NOOS annual report 2017

Member report – CEFAS

August 2012

Country	UK
Institution	Centre for Environment Fisheries and Aquaculture Research
Observations Status and new initiatives	1) WaveNet

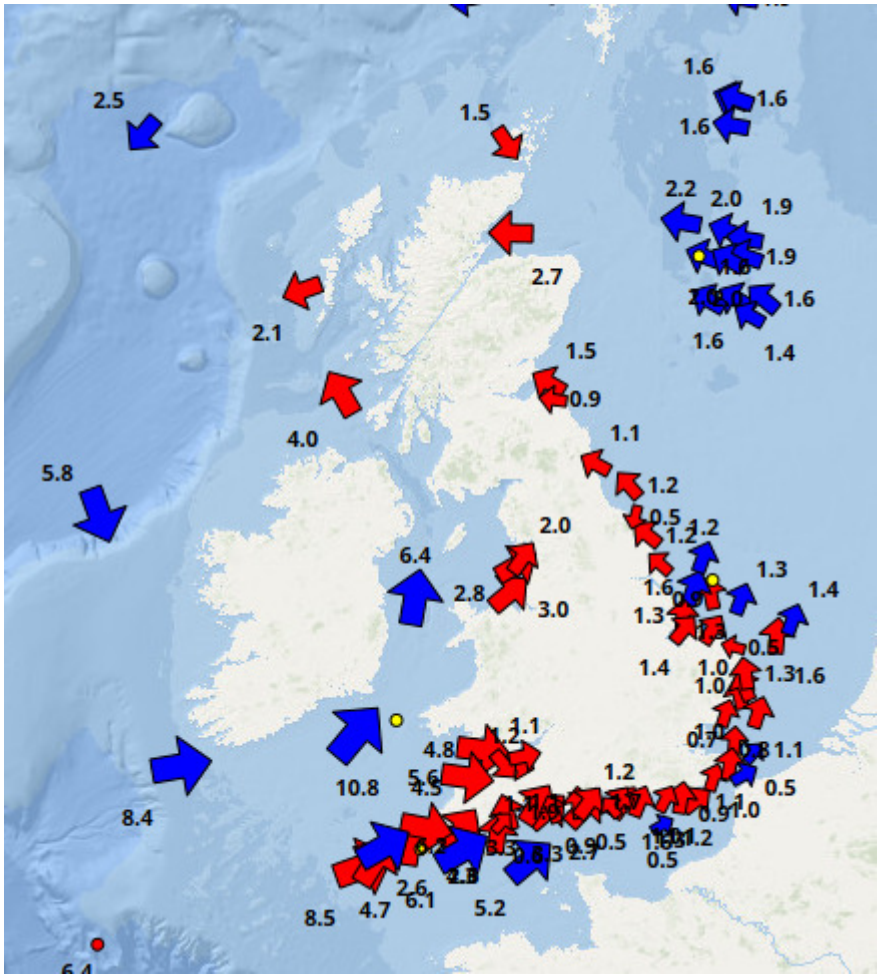

Figure 1 – Snapshot of significant wave heights from Wavenet website during Storm Ophelia.

Figure 1 shows the extent of Wavenet as of Autumn 2017. Virtually all public and commercial real-time wave feeds have been gathered together in the WaveNet system applying consistent QA/QC procedure on a nationwide scale. This combines data from the Oil and Nuclear Industries as well as some of the renewables sector in addition to the publicly funded buoys from the UKMO (K series), Irish Buoys (M series), CCO (Channel Coastal Observatory) and Cefas' Buoys operated on behalf of UK Coastal Flood Forecasting Service.

2) SmartBuoy

Cefas continues to operate 4 SmartBuoys at Liverpool Bay, West Gabbard , Warp and Dowsing sites serviced on a 3-monthly basis. The platforms continue to be testing sites for novel sensors including 3- axis accelerometers and micro nutrient sensors (NOC). The buoys continue to be a key part of the UK's evidence base for a number of EU Directives.

- There have been 56 published peer reviewed publications using SmartBuoy data from 2002 to date, plus 6 completed PhD theses and 8 current PhD students

using SmartBuoy data.

- SmartBuoy data was fundamental to the recent UK OSPAR eutrophication assessment.
- In addition to meeting Defra monitoring requirements, SmartBuoy data have been used for validation of satellite products (e.g. the EU HIGHROC project) and marine ecosystem models (e.g. Shelf Sea Biogeochemistry research programme), and providing in situ data for marine ecosystem research programmes (e.g. Marine Ecosystem Connections and Shelf Sea Biogeochemistry research programmes).

3) Ferrybox

The underway Ferrybox system on the Cefas Endeavour continues to operate, collecting biogeochemical parameters including seawater pCO_2 and phytoplankton functional types with a flow cytometer (Cytosense). Additionally, marine litter is monitored with an automated underway sampler. A passive sampler system is fitted for ecotoxicology studies and a Plankton Imager analyser (PIA) have been installed. We've also been monitoring pH using a state of the art ISFET sensor.

4) Autonomous Surface Vehicle

Cefas operate the Liquid Robotics Waveglider *Lyra* which has been used on a number of research and proof of concept campaigns. Highlights include using satellite observations to determine the key location to take water samples on the Dogger bank during a harmful algal bloom; linking biogeochemistry sampling at SmartBuoy sites. Future plans include operating fisheries acoustics as part of the NERC- Defra AlterECO campaign.

5) Satellite Observations

Cefas is part of Defra's Centre of Earth Observation Centre of Excellence (EOCoE) utilising a wide range of satellite products (ESA Sentinel) to monitor both the terrestrial and marine environments. Various projects are developing cross-cutting tools (MEO-Ap), determining pressures (Marine AIS for Shipping Intensity maps, MCZ monitoring and Air Quality) besides determine the extent and duration of impacts (e.g. suspended sediment plumes from offshore Windfarms).

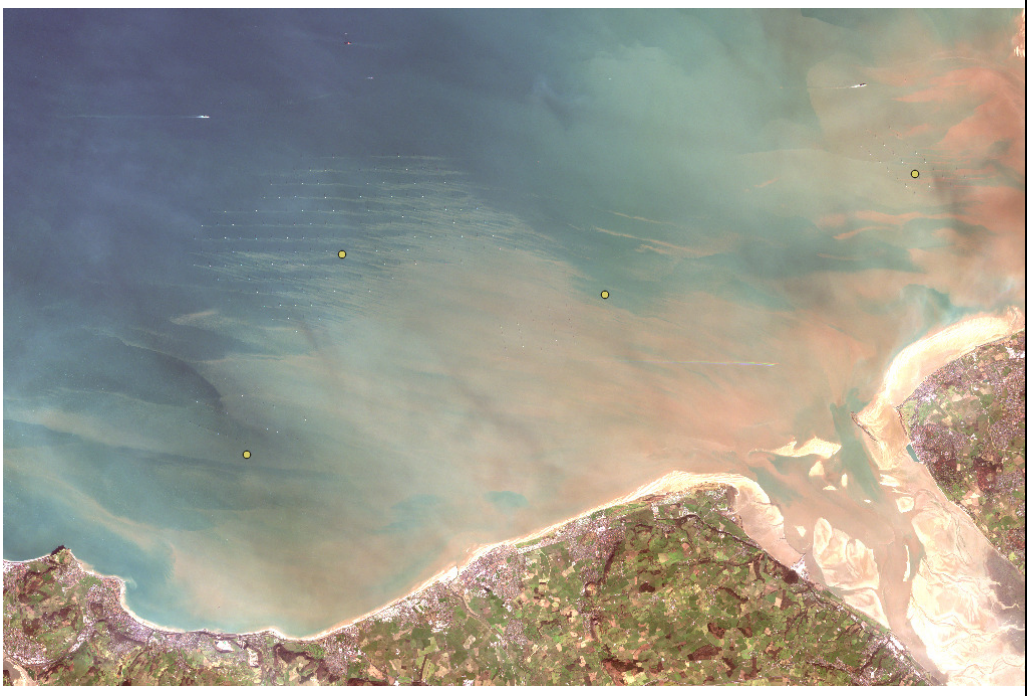

Figure 2 - Sentinel 2 Image of suspended sediment plumes from Offshore wind farms in Liverpool Bay.

Modelling Status and new initiatives	Cefas continues to contribute to the EG (Environment Group) in Marine emergencies providing advice to Defra, MMO (Marine Management Organisation), JNCC (Joint Nature Conservation Committee) and FSA (Food Standards Agency) as well as the Coastguard. The trajectory modelling relies on flow fields from Copernicus and Cefas' own high resolution Telemac model with river inputs. These provide the base data from which commercial products such as OSCAR and Chemmap provide the behavioural trajectories and budgets (utilising UKMO wind fields). Post incident monitoring is undertaken using the PREMIAM guidelines (https://www.cefas.co.uk/premiam.aspx?RedirectMessage=true). Cefas has also developed Forensic Oceanography services to various Police authorities around the UK and the NCA (National Crime Agency). Advice on potential trajectories of Missing persons has been used to optimise police procedures to maximise the use of Police assets in order to get closure for the family. Also used in backtrack mode for narcotics and determine likely entry points for recovered bodies.
Dissemination Status and new initiatives	In support of our commitment to open data access and open science, we have launched the Cefas Data Hub – an online portal allowing the public and UK businesses to explore, download and reuse the data for their own research (Open Government Licence terms and conditions apply). Datasets available include many of our legacy datasets covering subjects such as fish, shellfish and plankton survey data from the 1980's to the present day, records relating to MEDIN Marine Fisheries Data Archive Centre, water temperature, salinity, and sediment data from across the UK continental shelf. Additional data is published on a monthly basis. The Cefas data hub page is currently being updated, and we hope to include data visualisation tools and highlight particular datasets regularly in future. The Cefas data hub is also one of the virtual access infrastructures for Jerico Next. In addition to the wide range of data available on the Cefas Data Hub, the SmartBuoy data are available in NRT on the Cefas website and NOOS and EMODnet portals. Wave data can be downloaded from the Cefas WaveNet website for certain buoys only. This single data source provides the best possible data quality assurance for downloaded wave data. Data downloads are recorded as this constitutes one of the key KPIs of the project funder. MeoAP is the marine node of the Defra EO collaboration platform. It is a bespoke "one stop" portal delivering EO products identified by government and other users as essentials for marine monitoring, meeting requirements and delivery. Funding has been secured for two further years, and the portal will be populated with the best Chl-a, SST, SPM and pressure (from human activities) maps for all UK waters. It will go live in FY 2018/2019 but products will be available on request prior to this.
Relevant national projects	CEFMAT - The old EMECO tool has been replaced by a new assessment tool 'CefMAT' that is significantly more robust and secure, and can produce a wider range of assessments using a wide range of parameters. The assessment tool can generate data products that correspond to MSFD and OSPAR indicators assessment outputs (a full talk on this will be made in the meeting). AlterECO exploring the differences between Fisheries acoustic sounders on a glider and that on the Cefas Endeavour.
Relevant International projects	JERICO-NEXT – Cefas are involved in the JERICO-NEXT project –leading WP6 on virtual access to data and services. We are also working in JRAP 1 on innovative technologies for determination of phytoplankton diversity and biomass. HIGHROC – Cefas data (discrete samples (HPLC pigments, SPM, light profiles for kd-par), FerryBox and SmartBuoy data) have been used extensively in the HIGHROC project to validate remote sensing products. During the project we have worked particularly on improving calibration of sensors on the platforms and conversion of fluorescence to chlorophyll. Eunosat – this project will work to align eutrophication indicator measurements and assessment methods to improve the coherence and consistency of GES assessments in the

	North Sea, with a particular focus on chlorophyll. Shelf Sea Biogeochemistry – Cefas is continuing our science using the extensive data collected from the 2014-2015 SSB campaign. This includes 2 SmartBuoys, FerryBox, and 5 seabed lander locations. Seabasin Checkpoints – Cefas is involved in the Atlantic checkpoint, testing the data infrastructures to answer specific questions related to climate, fish and eutrophication.
Additional information	

Annex 1 :

Annex 2 :