



St Mary's Sound Directional Waverider Buoy

Location			
OS	90367 E 8029 N		
WGS84	Latitude: 49° 53.53' N Longitude: 06° 18.77' W		
Instrument type			
Datawell Directional Waverider Mk III			
Water depth	~53m CD	Buoy in situ in St Mary's Sound. Photo courtesy of Fugro GB Marine Limited	Location of buoy (Google mapping, image ©2016 Getmapping plc)

Data Quality

Recovery rate (%)	Sample interval
63	30 minutes

Monthly averages - 2014

All times are GMT

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)	No. of days
January	-	-	-	-	-	-	0
February	-	-	-	-	-	-	0
March	-	-	-	-	-	-	0
April	-	-	-	-	-	-	0
May	0.56	7.7	4.6	217	11.9	-	16
June	0.83	6.7	4.3	186	13.8	1	30
July	0.65	6.7	4.5	248	15.6	0	31
August	0.87	7.2	4.7	245	15.4	2	31
September	0.86	8.2	4.7	193	15.6	3	30
October	1.41	8.2	5.1	216	14.5	11	31
November	1.64	8.6	5.5	207	13.2	15	30
December	1.31	8.2	5.0	222	12.2	17	31

Monthly Averages - All Years (May 2014 – December 2019)

Month	H _s (m)	T _p (s)	T _z (s)	Dir. (°)	SST (°C)	Bimodal seas (%)
January	1.48	9.0	5.2	227	11.0	19
February	1.64	9.0	5.3	204	10.1	25
March	1.47	9.3	5.3	219	9.8	19
April	1.18	8.6	5.0	208	10.3	10
May	0.89	8.4	4.9	223	11.5	5
June	0.82	7.6	4.6	216	13.5	3
July	0.75	7.6	4.6	238	15.2	2
August	0.83	7.5	4.6	244	15.4	2
September	1.01	8.0	4.7	213	15.1	8
October	1.31	8.5	5.0	206	14.1	11
November	1.53	8.6	5.2	210	13.0	15
December	1.76	9.1	5.5	219	11.9	22

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)
06-Oct-2014 02:00:00	5.30	9.1	7.4	193	1.69	HW -2	4.20	-	-
14-Nov-2014 00:30:00	4.56	8.3	6.8	179	0.09	HW -6	2.50	-	-

* Tidal information is estimated from the predicted tide levels (Admiralty Total Tide).

Annual Statistics

Year	Annual H _s exceedance** (m)						Annual Maximum H _s	
	0.05%	0.5%	1%	2%	5%	10%	Date	A _{max} (m)
2014	4.98	3.39	3.14	2.86	2.29	1.96	06-Oct-2014 02:00:00	5.30
2015	5.31	4.11	3.68	3.27	2.81	2.35	30-Dec-2015 05:30:00	5.87
2016	4.76	3.57	3.06	2.72	2.33	1.95	10-Apr-2016 14:00:00	5.13
2017	6.33	4.20	3.62	3.07	2.49	2.04	02-Feb-2017 15:30:00	6.72
2018	5.57	4.62	4.14	3.61	3.00	2.55	12-Oct-2018 14:30:00	6.10
2019	5.39	4.01	3.74	3.38	2.78	2.27	18-Dec-2019 17:00:00	6.12

** i.e. 5 % of the H_s values measured in 2014 exceeded 2.29 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	May 2014 to December 2019	
Return period (years)	Significant wave height (m)	Comments
0.25	4.36	No depth limitation
1	5.44	
2	5.87	
5	6.36	
10	6.67	
20	6.93	
50	7.23	

Distribution plots

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

- Annual time series of H_s (red line is 4.36 m storm alert threshold)
- Incidence of storm waves for 2014. 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 2014
- 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

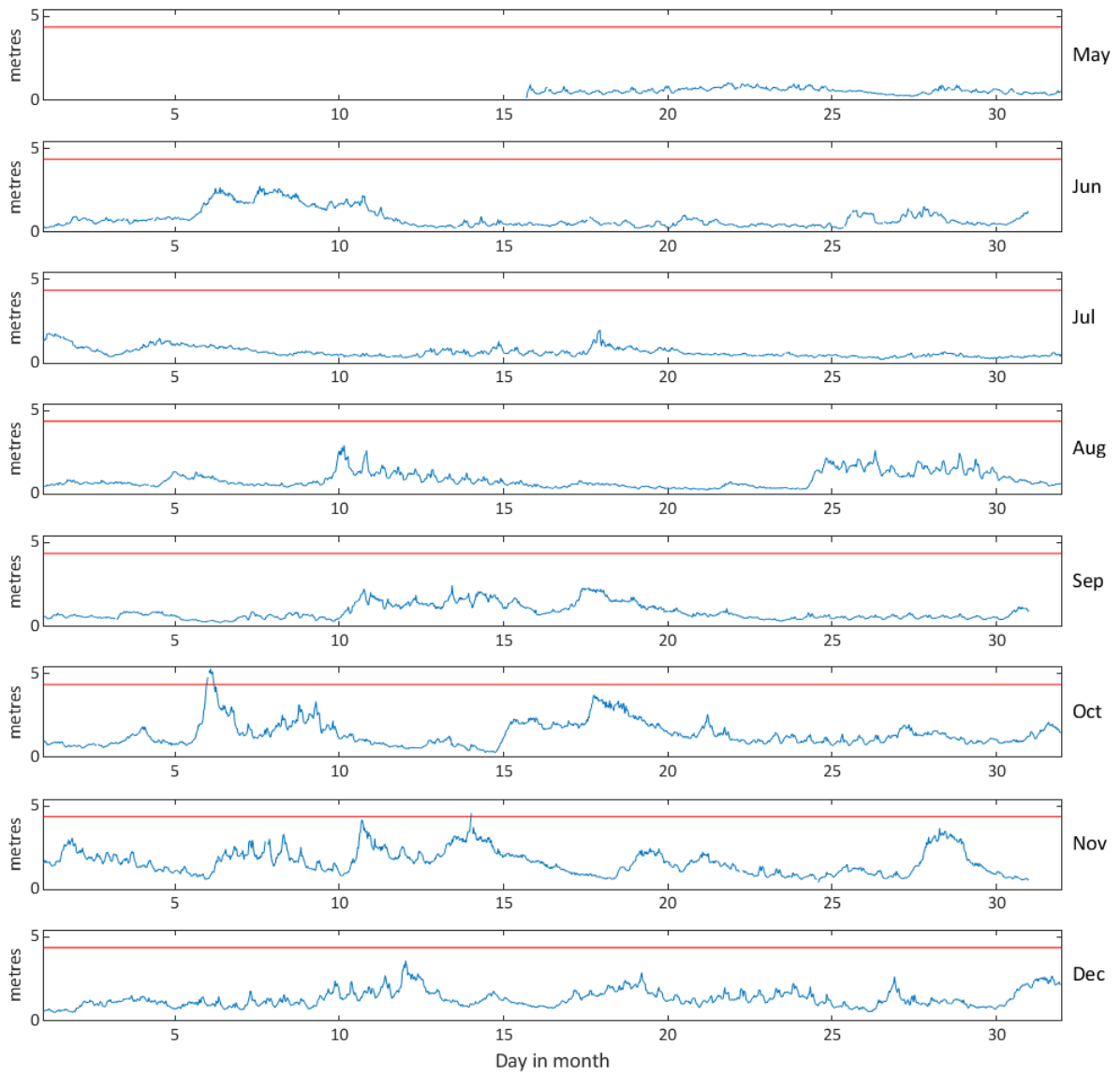
The buoy, owned by Teignbridge District Council, was first deployed on 15 May 2014, at which time the magnetic declination at the site was 3.03° west, changing by 0.17° east per year.

Acknowledgements

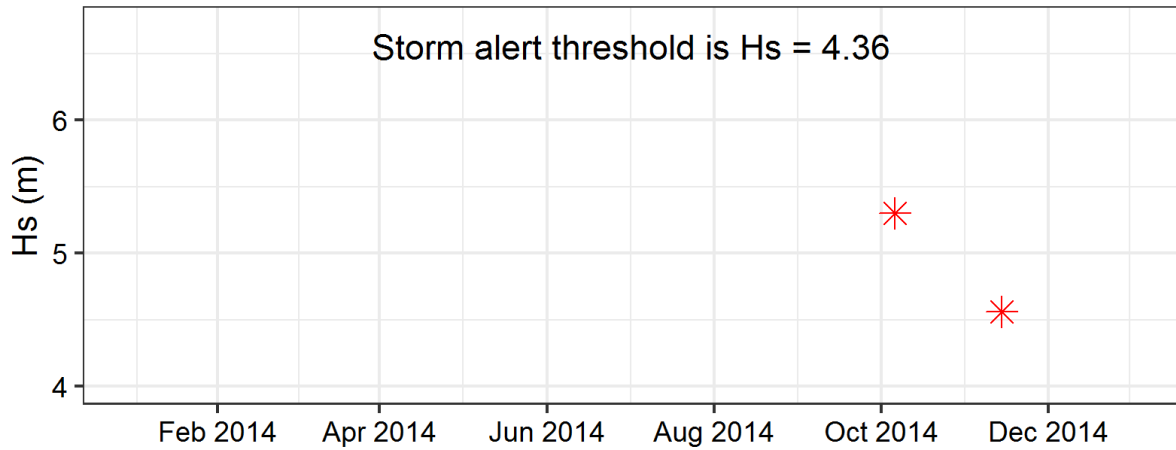
The shore station is kindly hosted by the leaseholder of the Coastguard Tower.

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

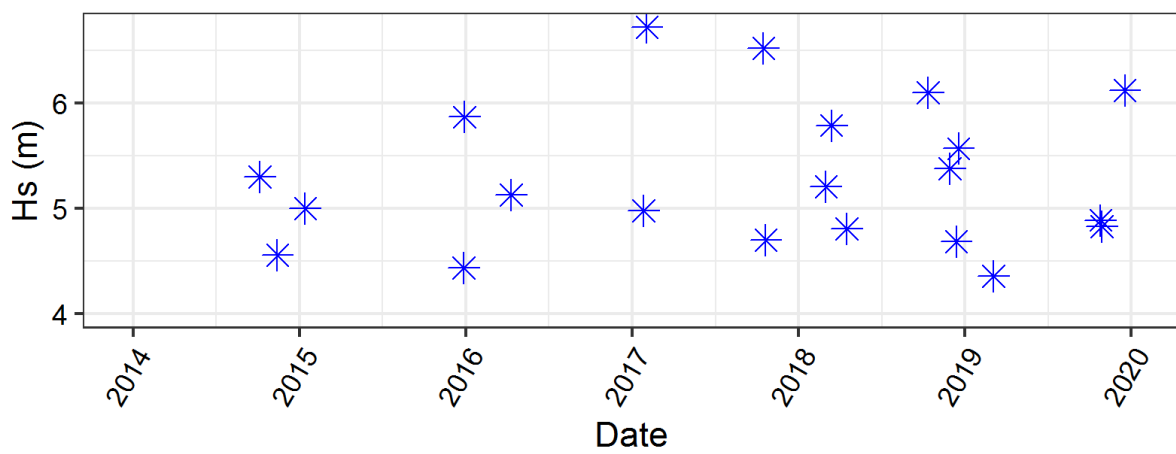
St Mary's Sound - Significant Wave Height (Hs) during 2014



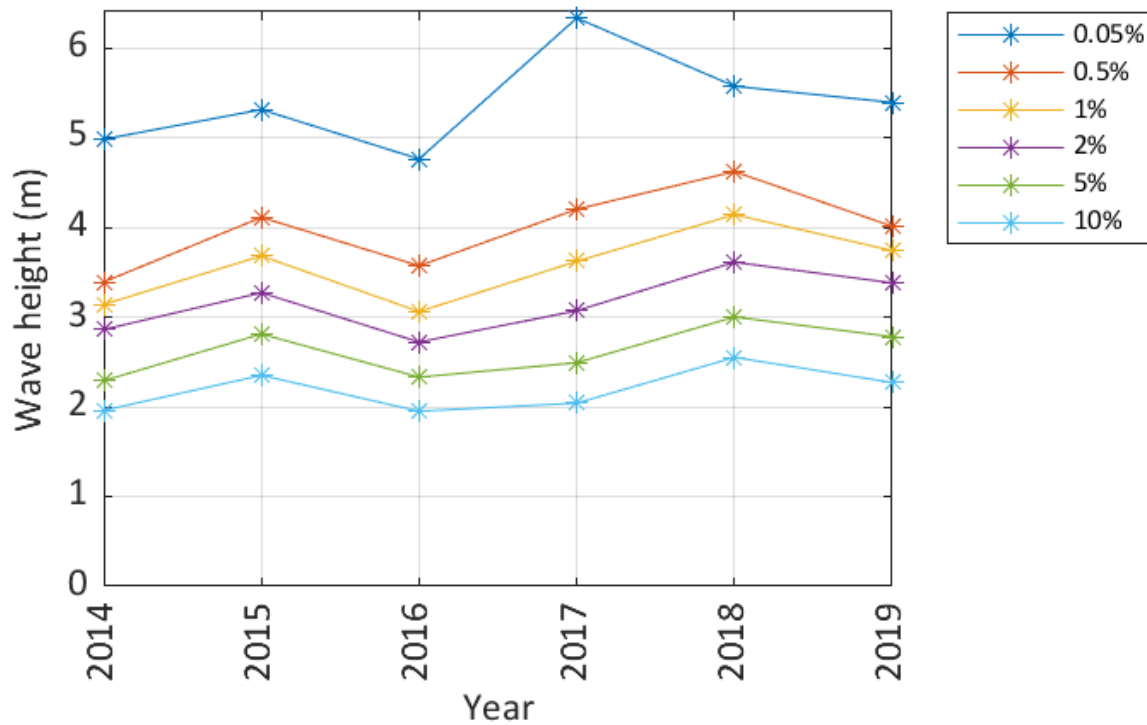
Storms at St Mary's Sound during 2014



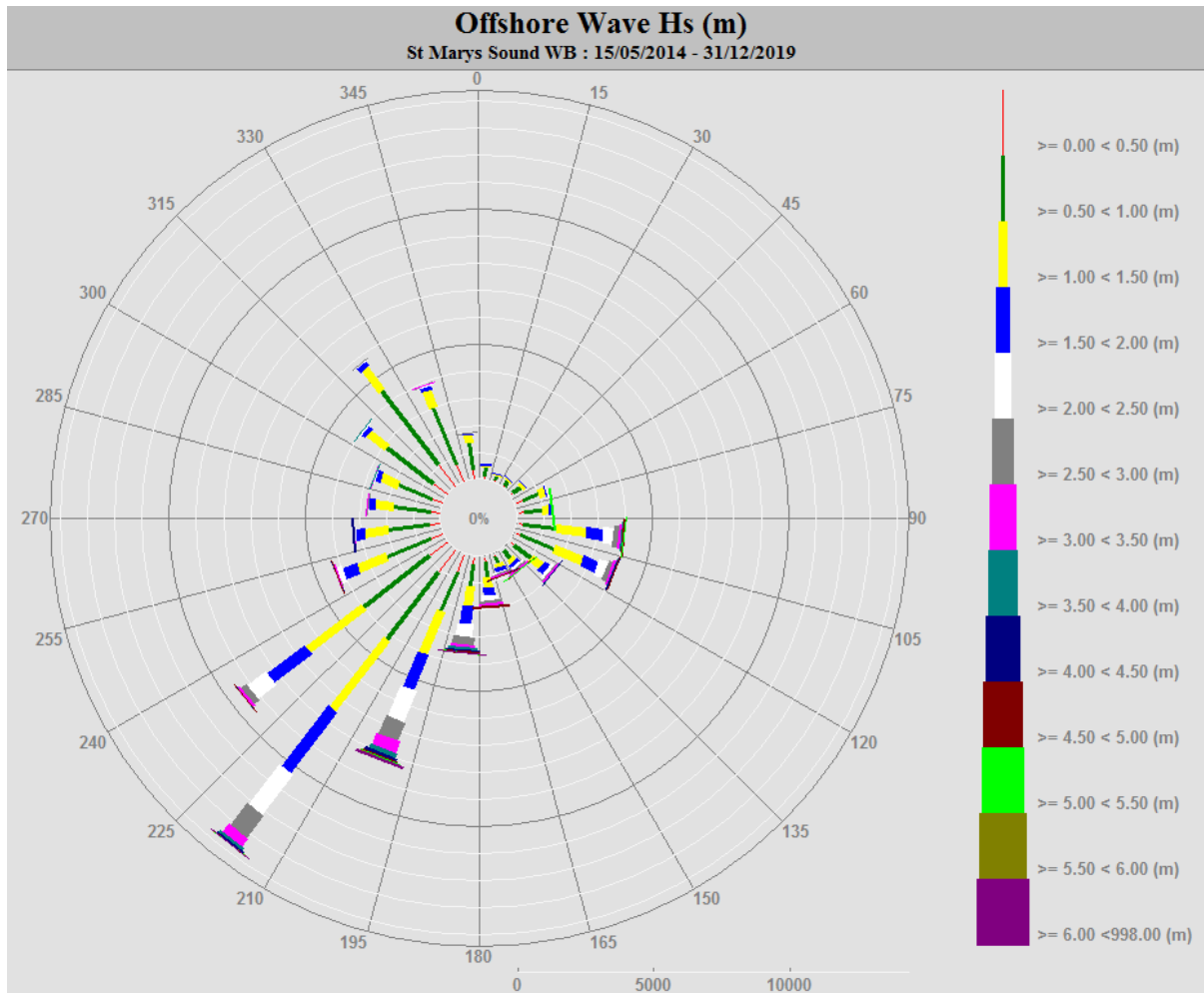
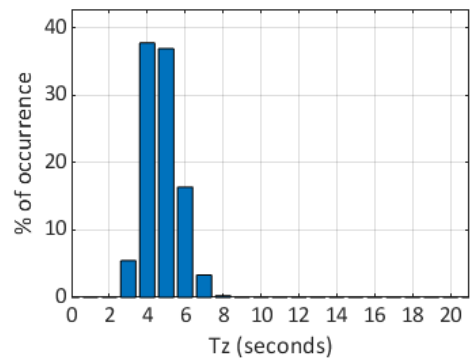
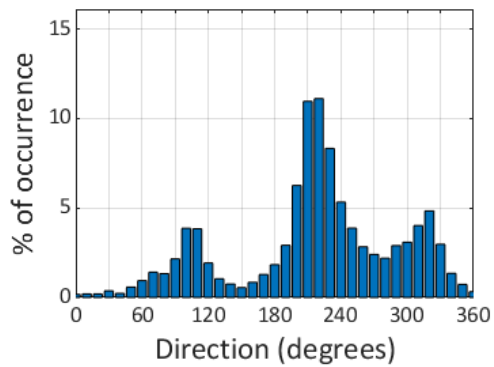
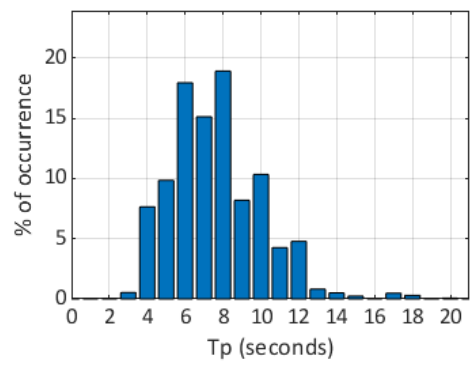
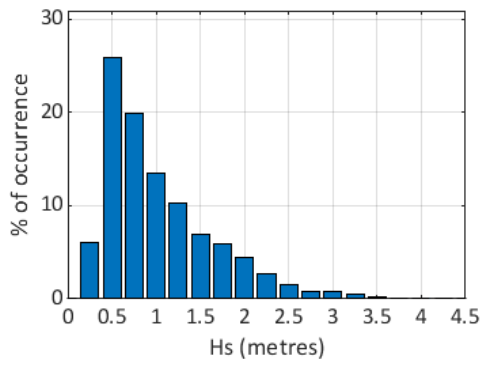
Storms at St Mary's Sound - all years



St Marys Sound - Wave height exceedance (Hs)



St Marys Sound 2014



St Marys Sound 2014 to 2019 - Joint distribution (% of occurrence)

