The concept of featured data services in the PORTO interface

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In the last decade, the valuation of ocean information and the drive to make marine data more freely accessible to a wider range of users have been on the agenda of many initiatives with some tangible results. In Europe, the COPERNICUS and EMODnet web platforms have been consolidated with an increasing set of data products and user support services appealing to an audience that goes beyond the research community. SeaDataNet and subsequently SeaDataCloud have contributed to synergise national ocean data centres on a common operationally robust data infrastructure providing access to ocean and marine metadata, data and data products, based on common data management standards, promoting data archaeology, and providing secure data archival.

There has been a proliferation of web data services focusing on the delivery of essential datasets targeted to specialised users, and often linked to international and regional initiatives such as with observational programmes or thematic networks. The IOC Ocean Data and Information System (https://catalogue.odis.org/) provides an online browsable and searchable broad worldwide catalogue of existing ocean related web-based data and information sources, including products and services. The evolution of these web data services has matured to provide user-friendly systems, adopting increasing functionalities to aid the users in data discovery, online visualisation, data subsetting and download criteria including variable data formats.

The digital era has opened new realms for ocean data delivery. As more users become dependent on reliable information deriving from multiple sources data, the non-professional users are increasing in numbers whose demands are different from those of professional users. Technology is leading to a step shift in the value addition chain of data to information, knowledge and intelligence, providing sophisticated user experiences online, with faster delivery and service elaborations on a wider range of more affordable smart mass media like iPhone, iPad and other wireless devices. While providing more elaborated deliveries to expert users, the digital environments add a new dimension to data services by matching user experience, expectations and demand.

This has led to the concept of featured data services. In contrast to the traditional generic services, the featured services are usually dedicated to a category of users with specific needs, providing routine data-derived products to support their operational day-to-day activities or production lines. User categories can be from industry, such as in relation to the tourism sector to provide a higher-level information service according to user location, demanded facility, and specific real-time request. Compared to the static delivery of pre-prepared products determined at source, the featured web services use a dynamic added value production composed directly by the online user who can customise the service to fit a specific need or query. Four essential ingredients of featured services are: (i) GIS-like web tools for geographic rendering and mapping; (ii) user specified dynamic content delivery; (iii) online functionalities to elaborate data online; and (iv) real-time updating of data and information.

The CALYPSO South project (www,calypsosouth.eu) is pioneering in featured data services through the PORTO interface which follows on the experience gained in the KAPTAN online and smartphone

application. PORTO is an integrated online service of met-ocean information delivered to especially aid harbour masters, port authorities and operators in the shipping and maritime services in the proximity of the Maltese Islands and south of Sicily. The initiative follows the trail of efforts to deliver services deriving from operational oceanography and meteorology to dedicated users. The PORTO service package entails the use of web-based tools that give the user a direct handle to view, analyse and compare different datasets online such as through user-selected geographic sub-domains, transects, inter-comparison of sites and overlaying of data layers. The novelty of PORTO is that it allows the user to combine data on user-dedicated request employing augmented web features to customise the use of the online data. A drawing board allows the user to adapt the viewing the content. The interface also provides early warning alerts on extreme events such as gale winds, high waves or strong currents, serving as important indicators to operators who can avail of such information to mitigate adverse conditions.

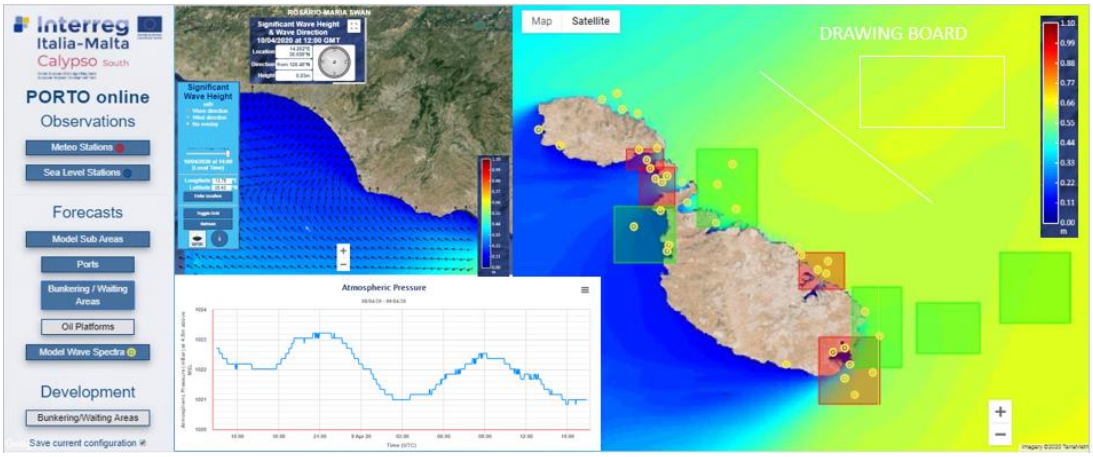

Figure. 1: Snapshots of the PORTO online service delivery

The PORTO interface is based on Google Maps JavaScript API. Using this API it is possible to display geo-referenced data as an image over various types of maps, such as satellite images of the area, terrain or street maps. The control panel on the interface allows users to select from various layers of data that are available, while the data panel displays details for the selection and elaboration of selected data points. Clicking on the various map features such as sub-area categories opens new windows displaying more detailed information and further data pertaining to the specific feature.

The interface was developed using Bootstrap, and is therefore responsive and mobile friendly. It is deployed as a Progressive Web App allowing users to eventually download it onto their mobile device for easy access. It utilises HTML5's local storage facility to be able to save the user's preferred configuration from one session to the next. Interaction between the interface and the server is through one of two Simple Object Access Protocol (SOAP) web-based services. These web services expose a number of functions, which can be called using AJAX (Asynchronous JavaScript And XML). When a user selects a feature to view, the interface calls the appropriate function on the web service, with elaborations on the area of interest and the time frames required. On the server side, the function retrieves the relevant data, either by sending an SQL request to a database, or by running a script to read the data from a text file. The data is then packaged as an XML (eXtensible Mark-up Language) object and transmitted back to the interface.

Data for the interface comes from various sources, including both observations and numerical model data. Key data in PORTO are real time observations from ten meteorological stations, four sea level gauges and seven HF radars belong to the CALYPSO network; numerical model data for atmospheric parameters, waves, currents sea surface temperature and salinity; satellite data from different platforms. The raw model data outputs are further elaborated to extract secondary data, which is also available to the user. It is intended to package the PORTO interface as a Progressive Web App to deliver the service on mobiles without the need of developing a dedicated smartphone application.

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