ID5- EMODNET PHYSICS AND RIVER RUNOFF DATA MANAGEMENT

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Abstract
Rivers runoff exert a strong influence in their neighbouring coastal area in several ways, modifying the water stratification, introducing significant fluctuations in circulation patterns and modulating the impact of upwelling events. This paper presents data management methods and standards to make harmonised river data available and accessible.

Keywords – River Runoff, data management, climatology, MOHID Land model, forecast, near real time data

I INTRODUCTION

Rivers runoff exert a strong influence in their neighbouring coastal area in several ways, modifying the water stratification [1], introducing significant fluctuations in circulation patterns and modulating the impact of upwelling events [2,3]. In the current context of a global decline of the hydrometric networks [4], the uncertainties include the river runoff reaching the coast and most of the water properties as temperature, salinity, etc. For this reason, river climatologies are generally imposed in the land boundaries of coastal or regional ocean models, ignoring river variability in flow and other associated properties. Anyhow, the main weakness of river climatologies is its incapacity to include the interannual variability compared to watershed model applications that agree with the main river flow trends. On the other hand, watershed models tend to overestimate river flows, especially during dry seasons, as they are closer to the natural flows and thus disregarding fresh water human management [5]. This current approach for freshwater incorporation into regional models translates into a poor representation of the sea surface salinity due to the large uncertainties remain regarding the runoff and river discharges that force the models [6].
Near real time data near the coastal area is not easily accessible in many countries and information and, when available, data sources provide access to the data in webpages in the local language under many different data formats. Fresh water management differs greatly among countries, in some the water is managed by a national agency (i.e. Portugal and Ireland) while in others are the regions the specific bodies for large watersheds or regions can coexists (i.e. Spain and Italy). This organisation for collecting river data increases data fragmentation. Global databases (such as the Global Runoff Data Base) collect and distribute historic data however they fail to provide operational near real time data. In addition, there are rivers where monitoring is absent, or stations were data provided consist only in water levels that without a flow conversion curve and thus not useful for obtaining the river contributions at the coastal area.

II. EUROPEAN MARINE OBSERVATION AND RIVER DATA NETWORK

EMODnet [7] is a long-term marine data initiative from the EU Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE) involving more than 150 organisations for assembling marine data, products and metadata. It has been developed through a step-wise approach and is currently in its third and final development phase. The organisations involved work together to observe the sea, process the data according to international standards and make that information freely available as interoperable data layers and data products. EMODnet provides access to European marine data across seven themes: bathymetry [8], geology [9], seabed habitats [10], chemistry [11], biology [12], physics [13] and human activities [14]. For each theme, EMODnet has created a gateway to a range of data archives managed by local, national, regional and international organisations. Users have free access to standardised observations, data quality indicators and processed data products.
The acquisition of physical parameters is largely an automated process that allows the dissemination of near real time information. In particular, EMODnet Physics is a stock-share portal strongly federated to the Copernicus Marine Environment Monitoring Service in situ Thematic Assembly Center (CMEMS In Situ TAC). Historical validated datasets are organized in collaboration with SeaDataNet and its network of National Oceanographic Data Centers.
The EMODnet Physics portal is currently providing easy access the following products: wave height and period; temperature and salinity of the water column; wind speed and direction; horizontal velocity of the water column; light attenuation; sea ice coverage and sea level trends. Lately, EMODnet Physics started working on river runoff data, total suspended matter and underwater noise.

III. RIVER DATA – A RECENT EMODNET PHYSICS PRODUCT

For the reasons described above, EMODnet Physics has started gathering, harmonizing and making available near real time river runoff and in situ river run off trends (monthly and annual means). EMODnet Physics developed a dedicated data infrastructure to manage river station, and both near real time (about 100 stations; Fig. 1) and historical trends (in situ trends are an EMODnet Physics product and are computed from the Global Runoff Data Base) are available.
The main objective is to provide river observations integrated and distributed in a single platform with a common format and including relevant metadata information able to help coastal managers and to acknowledge data providers (Fig.2). Current activities include to identify the institutions responsible for maintaining the hydrographic network at each region/country and to select the most convenient and reliable stations near the coastal area. For the later, EMODnet physics is collecting valuable information from coastal/ocean experts and operational observations will be increasingly made available to the public and

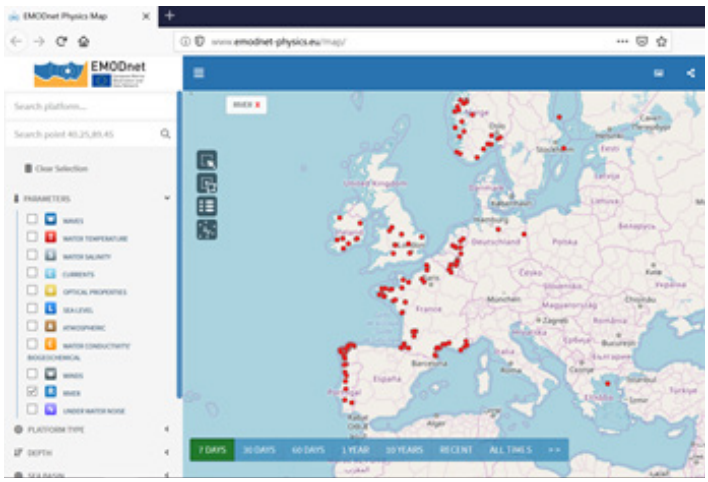

Fig 1. River Station EMODnet Physics

research community through the EMODnet physics webpage.
Key progress on the river data inclusion activities are:
• Ingestion of more and new operational systems: EMODnet Physics is now connecting platforms from Portugal, Spain, France, Germany, Belgium, Ireland, UK, and Italy. Data structure follows the already adopted for the management of data coming from the other networks: transport file is netcdf v3.6 (and v.4.0), data is be stored in a data server with three folders according the data age: latest, monthly and history. CF convention/SeaDataNet P09 are used for parameters.
• In situ river outflow trends, computed from the Global Runoff Database, with

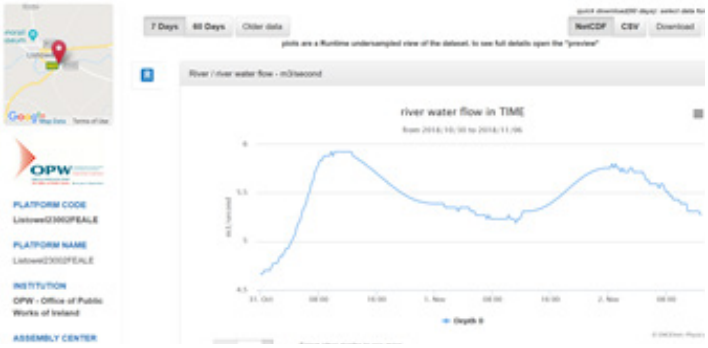

Fig 2. Example of an Irish river runoff station in EMODnet Physics

data coverage until 31/12/2016.

IV. CONCLUSIONS

The efforts to make available near real time river data is being welcomed by the community such as the EUROGOOS coastal working group and the CMEMS Monitoring Forecast Centres (MFCs) that are interested in improving their thermohaline circulation in coastal areas by a better characterisation of the land-marine boundary conditions.

However, many hydrographic networks mainly focus in river water levels and/or flows and other relevant variables such as temperature, which is important for the generation of thermal fronts near the coastal areas, is not measured operationally in many regions. Numerical models can provide unmonitored variables, fill network gaps and generate forecasts. Watershed applications, based on MOHID Land model [15], will be made available through the same platform in the next future in order to provide a consistent product for coastal managers.

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