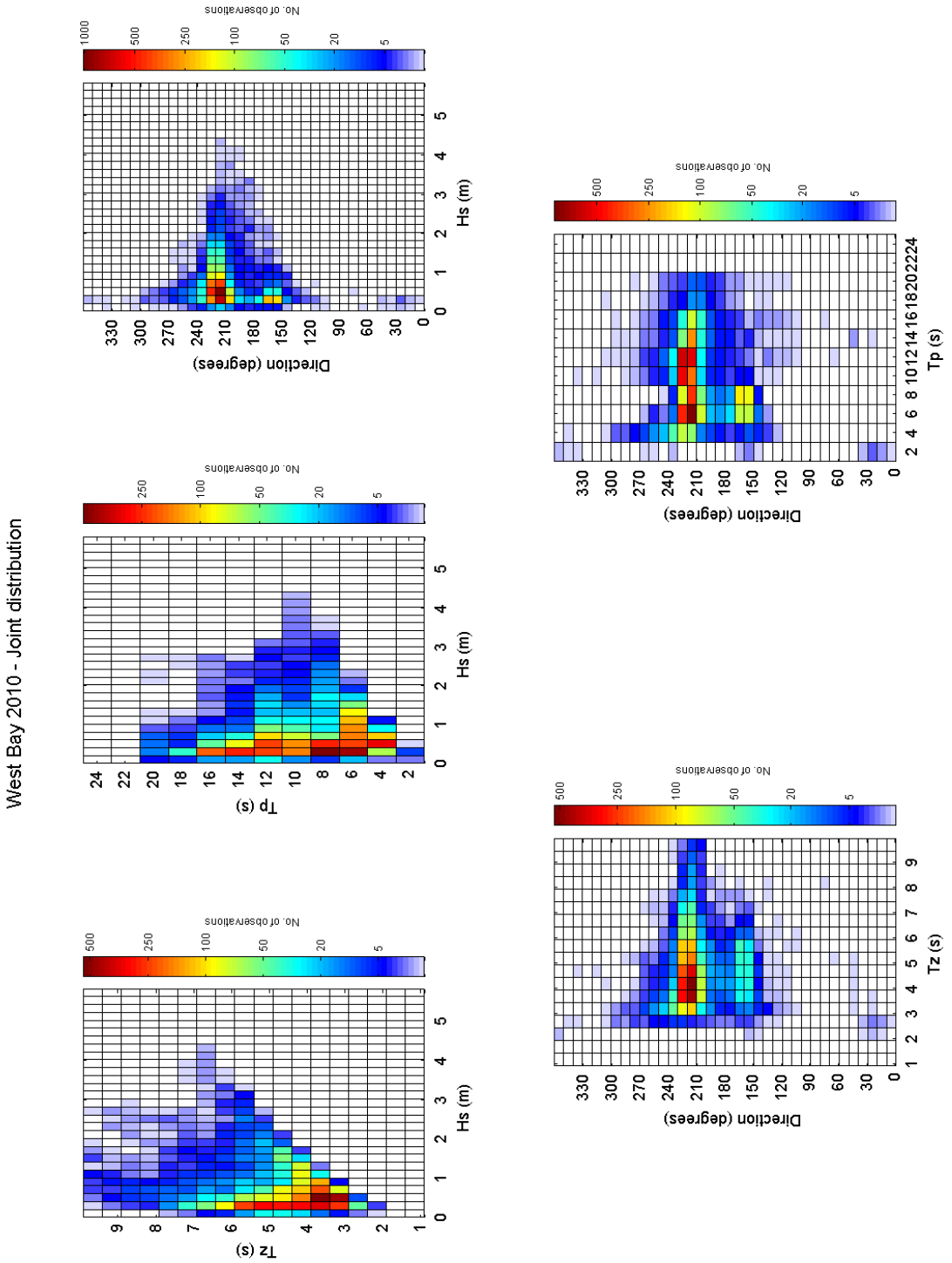
## General

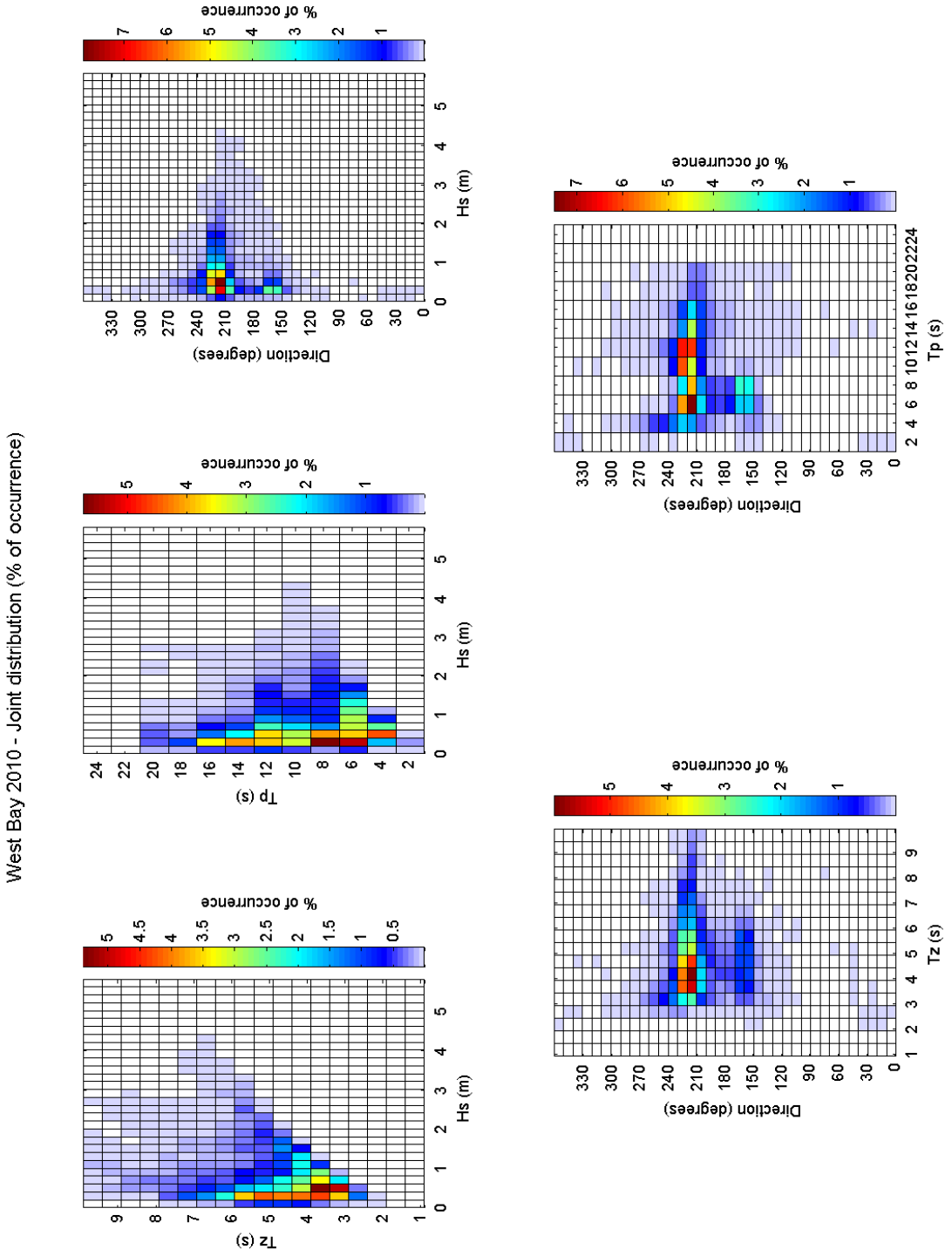
The Waverider was first deployed on 19 November 2006.

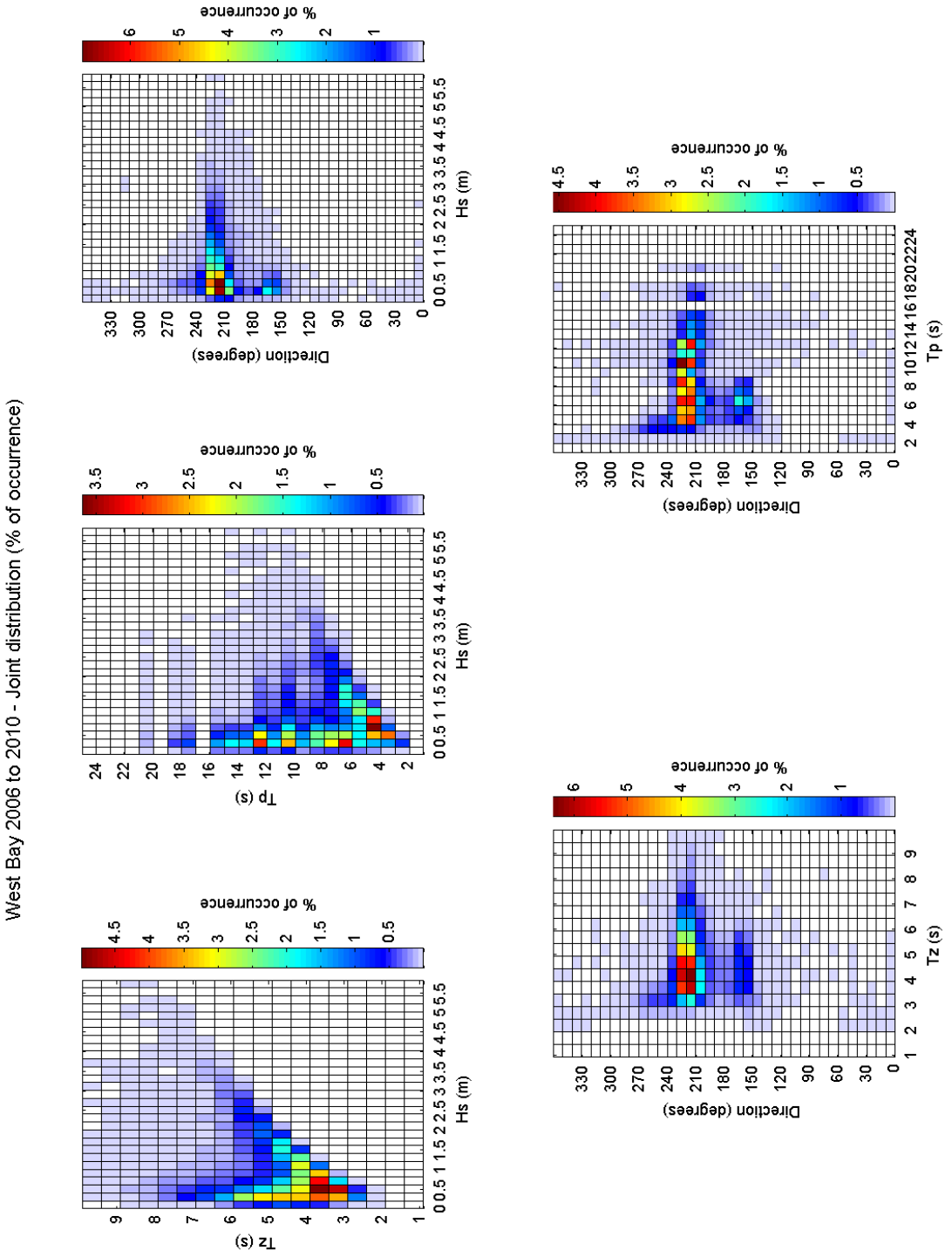
## Acknowledgements

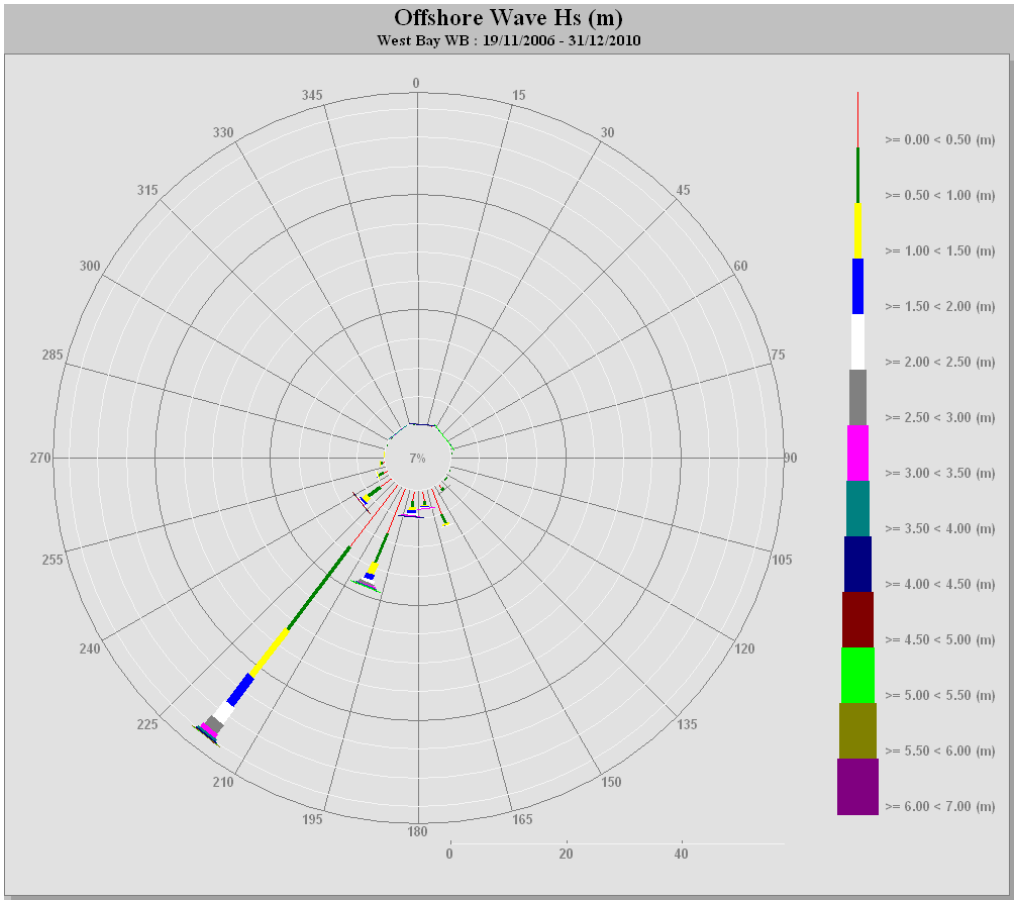
TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.


West Bay 2010
% 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%

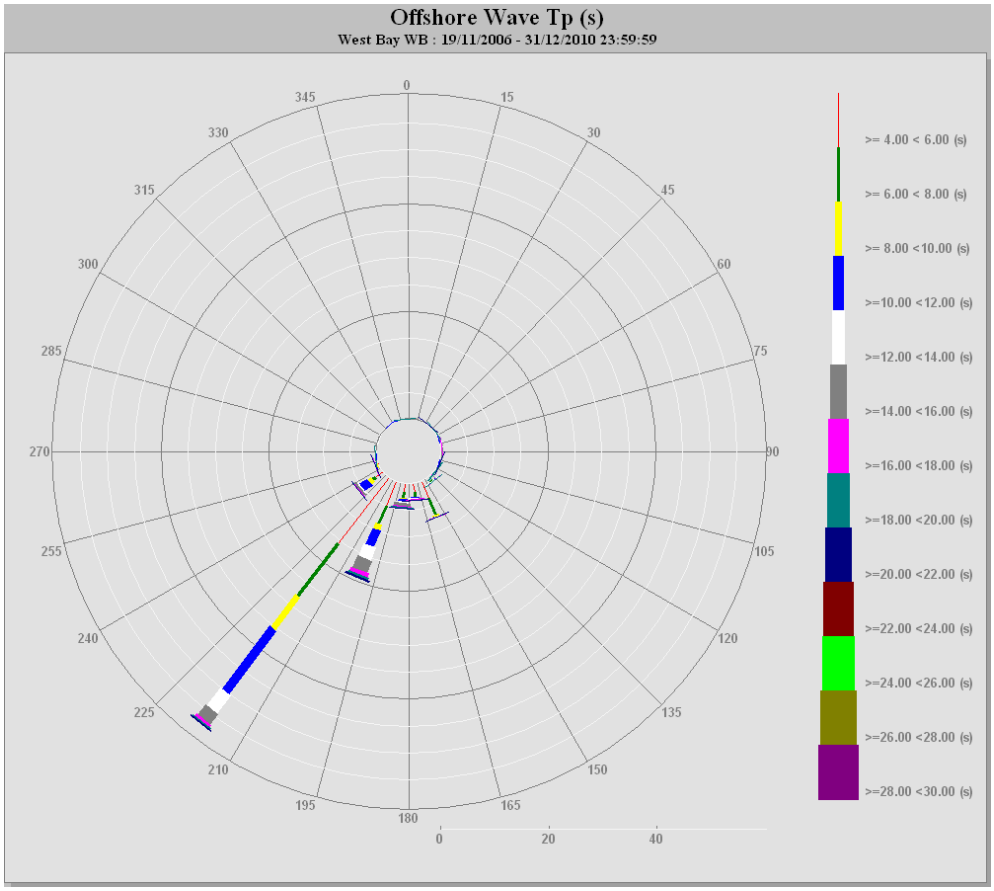

West Bay 2010 - Joint distribution
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
Tp (s)
No. of observations


West Bay 2010 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
% of occurrence

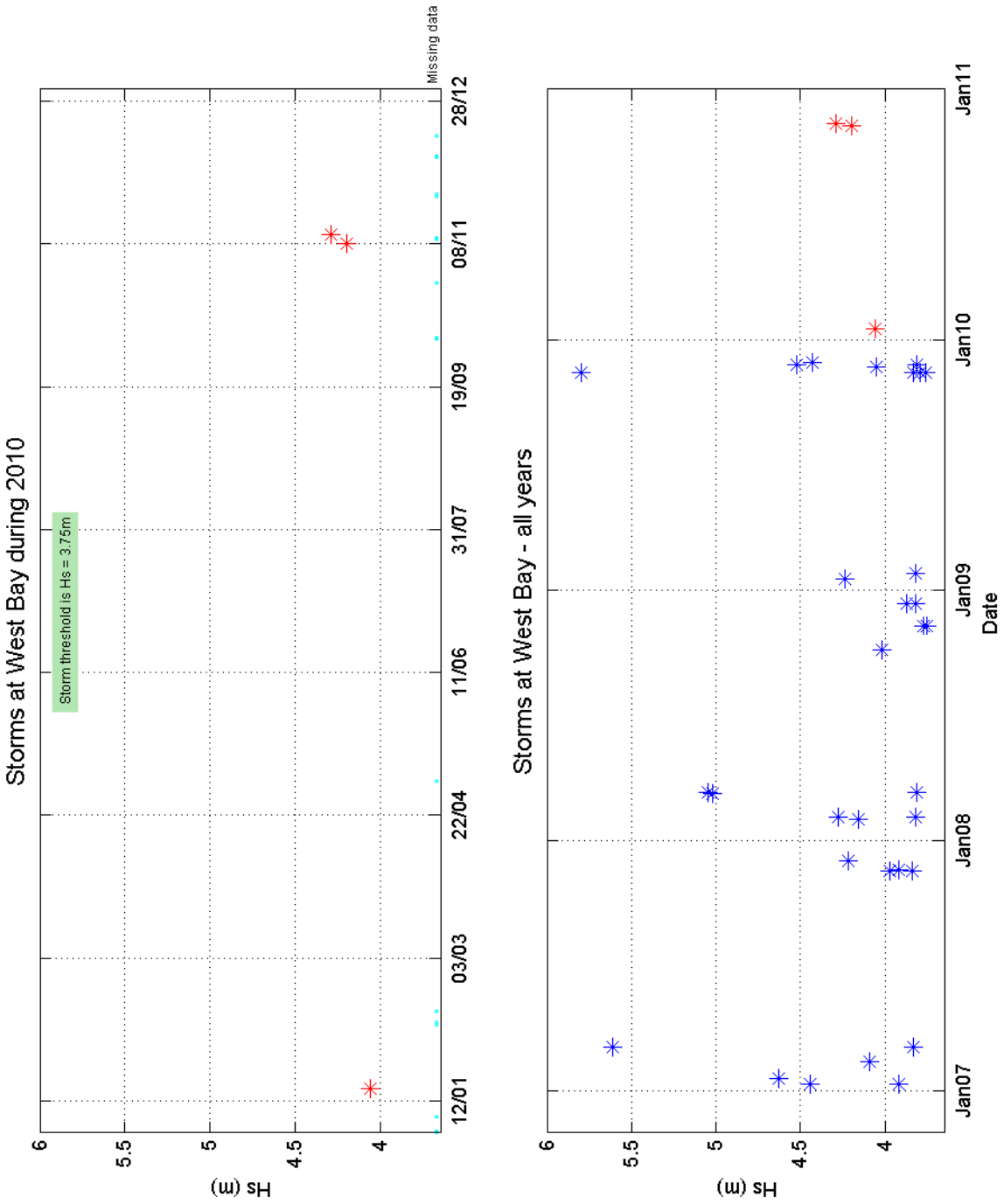

West Bay 2006 to 2010 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
% of occurrence

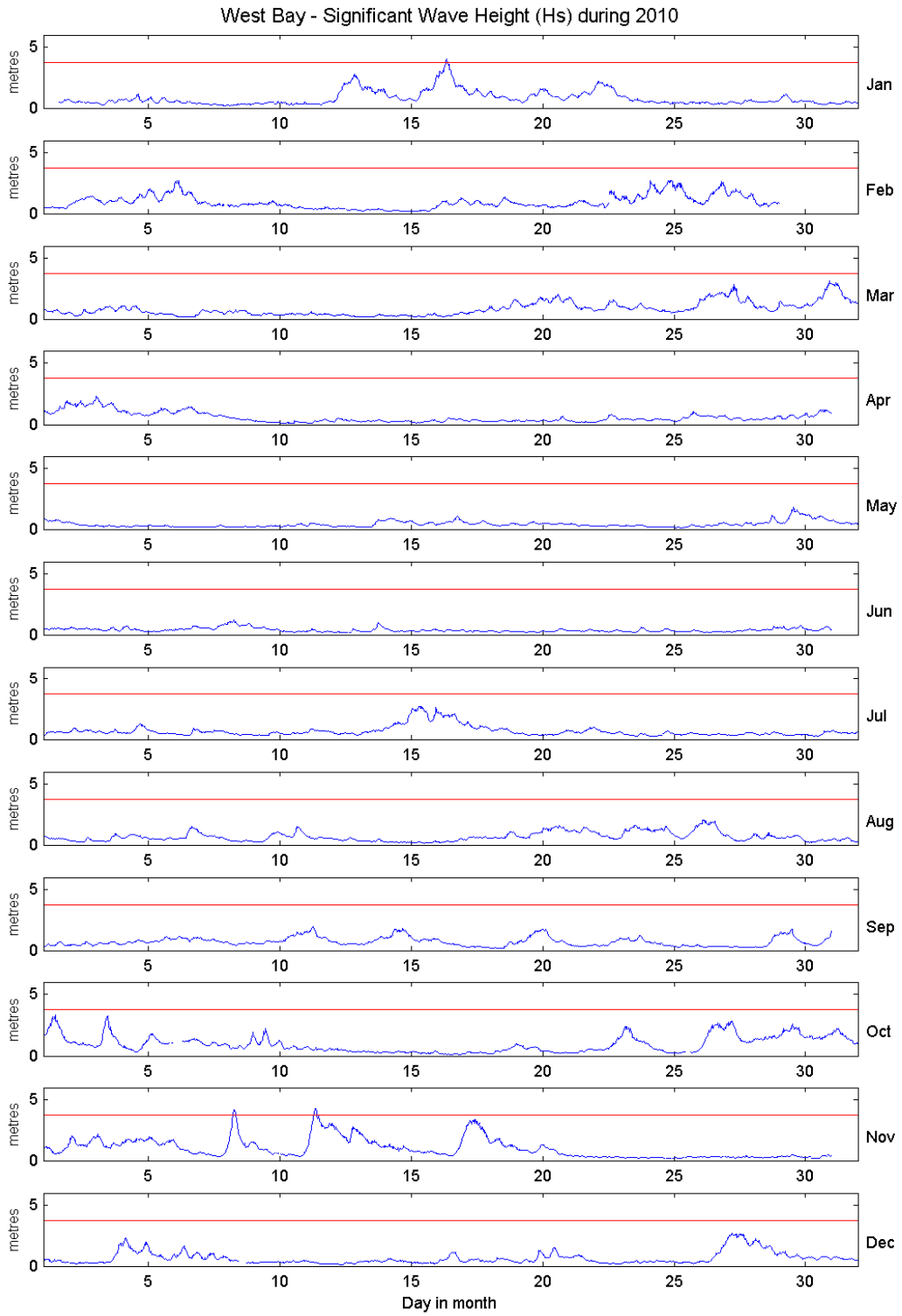



Direction vs. $H_s$ (all measured data)




Direction vs. $T_p$ (all measured data)


Storms at West Bay during 2010
Storm threshold is Hs = 3.75m
Missing data
Hs (m)
6
5.5
5
4.5
4
12/01
03/03
22/04
11/06
31/07
19/09
08/11
28/12
Storms at West Bay - all years
Hs (m)
Jan07
Jan08
Jan09
Jan10
Jan11
Date


West Bay - Significant Wave Height (Hs) during 2010
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month