

EMODnet Physics from data to use cases

Antonio Novellino, ETT SpA (Italy), antonio.novellino@ettsolutions.com

Marco Alba, ETT SpA (Italy), marco.alba@ettsolutions.com

Patrick Gorringe, Swedish Meteorological and Hydrological Institute, SMHI (Sweden),

Patrick.Gorringe@smhi.se

Luca Bonofiglio, ETT SpA (Italy), luca.bonofiglio@ettsolutions.com

Introduction

EMODnet-Physics map portal (www.emodnet-physics.eu/map) has been developed for the past 10 years and nowadays provides a single point of access to in situ datasets, products and their metadata. Time series and datasets are made available, as recorded by fixed platforms (moorings, tide gauges, HF radars, etc.), moving platforms (ARGO, Lagrangian buoys, ferryboxes, etc.) and repeated observations (CTDs, etc.). Apart from these data, EMODnet Physics is developing interoperability services to facilitate machine-to-machine interaction and to provide further systems and services.. These features range from widgets to WxS OCG compliant services.

Products

Datasets are organized in products and are discoverable by many interfaces: the catalogue (catalog.emodnet-physics.eu), map-viewer (emodnet-physics.eu/map), thredds (thredds.emodnet-physics.eu), erddap (erddap.emodnet-physics.eu) and geoserver (geoserver.emodnet-physics.eu). The following paragraph lists the key available products:

a. Temperature and Salinity in the water column

Temperature, in the water column, is a vital component of the climate system and its variability. Salinity observations contribute to monitoring the global water cycle, ocean density and mass, etc. In situ observations available in EMODnet Physics are taken from a variety of catalogues (e.g. CMEMS INSTAC, SDN, IOOS, IMOS, etc.) linking platforms with a large range of spatial and temporal scales.

b. Sea Surface Currents

Ocean surface general circulation is responsible for significant surface transport of heat, salt, passive tracers and ocean pollutants. The existing surface current observing systems (moorings, Lagrangian drifters) capture much of this range. EMODnet Physics is combining these observations together with land-based HF radars observation that offer a high-resolution tool (with limited spatial coverage) for improved understanding of surface currents, eddies and air-sea fluxes, and exchange between coastal waters and the open ocean.

c. River Runoff Data

River runoff exert a strong influence in their neighbouring coastal area in several ways, modifying water stratification, introducing significant fluctuations in circulation patterns and modulating the impact of upwelling events. EMODnet Physics developed a dedicated data infrastructure to manage and give access to in situ river runoff operational data (~170 stations) and historical trends (~550 stations - based on the Global Runoff Data Base collection).

d. Total Suspended Matter

Total Suspended Matter (unit: % of suspended particles, not dissolved) is a gridded product based on the CoastColour L2W Concentrations Data, obtained from the OC4 algorithm for clear and moderate turbid waters, and from the CoastColour v1 neural network. The L2W product is then remapped on a regular grid,

maintaining 300m full resolution, in order to obtain products over the European sea basins and monthly averaged. The product covers the period 2012 – 2013.

e. Sound Maps and acoustic pollution

EU Technical Group on Underwater Noise (TG-NOISE) has made progress on this concept and has lately started discussing how to implement the MSFD indicator. It is also likely to combine and correlate sound/noise maps vs biodiversity maps. The noise map can be based on ship density maps combined to a model of noise propagation at sea. This product should be calibrated (or the map uncertainty should be assessed) by in situ data. EMODnet Physics is implementing such an approach by running the pilot for the areas in which in situ data is available, and it is developing a common method to manage and federate the in situ operational SPL data.

f. Wave and winds – Sea State

Sea State is the characterisation of wave and swell, typically in terms of height, wavelength, period, and directional wave energy flux. These data are accessible in EMODnet Physics, integrating several data sources (Data Buoy Cooperation Panel, regional observations in Europe – CMEMS INSTAC, US - IOOS, Australia – IMOS, etc.) into one single catalogue. Operational data are aggregated into a synoptic dynamic view.

Use cases

Users are at the centre of EMODnet's services and resources. The data and the data products provided by EMODnet physics are important for many applications. To understand the full benefits of EMODnet, users have been asked to describe how EMODnet supports them in their daily work and activities; if they have developed an application using EMODnet products or if they use EMODnet data for other purposes. Thanks to the developed features in EMODnet Physics, many different users have started to link and use the data. . Results and significant use cases come from SINDBAD Operational service to support navigation, CMEMS in Situ TAC where EMODnet Physics has developed a user-friendly interface to improve the viewing service developed for outreach and promotion activities. Other examples are DLR's German Remote Sensing Data Center (DFD) and Remote Sensing Technology Institute (IMF), DHI and HyMOLab-University of Trieste and others that will be presented and can be viewed at <https://www.emodnet.eu/en/use-cases>.