



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 EMU Limited	Location of buoy (Google mapping)

Data Quality

Recovery rate (%)	Sample interval
99	30 minutes

Monthly Averages - 2015

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	No. of days
January	0.61	7.8	3.8	179	9.8	31
February	0.59	8.2	4.0	158	7.8	28
March	0.49	7.5	3.6	164	8.7	31
April	0.45	6.2	3.5	152	10.7	30
May	0.48	6.0	3.4	171	12.1	31
June	0.41	5.7	3.4	161	14.3	30
July	0.42	5.2	3.3	167	16.2	31
August	0.41	5.4	3.4	163	16.8	31
September	0.55	5.4	3.5	157	16.3	30
October	0.68	6.3	3.9	144	14.8	31
November	0.64	6.5	3.7	173	13.6	29
December	1.12	7.1	4.0	173	12.3	31

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

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

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)
30-Dec-2015 09:30	3.22	7.1	5.5	167	-	HW	~3.2	-	-
05-Oct-2015 00:00	2.87	7.1	5.3	153	-	HW +1	~2.6	-	-

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

* 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.

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 2015. 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 2015
- 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

* Tidal information used to be obtained from the WaveRadar REX on Teignmouth Pier but this was put out of action on 03 Feb 2014 by damage to the pier. Accordingly, the tidal stage and range are estimated from the predicted tide levels.

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

3-hourly records from December 2010 to December 2015		
Return period (years)	Significant wave height (m)	Comments
1	3.7	No depth limitation
2	3.9	
5	4.2	
10	4.5	
20	4.7	
50	5.0	Depth-limited at MLWS

1-hourly records from December 2010 to December 2015		
Return period (years)	Significant wave height (m)	Comments
1	4.3	No depth limitation
2	4.7	
5	5.1	Depth-limited at MLWS
10	5.4	
20	5.8	
50	6.2	Depth-limited at MHWS

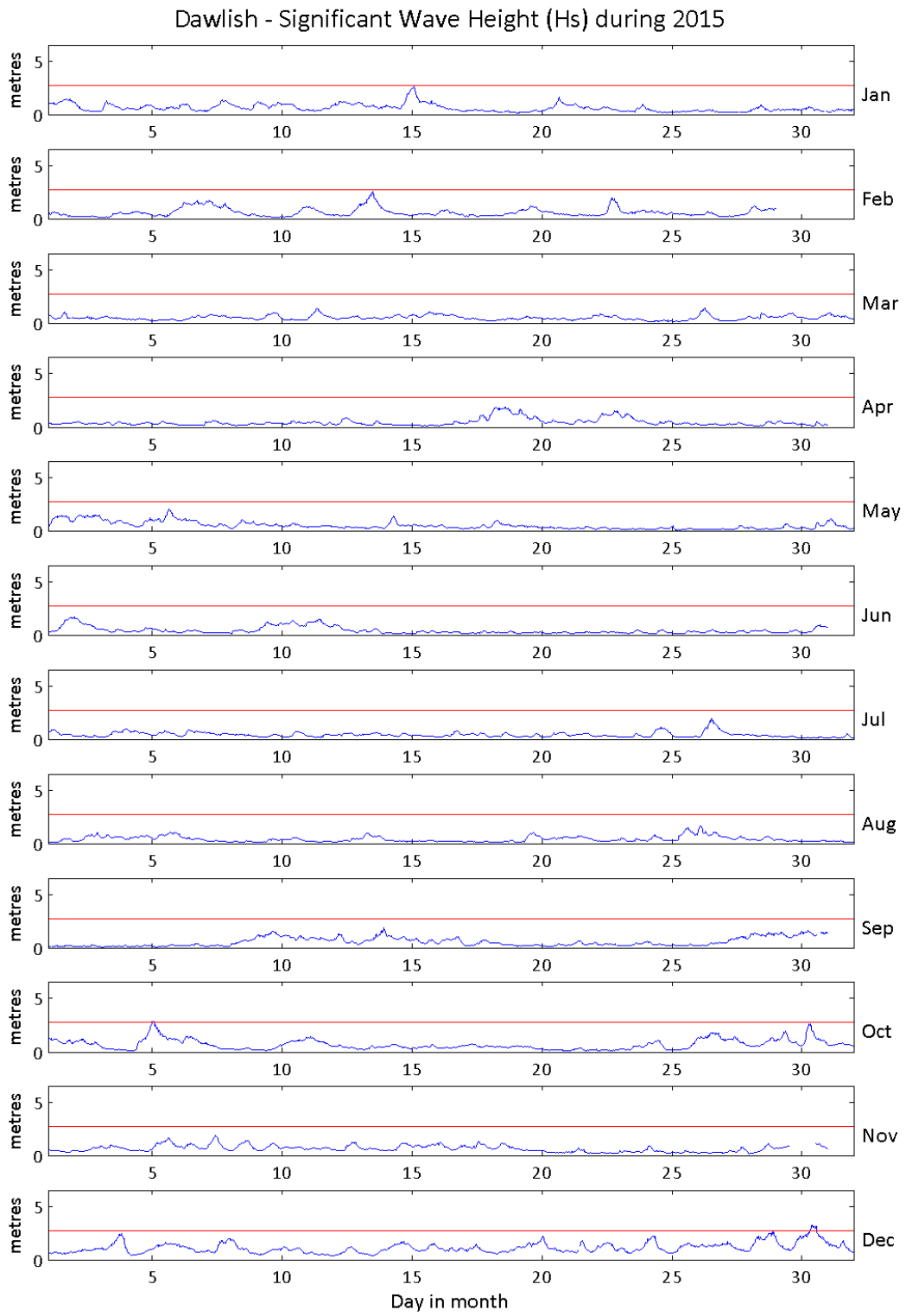
0.5-hourly records from December 2010 to December 2015		
Return period (years)	Significant wave height (m)	Comments
1	4.7	No depth limitation
2	5.0	Depth-limited at MLWS
5	5.4	
10	5.8	
20	6.1	
50	6.5	Depth-limited at MHWS

General

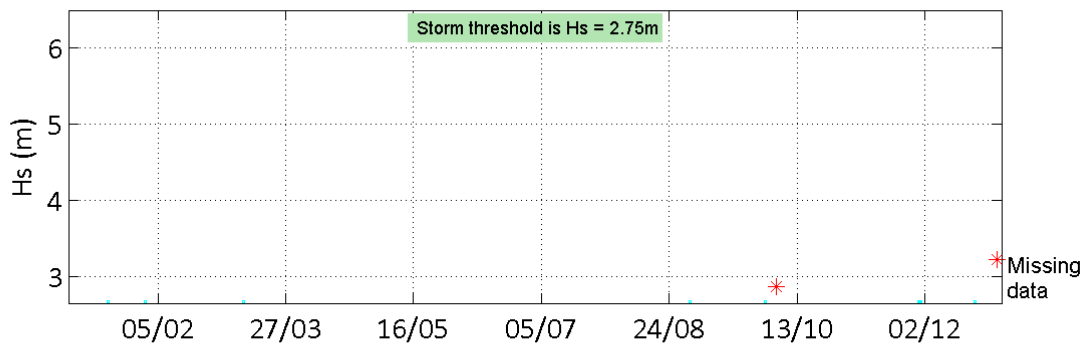
The wave buoy at Dawlish was deployed on 07 December 2010, at which time the magnetic declination at the site was 2.7° west, changing by 0.15° east per year.

Acknowledgements

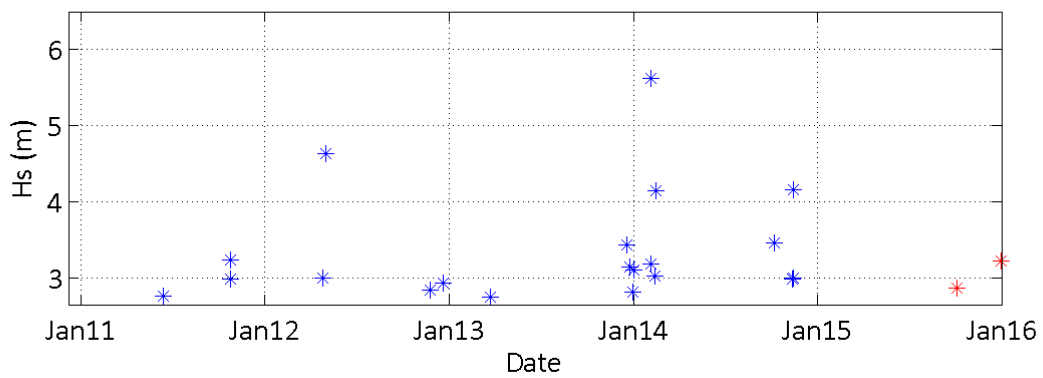
TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.



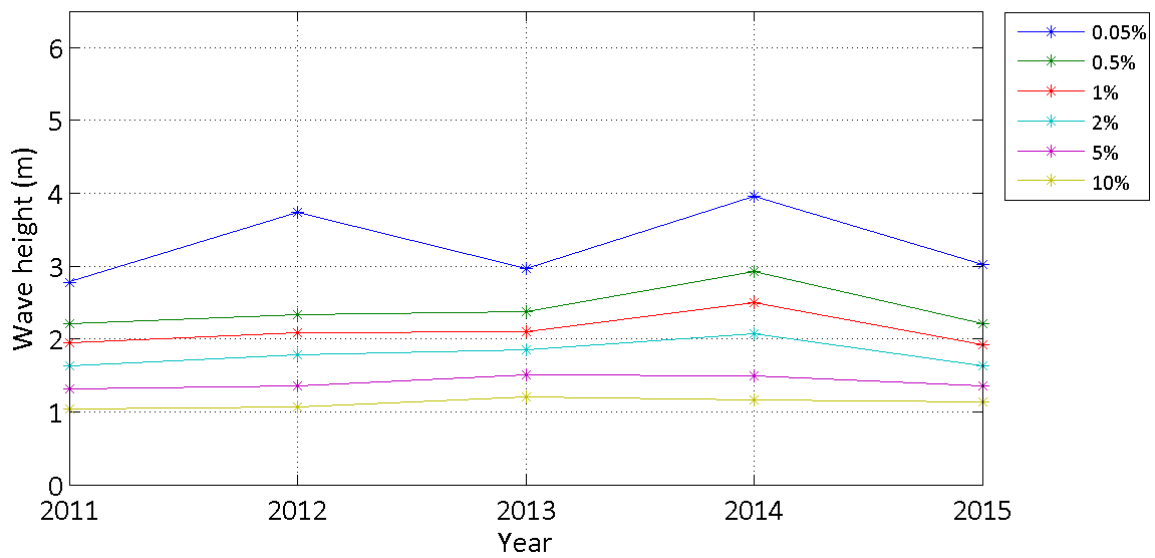
Storms at Dawlish during 2015



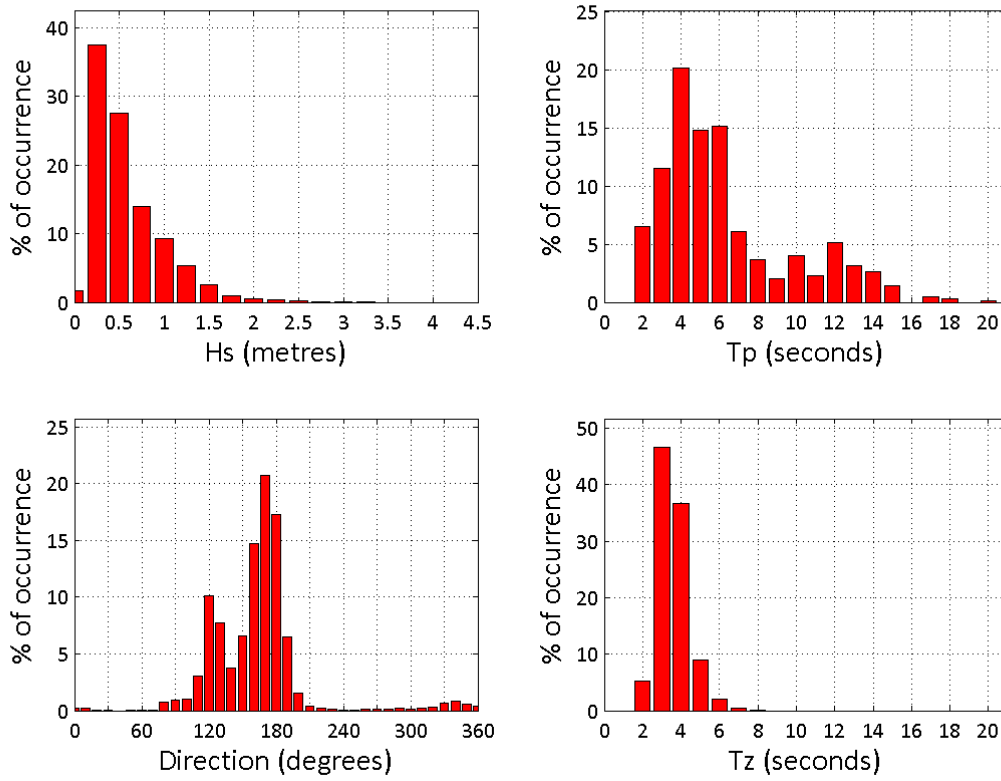
Storms at Dawlish - all years



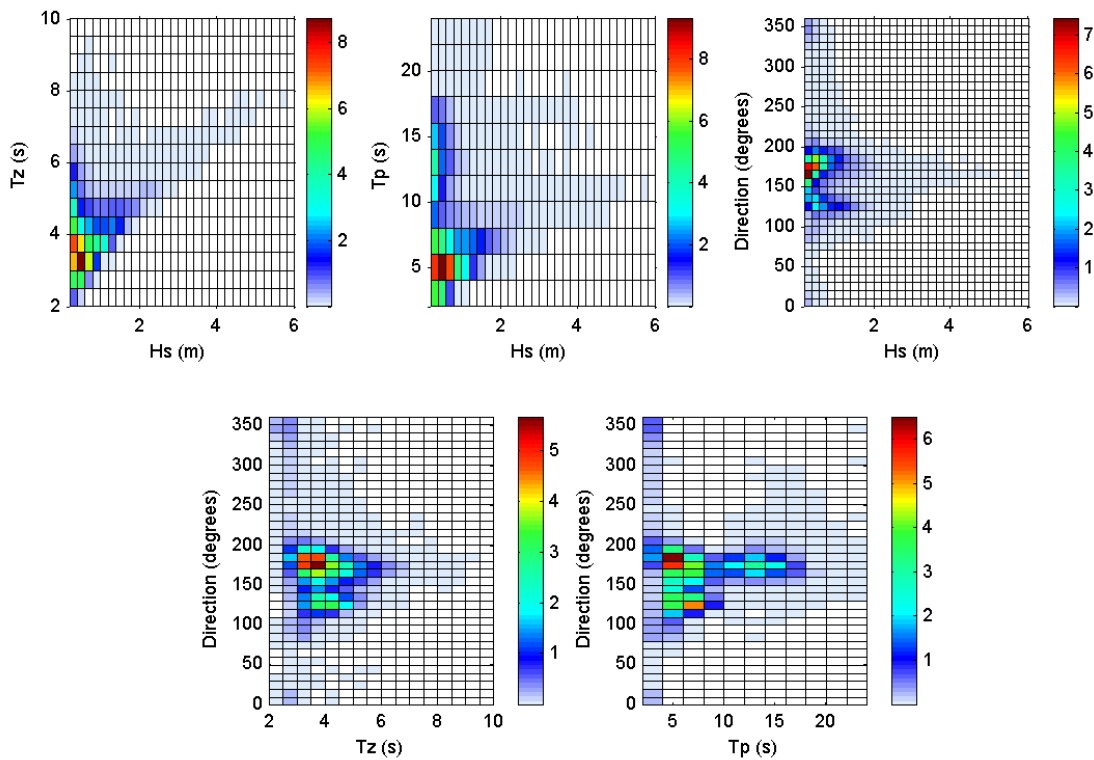
Dawlish - Wave height exceedance (Hs)



Dawlish 2015



Dawlish 2010 to 2015 - Joint distribution (% of occurrence)



Offshore Wave Hs (m) Dawlish WB : 07/12/2010 - 31/12/2015

