# Perranporth Directional Waverider Buoy

Location
*OS:* 174209E 55231N
*WGS84:* *Latitude:* 50° 21.21' N *Longitude:* 005° 10.53' W

Water Depth
Approx. 10m CD

Instrument Type
Datawell Directional Waverider Mk III

Data Quality

| C1(%) | Sample interval |
|---|---|
| 93 | 30 minutes |

Monthly Means *All times GMT*

| Month | $H_s$ (m) | $T_p$ (s) | $T_z$ (s) | Direction (°) | SST (°C) | No. of days |
|---|---|---|---|---|---|---|
| January | 2.38 | 12.0 | 6.3 | 286 | 10.3 | 3 |
| February | 1.69 | 12.9 | 6.8 | 283 | 9.7 | 29 |
| March | 2.39 | 10.9 | 6.0 | 288 | 9.7 | 30 |
| April | 1.36 | 10.0 | 5.3 | 282 | 10.4 | 29 |
| May | 0.73 | 10.0 | 5.8 | 285 | 12.4 | 31 |
| June | 1.23 | 9.2 | 5.0 | 280 | 14.8 | 30 |
| July | 1.18 | 8.5 | 5.1 | 277 | 15.8 | 29 |
| August | 1.53 | 9.4 | 5.4 | 278 | 16.2 | 31 |
| September | 1.29 | 10.0 | 5.8 | 284 | 16.1 | 30 |
| October | 2.00 | 10.6 | 5.9 | 287 | 14.1 | 31 |
| November | 1.95 | 9.4 | 5.5 | 296 | 11.8 | 30 |
| December | 1.88 | 12.1 | 6.3 | 289 | 10.0 | 31 |

*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 2008 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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) |
| 10-Mar-2008 15:30 | 7.78 | 16.7 | 9.8 | 280 | - | HW -4 | 6.5 | - | - |
| 12-Mar-2008 08:30 | 6.53 | 13.3 | 8.5 | 281 | - | HW | 5.6 | - | - |
| 05-Dec-2008 06:00 | 6.05 | - | 8.7 | - | - | HW -3 | 3.3 | - | - |

* *Tidal information is obtained from the nearest recording tide gauge (tidal stage and range are from predicted tides at Perranporth). 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 | 6.90 | 5.21 | 4.89 | 4.48 | 3.79 | 3.12 | 09-Dec-2007 18:00 | 8.14 |
| 2008 | 6.37 | 4.59 | 4.20 | 3.85 | 3.28 | 2.86 | 10-Mar-2008 16:30 | 7.78** |

** i.e. 5 % of the $H_s$ values measured in 2007 exceeded 3.79m*

## 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 2008
- Percentage wave height exceedance
- Joint distribution of all parameters for 2008, given both as number of observations and as percentage of occurrence
- Cumulative joint distribution of parameters from start of records (percentage of occurrence only)
- Incidence of storms in 2008. Storm events are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm event is shown. Annual time series of $H_s$ (red line is storm threshold)

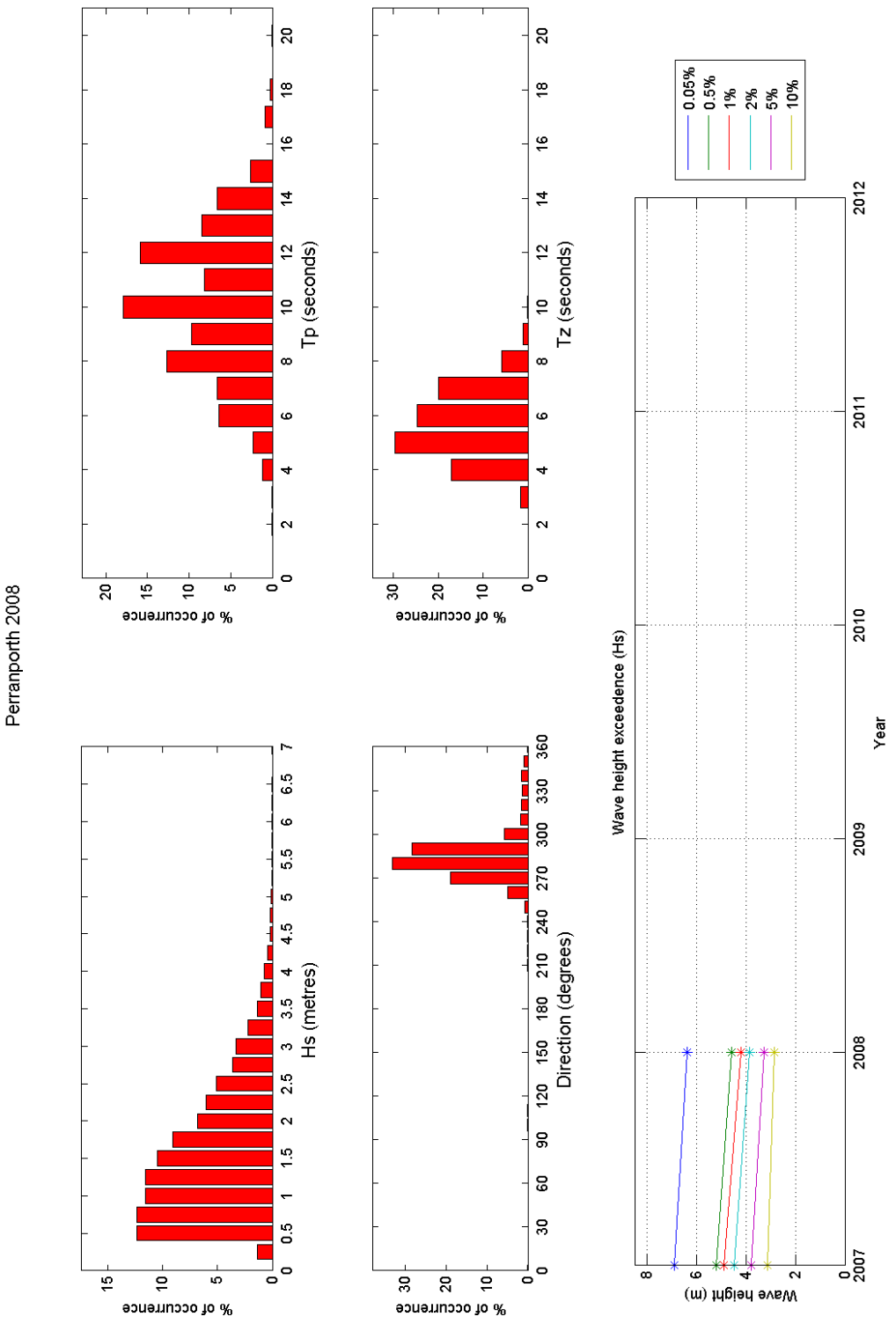
## General

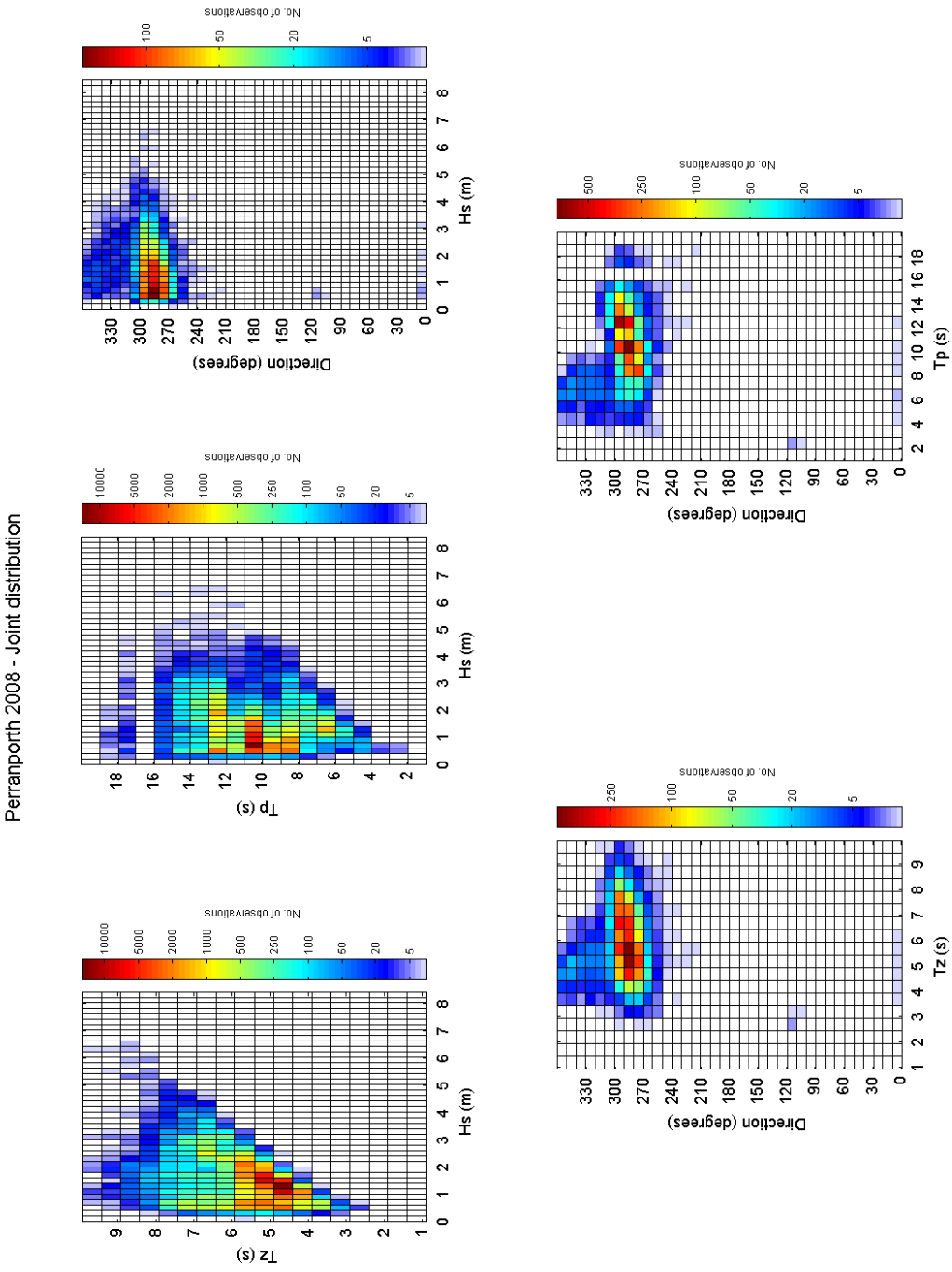
The Waverider was deployed on 18 December 2006. The buoy was hit and cut from its mooring on 4 January 2008. Whilst beached, the hatch cover was opened by vandals and the buoy suffered malicious internal damage, necessitating full repair by Datawell. A spare was deployed on 28 January.

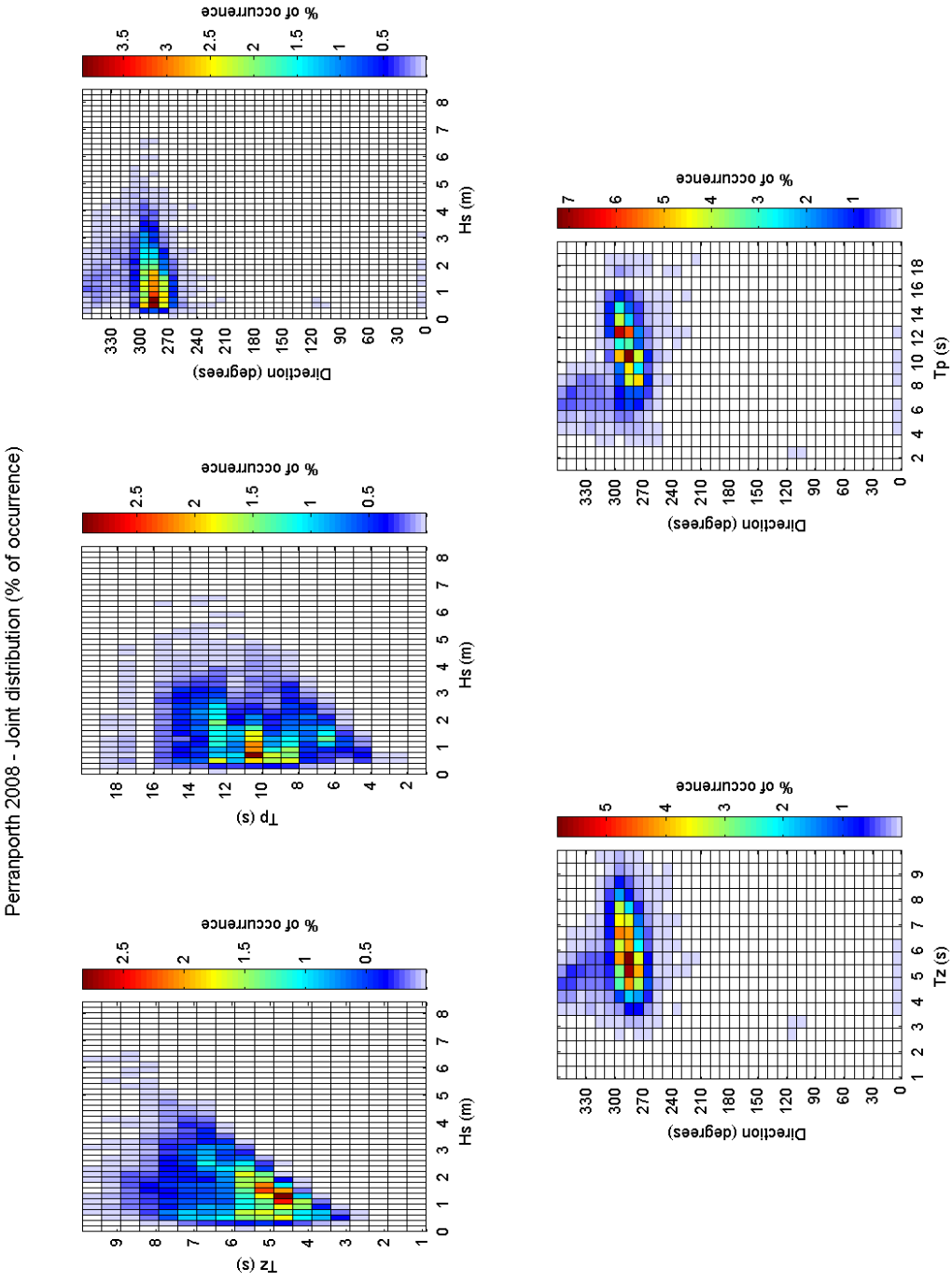
**The Waverider was in breaking waves during the storm on 10 March 2008. Detailed analysis of the buoy heave data suggests that significant wave heights during part of the measurement burst were in excess of 8m, but short periods of readings in what are interpreted to be breaking waves contaminated the burst statistics, leading to subsequent failure of quality control. Hence, it is likely that the $A_{max}$ for 2008 may underestimate the true figure.

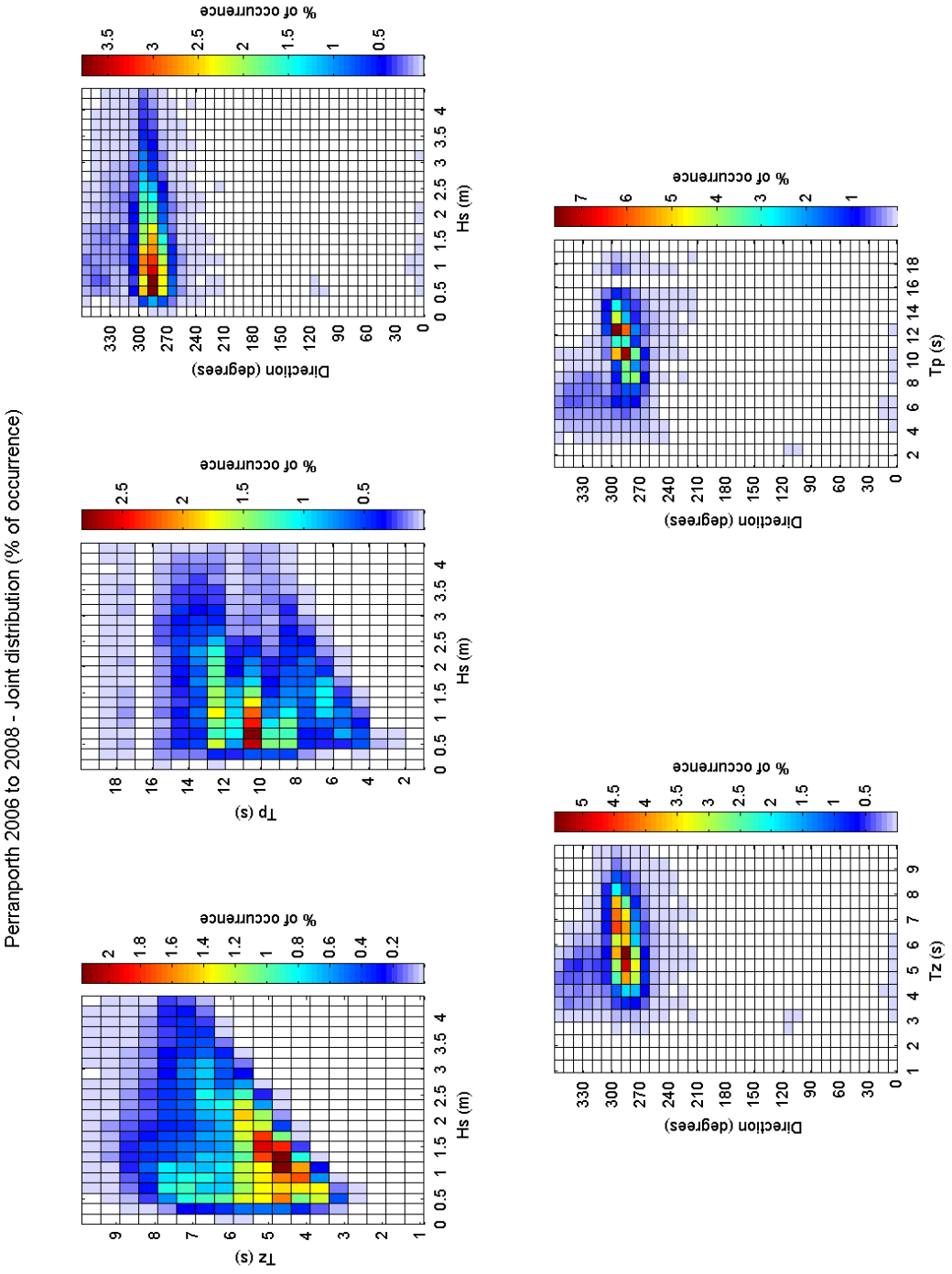
## Acknowledgements

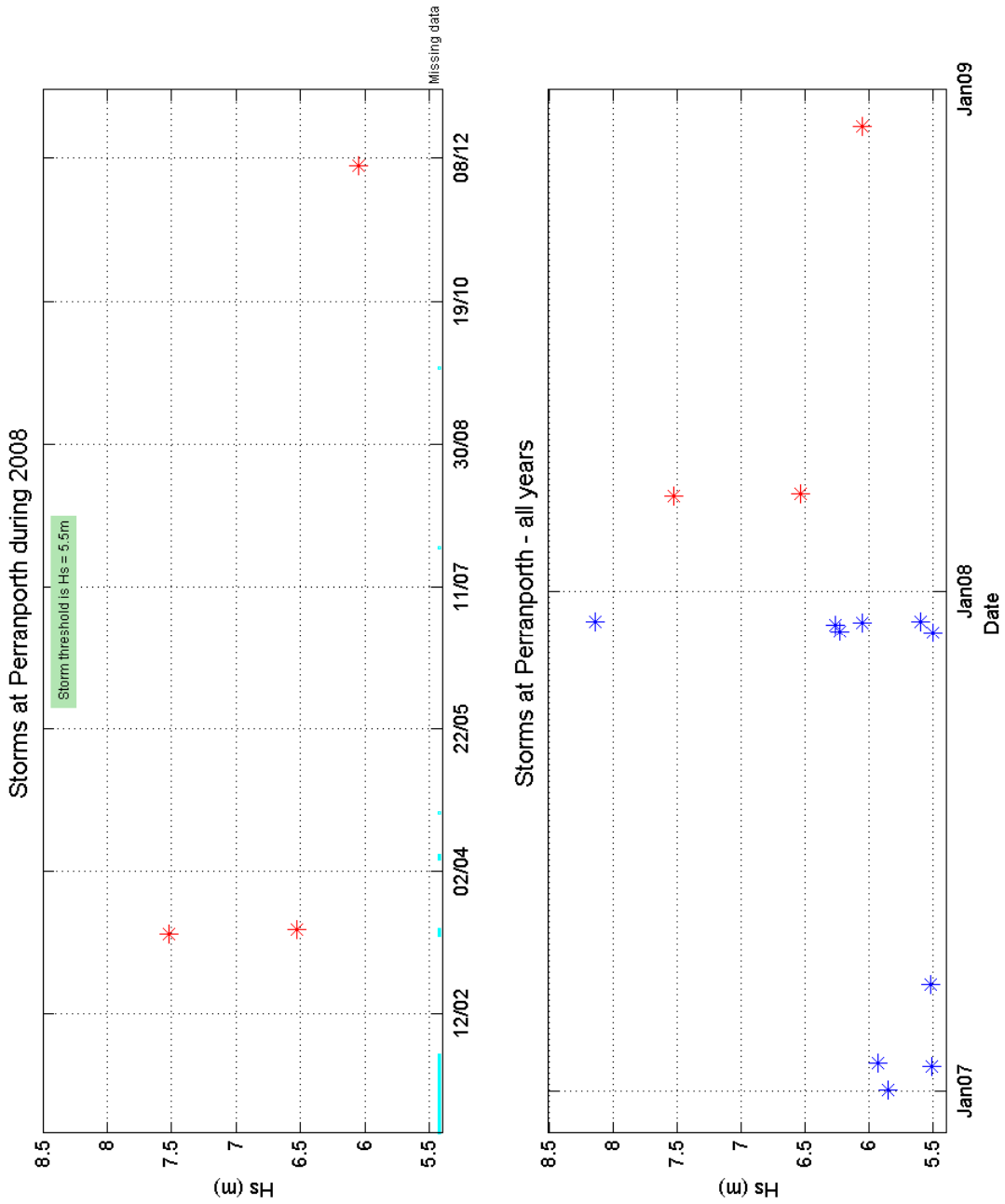
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

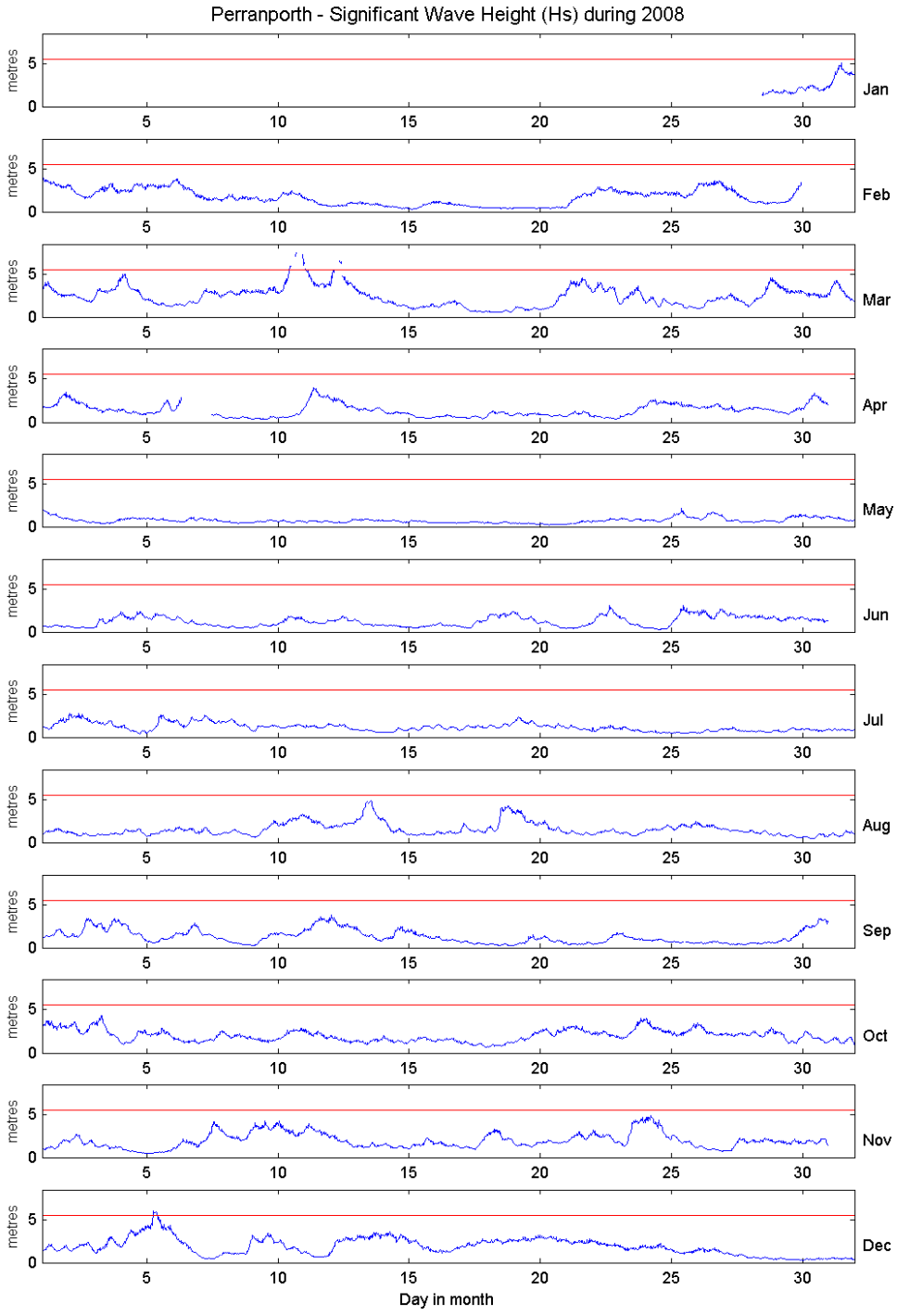

Perranporth 2008
% of occurrence
Hs (metres)
Tp (seconds)
Tz (seconds)
Direction (degrees)
Wave height exceedence (Hs)
Wave height (m)
Year
0.05%
0.5%
1%
2%
5%
10%


Perranporth 2008 - Joint distribution
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
No. of observations


Perranporth 2008 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
% of occurrence


Perranporth 2006 to 2008 - Joint distribution (% of occurrence)
Direction (degrees)
Hs (m)
Tp (s)
Tz (s)
% of occurrence


Storms at Perranporth during 2008
Storm threshold is Hs = 5.5m
Missing data
Hs (m)
8.5
8
7.5
7
6.5
6
5.5
12/02
02/04
22/05
11/07
30/08
19/10
08/12
Storms at Perranporth - all years
Hs (m)
Jan07
Jan08
Jan09
Date


Perranporth - Significant Wave Height (Hs) during 2008
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month