



## Seaford Directional Waverider Buoy

<b>Location</b>			
OS	546458 E 98376 N		
WGS84	Latitude: 50° 45.99' N Longitude: 00° 04.53' E		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~11m CD	Buoy in situ off Seaford beach. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 TerraMetrics)

## Data Quality

<b>Recovery rate (%)</b>	<b>Sample interval</b>
99	30 minutes

## Monthly Averages - 2009

All times are GMT

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	1.08	8.6	4.4	192	6.2	5	31
February	0.59	8.2	4.0	208	6.2	2	28
March	0.76	7.1	3.9	216	7.6	0	31
April	0.45	8.0	4.1	214	10.0	0	29
May	0.75	6.3	3.7	207	13.0	1	31
June	0.41	5.7	3.4	204	15.7	0	30
July	0.88	5.7	3.7	231	18.3	0	31
August	0.68	5.2	3.6	230	19.0	0	29
September	0.54	5.6	3.6	201	17.2	0	30
October	0.76	6.3	3.8	204	15.3	1	31
November	1.85	6.9	4.8	221	12.6	2	28
December	0.99	7.0	4.2	209	9.0	3	31

## Monthly Averages - All Years (January 2008 – December 2019)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.06	7.1	4.3	209	7.9	2
February	0.92	7.8	4.2	206	6.9	3
March	0.76	7.2	4.0	207	7.6	1
April	0.56	7.0	3.8	207	9.7	0
May	0.54	6.1	3.6	210	12.5	0
June	0.57	5.8	3.6	212	15.5	0
July	0.62	5.3	3.5	223	17.9	0
August	0.71	5.3	3.6	227	18.8	0
September	0.70	5.9	3.7	214	17.6	0
October	0.87	6.2	3.9	208	15.2	1
November	1.09	6.5	4.2	207	12.3	1
December	1.17	6.7	4.3	214	9.5	3

## Storm Analysis

Date/Time	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	Water level elevation* (OD)	Tidal stage (hours re. HW)	Tidal range (m)	Tidal surge* (m)	Max. surge* (m)
14-Nov-2009 16:00:00	4.56	9.1	7.0	215	-1.73	HW	4.15	0.50	0.56
04-Mar-2009 00:00:00	4.19	8.3	6.5	197	-0.16	HW -3	3.92	0.28	0.31
18-Jan-2009 01:00:00	3.92	7.7	6.3	219	0.36	HW -2	4.33	0.37	0.56
22-Jan-2009 05:00:00	3.82	7.7	6.3	198	0.10	HW -4	2.69	0.24	0.28

\* Tidal information is obtained from the National Network gauge at Newhaven. The surge shown is the residual at the time of the highest H<sub>s</sub>. The maximum tidal surge is the largest surge during the storm event.

## Annual Statistics

Year	Annual H <sub>s</sub> exceedance** (m)						Annual Maximum H <sub>s</sub>	
	0.05%	0.5%	1%	2%	5%	10%	Date	A <sub>max</sub> (m)
2008	4.35	3.53	3.16	2.79	2.29	1.80	10-Mar-2008 07:30:00	4.83+
2009	3.89	3.28	3.00	2.73	2.23	1.80	14-Nov-2009 16:00:00	4.56+
2010	4.03	2.97	2.64	2.25	1.71	1.32	11-Nov-2010 10:00:00	4.67+
2011	4.21	2.99	2.72	2.46	2.04	1.74	13-Dec-2011 02:30:00	5.21+
2012	4.27	3.21	2.91	2.59	2.14	1.73	25-Nov-2012 05:30:00	4.39
2013	4.80	3.51	3.21	2.78	2.21	1.74	23-Dec-2013 23:30:00	5.42
2014	4.58	3.61	3.31	2.97	2.49	2.01	15-Feb-2014 00:30:00	5.24+
2015	4.04	3.40	3.18	2.87	2.49	2.08	15-Jan-2015 03:00:00	4.61+
2016	4.69	3.34	3.03	2.68	2.17	1.76	28-Mar-2016 04:00:00	5.57+
2017	4.00	3.22	2.96	2.61	2.15	1.74	10-Dec-2017 12:30:00	4.82
2018	3.73	3.07	2.89	2.64	2.10	1.66	10-Nov-2018 00:00:00	4.33
2019	4.18	3.21	2.97	2.75	2.31	1.93	02-Nov-2019 12:30:00	4.76+

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2008 exceeded 2.30 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 Generalised Pareto Distribution (GPD).

Observation period	January 2008 to December 2019	
Return period (years)	Significant wave height (m)	Comments
0.25	3.74	No depth limitation
1	4.43	
2	4.73	Depth-limited at MLWS
5	5.07	
10	5.29	
20	5.49	
50	5.73	
100	5.88	

## Distribution plots

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

- Annual time series of  $H_s$  (red line is 3.74 m storm threshold)
- Incidence of storm waves for 2009. 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 2009
- 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

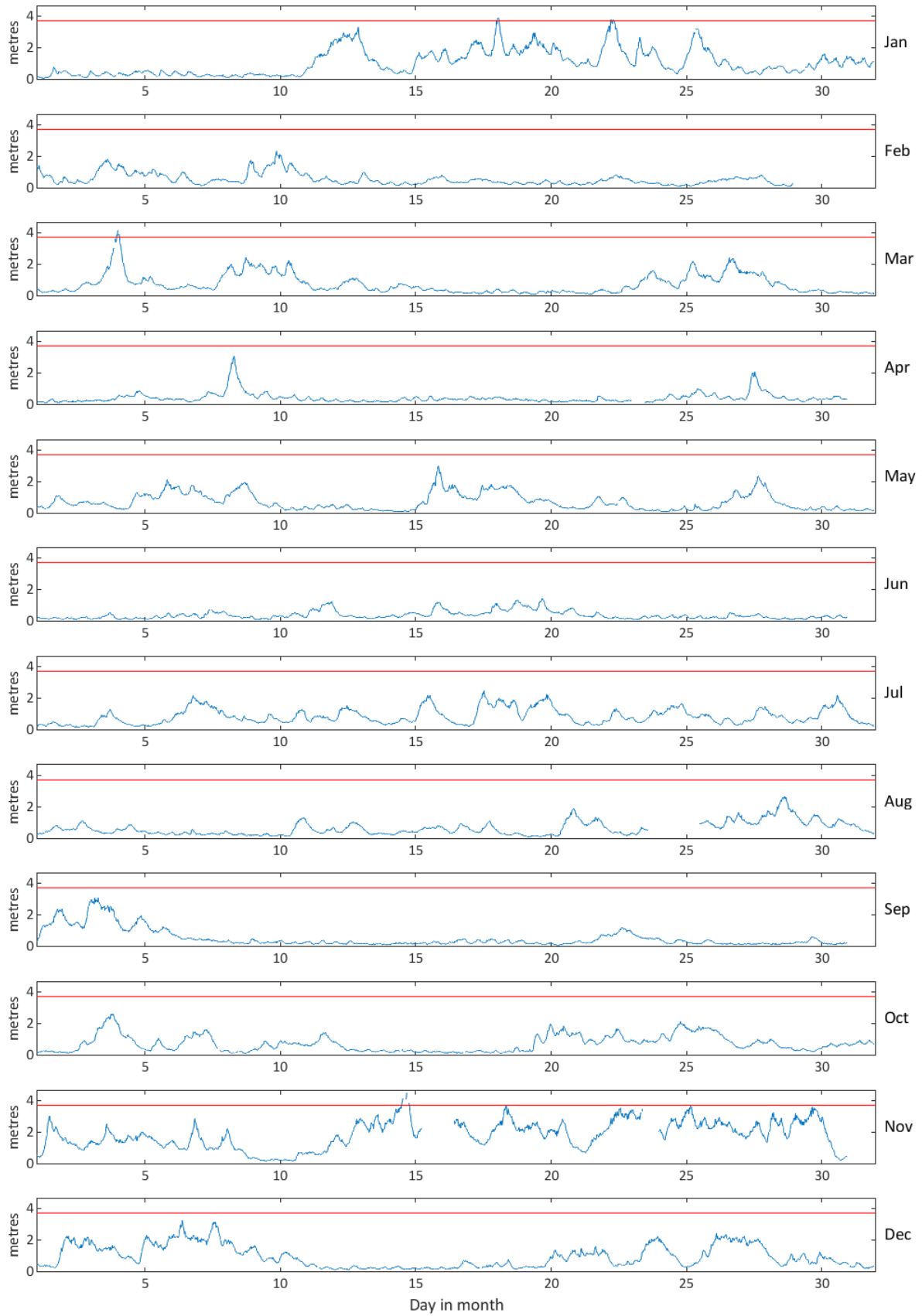
The buoy, owned by New Forest District Council, was first deployed on 22 January 2008, at which time the magnetic declination at the site was  $1.8^\circ$  west, changing by  $0.14^\circ$  east per year.

## Acknowledgements

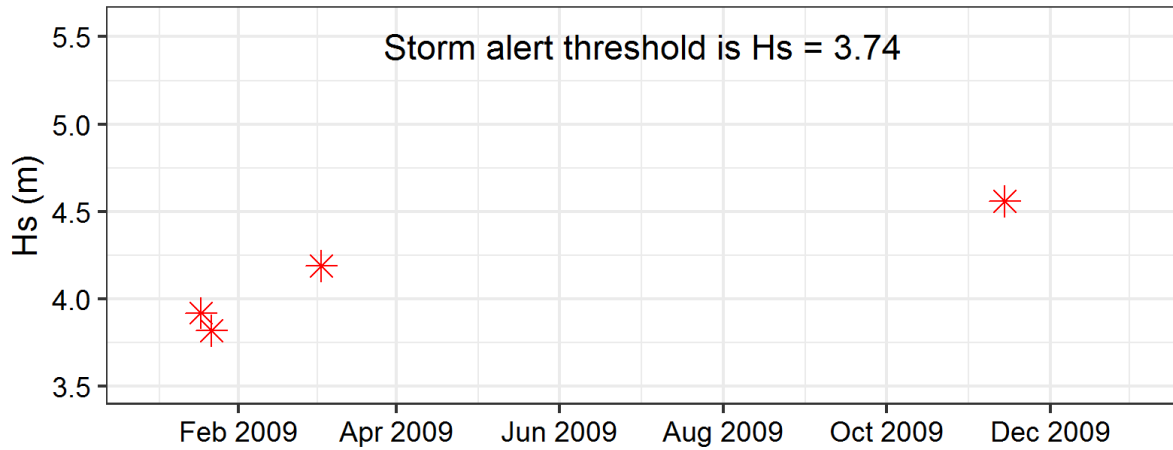
The shore station is kindly hosted by Newhaven Fort.

Tidal data at Newhaven were provided by the British Oceanographic Data Centre from the UK national tide gauge network, owned and operated by the Environment Agency.

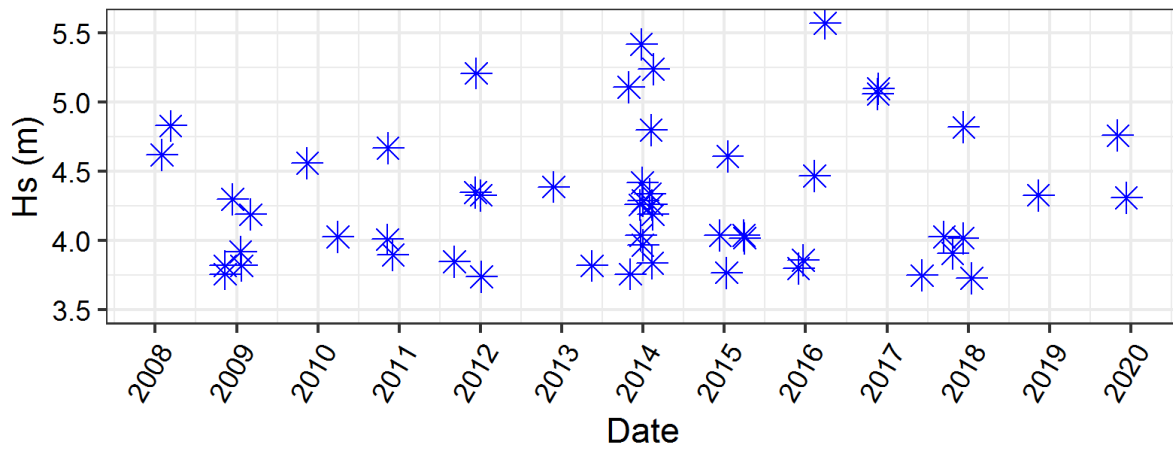
### Seaford - Significant Wave Height (Hs) during 2009



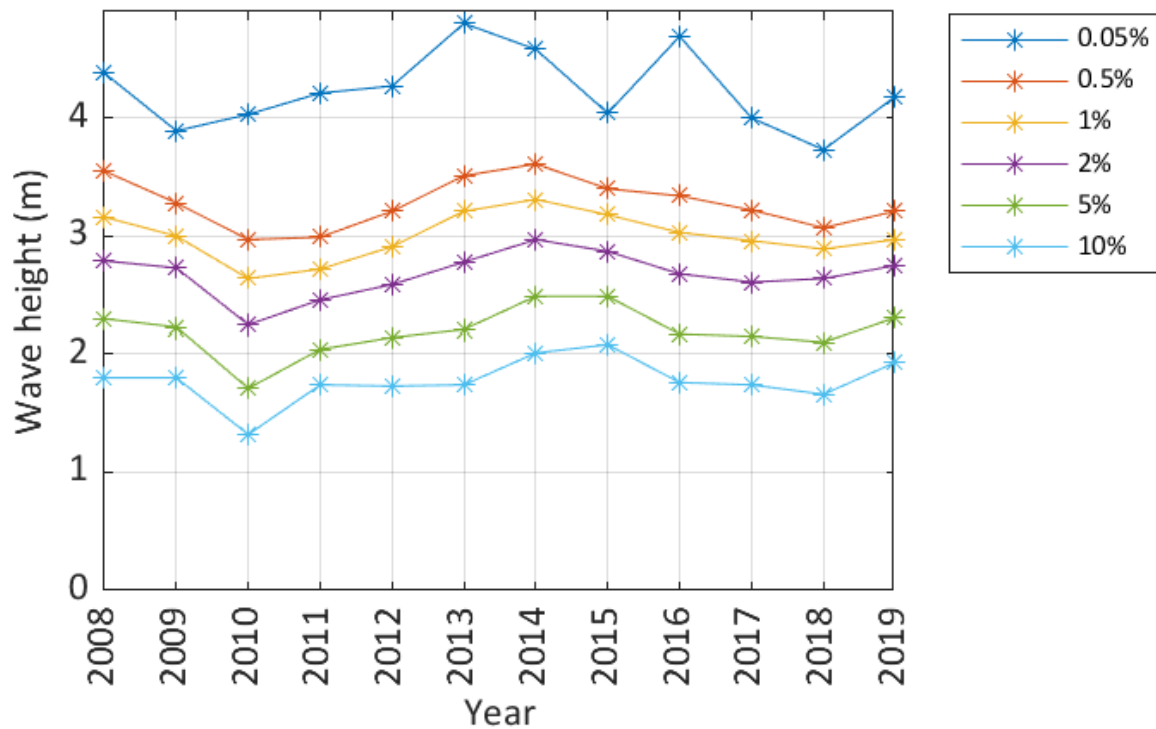
### Storms at Seaford during 2009



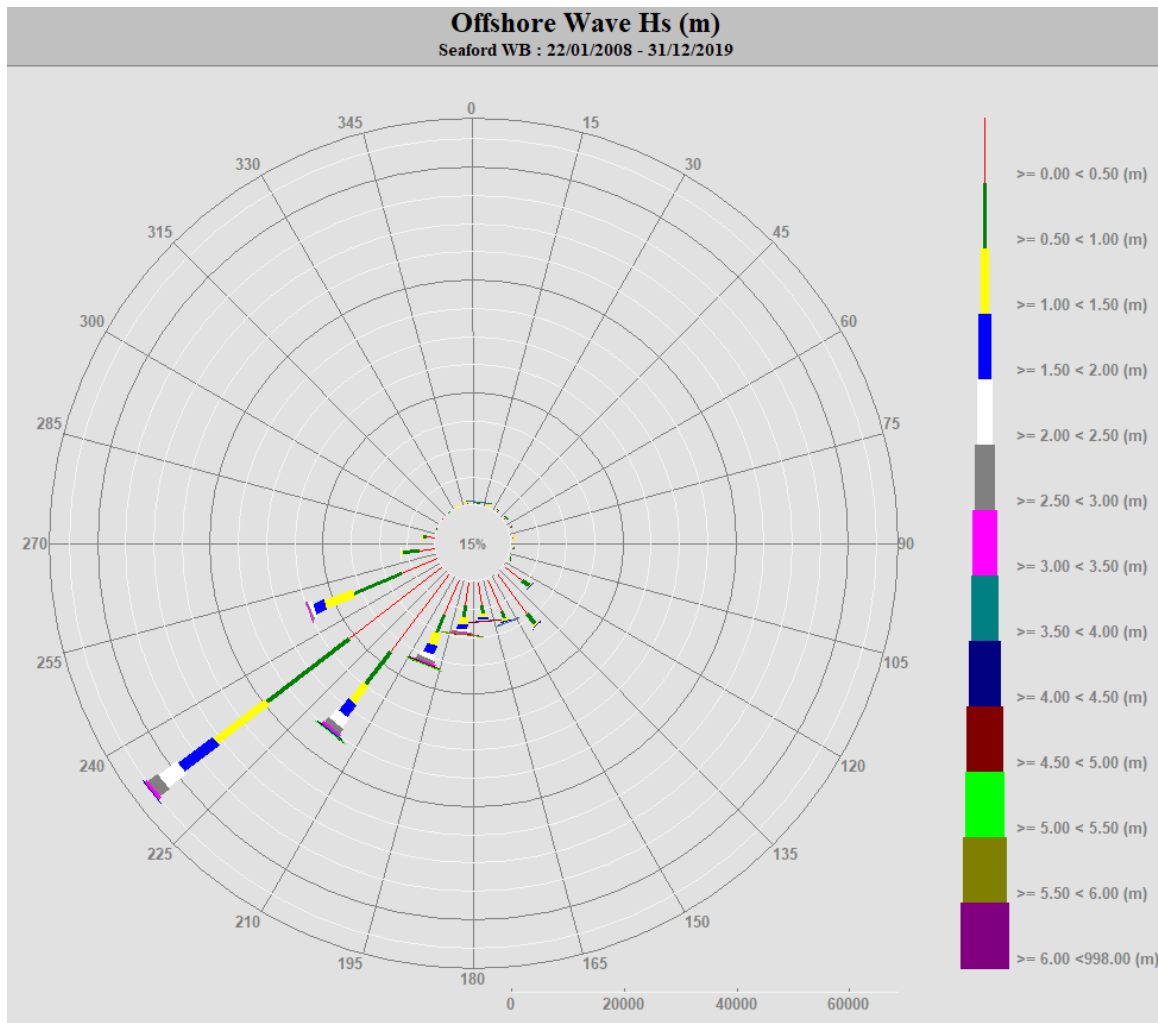
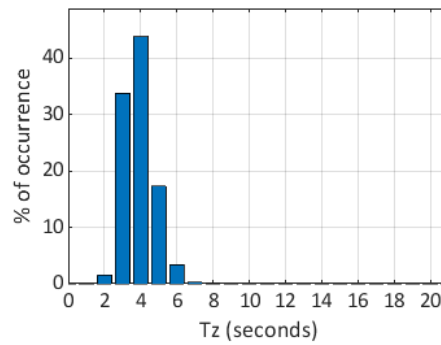
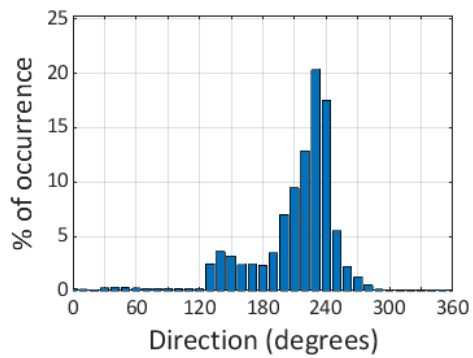
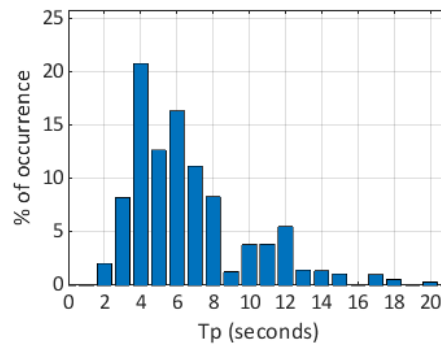
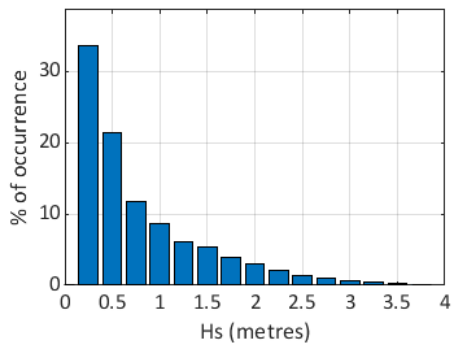
### Storms at Seaford - all years



### Seaford - Wave height exceedance ( $H_s$ )



Seaford 2009



Seaford 2008 to 2019 - Joint distribution (% of occurrence)

