Dawlish Directional Waverider Buoy

Location			
OS	299757 E 76516 N		
WGS84	*Latitude:* 50° 34.78' N *Longitude:* 03° 25.03' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~11 m CD	Buoy in situ off Dawlish beach. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	**Sample interval**
100	30 minutes

Monthly Averages - 2016

All times are GMT

Month	**H_s (m)**	**T_p (s)**	**T_z (s)**	**Dir. (°)**	**SST (°C)**	**Bimodal seas (%)**	**No. of days**
January	0.94	8.1	4.2	173	10.2	3	31
February	0.76	8.8	4.1	162	9.6	3	29
March	0.60	7.5	3.9	162	8.9	0	31
April	0.52	7.1	3.7	174	10.2	0	30
May	0.36	5.2	3.3	153	12.4	0	31
June	0.31	5.6	3.4	168	14.7	0	30
July	0.30	5.1	3.3	173	16.2	0	31
August	0.38	5.5	3.3	173	17.3	0	31
September	0.48	5.9	3.5	173	17.8	0	30
October	0.75	6.2	3.7	142	15.1	0	31
November	0.66	6.1	3.9	154	12.6	0	30
December	0.64	8.0	4.0	163	10.7	1	31

Monthly Averages - All Years (December 2010 – December 2015)

Month	**H_s (m)**	**T_p (s)**	**T_z (s)**	**Dir. (°)**	**SST (°C)**	**Bimodal seas (%)**
January	0.66	7.9	3.9	167	9.5	2
February	0.75	8.3	4.0	162	8.2	2
March	0.57	7.2	3.7	152	8.7	1
April	0.53	7.1	3.7	156	10.2	1
May	0.43	5.8	3.3	169	12.0	0
June	0.44	5.3	3.4	161	14.3	0
July	0.35	5.1	3.3	167	16.6	0
August	0.40	5.3	3.4	169	17.0	0
September	0.45	5.8	3.4	161	16.7	0
October	0.67	6.2	3.7	159	15.3	1
November	0.70	6.9	3.9	161	13.0	0
December	0.71	7.7	3.9	168	10.6	3

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)
20-Nov-2016 02:00	4.05	9.1	6.9	153	0.53	HW +3	2.83	-	-
01-Jan-2016 22:30	3.99	8.3	6.5	149	~1.84	~HW	~2.17	-	-
28-Mar-2016 01:30	3.26	7.7	6.0	163	-1.35	HW +4	3.1	-	-
18-Jan-2016 08:30	3.19	7.1	6.0	151	0.30	HW -4	2.08	-	-

** Tidal information is obtained from the WaveRadar REX in Exmouth Marina and/or estimated from the predicted tide levels (Admiralty Total Tide).*

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	2.78	2.21	1.95	1.63	1.31	1.04	24-Oct-2011 16:30	3.24
2012	3.74	2.33	2.08	1.78	1.35	1.07	30-Apr-2012 07:00	4.63[+]
2013	2.97	2.37	2.10	1.85	1.51	1.20	18-Dec-2013 22:00	3.44
2014	3.96	2.93	2.50	2.07	1.50	1.16	05-Feb-2014 01:30	5.62[+]
2015	3.02	2.21	1.92	1.63	1.36	1.13	30-Dec-2015 09:30	3.22
2016	3.76	2.59	2.16	1.82	1.46	1.13	20-Nov-2016 02:00	4.05

*** i.e. 5 % of the H_s values measured in 2011 exceeded 1.31 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.

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 0.5 hourly and 3-hourly records and are calculated for periods up to 10 times the record length, using a Weibull distribution.

0.5-hourly records December 2010 – December 2016		
Return period (years)	**Significant wave height (m)**	**Comments**
1	4.7	Depth-limited at MLWS
2	4.9	Depth-limited at MHWS
5	5.3	
10	5.6	
20	5.9	Depth-limited at HAT
50	6.3	

3-hourly records December 2010 – December 2016		
Return period (years)	**Significant wave height (m)**	**Comments**
1	3.6	No depth limitation
2	3.9	
5	4.1	
10	4.4	
20	4.6	
50	4.8	Depth-limited at MLWS

Distribution plots

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

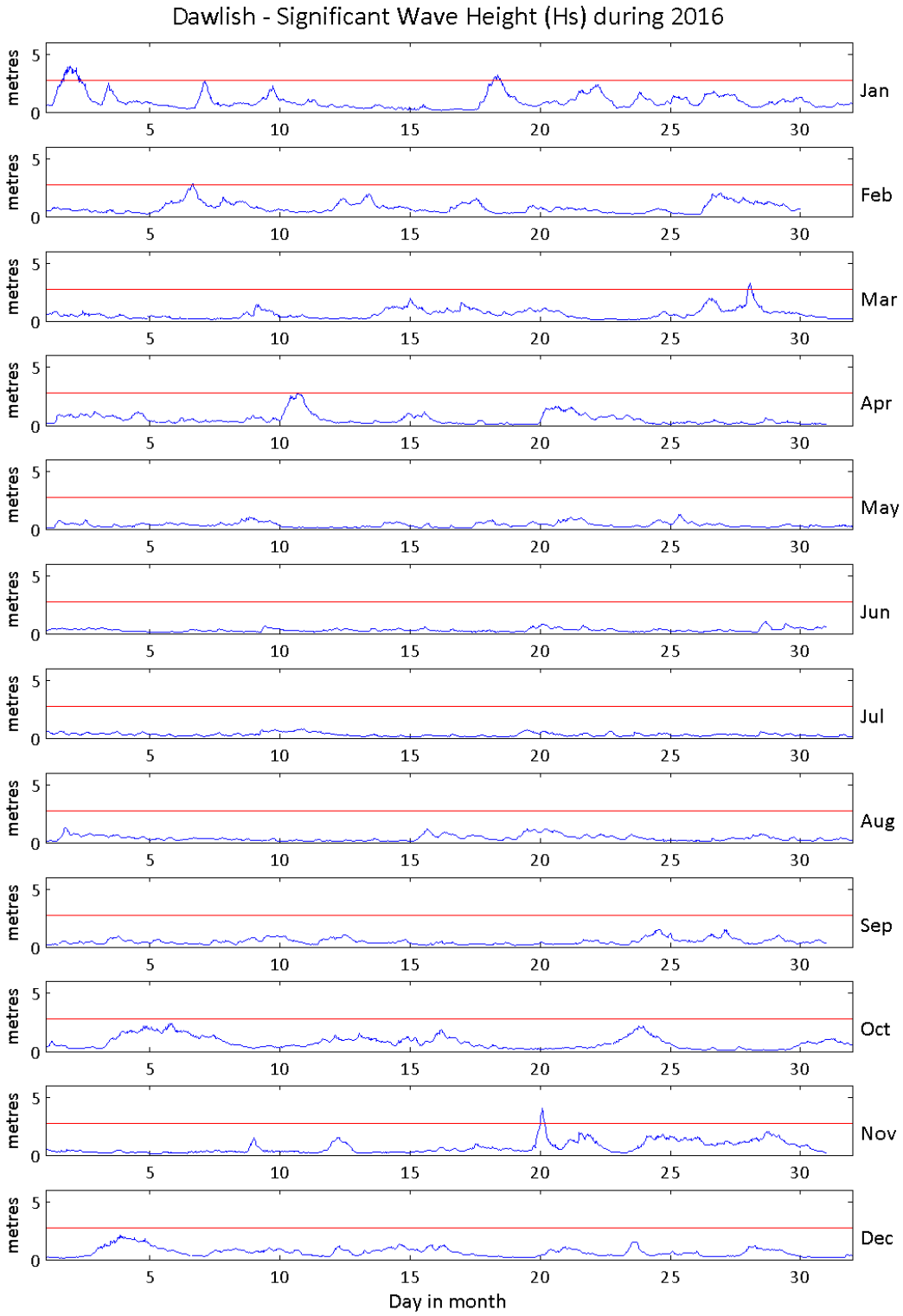
- Annual time series of H_s (red line is 2.75 m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, T_p, T_z and Direction for 2016
- Joint distribution of all parameters for all measured data, given as percentage of occurrence
- Wave rose (percentage of occurrence of direction vs. H_s) for all measured data

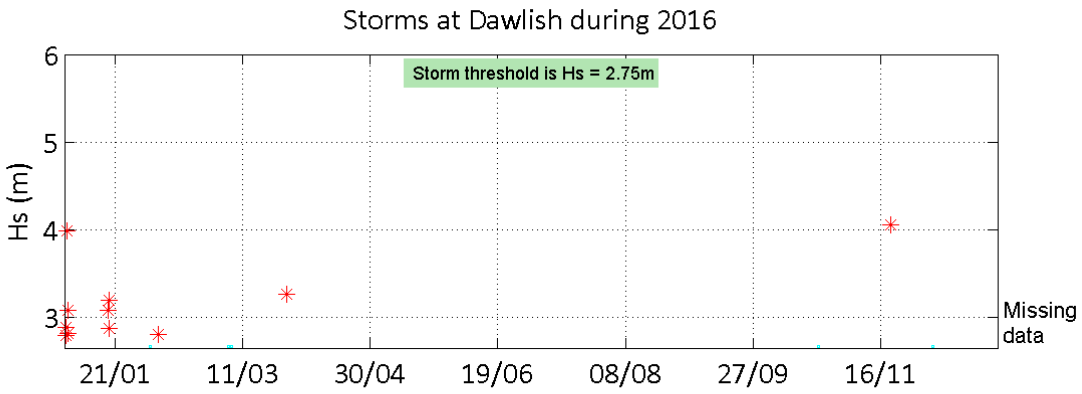
General

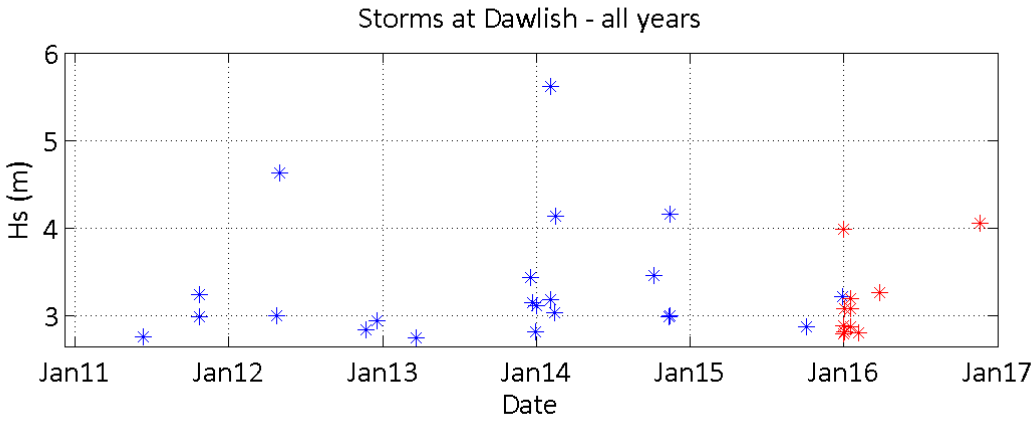
The wave buoy at Dawlish, owned by Teignbridge District Council, was deployed on 07 December 2010, at which time the magnetic declination at the site was 2.7° west, changing by 0.15° east per year.

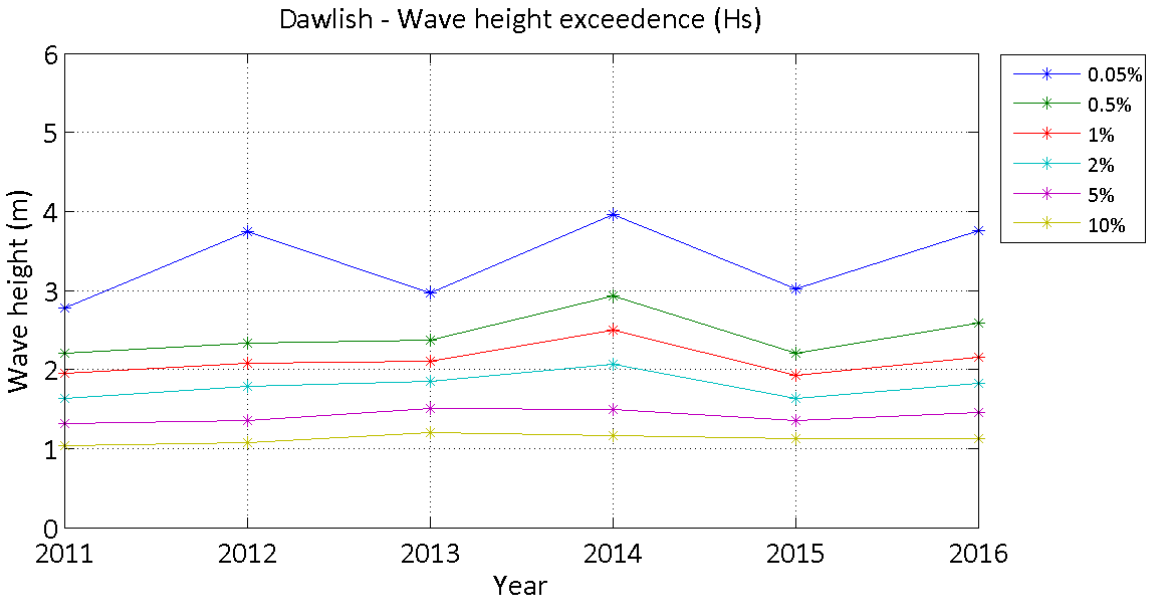
Acknowledgements

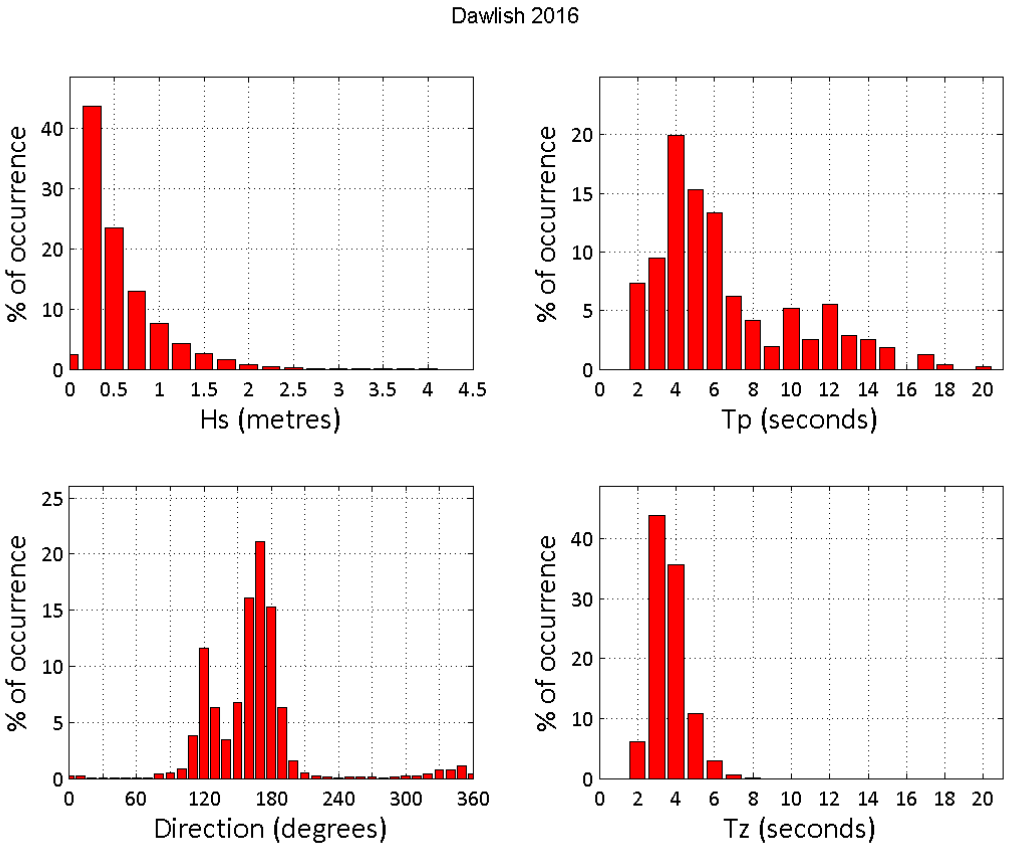
Tidal predictions were produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool).

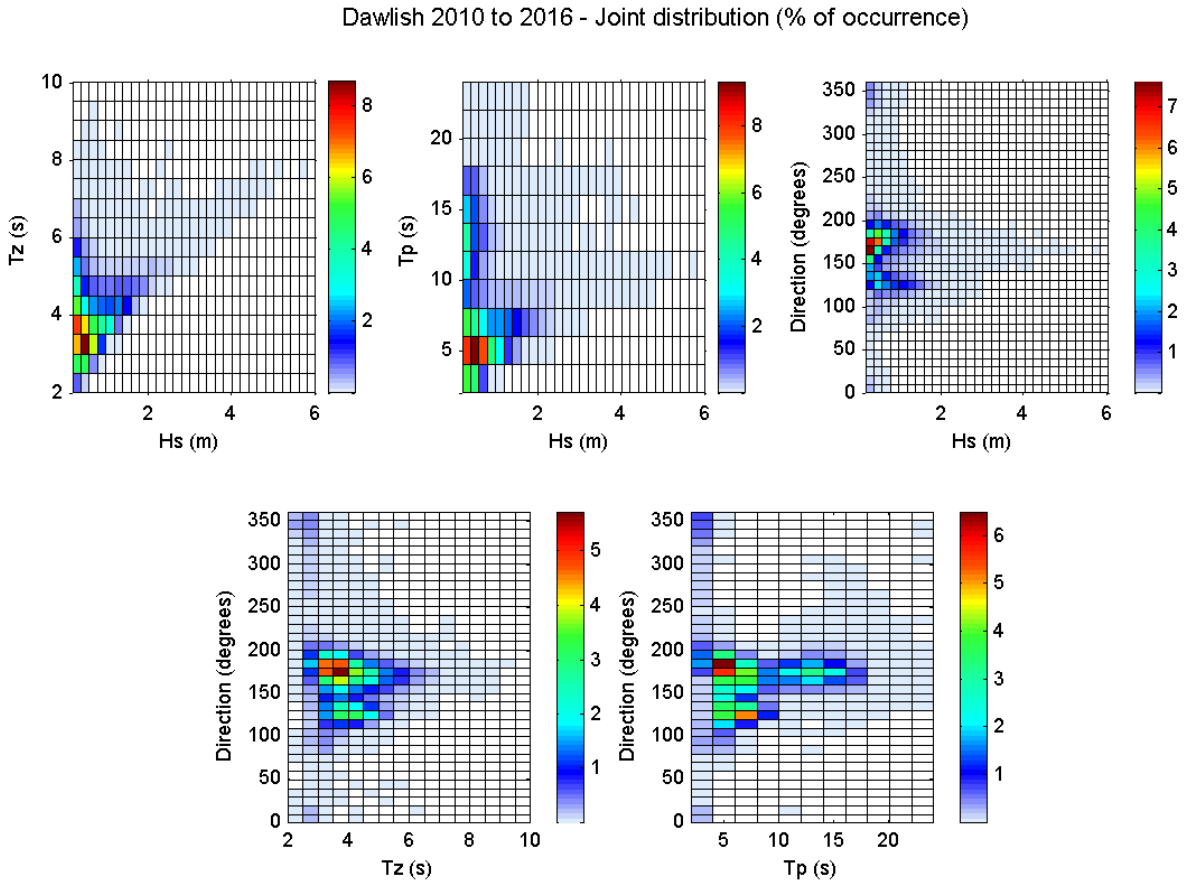

Dawlish - Significant Wave Height (Hs) during 2016
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month

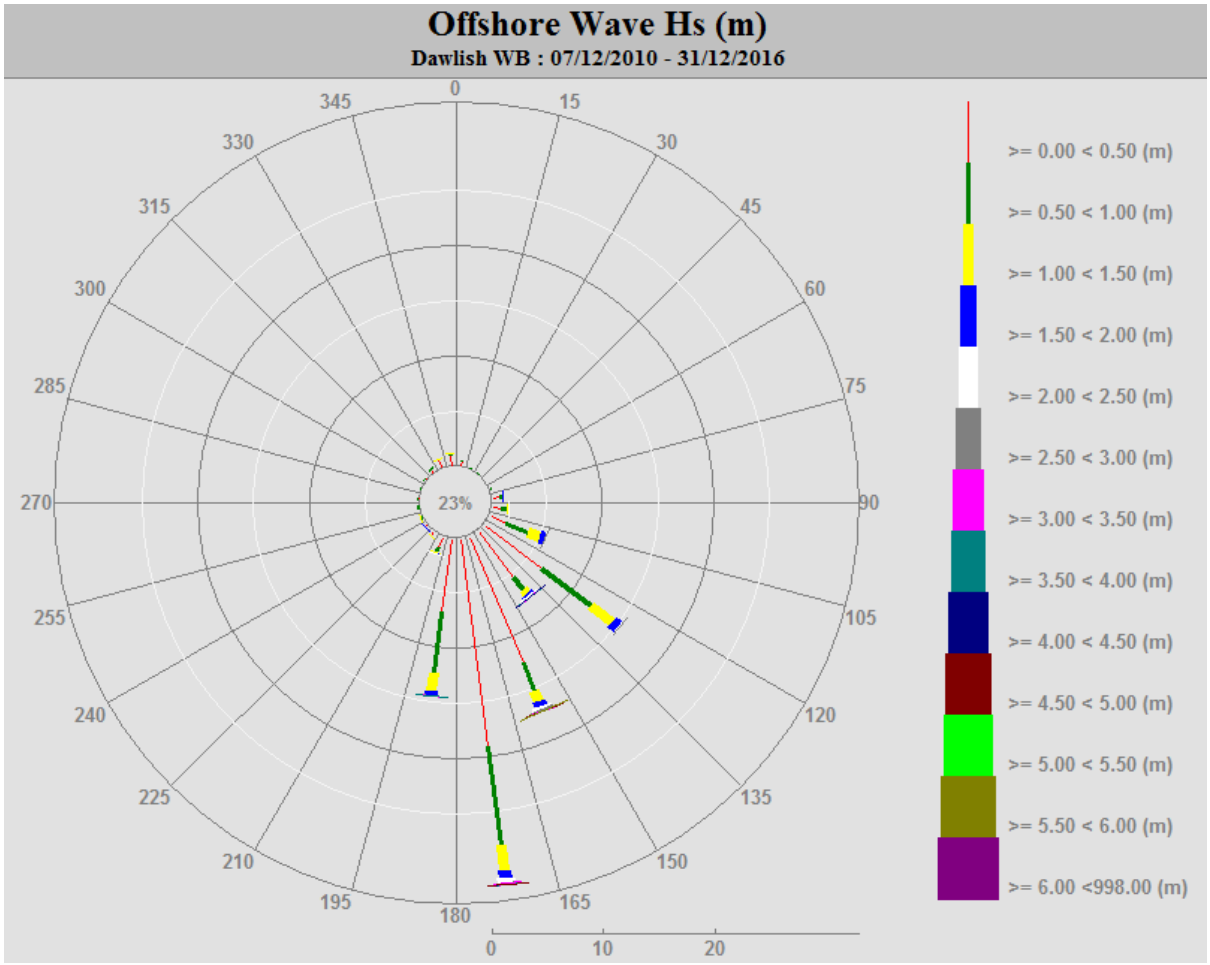

Storms at Dawlish during 2016
Storm threshold is Hs = 2.75m
Hs (m)
6
5
4
3
Missing data
21/01
11/03
30/04
19/06
08/08
27/09
16/11


Storms at Dawlish - all years
Hs (m)
6
5
4
3
Jan11
Jan12
Jan13
Jan14
Jan15
Jan16
Jan17
Date


Dawlish - Wave height exceedence (Hs)
Wave height (m)
6
5
4
3
2
1
0
2011
2012
2013
2014
2015
2016
Year
0.05%
0.5%
1%
2%
5%
10%


Dawlish 2016
% of occurrence
Hs (metres)
Tp (seconds)
Direction (degrees)
Tz (seconds)


Dawlish 2010 to 2016 - Joint distribution (% of occurrence)
Tz (s)
Hs (m)
Tp (s)
Direction (degrees)


Offshore Wave Hs (m)
Dawlish WB : 07/12/2010 - 31/12/2016
0
15
30
45
60
75
90
105
120
135
150
165
180
195
210
225
240
255
270
285
300
315
330
345
23%
0
10
20
>= 0.00 < 0.50 (m)
>= 0.50 < 1.00 (m)
>= 1.00 < 1.50 (m)
>= 1.50 < 2.00 (m)
>= 2.00 < 2.50 (m)
>= 2.50 < 3.00 (m)
>= 3.00 < 3.50 (m)
>= 3.50 < 4.00 (m)
>= 4.00 < 4.50 (m)
>= 4.50 < 5.00 (m)
>= 5.00 < 5.50 (m)
>= 5.50 < 6.00 (m)
>= 6.00 <998.00 (m)