

## New Brighton Directional Waverider Buoy

<b>Location</b>			
OS	331389 E 394507 N		
WGS84	Latitude: 53° 26.57' N Longitude: 03° 02.06' W		
<b>Instrument type</b>			
Datawell Directional Waverider Mk III			
<b>Water depth</b>	~5m CD	Buoy in situ off New Brighton. 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>
30	30 minutes

## Monthly Averages - 2016

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	0.29	4.0	3.3	184	6.9	0	30
February	0.29	4.1	3.3	190	6.4	0	29
March	0.21	3.8	3.1	188	6.6	0	30
April	0.21	3.7	3.1	179	8.9	-	19
May	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-

## Monthly Averages - All Years (August 2014 – April 2016)

Month	H <sub>s</sub> (m)	T <sub>p</sub> (s)	T <sub>z</sub> (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	0.34	4.2	3.4	175	6.3	0
February	0.27	4.0	3.2	183	5.4	0
March	0.24	3.9	3.2	175	6.4	0
April	0.20	3.7	3.1	176	9.3	0
May	0.28	3.7	3.1	197	11.6	0
June	0.23	3.6	3.0	196	15.0	0
July	0.25	3.7	3.1	190	17.0	0
August	0.24	3.7	3.1	185	16.9	0
September	0.20	3.8	3.1	176	15.8	0
October	0.21	3.9	3.2	178	13.4	0
November	0.31	4.0	3.3	182	10.2	0
December	0.34	4.2	3.4	188	8.1	0

## 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)
06-Apr-2016 21:30:00	1.57	7.7	5.5	350	4.28	HW -1	8.54	0.22	0.64

\* Tidal information is obtained from the National Network gauge at Liverpool. 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)
2014	1.75	1.51	1.35	1.14	0.85	0.62	24-Dec-2014 12:30:00	1.93
2015	1.63	1.26	1.12	0.97	0.75	0.57	29-Nov-2015 14:30:00	1.97
2016	1.56	1.28	1.19	1.03	0.79	0.54	06-Apr-2016 21:30:00	1.57

\*\* i.e. 5 % of the H<sub>s</sub> values measured in 2014 exceeded 0.85 m

## Distribution plots

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

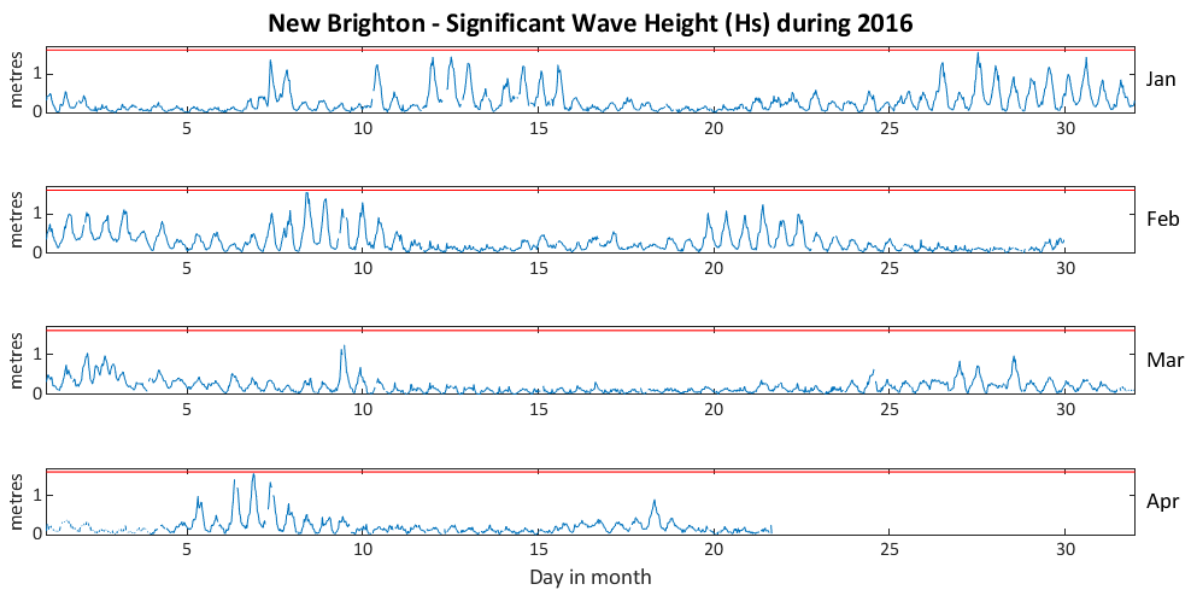
- Annual time series of H<sub>s</sub> (red line is 1.61m storm threshold)
- Incidence of storm waves for 2016. Storm events are defined using the Peaks-over-Threshold method. The highest H<sub>s</sub> of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of H<sub>s</sub>, T<sub>p</sub>, T<sub>z</sub> 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<sub>s</sub>) for all measured data

## General

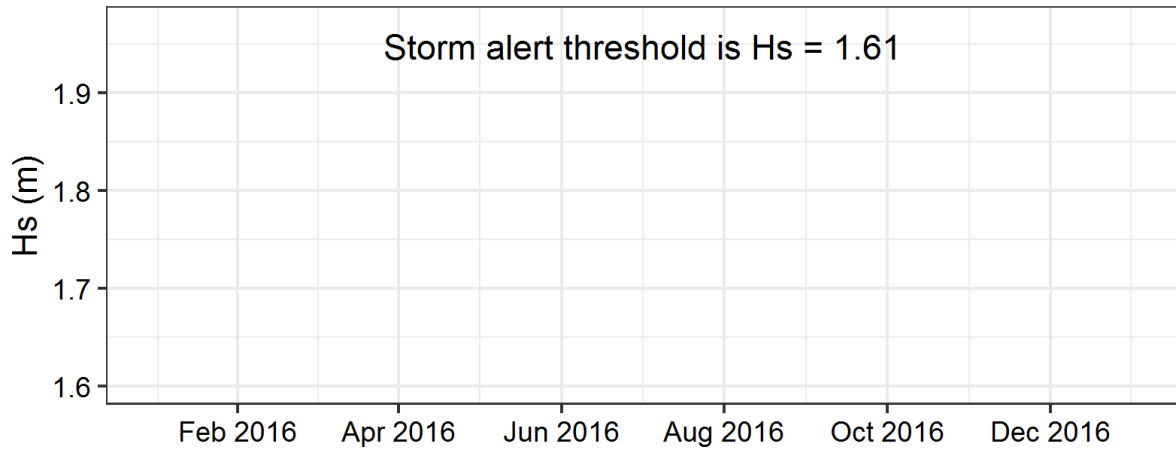
The wave buoy at New Brighton, owned by Sefton Council, was deployed on 06 August 2014, at which time the magnetic declination at the site was 2.31° west, changing by 0.18° east per year. There is a notable tidal signature to significant wave heights at this location, given the water depth of the buoy (~5m CD) and the spring tidal range (~8.4m). The buoy was decommissioned on 21 April 2016.

## Acknowledgements

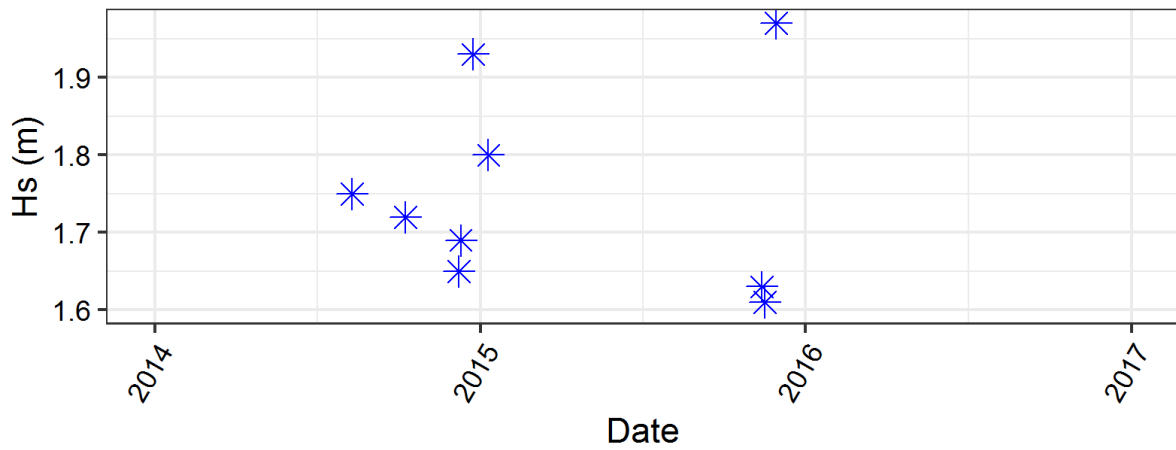
Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.



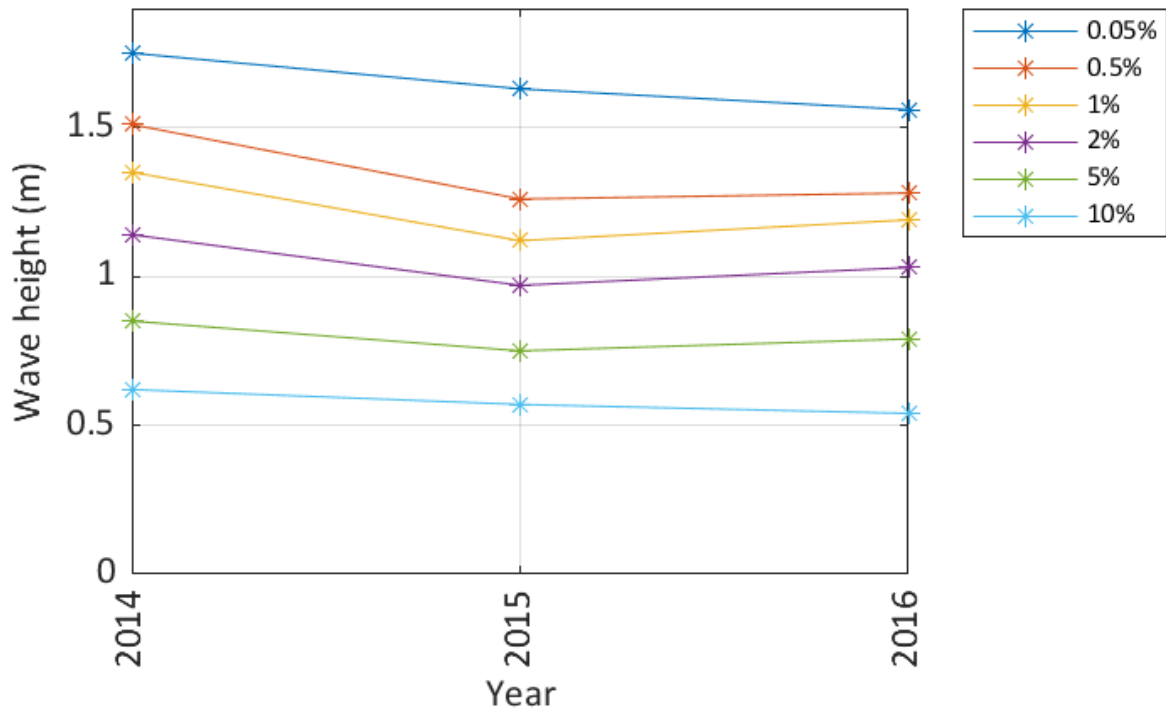
### Storms at New Brighton during 2016



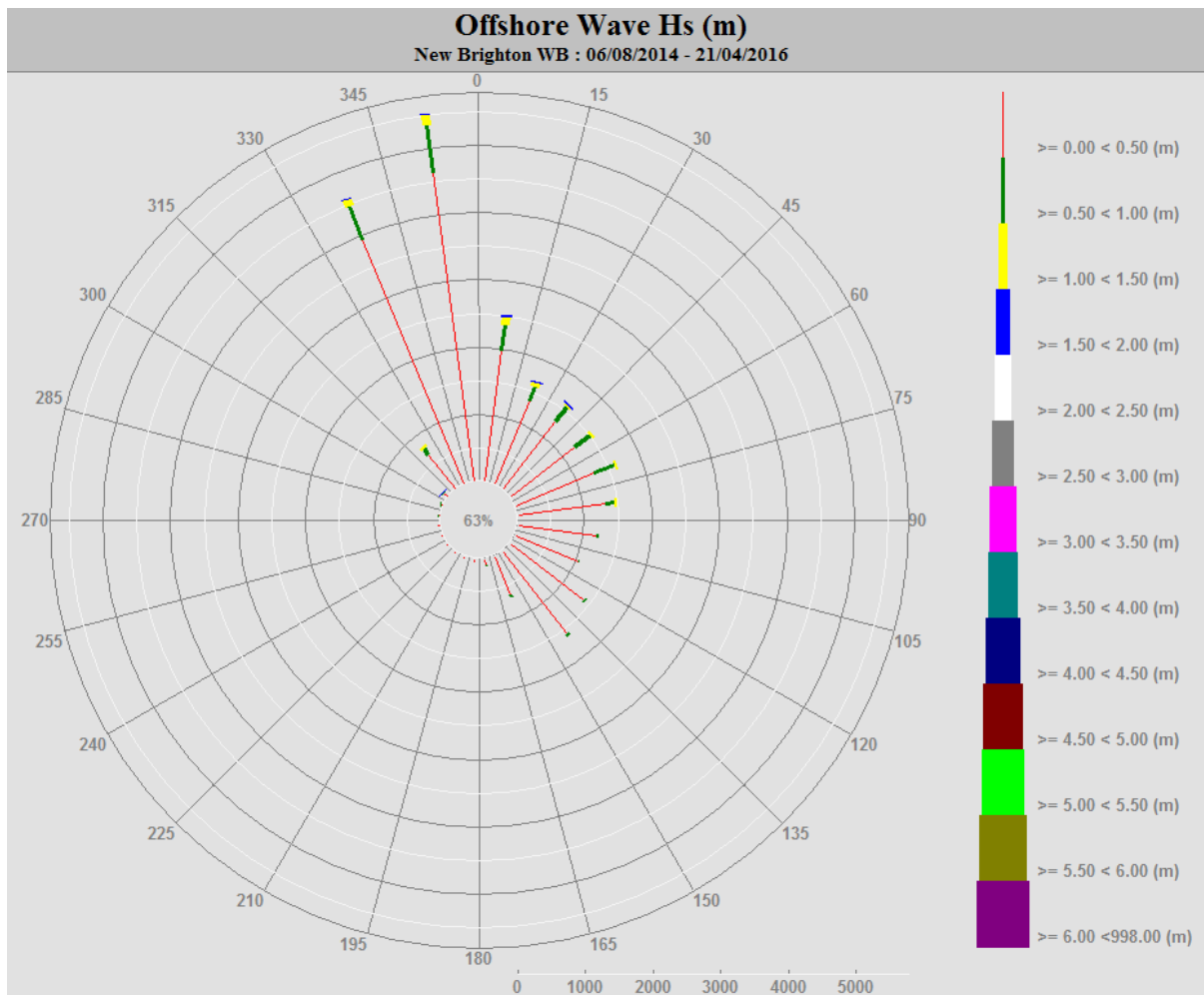
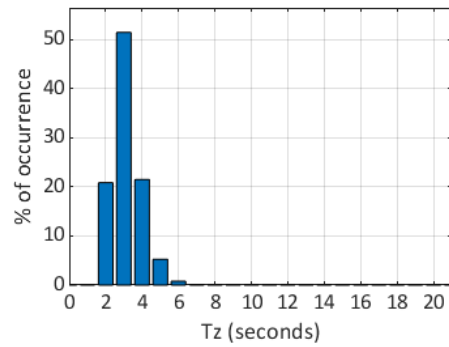
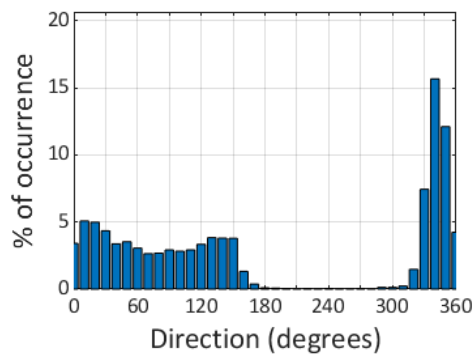
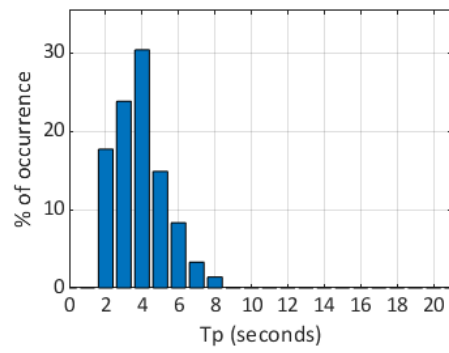
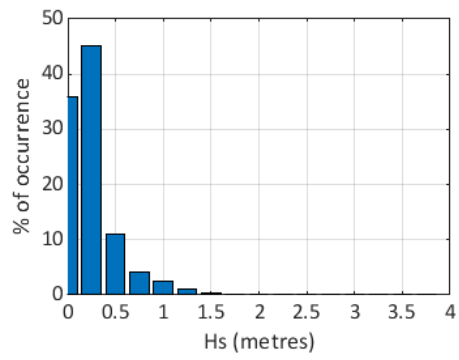
### Storms at New Brighton - all years



### New Brighton - Wave height exceedance ( $H_s$ )



### New Brighton 2016



### New Brighton 2014 to 2019 - Joint distribution (% of occurrence)

