

## Perranporth Directional Waverider Buoy

### Location

OS: 174304E 55125N

WGS84: Latitude: 50° 21.160' N Longitude: 05° 10.445' W

### Water Depth

~14 m CD

### Instrument Type

Datawell Directional Waverider Mk III

### Data Quality

| Recovery rate (%) | Sample interval |
|-------------------|-----------------|
| 99                | 30 minutes      |

### Statistics - 2011

All times are GMT

| Month     | H <sub>s</sub><br>(m) | T <sub>p</sub><br>(s) | T <sub>z</sub><br>(s) | Dir.<br>(°) | SST<br>(°C) | No. of<br>days |
|-----------|-----------------------|-----------------------|-----------------------|-------------|-------------|----------------|
| January   | 1.42                  | 11.9                  | 5.9                   | 286         | 9.0         | 30             |
| February  | 2.46                  | 14.3                  | 7.6                   | 284         | 9.2         | 28             |
| March     | 1.14                  | 12.1                  | 6.3                   | 283         | 9.5         | 31             |
| April     | 1.40                  | 12.1                  | 6.7                   | 282         | 11.4        | 30             |
| May       | 1.67                  | 10.0                  | 5.7                   | 280         | 12.8        | 31             |
| June      | 1.37                  | 8.4                   | 5.1                   | 278         | 14.2        | 30             |
| July      | 1.20                  | 9.1                   | 5.2                   | 280         | 15.6        | 31             |
| August    | 1.12                  | 8.3                   | 4.9                   | 279         | 16.1        | 31             |
| September | 1.81                  | 11.2                  | 6.2                   | 280         | 15.6        | 30             |
| October   | 1.65                  | 10.4                  | 5.9                   | 281         | 15.0        | 31             |
| November  | 1.81                  | 12.5                  | 7.0                   | 279         | 13.2        | 30             |
| December  | 2.87                  | 11.4                  | 6.3                   | 285         | 11.2        | 31             |

### Storm Analysis

| Date/Time            | H <sub>s</sub><br>(m) | T <sub>p</sub><br>(s) | T <sub>z</sub><br>(s) | Dir.<br>(°) | Water level<br>elevation*<br>(OD) | Tidal<br>stage<br>(hours re.<br>HW) | Tidal<br>range<br>(m) | Tidal<br>surge*<br>(m) | Max.<br>surge*<br>(m) |
|----------------------|-----------------------|-----------------------|-----------------------|-------------|-----------------------------------|-------------------------------------|-----------------------|------------------------|-----------------------|
| 15-Dec-2011<br>04:30 | 6.75                  | 13.3                  | 9.3                   | 293         | -0.28                             | HW -4                               | 5.4                   | 0.05                   | 0.45                  |

\* Tidal information is obtained from the nearest recording tide gauge (the step gauge at Port Isaac). The surge shown is the residual at the time of the highest H<sub>s</sub>. The maximum tidal surge is the largest positive surge during the storm event.

## 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 | 6.10                         | 5.16 | 4.84 | 4.44 | 3.78 | 3.11 | 09-Dec-2007 13:30    | 6.90 <sup>+</sup> |
| 2008 | 6.21                         | 4.57 | 4.18 | 3.84 | 3.27 | 2.86 | 12-Mar-2008 08:30    | 6.53 <sup>+</sup> |
| 2009 | 5.46                         | 4.74 | 4.44 | 4.08 | 3.56 | 3.00 | 22-Nov-2009 21:00    | 5.69              |
| 2010 | 5.91                         | 4.01 | 3.52 | 3.05 | 2.57 | 2.16 | 11-Nov-2010 20:30    | 6.30              |
| 2011 | 5.45                         | 4.37 | 4.13 | 3.86 | 3.36 | 2.91 | 15-Dec-2011 04:30    | 6.75 <sup>+</sup> |

\* i.e. 5 % of the  $H_s$  values measured in 2007 exceeded 3.78 m

<sup>+</sup> 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 5.6 m storm threshold)
- Wave roses (Direction vs.  $H_s$  and vs.  $T_p$ ) for all measured data
- Percentage of occurrence of  $H_s$ ,  $T_p$ ,  $T_z$  and Direction for 2011
- Incidence of storm waves for 2011. 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

## 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.

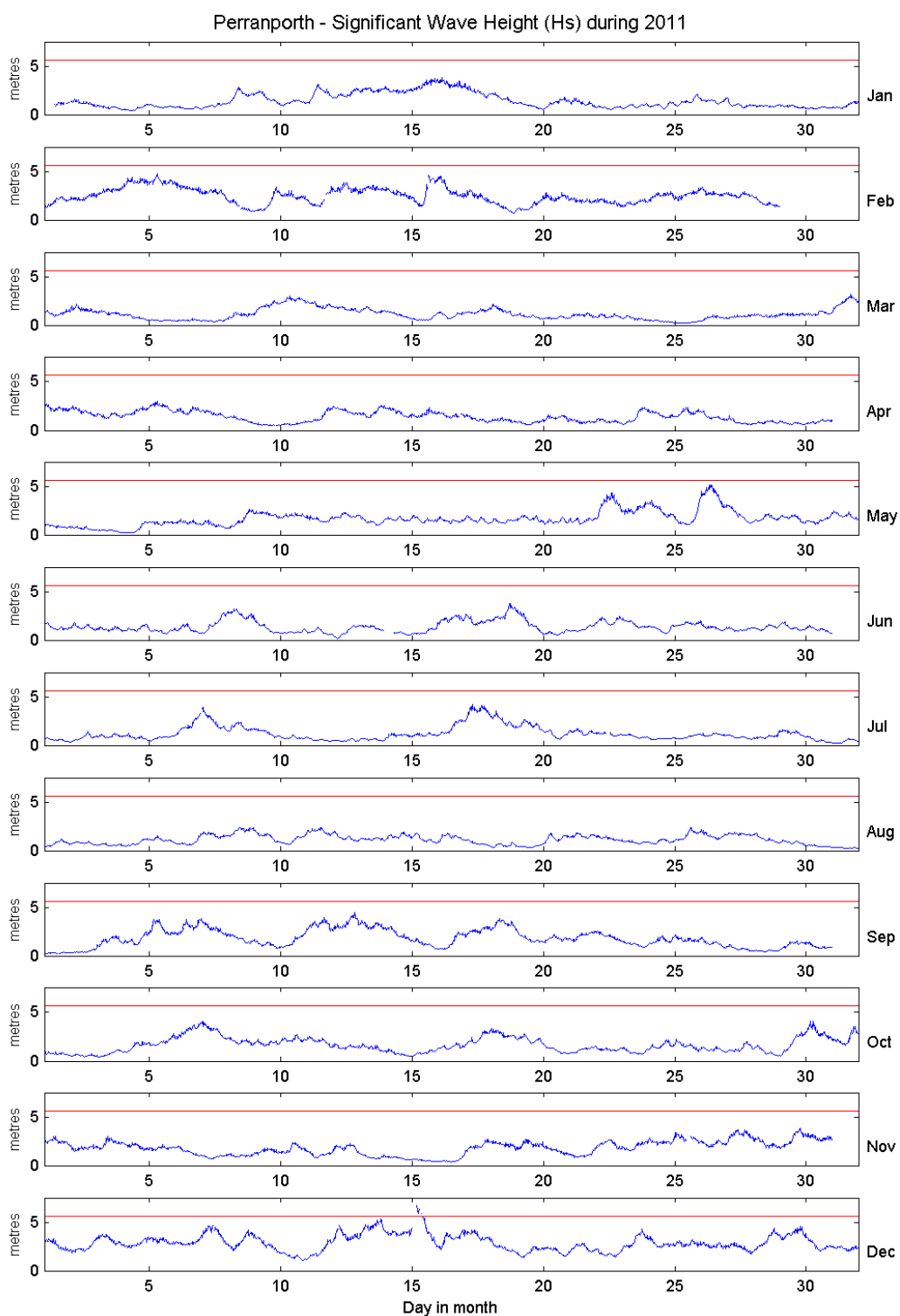
| Return period (years) | Significant wave height (m) | Comments              |
|-----------------------|-----------------------------|-----------------------|
| 1                     | 6.13                        | Depth-limited at MLWS |
| 2                     | 6.35                        |                       |
| 5                     | 6.62                        |                       |
| 10                    | 6.81                        |                       |
| 20                    | 7.00                        |                       |
| 50                    | 7.24                        |                       |

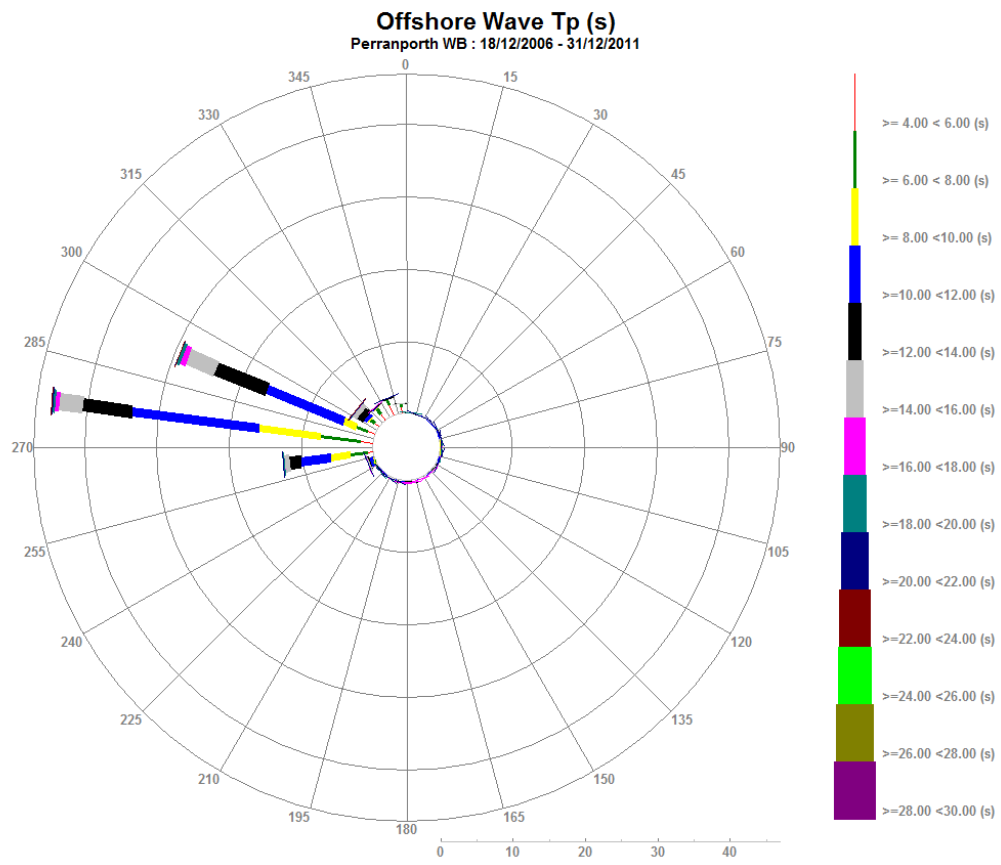
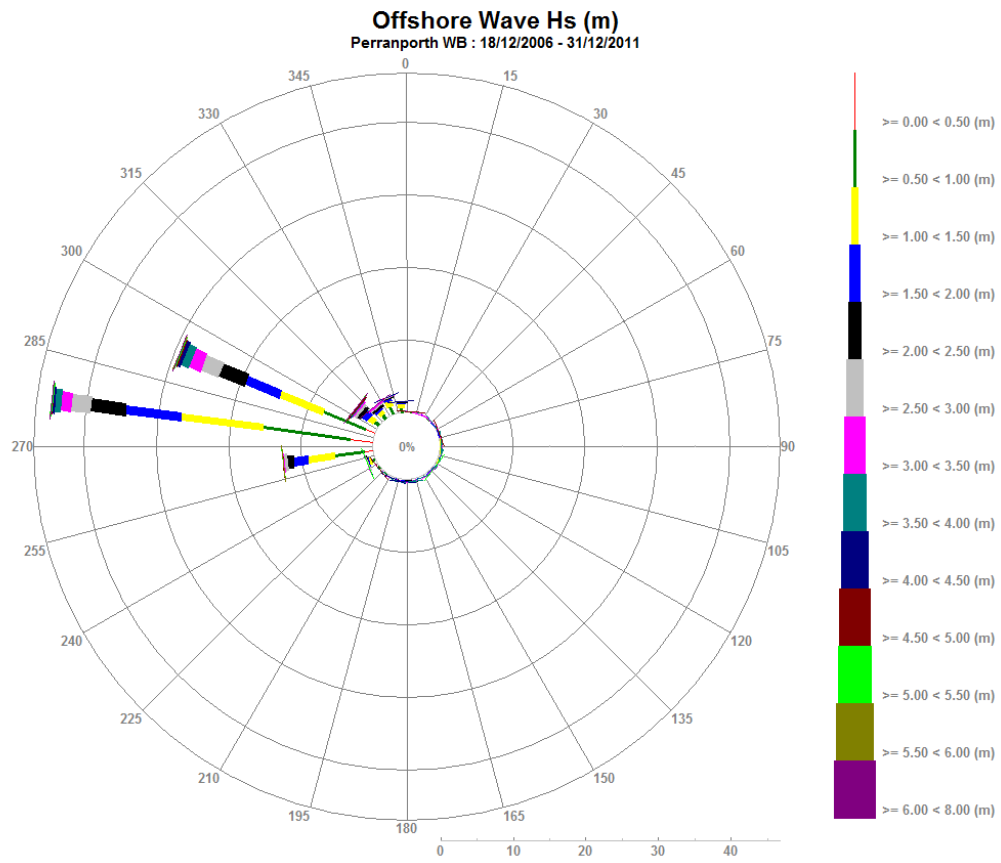
## General

The buoy was first deployed on 18 December 2006.

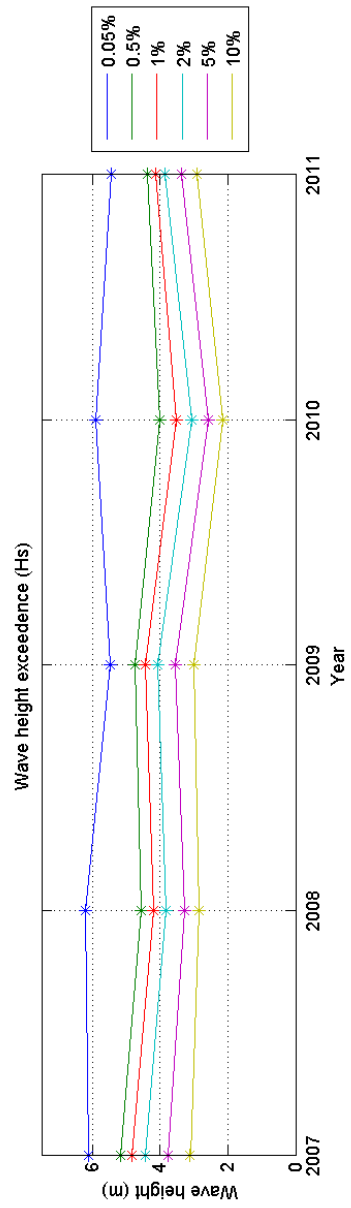
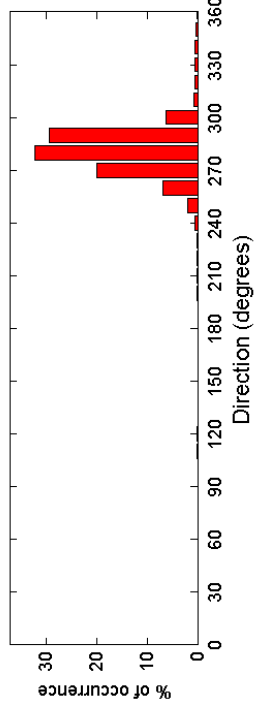
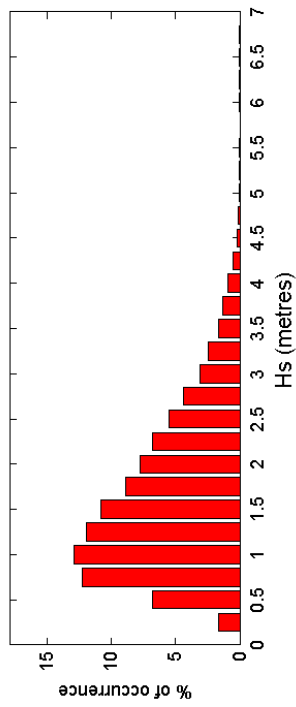
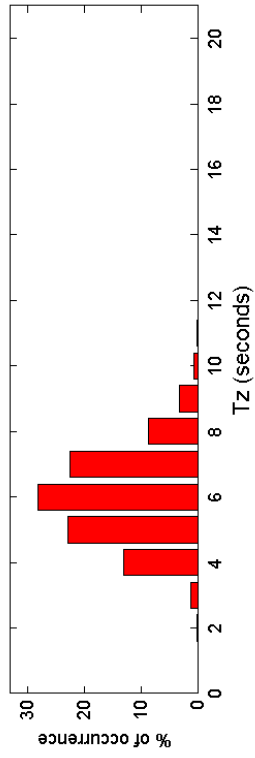
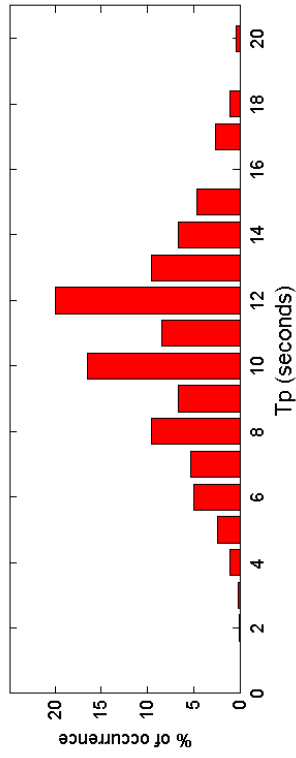
## Acknowledgements

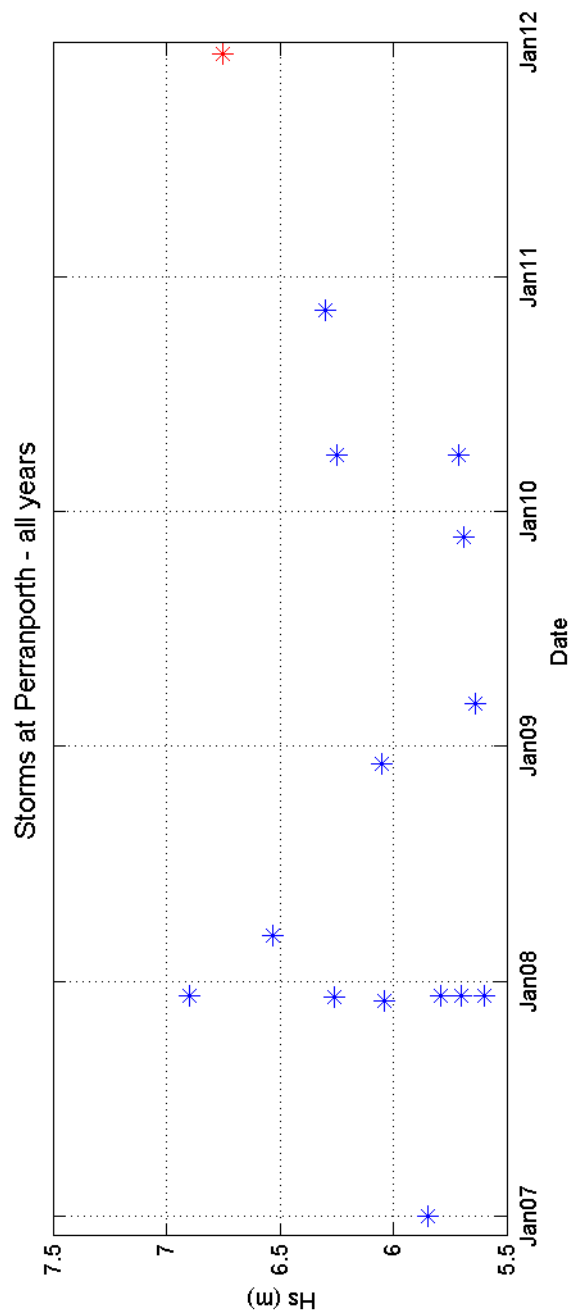
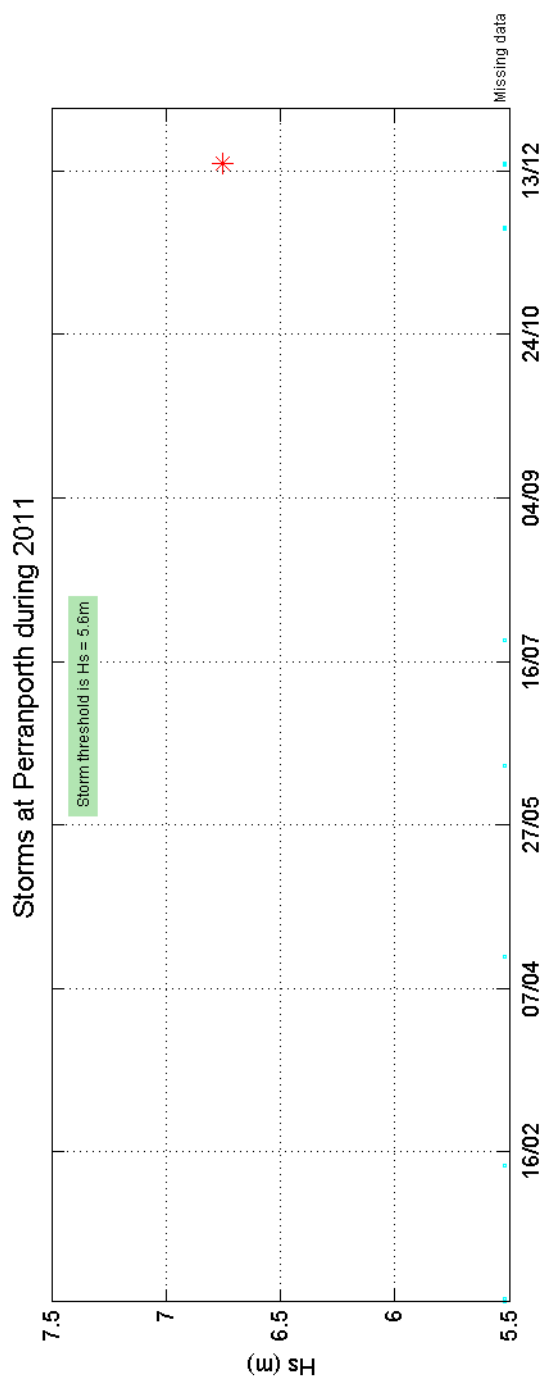
The shore station is kindly hosted by Perranporth Youth Hostel. TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.





Perranporth 2011





Perranporth 2006 to 2011 - Joint distribution (% of occurrence)

