



Scarborough Directional Waverider Buoy

Location			
OS	509598 E 489943 N		
WGS84	Latitude: 54° 17.60' N Longitude: 00° 19.06' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~19m CD	Buoy in situ off Scarborough beach. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 Infoterra Ltd & Bluesky)

Data Quality

Recovery rate (%)	Sample interval
90	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	1.33	10.1	5.1	87	7.4	7	31
February	1.41	7.9	4.7	95	6.6	5	28
March	0.94	8.6	4.9	102	7.1	6	15
April	1.55	8.8	5.4	58	8.6	7	10
May	0.88	6.7	4.3	77	9.6	1	31
June	0.67	7.2	4.2	106	11.5	2	30
July	0.64	5.8	4.0	110	13.1	0	31
August	0.62	7.0	4.1	123	13.7	1	30
September	0.84	6.3	4.0	121	13.2	0	30
October	1.08	8.2	4.6	140	12.6	3	31
November	1.55	9.7	5.4	115	10.7	11	30
December	1.43	10.0	5.2	92	7.7	12	31

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)
13-Jan-2017 14:30	6.76	12.5	8.7	1	2.14	HW -2	1.22	0.90	1.22
04-Jan-2017 18:00	5.01	10.5	7.7	16	1.34	HW -2	3.24	0.12	0.37
12-Feb-2017 05:30	4.90	10.0	7.4	55	2.44	HW	4.49	0.07	0.26
08-Dec-2017 18:30	4.76	10.5	8.0	3	2.23	HW -2	3.82	0.17	0.51
23-Feb-2017 19:30	4.48	10.0	7.3	4	-0.54	HW +5	2.89	0.56	0.64

* Tidal information is obtained from the tide gauge at Scarborough. 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)
2013	-	4.93	4.46	3.76	2.89	2.12	10-Oct-2013 20:30	6.03
2014	3.91	3.16	2.95	2.63	2.22	1.84	14-Oct-2014 04:30	4.45
2015	6.17	4.35	3.57	3.12	2.31	1.81	21-Nov-2015 07:00	6.70
2016	4.46	3.96	3.56	2.99	2.44	2.08	06-Jan-2016 03:00	4.98
2017	6.02	4.30	3.91	3.45	2.84	2.20	13-Jan-2017 14:30	6.76 ⁺

** i.e. 5 % of the H_s values measured in 2013 exceeded 2.89 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.

Distribution plots

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

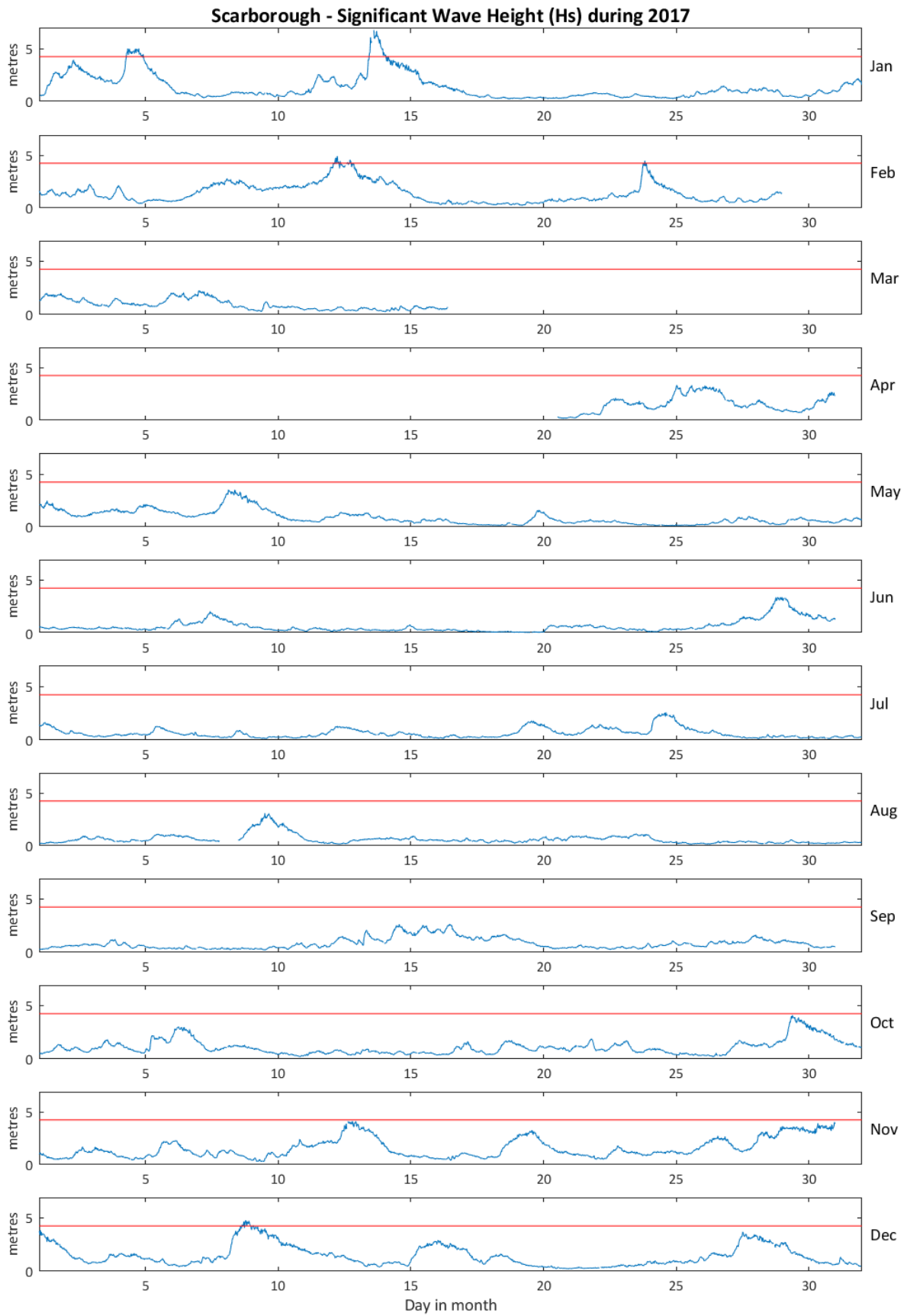
- Annual time series of H_s (red line is 4.24 m storm alert threshold)
- Incidence of storm waves for 2017. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H_s, 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

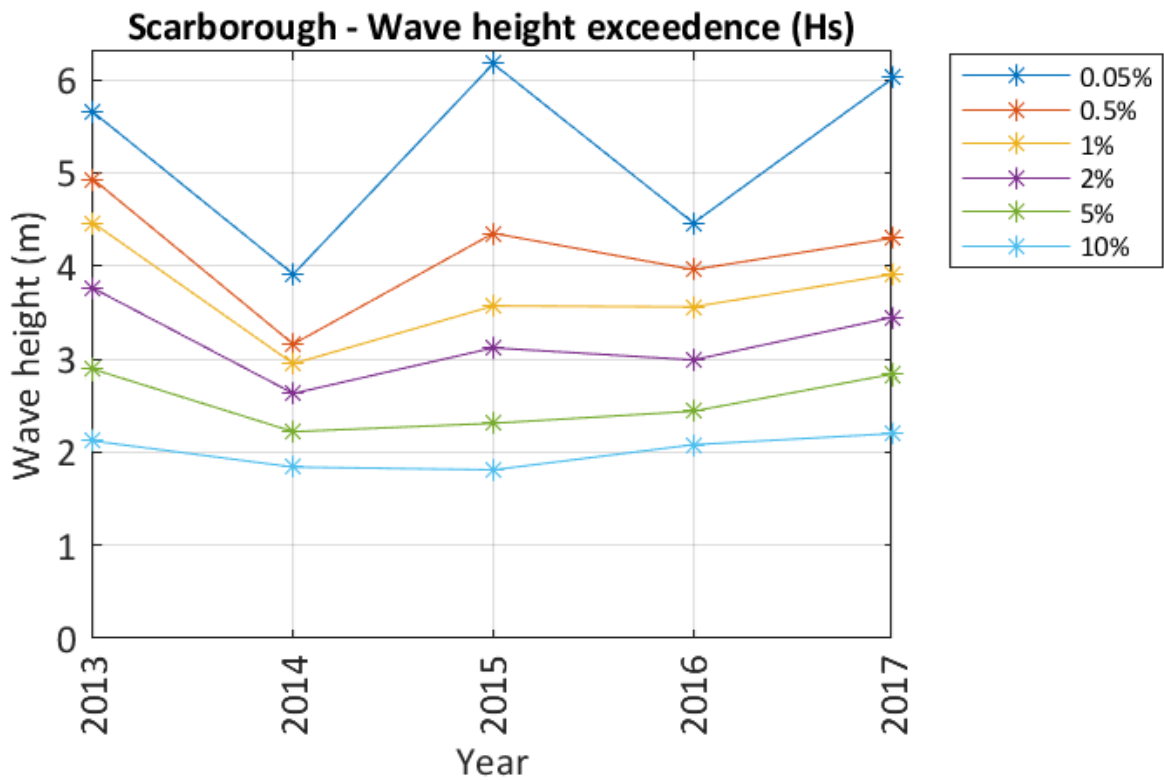
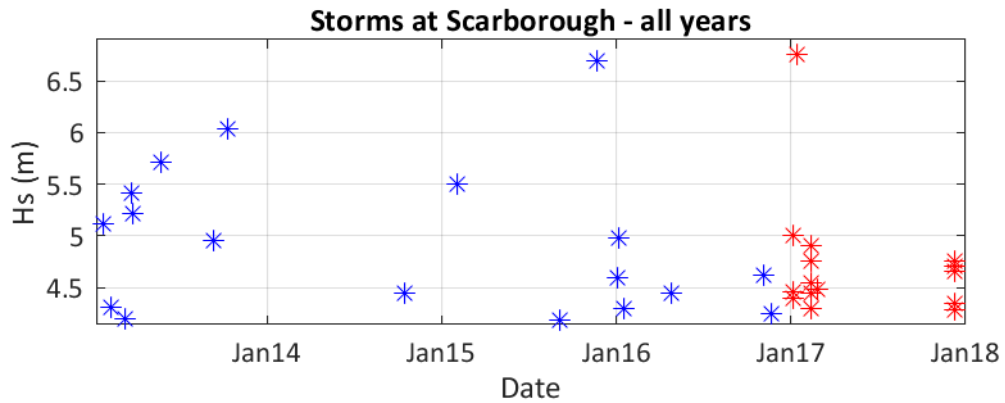
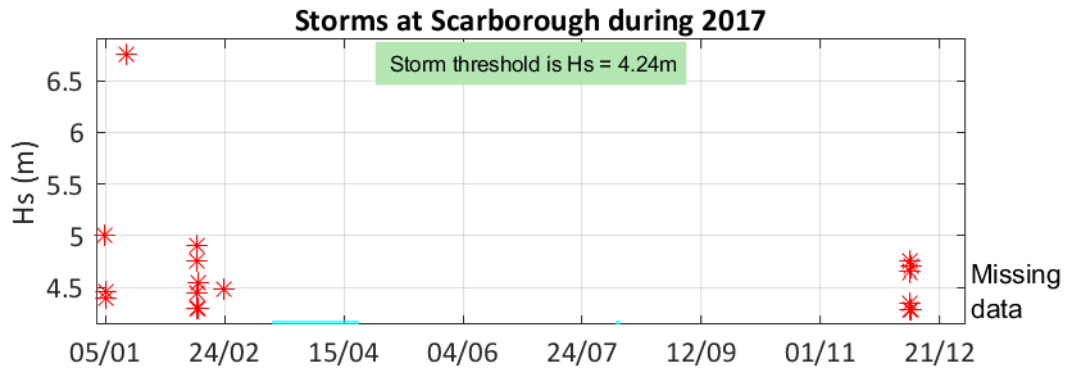
General

The buoy, owned by Scarborough Borough Council, was deployed on 18 January 2013, at which time the magnetic declination at the site was 1.66° west, changing by 0.18° east per year.

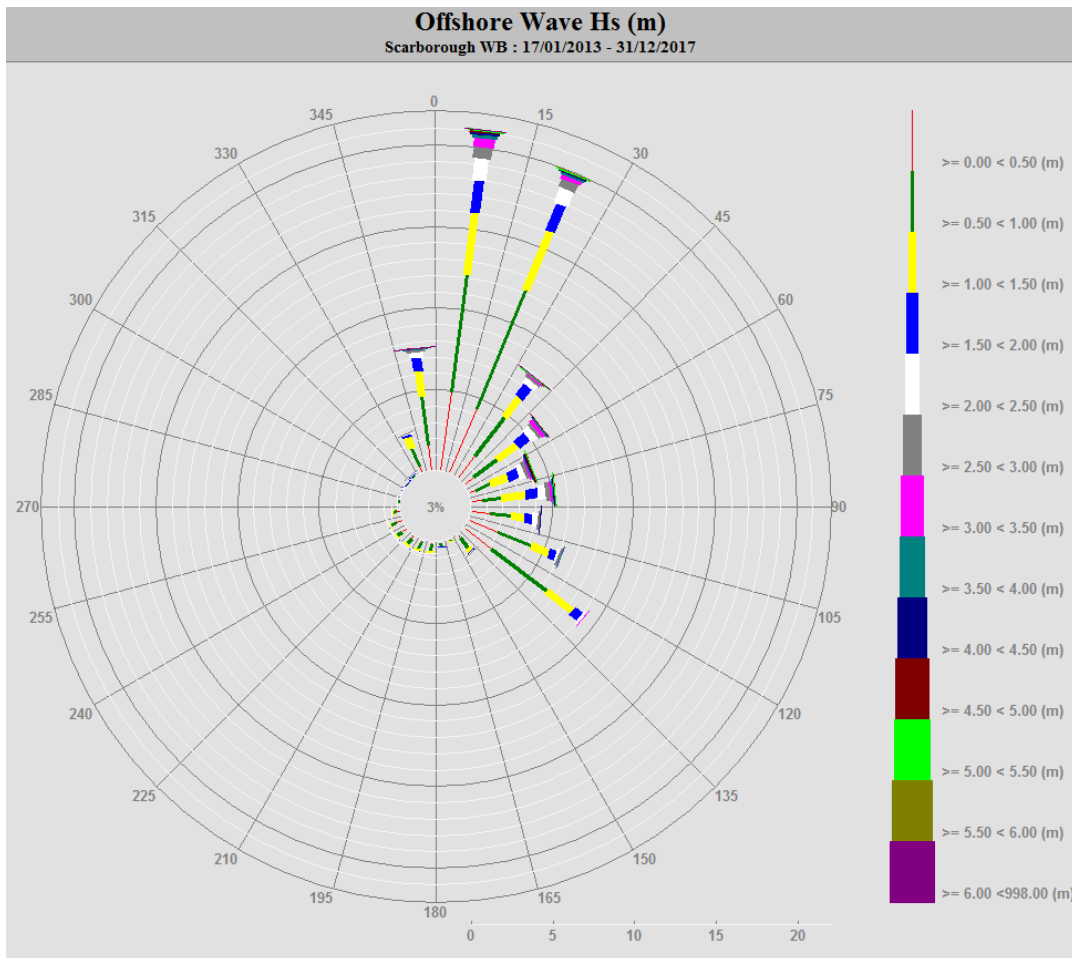
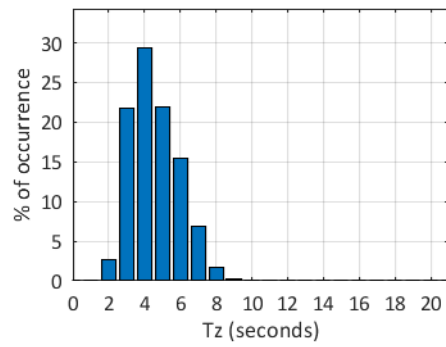
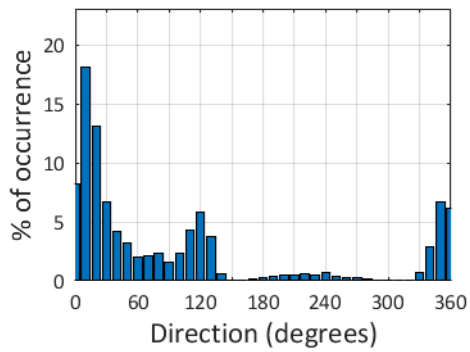
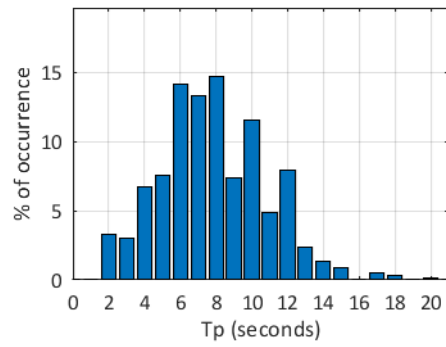
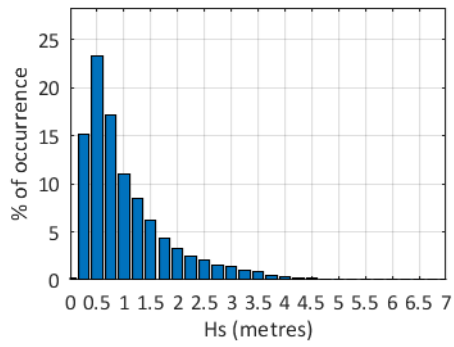
Acknowledgements

Tidal predictions were supplied by Fugro GB Marine Limited.





Scarborough 2017



Scarborough 2013 to 2017 - Joint distribution (% of occurrence)

