



## Blakeney Overfalls Directional Waverider Buoy

<b>Location</b>			
OS	608075 E 355639 N		
WGS84	Latitude: 53° 03.45' N Longitude: 01° 06.21' E		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~23m CD	Example buoy in situ. Photo courtesy of Fugro Marine GB Limited	Location of buoy (Google mapping, image ©2019 Landsat / Copernicus)

## Data Quality

<b>Recovery rate (%)</b>	<b>Sample interval</b>
100	30 minutes

## Monthly Averages - 2007

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	1.26	6.1	4.1	201	7.4	-	31
February	0.95	6.8	4.2	109	6.5	-	28
March	1.10	7.0	4.1	140	7.3	-	31
April	0.79	7.1	4.0	94	9.0	-	30
May	0.83	5.9	3.8	120	11.4	-	31
June	0.79	6.4	4.0	97	13.4	-	30
July	0.80	5.6	3.8	165	15.4	-	31
August	0.85	5.4	3.7	162	16.5	-	31
September	1.15	6.5	4.2	148	15.8	-	30
October	0.73	6.3	3.7	124	13.7	-	31
November	1.41	7.6	4.4	137	10.7	-	30
December	1.03	5.7	3.9	167	8.0	-	31

## Monthly Averages - All Years (September 2006 – December 2019)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.09	6.4	4.1	156	6.1	-
February	0.99	6.5	4.1	139	5.4	-
March	0.93	6.8	4.0	137	6.2	-
April	0.83	6.2	3.9	122	8.2	-
May	0.86	5.7	3.9	129	10.8	-
June	0.74	5.7	3.8	123	13.5	-
July	0.68	5.2	3.6	146	16.0	-
August	0.71	5.1	3.5	167	17.0	-
September	0.85	5.6	3.8	155	15.8	-
October	1.00	6.2	4.0	140	13.5	-
November	1.09	6.2	4.0	151	10.5	-
December	1.04	6.1	3.9	170	7.6	-

## 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)
09-Nov-2007 04:30:00	4.69	11.1	6.7	357	2.42	HW	~2.61	0.73	~1.61
20-Mar-2007 17:30:00	4.00	7.7	6.3	1	2.05	HW -1	4.53	0.29	0.71
26-Sep-2007 19:00:00	3.59	9.1	6.3	14	2.25	HW	4.30	-	-
18-Jan-2007 16:30:00	3.54	6.7	5.4	294	~2.05	HW-2	3.46	~0.42	0.59
26-Jun-2007 02:30:00	3.53	8.3	5.8	4	1.57	HW -1	2.24	0.46	0.76
28-May-2007 02:00:00	3.44	8.3	6.0	48	1.00	HW -2	2.60	0.43	0.56
10-Dec-2007 18:00:00	3.31	8.3	5.7	359	1.85	HW -1	3.50	-	-
22-Aug-2007 10:00:00	3.30	8.3	5.7	24	0.05	HW -4	1.50	-	-

\* Tidal information is obtained from the National Network gauge at Cromer and/or estimated from the predicted tide levels (Admiralty Total Tide). The surge shown is the residual at the time of the highest H<sub>s</sub>. The maximum tidal surge is the large 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)
2006	2.56	2.34	2.18	1.88	1.52	1.34	12-Nov-2006 03:00:00	2.56
2007	4.16	3.20	3.01	2.69	2.22	1.83	09-Nov-2007 04:30:00	4.69
2008	3.67	3.16	2.85	2.48	1.97	1.64	01-Feb-2008 19:30:00	3.99
2009	4.56	3.10	2.86	2.49	1.87	1.53	17-Dec-2009 20:00:00	5.44
2010	4.04	3.35	3.11	2.82	2.35	1.87	01-Dec-2010 16:00:00	4.63
2011	2.79	2.44	2.31	2.13	1.83	1.55	07-Dec-2011 14:30:00	3.12
2012	3.71	3.13	2.82	2.46	1.98	1.59	29-Apr-2012 00:00:00	4.05
2013	3.86	3.46	3.17	2.87	2.23	1.76	10-Oct-2013 21:00:00	4.45
2014	3.14	2.57	2.27	1.98	1.68	1.44	13-Oct-2014 10:00:00	3.54
2015	3.79	2.77	2.53	2.21	1.76	1.51	21-Nov-2015 11:30:00	4.13
2016	4.15	2.91	2.67	2.40	1.96	1.63	14-Jan-2016 21:00:00	4.61
2017	3.89	3.09	2.77	2.57	2.15	1.78	13-Jan-2017 18:00:00	4.28
2018	3.55	3.00	2.72	2.24	1.82	1.53	20-Nov-2018 06:30:00	3.89
2019	4.05	3.03	2.76	2.40	1.93	1.59	27-Jan-2019 21:00:00	4.42

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2006 exceeded 1.52 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 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	September 2006 to December 2019	
Return period (years)	Significant wave height (m)	Comments
0.25	3.29	No depth limitation
1	4.00	
2	4.31	
5	4.66	
10	4.89	
20	5.10	
50	5.35	
100	5.51	

## Distribution plots

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

- Annual time series of  $H_s$  (red line is 3.29 m storm threshold)
- Incidence of storm waves for 2007. 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 2007
- 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

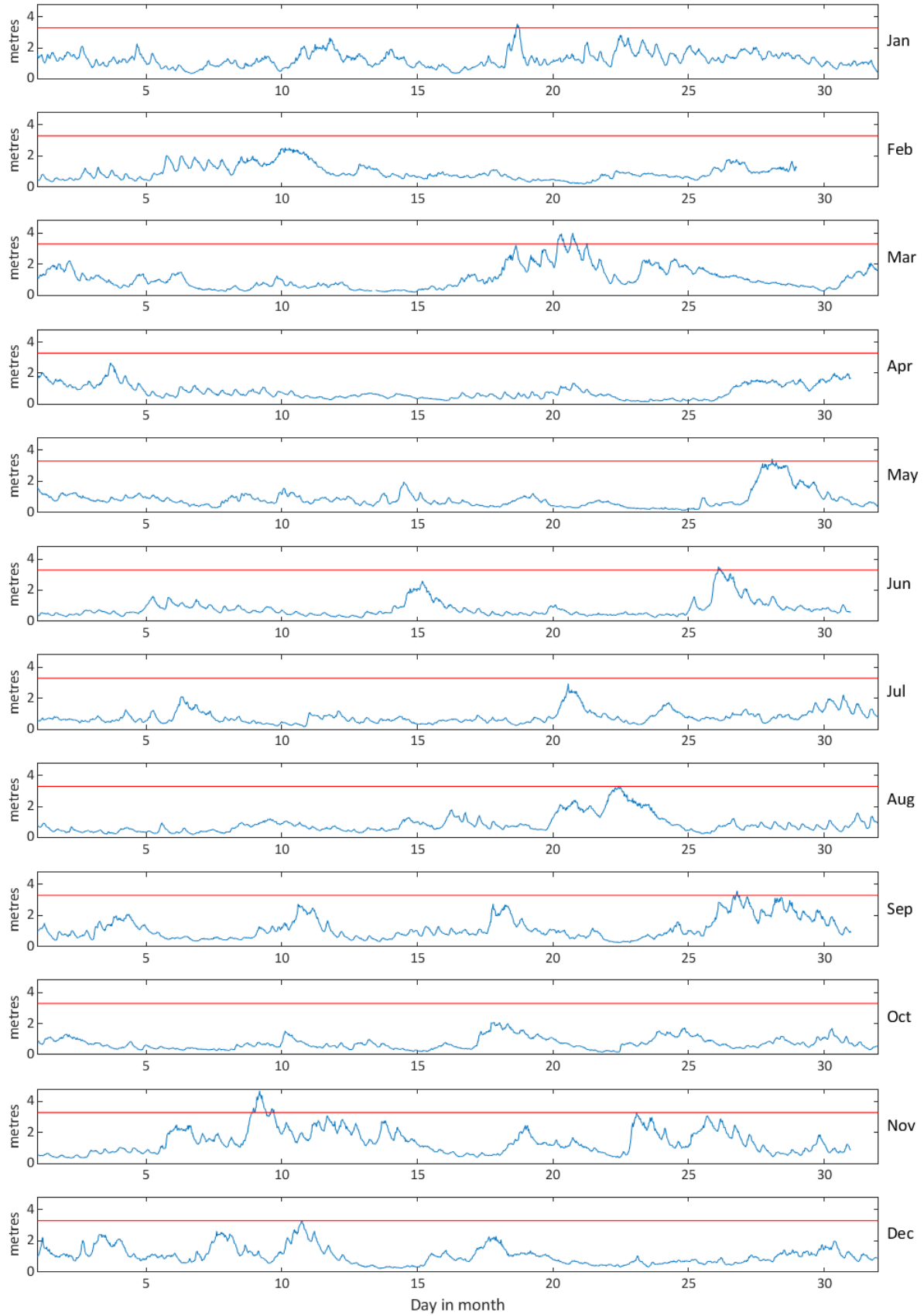
## General

The buoy, owned by the Environment Agency, was first deployed on 27 September 2006, at which time the magnetic declination at the site was 2.14° west, changing by 0.14° east per year.

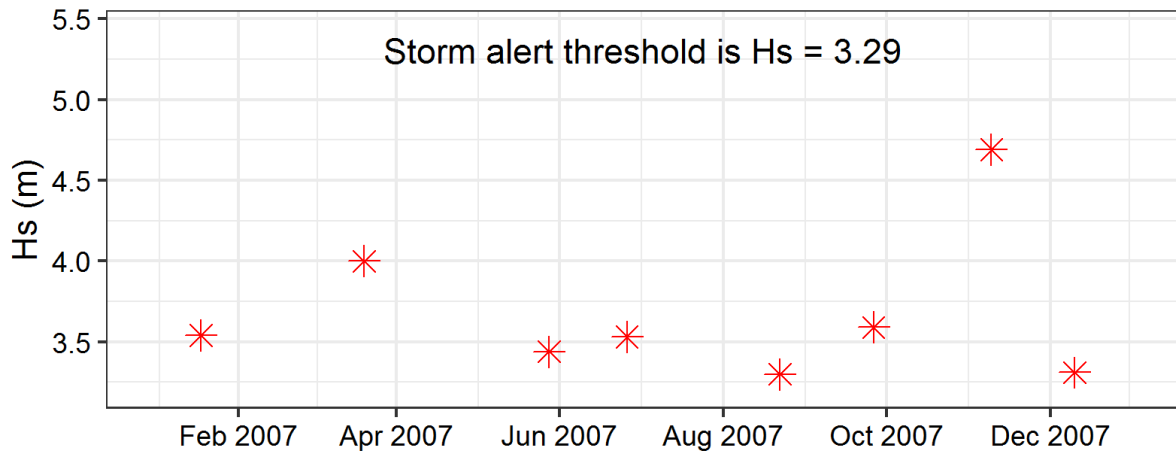
## Acknowledgements

The shore station is kindly hosted by Wells-Next-the-Sea RNLI Lifeboat Station.

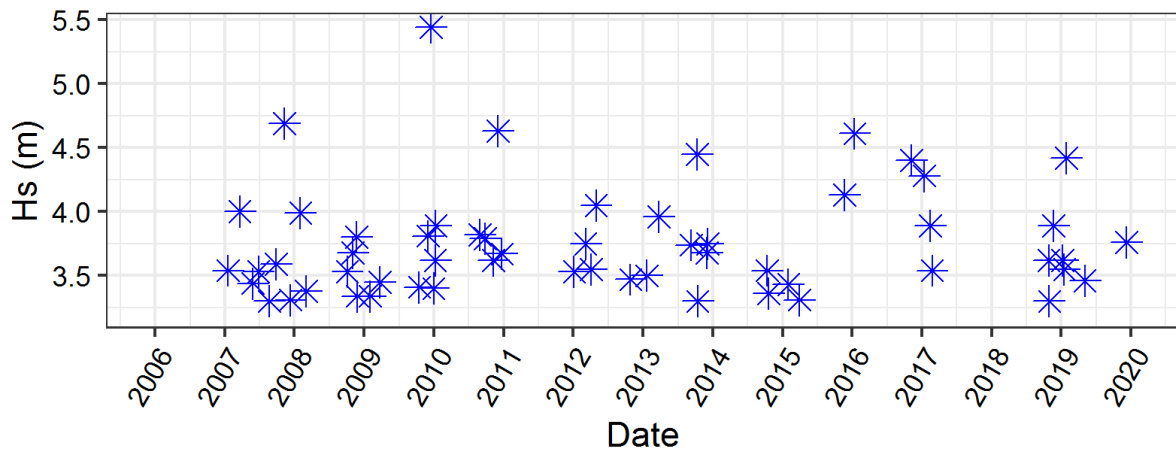
### Blakeney Overfalls - Significant Wave Height (Hs) during 2007



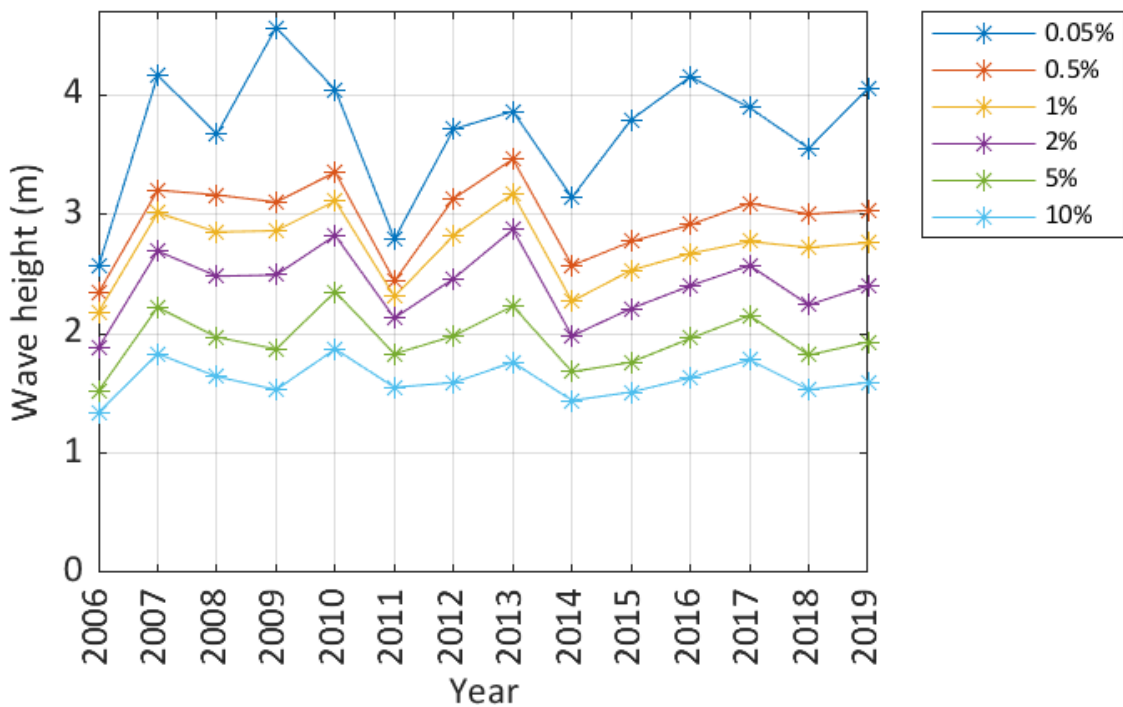
### Storms at Blakeney Overfalls during 2007



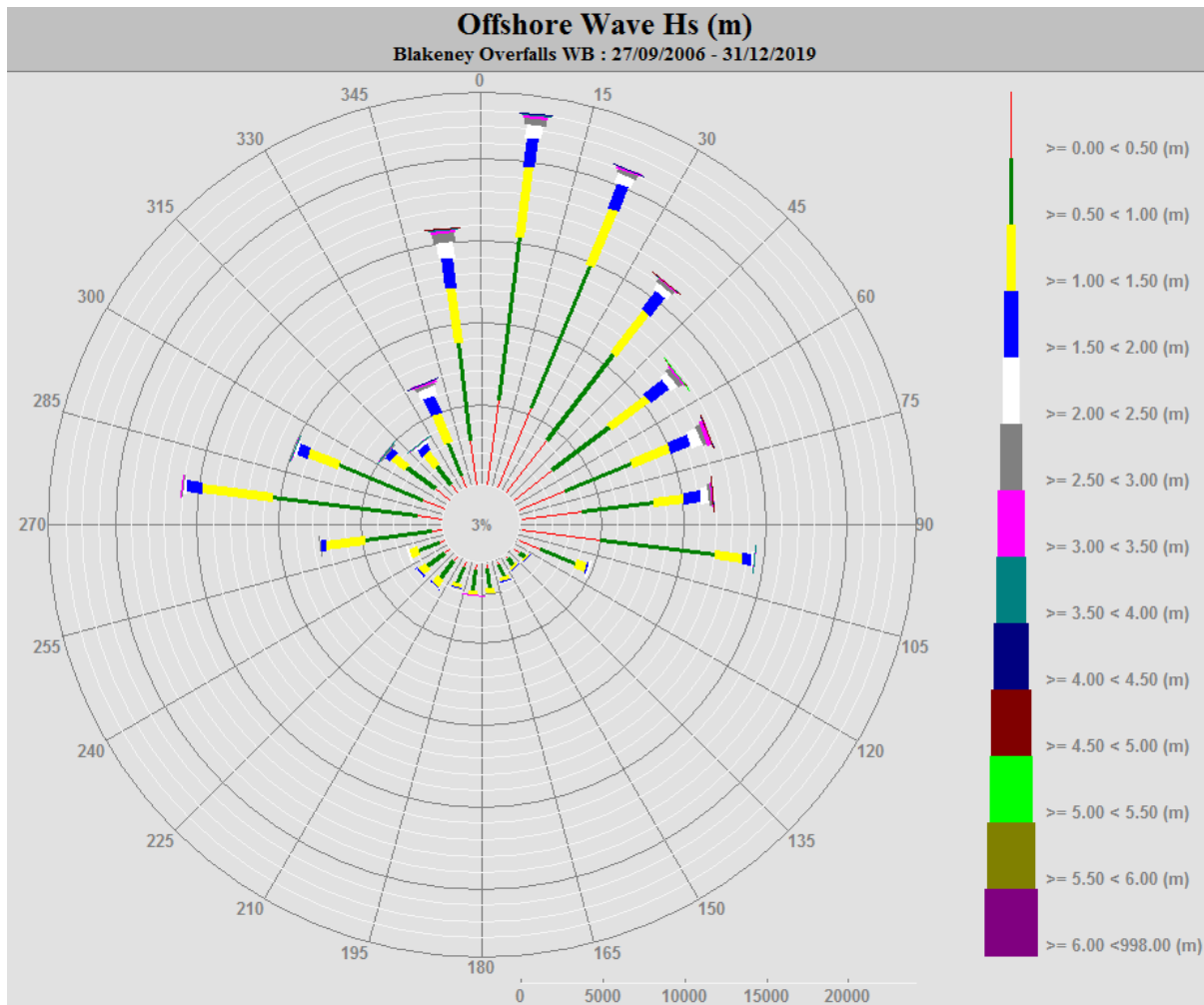
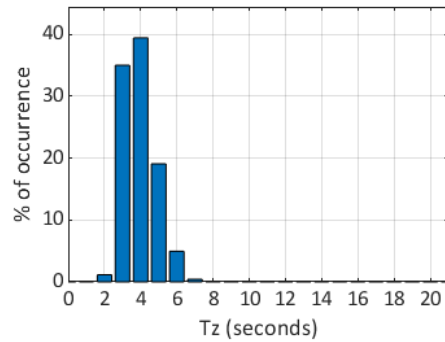
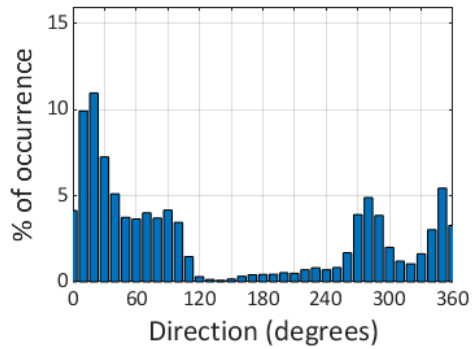
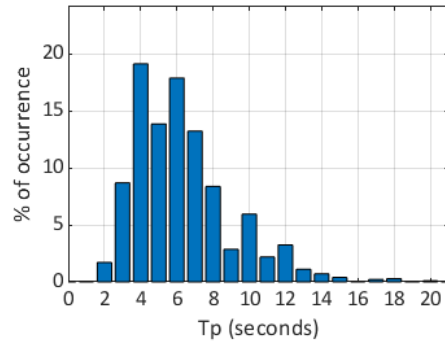
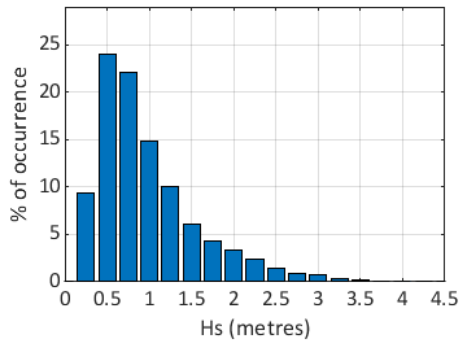
### Storms at Blakeney Overfalls - all years



### Blakeney Overfalls - Wave height exceedence ( $H_s$ )



### Blakeney Overfalls 2007



Blakeney Overfalls 2006 to 2019 - Joint distribution (% of occurrence)

