Pevensey Bay Directional Waverider Buoy

Location			
OS	570486 E 100959 N		
WGS84	*Latitude:* 50° 46.99' N *Longitude:* 00° 25.03' E		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~10m CD	Buoy in situ in Pevensey Bay. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

Data Quality

Recovery rate (%)	Sample interval
98	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	1.36	6.8	4.4	202	9.3	5	30
February	1.14	7.2	4.3	190	8.4	2	29
March	0.84	6.3	3.8	169	8.1	1	30
April	0.64	5.8	3.6	182	10.0	0	30
May	0.49	4.8	3.2	157	12.6	0	31
June	0.55	5.5	3.4	189	15.1	0	30
July	0.58	4.8	3.3	212	17.9	0	31
August	0.65	5.4	3.4	191	19.0	0	31
September	0.59	6.0	3.5	202	19.3	0	29
October	0.65	5.2	3.4	149	15.7	0	30
November	0.93	5.6	3.8	172	12.6	0	30
December	0.76	6.1	3.8	187	10.5	2	31

Monthly Averages - All Years (July 2003 – December 2015)

Month	H_s (m)	T_p (s)	T_z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.06	6.4	4.1	187	7.6	2
February	0.86	6.5	3.9	178	6.6	3
March	0.73	6.2	3.7	173	7.0	1
April	0.57	5.8	3.5	168	9.3	1
May	0.63	5.3	3.5	174	12.2	0
June	0.58	5.2	3.4	174	15.0	0
July	0.59	5.0	3.4	190	17.4	0
August	0.59	4.9	3.4	194	18.5	0
September	0.64	5.2	3.5	175	17.5	0
October	0.87	5.6	3.7	180	15.3	1
November	0.98	6.1	3.9	185	12.6	1
December	1.05	6.3	4.0	188	9.5	2

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 08:30	4.76	10.5	7.5	203	-1.20	HW +5	4.65	0.71	1.08
28-Mar-2016 04:00	4.55	10	6.9	197	1.84	HW +3	4.88	0.92	1.14
22-Nov-2016 03:00	3.94	8.3	6.3	203	1.58	HW -2	3.62	0.39	0.45
07-Feb-2016 23:30	3.68	8.3	6.3	214	2.86	HW	5.30	0.20	0.38
08-Feb-2016 13:30	3.46	9.1	6.3	225	1.51	HW +3	5.62	0.64	0.80
03-Jan-2016 14:30	3.32	7.1	5.6	177	0.26	HW -3	2.83	0.13	0.13

** Tidal information is obtained from the National Network gauge at Newhaven. 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)
2003	-	2.66	2.41	2.08	1.61	1.34	29-Nov-2003 13:00	3.45
2004	3.65	2.72	2.51	2.24	1.86	1.53	31-Oct-2004 17:00	3.92
2005	3.44	2.83	2.37	2.09	1.71	1.31	03-Dec-2005 00:00	3.55
2006	3.59	2.89	2.64	2.33	1.91	1.59	03-Dec-2006 09:30	4.10
2007	3.85	2.84	2.58	2.26	1.89	1.54	18-Jan-2007 12:00	4.23
2008	3.79	3.04	2.73	2.44	2.03	1.65	13-Dec-2008 12:00	3.97
2009	3.43	2.88	2.66	2.38	1.92	1.56	14-Nov-2009 17:30	3.61
2010	3.62	2.64	2.24	1.91	1.52	1.22	08-Nov-2010 12:00	4.13
2011	3.85	2.57	2.29	2.02	1.69	1.43	13-Dec-2011 01:30	4.42
2012	3.33	2.75	2.49	2.19	1.82	1.48	03-Jan-2012 13:00	3.51
2013	3.82	2.86	2.62	2.31	1.87	1.47	24-Dec-2013 03:30	4.79
2014	4.00	3.10	2.84	2.54	2.11	1.72	15-Feb-2014 02:30	4.26
2015	3.31	2.77	2.58	2.40	2.08	1.70	15-Jan-2015 05:00	3.95
2016	4.44	2.94	2.62	2.26	1.86	1.47	20-Nov-2016 08:30	4.76

*** i.e. 5 % of the H_s values measured in 2003 exceeded 1.61 m*

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 July 2003 – December 2016		
Return period (years)	**Significant wave height (m)**	**Comments**
1	4.6	Depth-limited at MLWS
2	4.7	
5	5.0	
10	5.1	
20	5.3	
50	5.5	Depth-limited at MHWS
100	5.7	

3-hourly records July 2003 – December 2016		
Return period (years)	**Significant wave height (m)**	**Comments**
1	4.0	No depth limitation
2	4.2	
5	4.4	Depth-limited at MLWS
10	4.6	
20	4.8	
50	5.0	
100	5.2	

Distribution plots

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

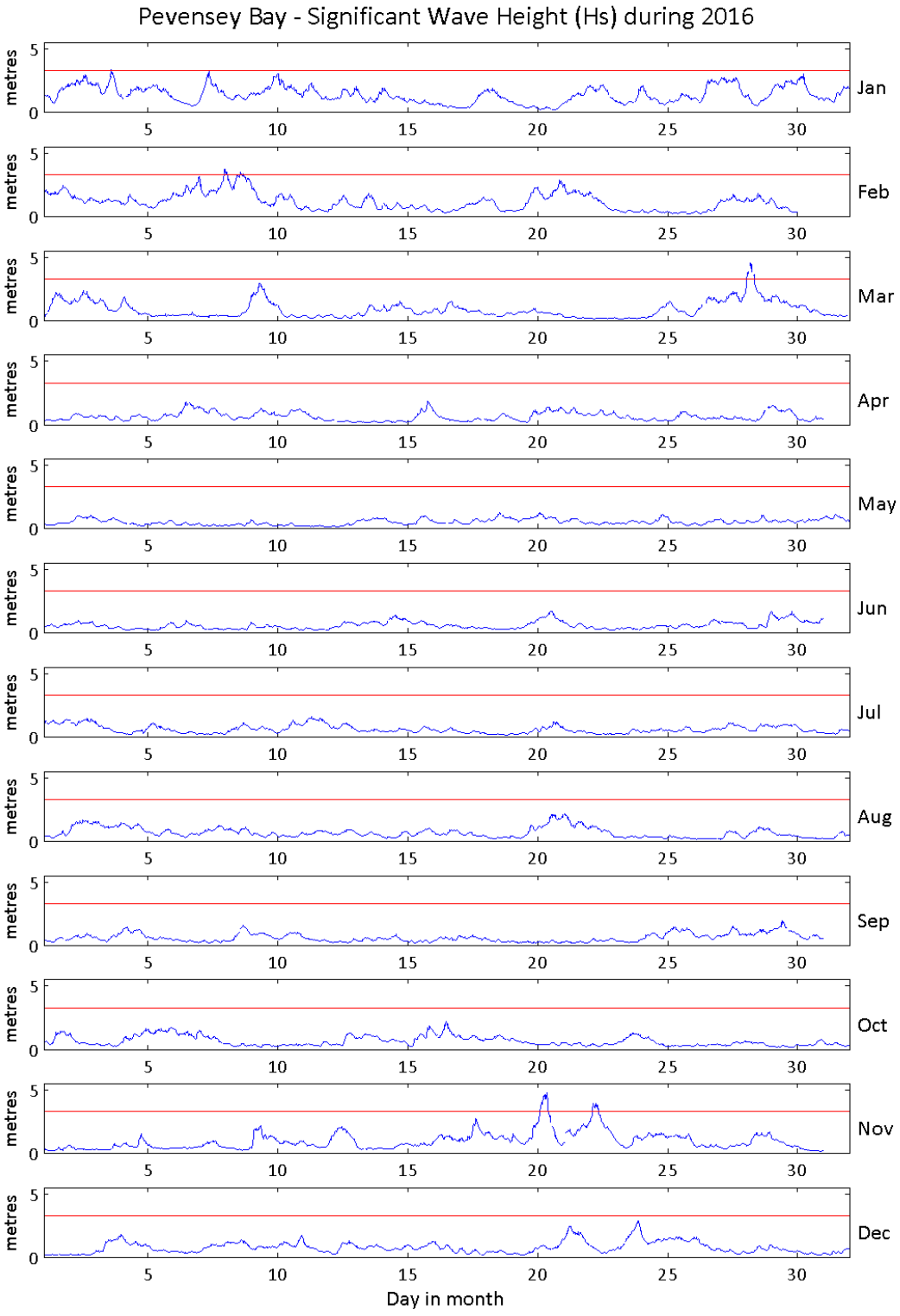
- Annual time series of H_s (red line is 3.25 m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, T_p, 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 from 01 April 2004

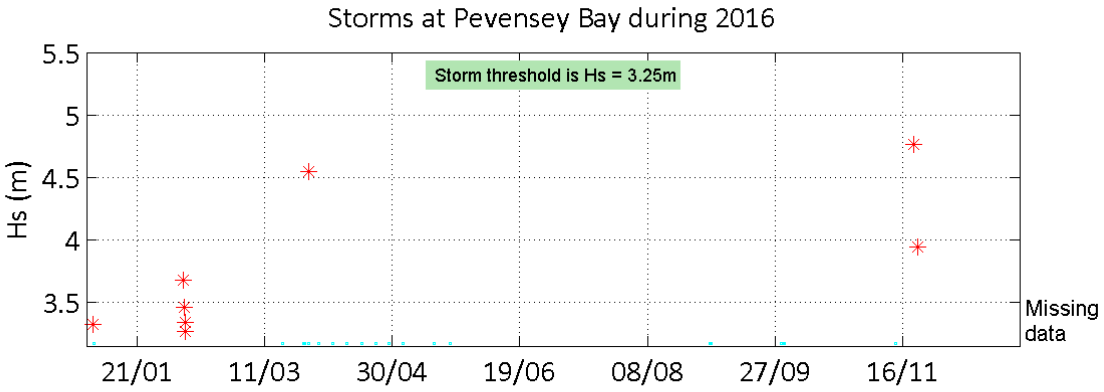
General

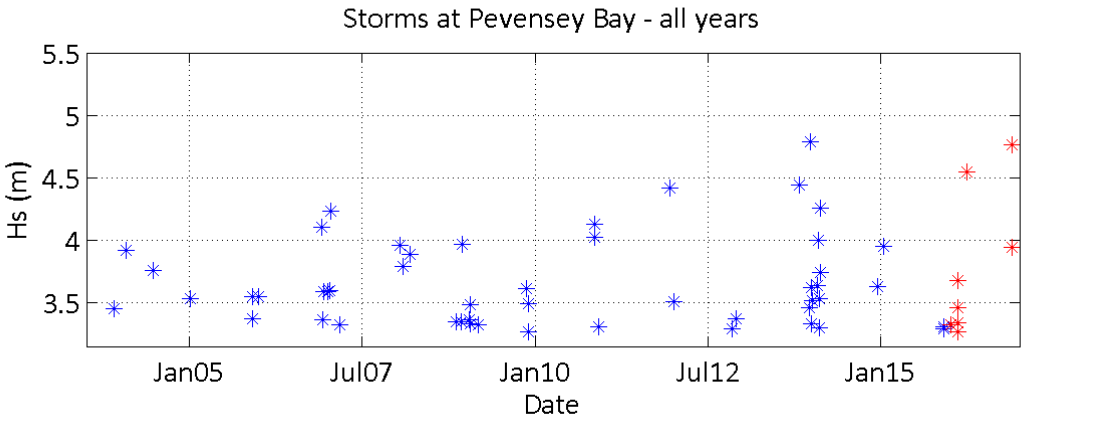
The buoy, owned by Canterbury City Council, was first deployed on 9 July 2003, at which time the magnetic declination at the site was 2.3° west, changing by 0.14° east per year.

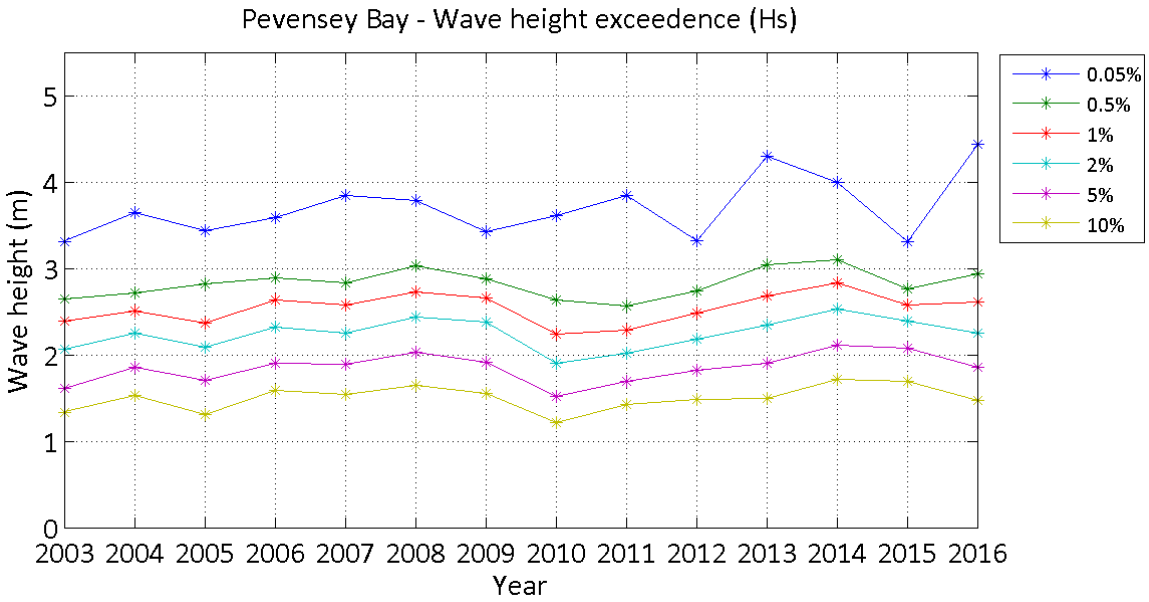
Acknowledgements

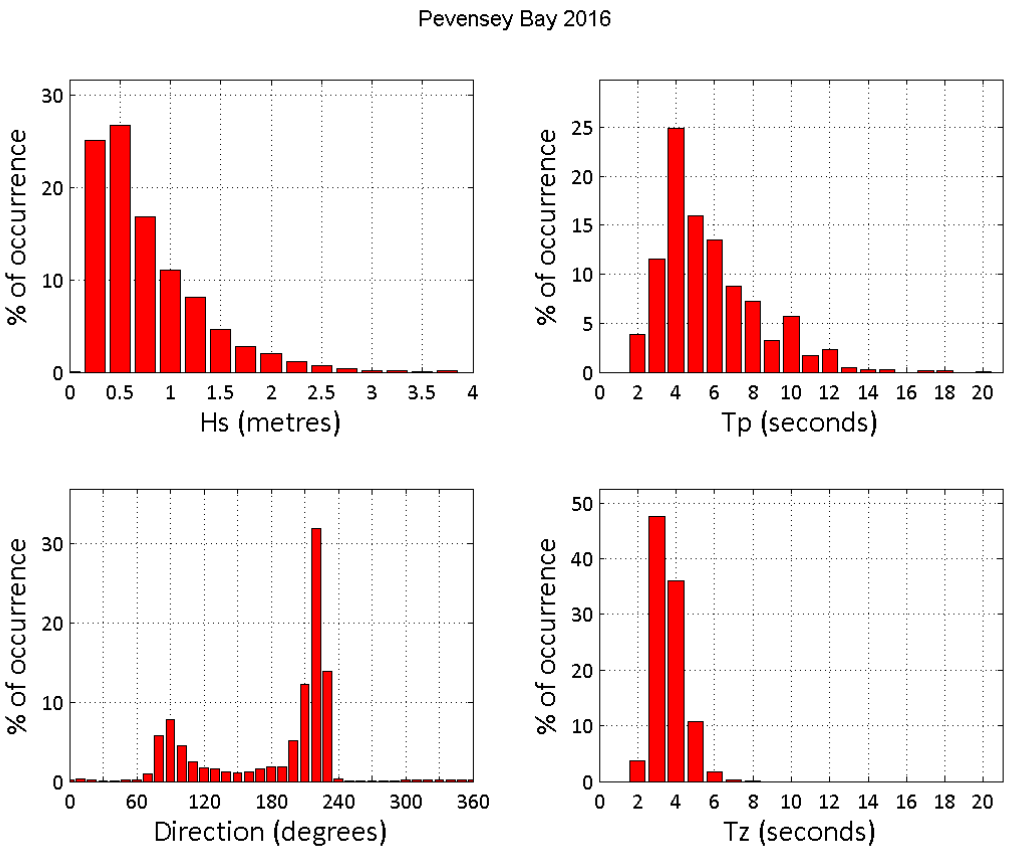
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

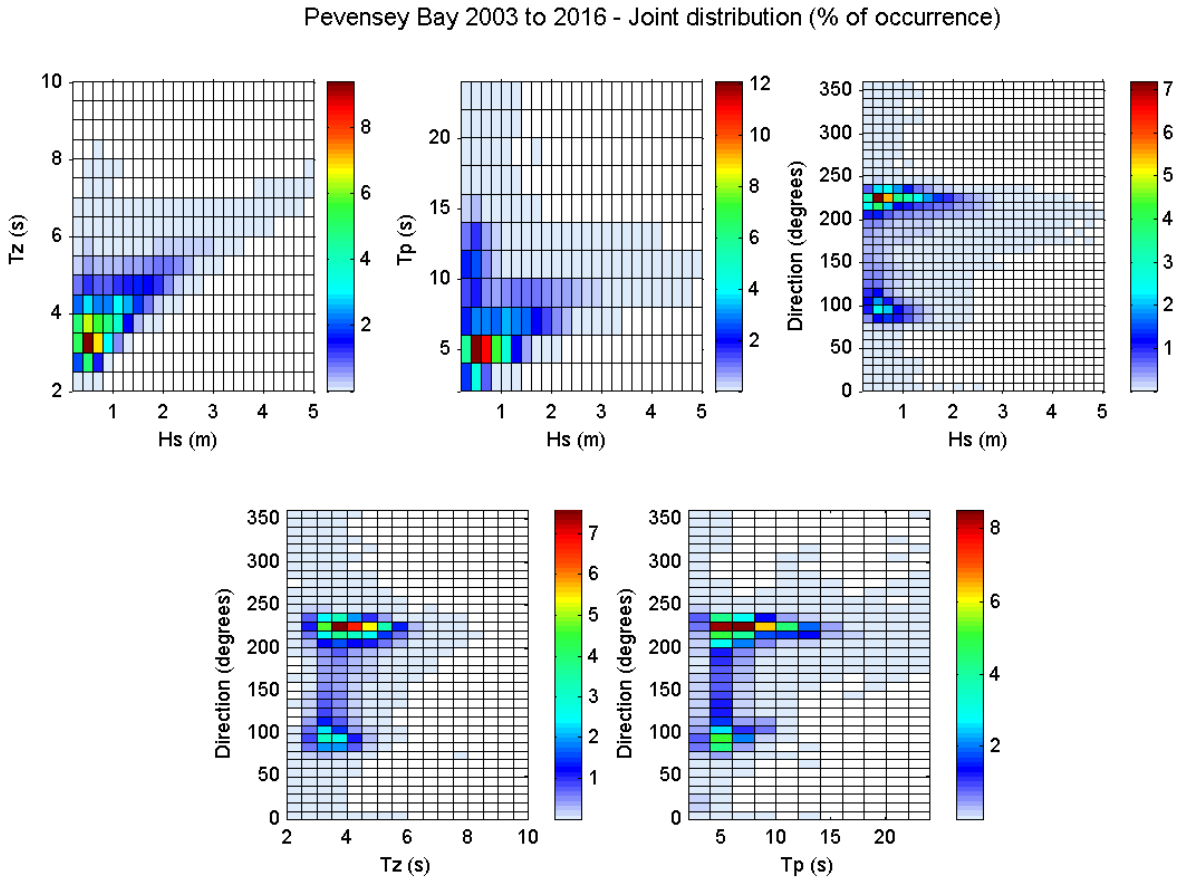

Pevensey Bay - Significant Wave Height (Hs) during 2016
metres
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
5
10
15
20
25
30
Day in month

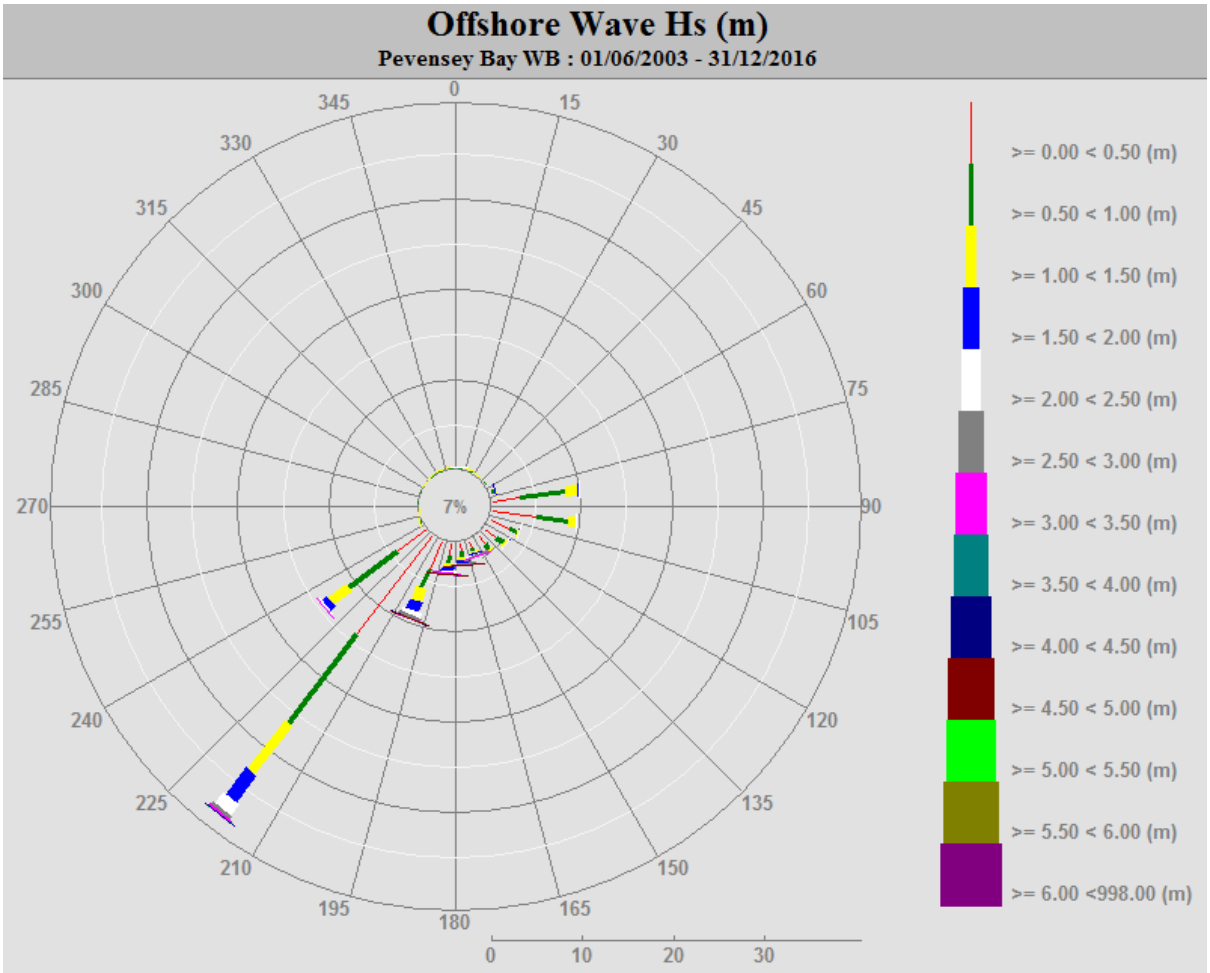

Storms at Pevensey Bay during 2016
Storm threshold is Hs = 3.25m
Hs (m)
5.5
5
4.5
4
3.5
Missing data
21/01
11/03
30/04
19/06
08/08
27/09
16/11


Storms at Pevensey Bay - all years
Hs (m)
5.5
5
4.5
4
3.5
Jan05
Jul07
Jan10
Jul12
Jan15
Date


Pevensey Bay - Wave height exceedence (Hs)
Wave height (m)
0
1
2
3
4
5
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Year
0.05%
0.5%
1%
2%
5%
10%


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


Pevensey Bay 2003 to 2016 - Joint distribution (% of occurrence)
Tz (s)
Hs (m)
Tp (s)
Direction (degrees)


Offshore Wave Hs (m)
Pevensey Bay WB : 01/06/2003 - 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
7%
0
10
20
30
>= 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)