



Lowestoft Directional Waverider Buoy

Location			
OS	659378 E 293416 N		
WGS84	Latitude: 52° 28.62' N Longitude: 01° 49.09' E		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~20m CD	Example buoy in situ. Photo courtesy of Fugro Marine GB Limited	Location of buoy (Google mapping, image ©2019 Landsat / Copernicus)

Data Quality

Recovery rate (%)	Sample interval
96	30 minutes

Monthly Averages - 2019

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	0.86	6.4	4.1	89	6.2	-	30
February	0.70	5.6	3.8	131	5.3	-	27
March	0.81	6.2	4.0	115	7.0	-	29
April	0.85	5.4	3.9	84	8.9	-	27
May	0.65	5.5	3.9	84	11.7	-	27
June	0.69	4.7	3.6	114	15.3	0	29
July	0.60	5.3	3.7	100	17.7	0	31
August	0.67	5.1	3.7	133	19.0	-	30
September	0.79	5.6	3.9	108	17.2	0	29
October	1.01	5.7	4.1	116	14.2	0	30
November	1.10	6.5	4.4	96	10.0	1	30
December	0.96	5.6	4.1	139	7.5	1	30

Monthly Averages - All Years (April 2016 – December 2019)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.80	6.0	4.0	98	5.8	-
February	0.86	5.7	4.0	123	5.3	-
March	0.73	5.6	3.9	119	6.3	-
April	0.74	5.5	3.8	82	9.2	-
May	0.74	5.5	3.9	78	11.4	-
June	0.65	5.2	3.7	100	14.8	-
July	0.60	5.0	3.6	120	17.6	-
August	0.62	5.0	3.6	126	18.7	-
September	0.70	5.1	3.7	120	17.5	-
October	0.98	5.9	4.1	106	14.1	-
November	1.13	6.2	4.2	121	10.3	-
December	0.92	5.8	4.0	139	7.6	-

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)
10-Dec-2019 20:00:00	4.03	-	7.8	-	0.90	HW	1.60	-	-
12-Dec-2019 21:00:00	3.76	8.3	7	163	0.69	HW	1.55	-0.30	-0.09
02-Nov-2019 13:30:00	3.39	7.7	6.1	176	1.03	HW +1	1.63	0.09	0.19
12-Mar-2019 12:30:00	3.23	8.3	6.6	186	-0.17	HW -2	1.46	-0.87	-0.34
14-Nov-2019 11:30:00	2.98	7.7	5.9	143	0.92	HW +2	1.85	0.16	0.24

* Tidal information is obtained from the National Network gauge at Lowestoft and/or estimated from the predicted tide levels (Admiralty Total Tide). The surge shown is the residual at the time of the highest H_s. 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)
2016	3.36	2.59	2.22	2.00	1.60	1.26	20-Nov-2016 07:30:00	3.70
2017	3.52	2.72	2.56	2.28	1.95	1.62	27-Dec-2017 10:00:00	3.63
2018	3.68	3.00	2.72	2.33	1.86	1.39	15-Dec-2018 20:00:00	3.82
2019	3.39	2.48	2.28	2.06	1.74	1.45	10-Dec-2019 20:00:00	4.03

** i.e. 5 % of the H_s values measured in 2016 exceeded 1.60 m

Distribution plots

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

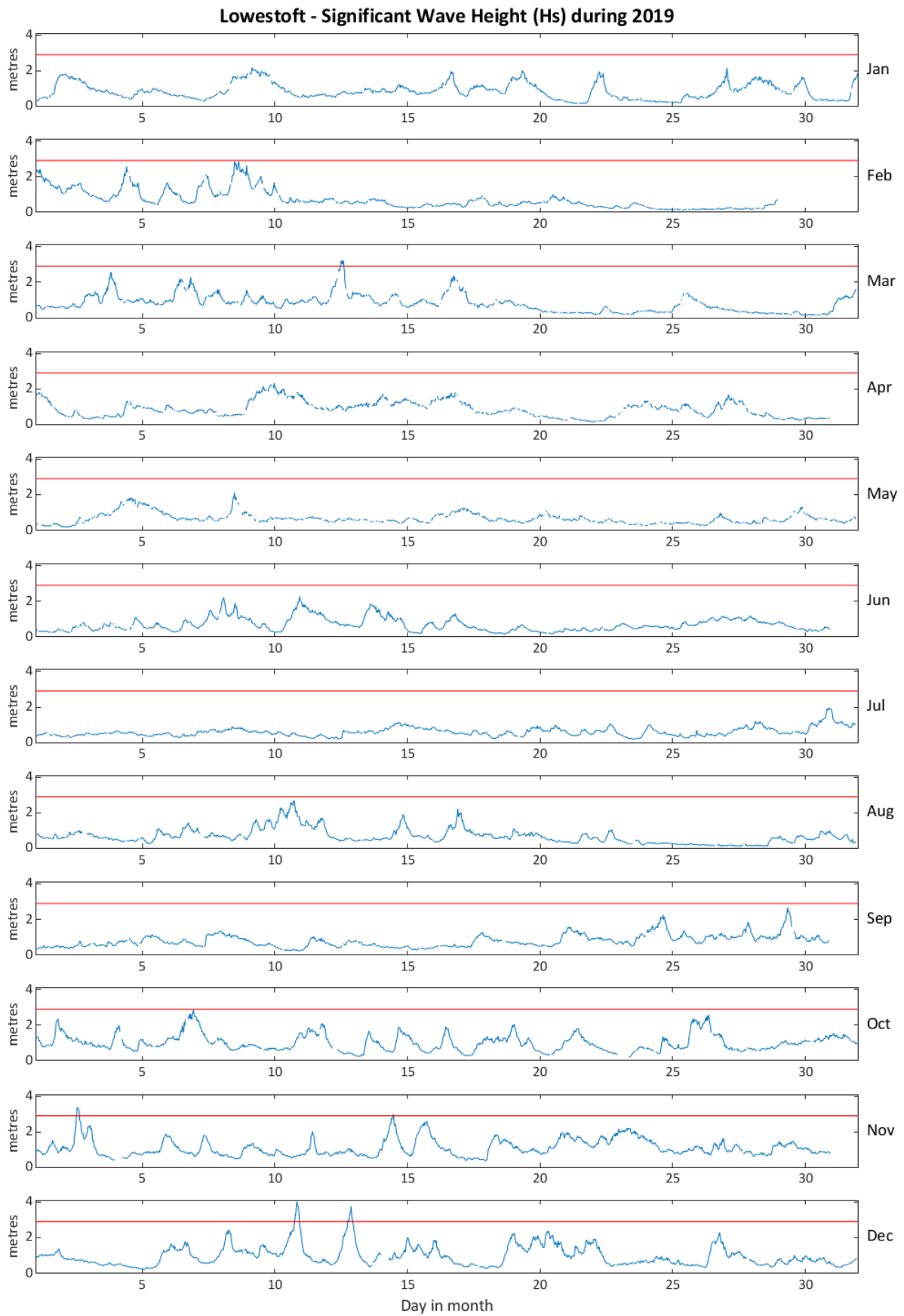
- Annual time series of H_s (red line is 2.90 m storm threshold)
- Incidence of storm waves for 2019. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, T_p, T_z and Direction for 2019
- 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

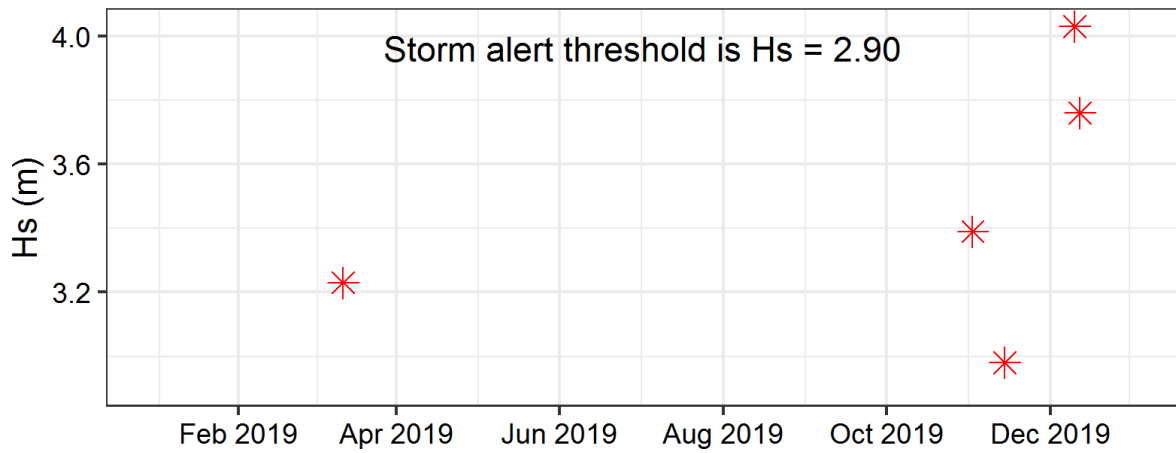
The buoy, owned by the Environment Agency, was first deployed on 20 April 2016, at which time the magnetic declination at the site was 0.23° west, changing by 0.18° east per year.

Acknowledgements

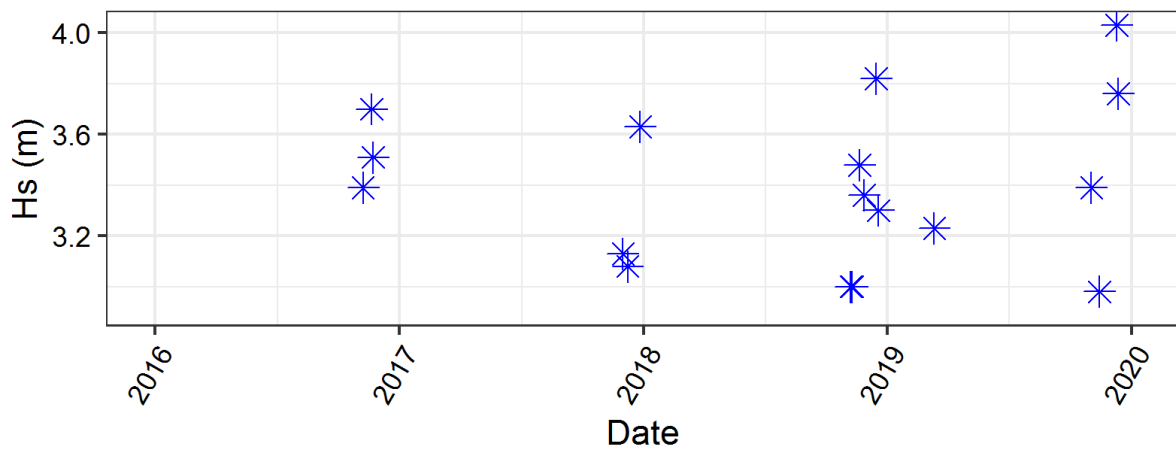
Tidal data at Lowestoft were provided by the British Oceanographic Data Centre from the UK national tide gauge network, owned and operated by the Environment Agency.



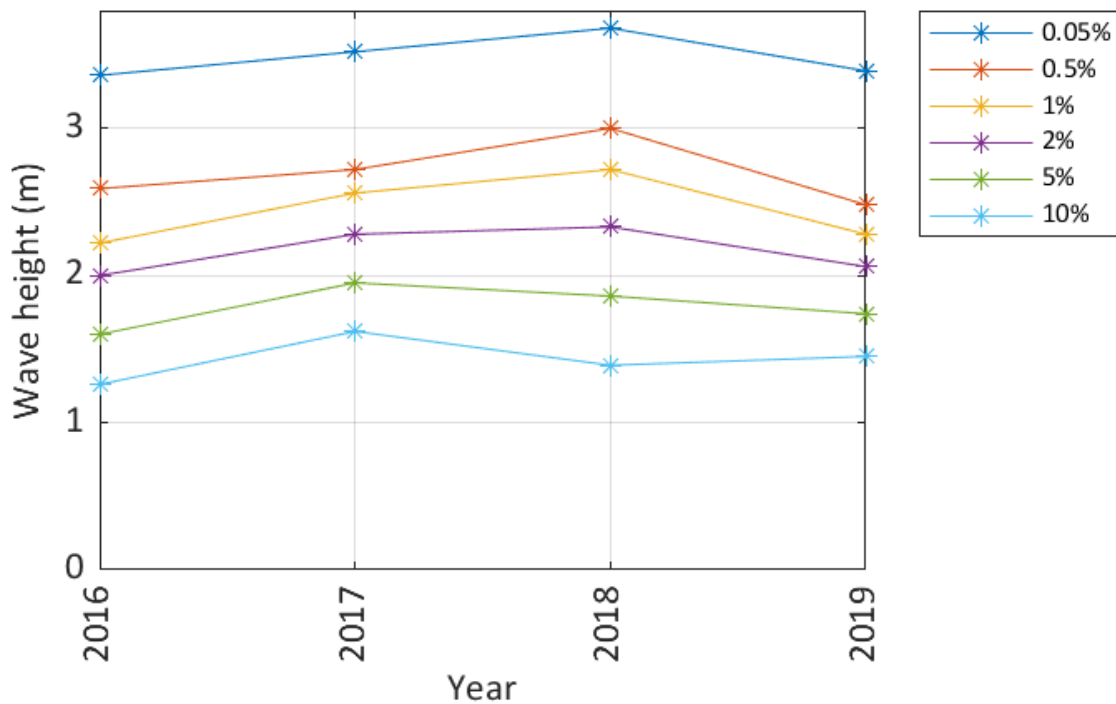
Storms at Lowestoft during 2019



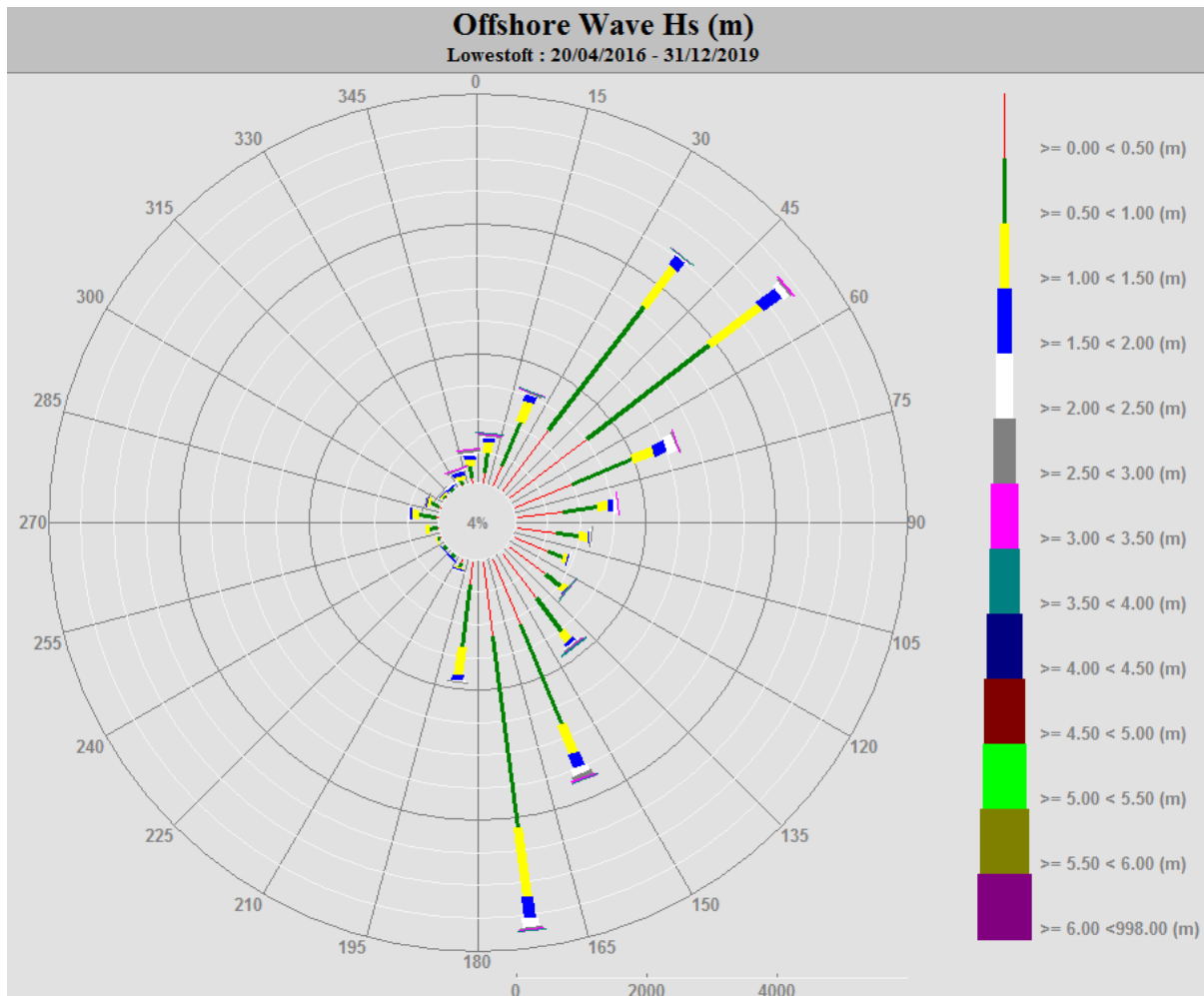
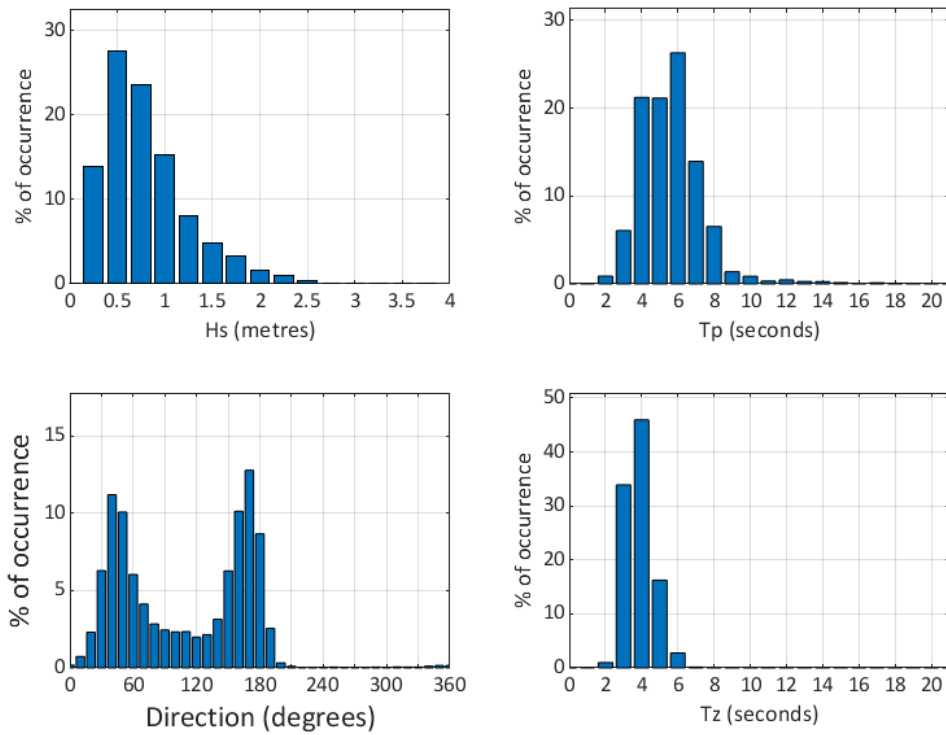
Storms at Lowestoft - all years



Lowestoft - Wave height exceedance (H_s)



Lowestoft 2019



Lowestoft 2016 to 2019 - Joint distribution (% of occurrence)

