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Channel Coastal Observatory (CCO)

National Network of Regional Coastal
Monitoring Programmes (NNRCMP)

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National Network of Regional Coastal Monitoring Programmes

- Scheme for the collection of a variety of coastal monitoring data, providing the underpinning for flood and coastal erosion risk management (FCERM) in England.
- Employ a consistent and targeted data collection strategy and make data and reporting freely available

www.coastalmonitoring.org

- Topo beach surveys
- Cliff surveys
- Aerial photography
- Lidar
- Bathymetry
- Funded in 6-year phases (2027)
Department for Environment , Food & Rural Affairs



Hydrodynamic Network

- 72 Instruments
 - 37 wave buoys
 - 15 tide gauges
 - 20 met stations

As of 1 December 2021...

- 498 years of wave data
 - + 31 years of QC'd commercial wave data
- 202 years of tide data
- 223 years of met data

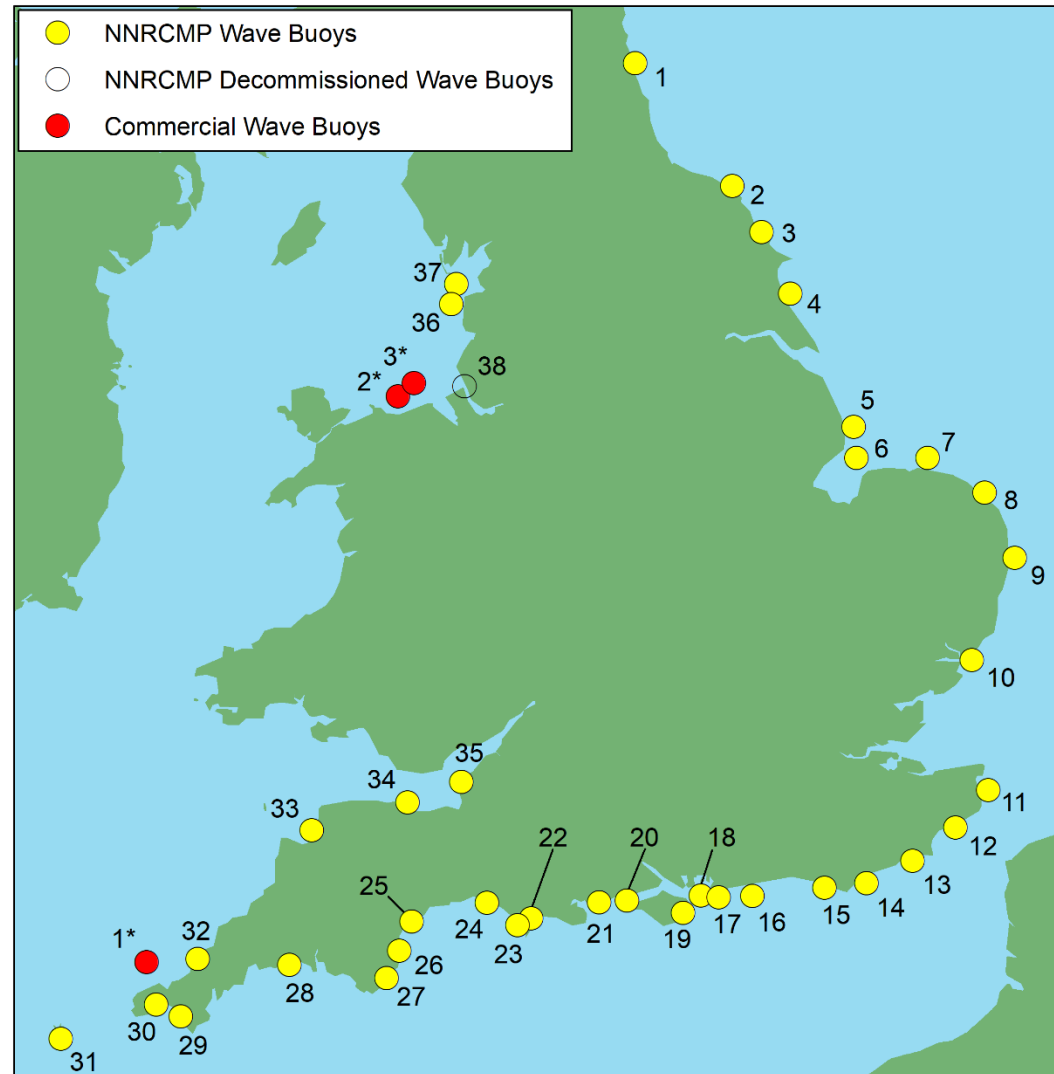


Wave Buoy Network Overview

35 buoys on HF comms.
2 buoys on Iridium comms.

37 Datawell Directional 90cm
Waverider MkIII's

~10-15m CD

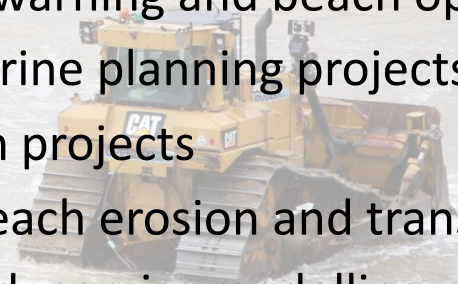


Wave Buoy Network Purpose



Overall purpose: Provide the evidence base for flood and coastal erosion risk management (FCERM)

- Provide real-time data for coastal flood forecasting, warning and beach ops.
- Provide base-line statistics for future coastal and marine planning projects
- Enable operational assistance in coastal construction projects
- Assist the monitoring of coastal processes such as beach erosion and transport
- Validate coastal wave hydrodynamics and sediment dynamics modelling



Wave Buoy Network Maintenance

- Maintenance work contracted to Fugro GB Marine Ltd
 - Wave buoys are serviced on a 6-monthly schedule

[NNRCMP. 2021. *Specification for Hydrodynamic Services*](#)

- Data is collected, quality-controlled and distributed by the Channel Coastal Observatory

[Mason & Dhoop 2017 *Quality Control of Wave Data*](#)

www.coastalmonitoring.org

Go directly to table data: [Waves](#) · [Tides](#) · [Met](#) · [GPS data](#)

+ Wave Buoy Network Data Delivery

• Real-time:

- Graphs: H_{m0} , H_{max} | T_p , T_{m02} (T_z) | Dir_{peak} , Spr_{peak} | SST
 - [Coming soon: Energy period T_e and wave power P , calculated on the fly]
- Plots of the wave spectrum & wave period vs direction [* .SPT file]
- Plot of the wave displacements (heaves) [* .RAW file]
- Live feed of wave displacements, updated every 5s

• API:

- Most recent wave buoy data
- Historic wave buoy data

• Quality-controlled archived data: [one month in arrears, auto + manual]

- *Timestamp (GMT), Lat, Lon, H_{m0} , H_{max} , T_p , T_{m02} (T_z), Dir_{peak} , Spr_{peak} , SST*
 - [Coming soon: Full upcross and spectral parameter output + energy period T_e and wave power P (Not QC'd)]

Legend

Arrow direction: wave/wind direction

Arrow size: wave height/wind speed

Arrow colour: temperature

- ↑ < 5°C
- ↑ 5 - 10°C
- ↑ 10 - 15°C
- ↑ 15 - 20°C
- ↑ > 20°C

Tide gauges: tide height (CD)

Delayed data

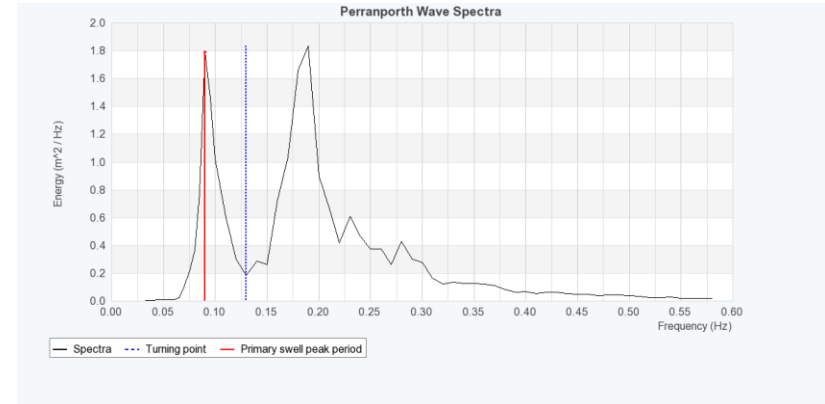
- > 24 hours delay
- > 3 hours delay

Data sources:

- Regional monitoring
- ARGUS
- GPS
- ▼ Other
- ↑ Tide gauges

Wave Buoy Network Analysis Outputs

[combination of sea and swell]



- Bimodal seas:
 - Methodology:

Mason, T. & Dhoop, T. 2018. Occurrence of bimodal seas around the English coastline

- Dataset:

Monthly occurrence of bimodal seas

- Annual reports:
 - Statistical analysis of quality-controlled wave parameters

Annual Wave Report 2020 Hayling Island

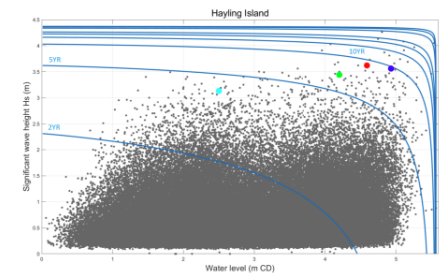
Storm Analysis

Date/Time	H _s (m)	T _p (s)	T _s (s)	Dir. (°)	Water level elevation* (OD)	Tidal stage (Hours re. HW)	Tidal range (m)	Tidal surge* (m)	Max. surge* (m)
09-Feb-2020 11:30:00	3.62	8.3	6.3	194	1.86	HW+1	3.78	-0.11	0.48
15-Jan-2020 01:00:00	3.56	-	6.3	-	2.20	HW-1	3.65	0.81	0.93
16-Feb-2020 05:30:00	3.44	7.1	6.3	184	1.47	HW+1	2.64	-0.12	0.39
27-Dec-2020 04:30:00	3.13	10.0	5.4	193	-0.23	HW-4	2.18	0.36	0.45

* Tidal information is obtained from the National Network gauge at Portsmouth 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.

Joint return periods

Joint return periods for water level and significant wave height are based on 0.5 hourly records and calculated using a copula function. For more details on the copula function, see Dhoop & Thompson 2021. The grey point cloud represents the measured joint wave heights and water levels at Hayling Island and Portsmouth respectively, plotted against one another.



Date/Time	Symbol	H _s (m)	Water level elevation		Joint Return Period
			OD	CD	
09-Feb-2020 11:30:00	●	3.62	1.86	4.59	1 in 5 years
15-Jan-2020 01:00:00	●	3.56	2.20	4.93	1 in 5 years
16-Feb-2020 05:30:00	●	3.44	1.47	4.20	1 in 5 years
27-Dec-2020 04:30:00	●	3.13	-0.23	2.50	1 in 5 years



Questions?

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