Dawlish Directional Waverider Buoy

Location			
OS	299750 E 76540 N		
WGS84	*Latitude:* 50° 34.80' N *Longitude:* 03° 25.04' 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
96	30 minutes

Monthly Averages - 2017

All times are GMT

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	0.57	6.6	3.7	169	9.0	0	31
February	0.81	8.2	4.1	162	8.5	2	28
March	0.62	7.7	3.9	164	9.8	0	31
April	0.29	4.4	3.3	162	11.5	0	19
May	0.51	5.7	3.5	149	13.3	0	31
June	0.36	6.6	3.4	170	15.6	0	30
July	0.38	4.4	3.3	172	17.0	0	31
August	0.34	4.8	3.3	170	17.1	0	31
September	0.48	6.6	3.7	168	16.7	0	30
October	0.51	6.6	3.6	168	15.4	1	31
November	0.38	7.0	3.7	172	13.0	1	30
December	0.50	7.7	3.8	174	10.6	0	31

Monthly Averages - All Years (December 2010 – December 2016)

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.71	8.0	4.0	168	9.6	2
February	0.75	8.4	4.0	162	8.5	2
March	0.58	7.2	3.8	154	8.7	1
April	0.53	7.1	3.7	159	10.2	1
May	0.42	5.7	3.3	166	12.1	0
June	0.42	5.4	3.4	162	14.4	0
July	0.34	5.1	3.3	168	16.5	0
August	0.40	5.4	3.4	170	17.1	0
September	0.45	5.8	3.4	163	16.9	0
October	0.68	6.2	3.7	156	15.3	1
November	0.70	6.8	3.9	160	13.0	0
December	0.70	7.8	3.9	167	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)
03-Feb-2017 16:00	3.39	8.3	6.3	156	-0.51	HW +5	3.05	0.54	0.63
02-Feb-2017 10:30	3.12	7.1	5.6	169	2.32	HW	3.15	0.45	0.59
13-Feb-2017 21:30	2.57	8.3	5.3	118	1.92	HW +1	3.65	0.05	0.19
05-Jun-2017 18:30	2.56	6.7	5.1	170	0.96	HW +2	2.27	0.54	0.56

** Tidal information is obtained from the WaveRadar REX in Exmouth Marina. The surge shown is the residual at the time of the highest Hs. The maximum tidal surge is the largest 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)
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
2017	3.08	2.19	1.93	1.66	1.27	0.96	03-Feb-2017 16:00	3.39

*** 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 records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Weibull distribution.

Observation period	December 2010 to June 2017	
Return period (years)	**Significant wave height (m)**	**Comments**
0.25	3.14	No depth limitation
1	3.88	
2	4.19	
5	4.55	
10	4.80	Depth-limited at MLWS
20	5.03	
50	5.32	

Distribution plots

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

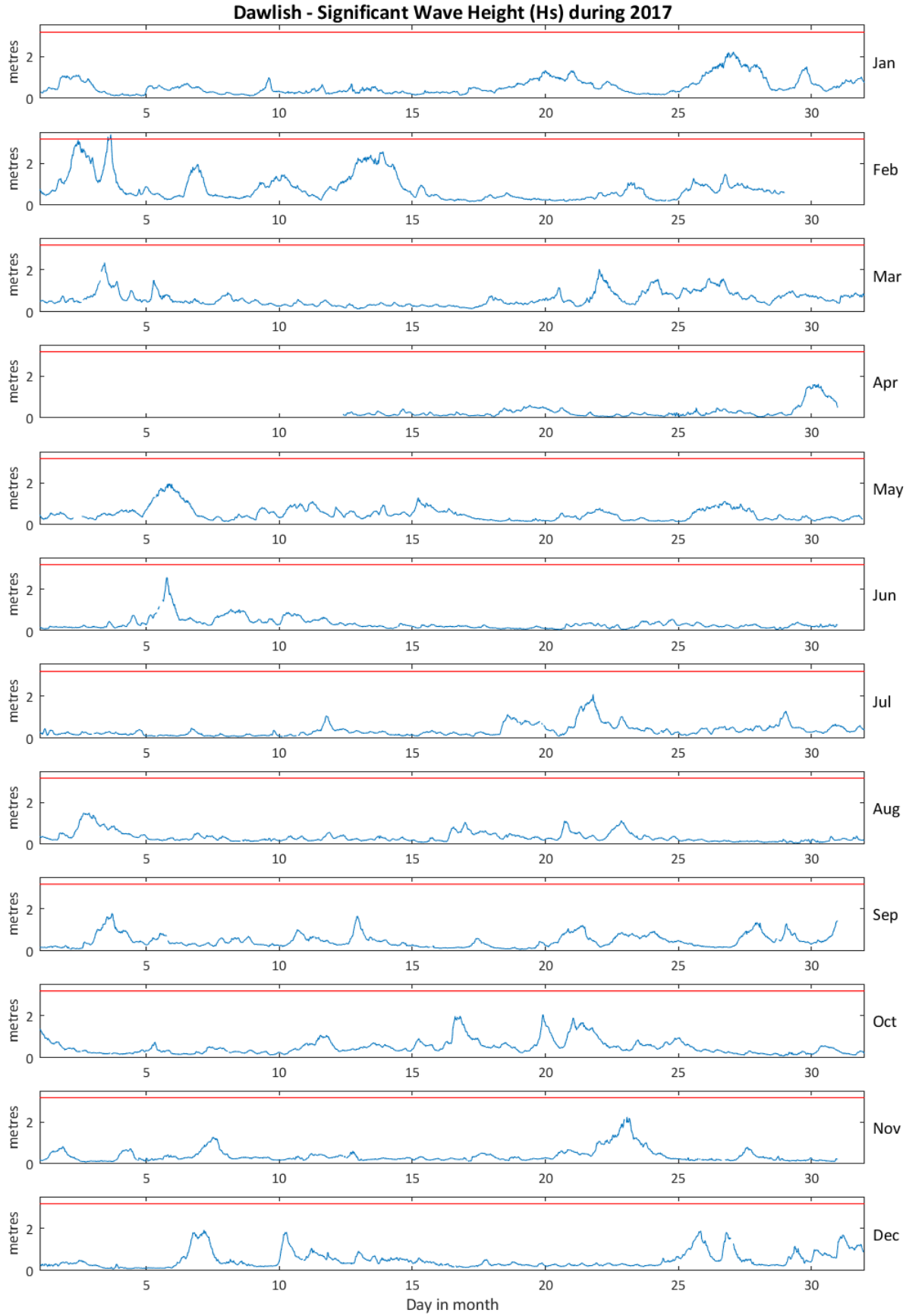
- Annual time series of H_s (red line is 3.14 m storm alert threshold)
- Incidence of storm waves for 2017. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, T_p, T_z and Direction for 2017
- Wave rose (percentage of occurrence of direction vs. H_s) for all measured data
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

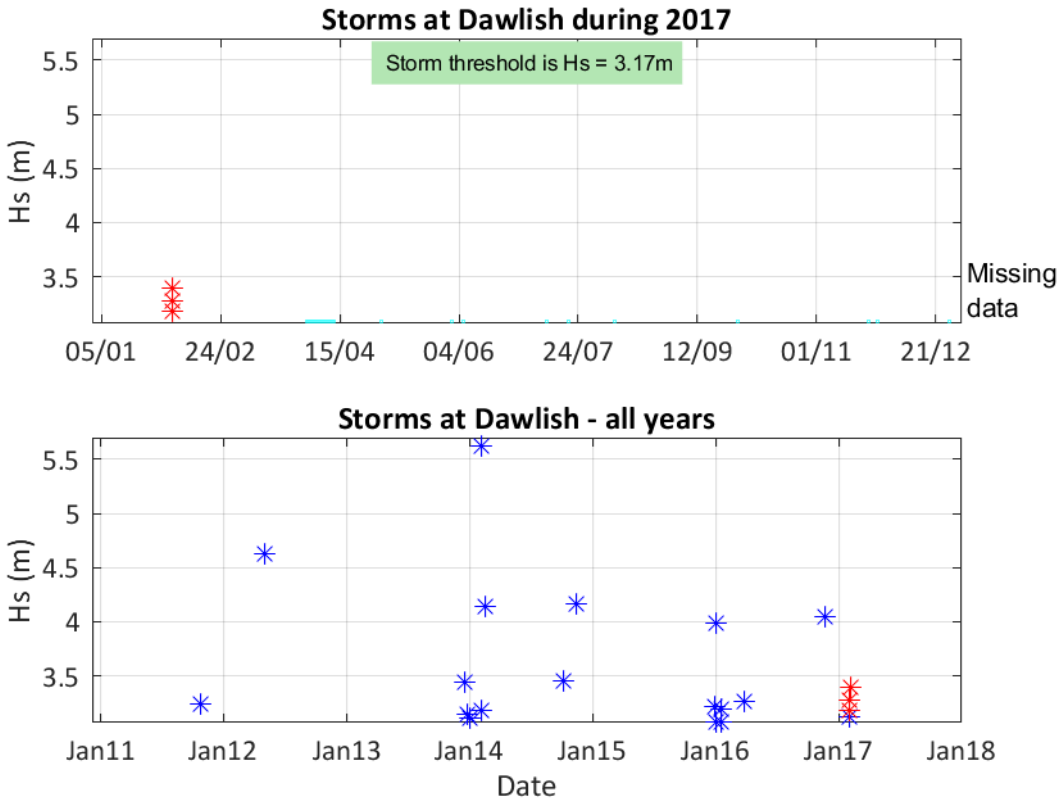
General

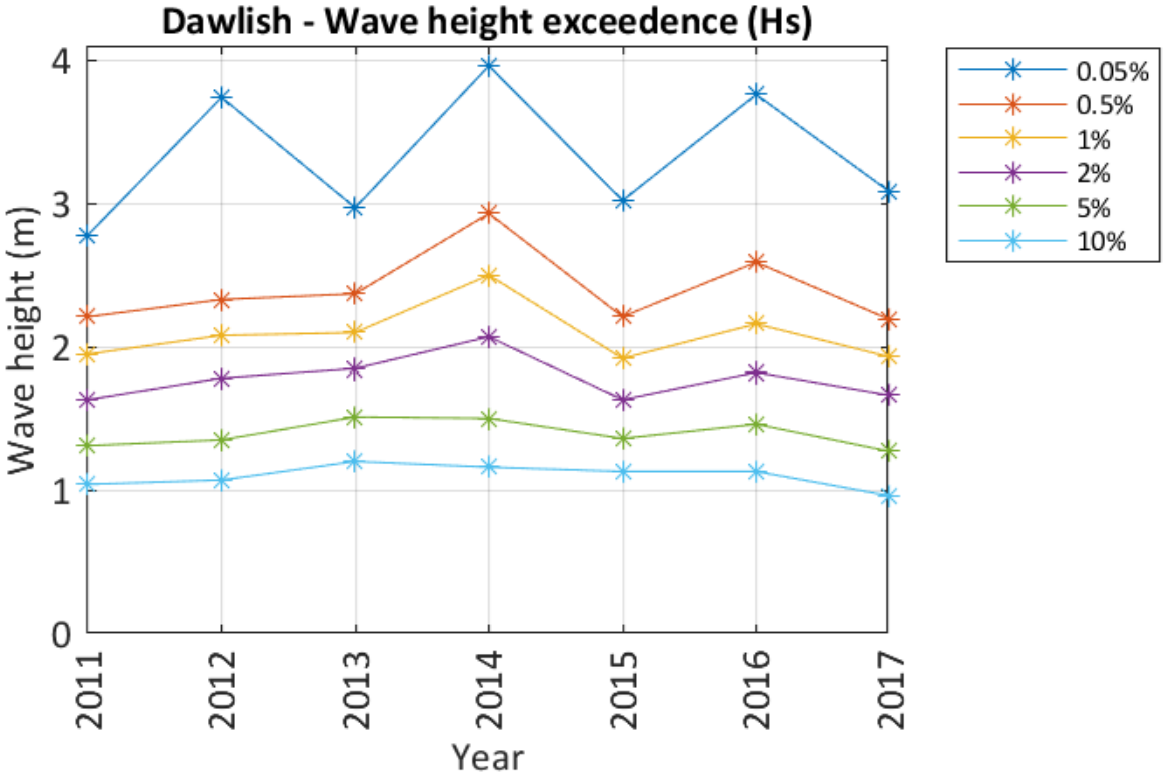
The wave buoy at Dawlish, owned by Teignbridge District Council, was deployed on 07 December 2010, at which time the magnetic declination at the site was 2.7° west, changing by 0.15° east per year.

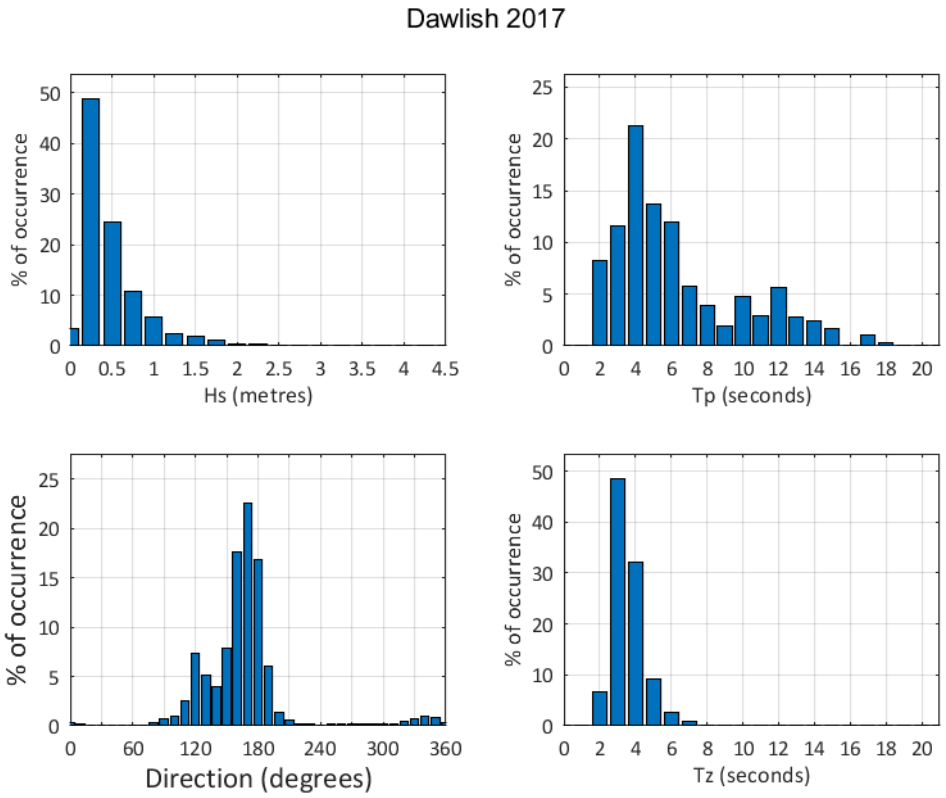
Acknowledgements

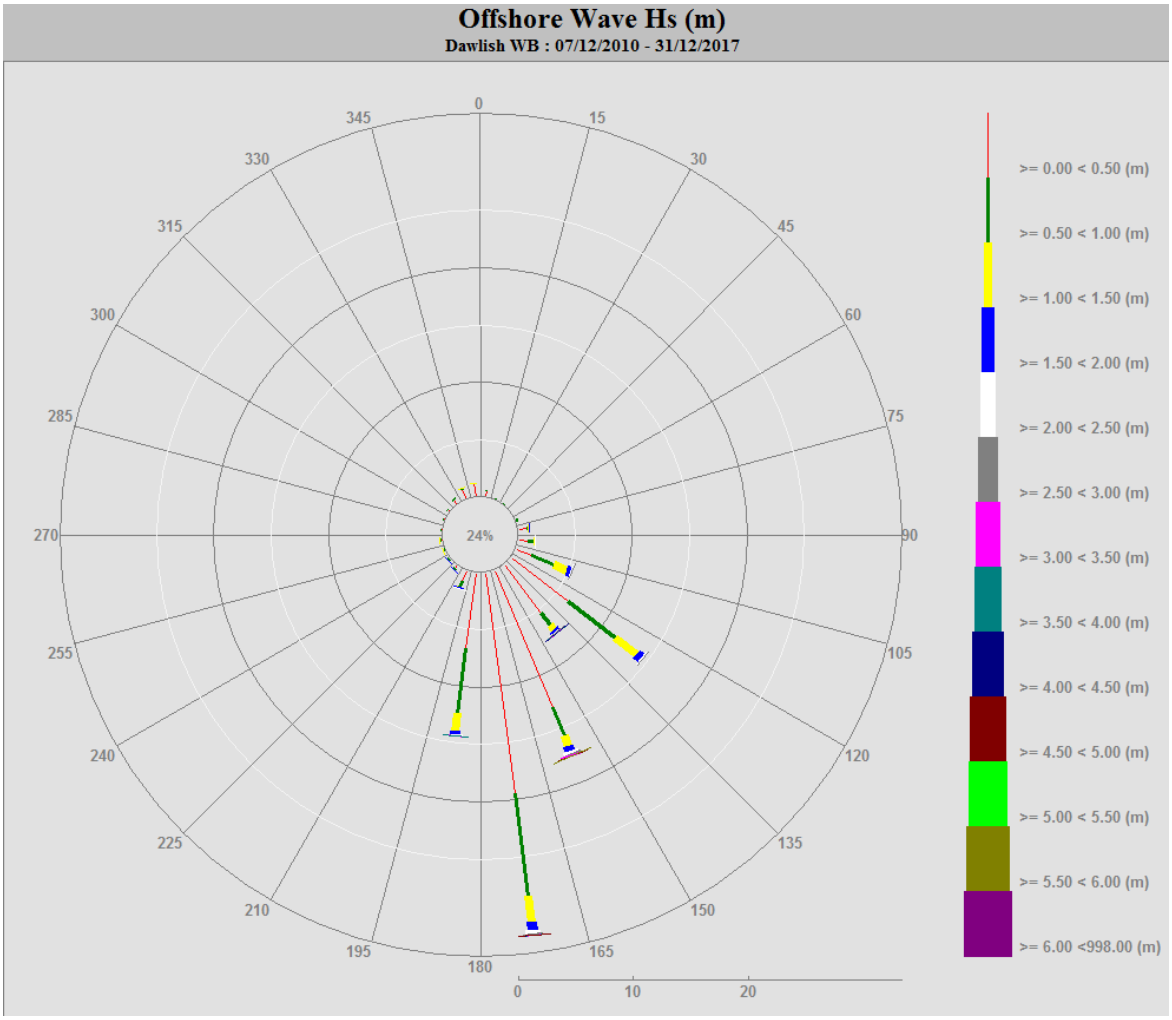
Tidal predictions were supplied by Fugro GB Marine Limited.


Dawlish - Significant Wave Height (Hs) during 2017
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
2
5
10
15
20
25
30
Day in month


Storms at Dawlish during 2017
Storm threshold is Hs = 3.17m
Hs (m)
5.5
5
4.5
4
3.5
Missing data
05/01
24/02
15/04
04/06
24/07
12/09
01/11
21/12
Storms at Dawlish - all years
Hs (m)
Jan11
Jan12
Jan13
Jan14
Jan15
Jan16
Jan17
Jan18
Date


Dawlish - Wave height exceedence (Hs)
Wave height (m)
0
1
2
3
4
2011
2012
2013
2014
2015
2016
2017
Year
0.05%
0.5%
1%
2%
5%
10%


Dawlish 2017
% of occurrence
Hs (metres)
Tp (seconds)
Direction (degrees)
Tz (seconds)


Offshore Wave Hs (m)
Dawlish WB : 07/12/2010 - 31/12/2017
24%
>= 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)

Dawlish 2010 to 2017 - Joint distribution (% of occurrence)