



Met Office

Report on Met Office buoy activities

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Drifter activities

- Have budget line for drifter activities that includes support for E-SURFMAR plus a separate line to procure and deploy barometer drifters in the South Atlantic/Southern Ocean as a contribution to the global drifter array (supporting GCOS and NWP)
- Has enabled purchase of
 - Iridium drifters (contributing to the DBCP Iridium Drifter Pilot Project)
 - Drifters with lithium batteries (hope for up to 2x the normal SVP lifetime at ~1.3x the normal SVP cost)
 - And from next year expect to purchase some drifters with high precision SST sensors



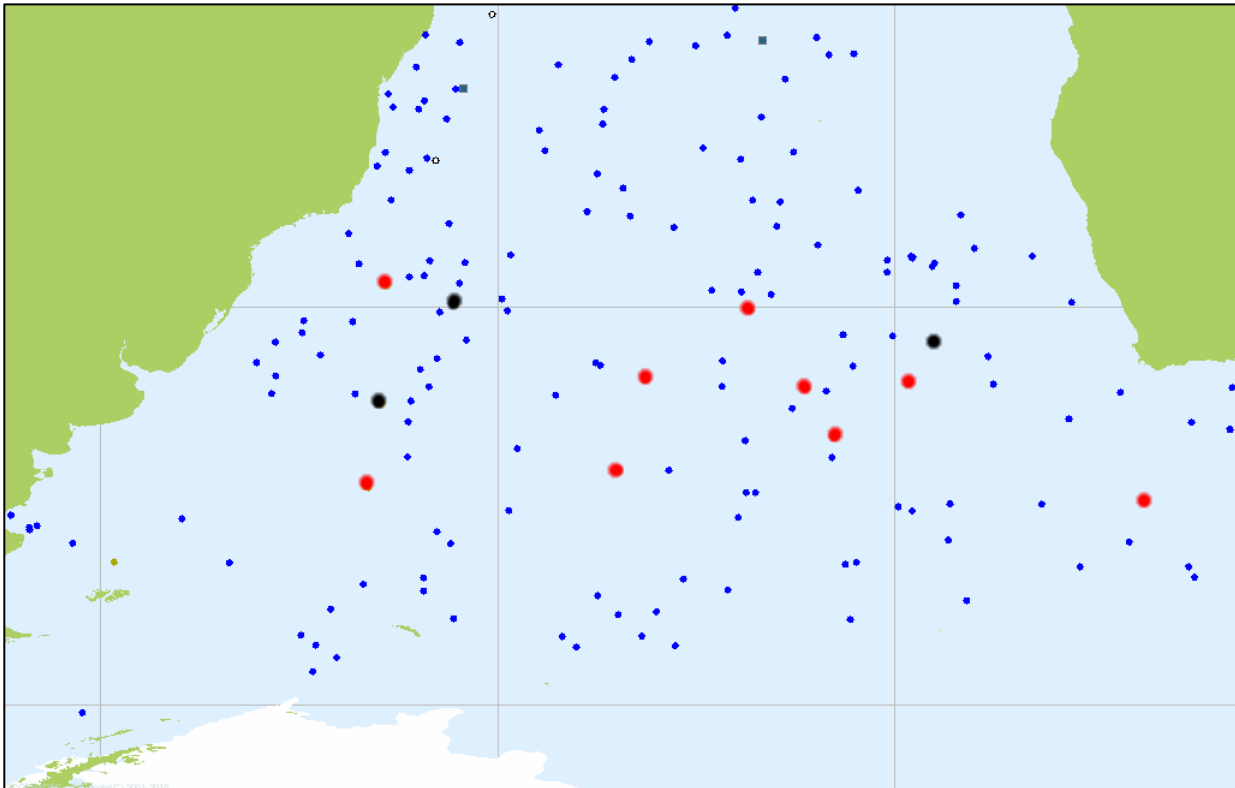
South Atlantic/Southern Ocean drifters

- 5 MetOcean SVP-B drifters deployed in Southern Ocean, Dec 2005
- 4 MetOcean SVP-B drifters (with lithium batteries) deployed in South Atlantic, May 2007
- 5 MetOcean SVP-B Iridium drifters deployed in Southern Ocean, Dec 2007/Jan 2008
- 7 MetOcean SVP-B Iridium drifters deployed in South Atlantic, Oct/Nov 2008 (2 with lithium batteries)
- 10 MetOcean SVP-B drifters (9 Iridium, 1 Argos) deployed in South Atlantic, Oct/Nov 2009 (all with lithium batteries)
- Expect delivery of another 7 drifters shortly for deployment from the James Cook and/or James Clark Ross in Oct/Nov



Active drifters (at 15 Sept)

3 Argos drifters ●, 9 Iridium drifters ● – all with Li batteries

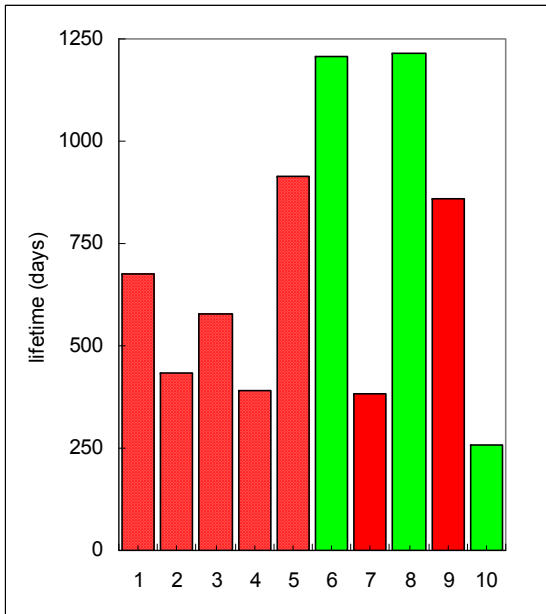




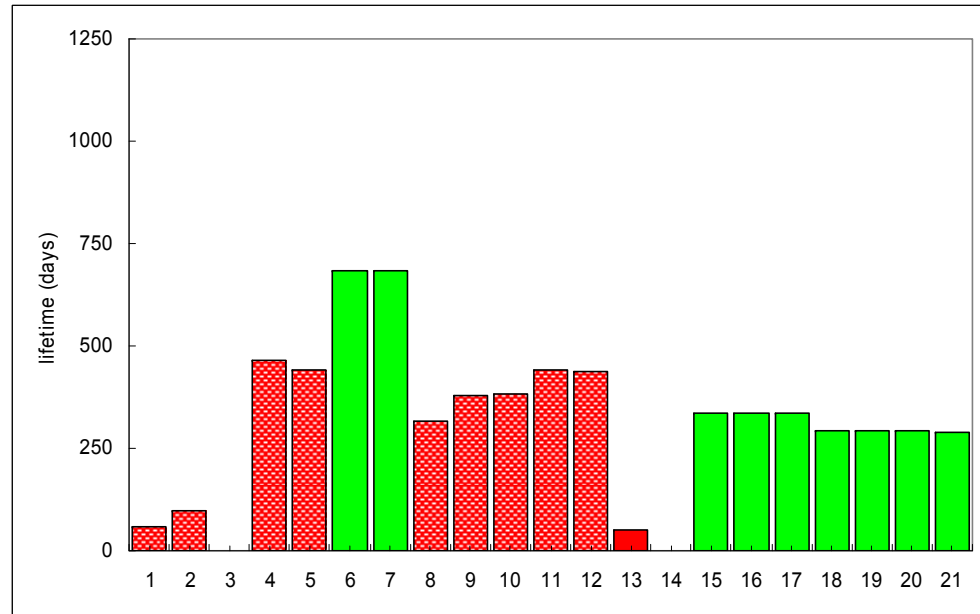
Drifter lifetimes

Expired drifters in red, active drifters in green
Hatched for alkalines, solid for lithiums

Argos drifters



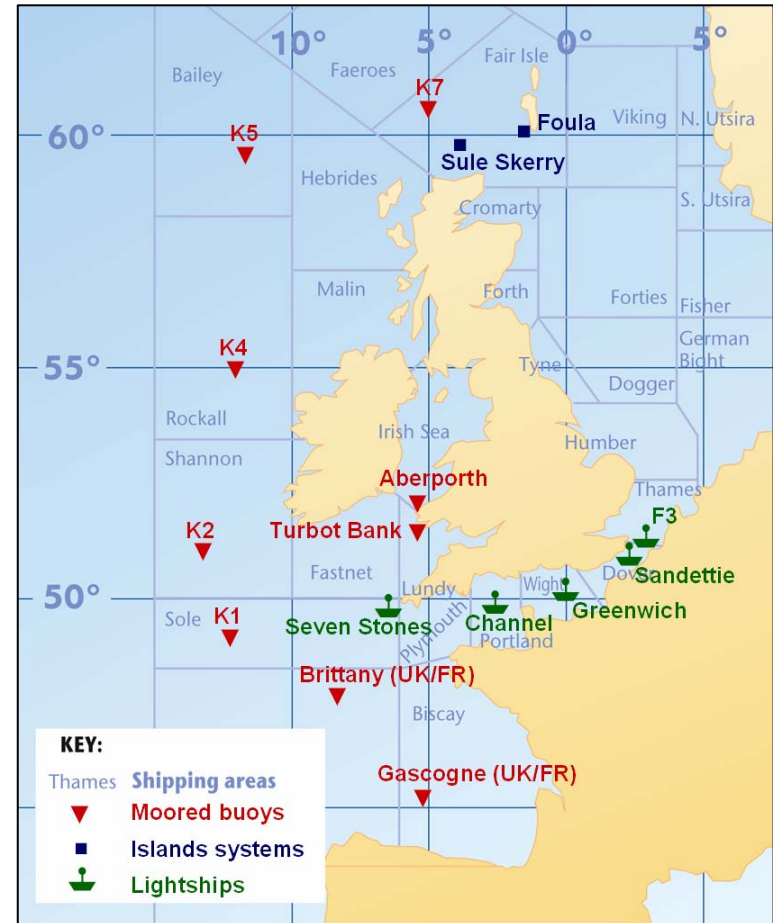
Iridium drifters





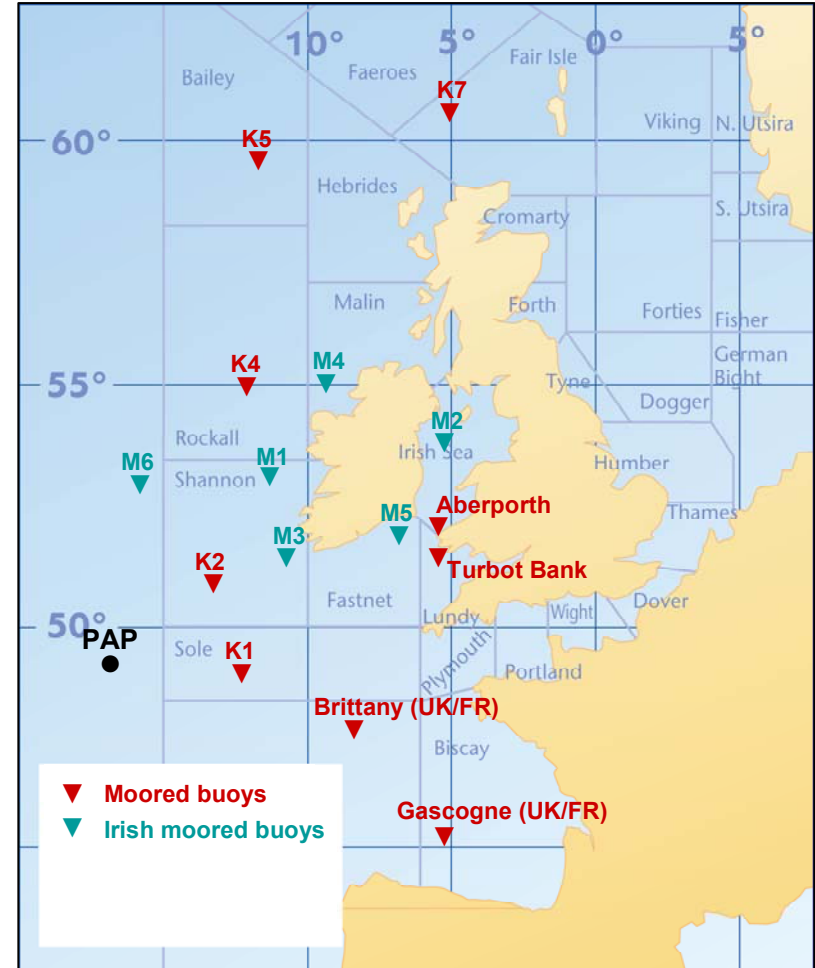
Marine Automatic Weather Station (MAWS) network

- Operational MAWS network presently comprises
 - 9 moored buoys
 - 5 light vessels
 - 2 remote islands



Moored buoy networks

- Met Office moored buoy network developed following the 'Great Storm' of 1987
- Brittany/Gascogne operated jointly with Météo-France
- Collaboration with Irish Marine Institute and Met Eireann on the Irish buoy network
- New (pre-operational) system operated at PAP with the National Oceanography Centre





K-series buoys

Specifications

- 3 m diameter hull
- 6 m overall height
- 4 m sensor exposure height above sea level
- 1.5 m diameter sensor ring
- Duplicate sensors attached with quick release clamps
- Cross-linked dual control electronics and communications systems for maximum resilience





Met Office moored buoys

- Parameters measured include: wind speed and direction, max gust, air pressure, air temperature, relative humidity, significant wave height, average wave period
- All stations transmit their observations hourly – 24 hours a day, 365 days a year
- 6-hourly spectral wave data presently being returned from K5



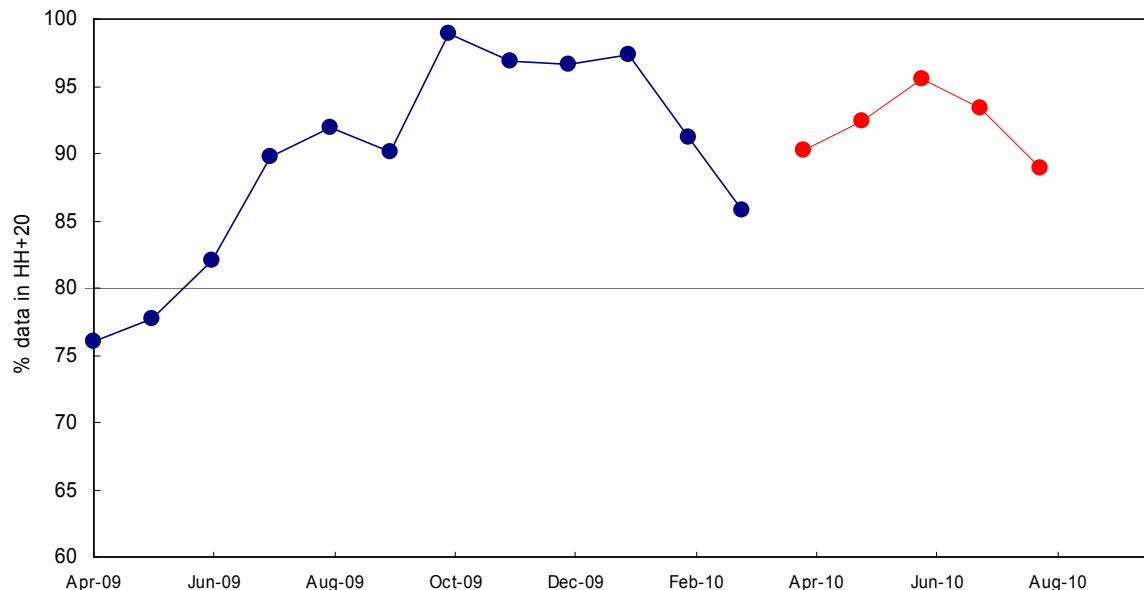
K-series buoys

- Have been in operation since the early 90s
- Buoys are normally deployed for 2 years with an annual service visit (sensor change and mooring inspection)
- Proven reliability, but ageing control electronics and transmission systems need replacement
 - Iridium now on one side on all buoys except K1 (which has been in the water since Apr 2006)
- Following trial of sonic anemometers, dual WindSonics are on all new deployments
 - single sonic on K2, K4, K5, Aberporth and Turbot Bank
 - dual sonics on K7, Brittany and Gascogne



Moored buoy network performance over previous year

- Met Office target is for: at least 80% of the agreed open ocean moored buoy network observations to be available by HH+20 in the Met DB (excludes Gascogne)
- Figure for FY09 89.5%, FY10 (so far) is 92.1%





Porcupine Abyssal Plain (PAP) buoy

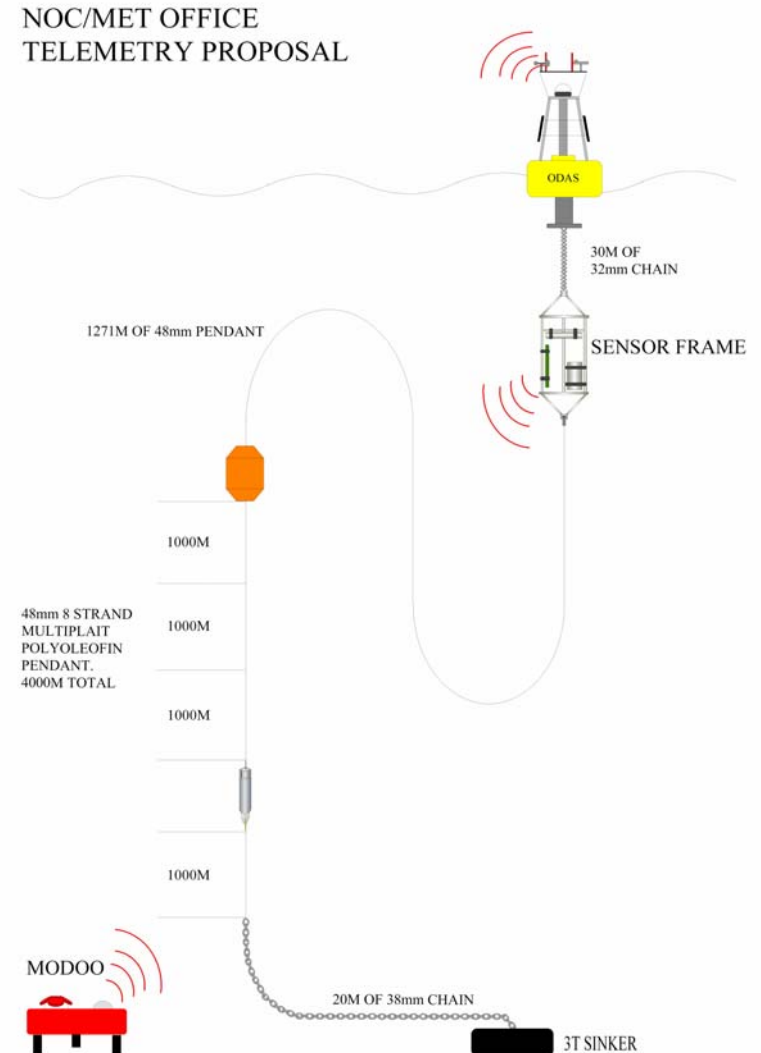
- Deployed buoy 1st June 2010 at Porcupine Abyssal Plain site to complement NOC mooring (OceanSITES/EuroSITES) – depth 4,800m
- Through this collaboration the practicality of using scheduled research vessel visits to PAP for deployment, servicing and recovery of the buoy will be assessed
- If feasible, then expected that a longer-term agreement to maintain a Met Office moored buoy at the PAP site will be developed





PAP system

- Has a single met system as one side is given over to NOC systems to receive and transmit sub-surface data
- Sub-surface sensor frame at 30m below the buoy
- Sea floor lander also deployed as part of the MOdular and mobile Deep Ocean Observatory (MODOO) project





Spectral wave data from K5

- Triaxys spectral wave system deployed on K5 in August 2008
- Data in NMEA (text) format are currently being archived and are used by the wave modelling group for model validation
- Plan to develop a marine data 'gateway' in FY11 which will enable spectral wave data in NMEA format to be converted to BUFR format for storage in operational database and dissemination via GTS
- Current system only returns the first-3 spectral parameters over 123 spectral bands, PP-WET recommendation is to return the 'first-5' spectral parameters
 - Datawell has 64 bands, WaveWatch3 uses 25, need less resolution at lower frequencies
 - Axys are working on new software to return 'first-5' over 32 spectral bands (rather than 123 as at present), will need an EPROM change



Plans for spectral wave capability

- Extend capability from 2010 to selected buoys across the network by installing stand-alone Triaxys systems with Iridium
 - K7 (operated for FOIB/NWAG)
 - Gascogne and Brittany (Meteo-France funded systems)
 - K1 (or K2) to provide information for the south-west approaches
- Comparison against a Datawell waverider remains an outstanding requirement to assess the influence of the buoy hull on the measurements



Network aspirations

- Extend buoy operating lifetimes (service interval)
- Reduce operating costs
- Enhance capability (sub-surface measurements)

- Replace existing electronics (CR10/PC42) with either dual Watchman 500 or CR1000 based systems
- Aim to build up systems on new (plastic) hulls during 2011



Network developments

- Deploy DB-300 buoy in Weymouth Bay (Olympic sailing venue) – have funding agreement to do so
- Replace buoy at Turbot Bank with a DB-300 based system (or smaller plastic hull)
- Deploy buoy at ex-RARH site (wave energy resource estimation) – subject to additional funding





Other sources of moored buoy data around the UK

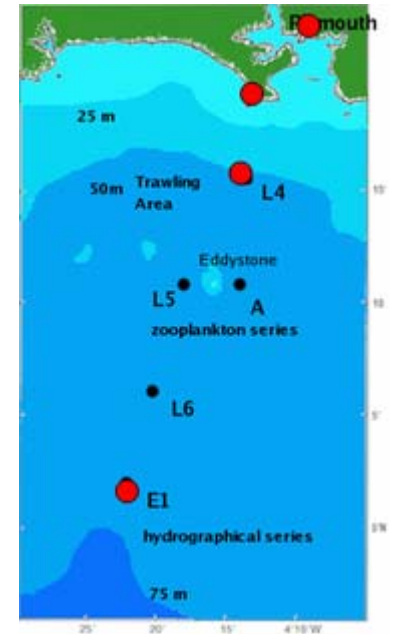
- Irish buoy network
 - Marine Institute programme to replace their K-series buoys with Fugro-Oceanor systems
- Western Channel Observatory (PML)
- Jersey Met Dept
- WaveNet
- CEFAS SmartBuoys



Western Channel Observatory

- Western Channel Observatory (Plymouth Marine Lab) funded through the NERC Oceans2025 programme
- 2 buoys at L4 (62030) and E1 (62050) stations
- 3-hourly met data (& SST) going to GTS, oceanographic data (salinity, dissolved oxygen, chlorophyll fluorescence, turbidity, nitrate concentration) and solar irradiance available on WCO web-site

www.westernchannelobservatory.org.uk





Jersey buoy

- Jersey buoy (62027), operated by Jersey Met Department
- Redeployed in autumn 2009, 20 minute met data, hourly wave data
- Data now going routinely to GTS





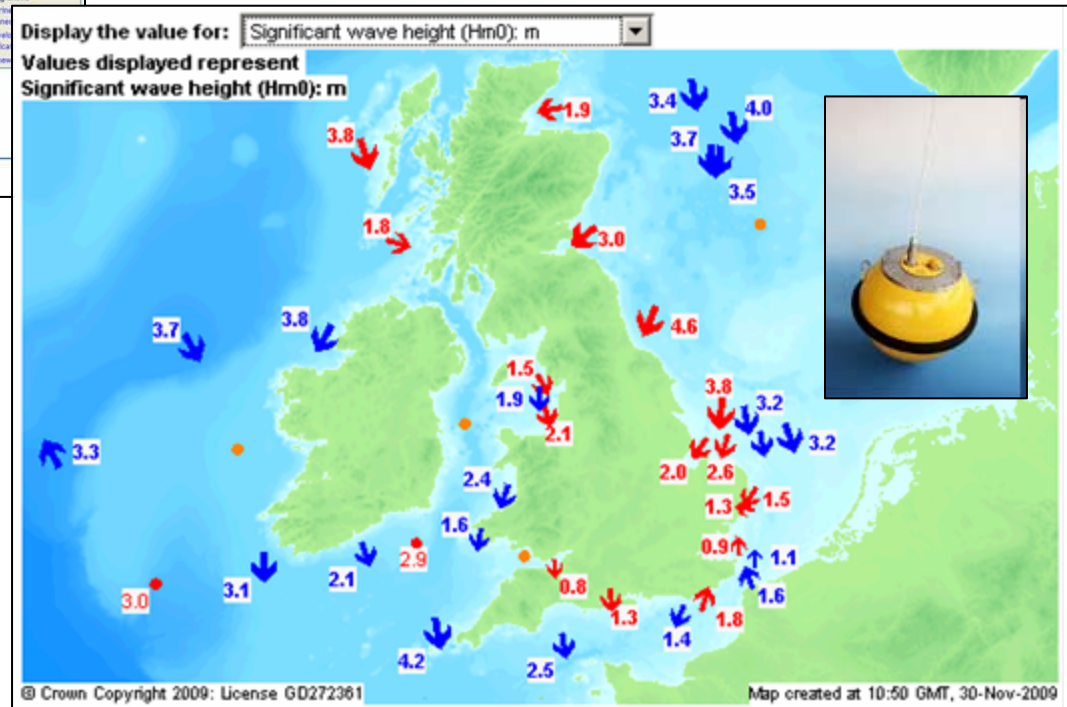
WaveNet

The Defra strategic wave monitoring network for England and Wales (now extended into Scotland)

www.cefas.co.uk/wavenet



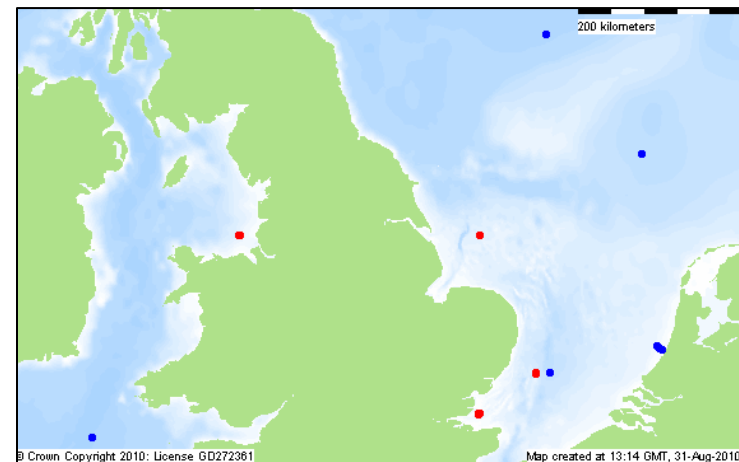
Includes data from Met Office buoys and lightships, CEFAS wave buoys, Shell metnet platforms, Irish buoys, Environment Agency wave buoys etc.





CEFAS SmartBuoys

- Measurements include: temperature, salinity, chlorophyll fluorescence, suspended particle load, downwelling PAR, nutrients
- Data applications
 - Improved understanding of environmental variability
 - New insights into ecosystem function
 - Monitoring change in marine biodiversity
 - Ecosystem model validation and testing
 - Ecosystem early warning and forecasting





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