IBISAR: Skill Assessment service for real-time ranking of met-ocean data products in the IBI area for emergency and SAR operators

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To support marine response and crisis management, a set of accurate near real-time (NRT) operational data and model forecasts is crucial. Search & Rescue (SAR) and environmental risk modelling applications are mostly based on the Lagrangian discrete particle algorithms. They rely on appropriate currents and wind forecasts to accurately predict oil's future drift or trajectories of drifting targets to determine an optimal search region. With multiple ocean forecasting datasets now available, the growing strategy is to ensure the availability of NRT datasets in a specific region, and to use all of them to develop a consensus of opinions from the various outcomes on what might occur.

If different forecast datasets result in disparate trajectories, there are multiple practical outcomes, and a low level of confidence in each of the predictions. In such context, the key over-arching concern of many targeted users is the impact of inaccurate data on decision-making, since it can result in erroneous estimation of the necessary resources and even in some extreme cases in lost lives. Moreover, the increasing complexity of high-resolution ocean models may require Skill Assessment (SA) methods that quantify the model performance, by providing easily interpretable and understandable metrics.

The other part of the answer lies in providing a confidence indicator of the forecast in a systematic and long-term routine manner, through user-friendly tools. The IBISAR SA service, built on an existing operational service, consists of an automated process that first simulates the trajectory of a particle for the available met-ocean datasets. Then, the process evaluates the model performance, by comparing pairs of observed and predicted trajectories to provide a dimensionless skill score metric. Surface current data from multi-platform observing systems (e.g. drifting buoys, satellite-derived observations, High-Frequency Radar -HFR- and moorings) are used to help estimate errors in NRT in the forecast outcomes, using Eulerian or Lagrangian approaches.

IBISAR is a restricted service available then only for registered users. A link to the IBISAR private service will be available on the dedicated webpage (draft as shown in Figure 1). Subscribers (targeted users) will be able to easily access the met-ocean data for downloading, visualizing and comparing different data products, assessing the quality (SA) of different model predictions and HFR performance in comparison with real-time or historical measurements. The service focuses on the IBI (Iberian-Biscay-Ireland) region, supporting a myriad of socio-economically important activities including fisheries, oil and gas shipping, commercial ship traffic, coastal and marine environment management and protection, marine safety and energy production.
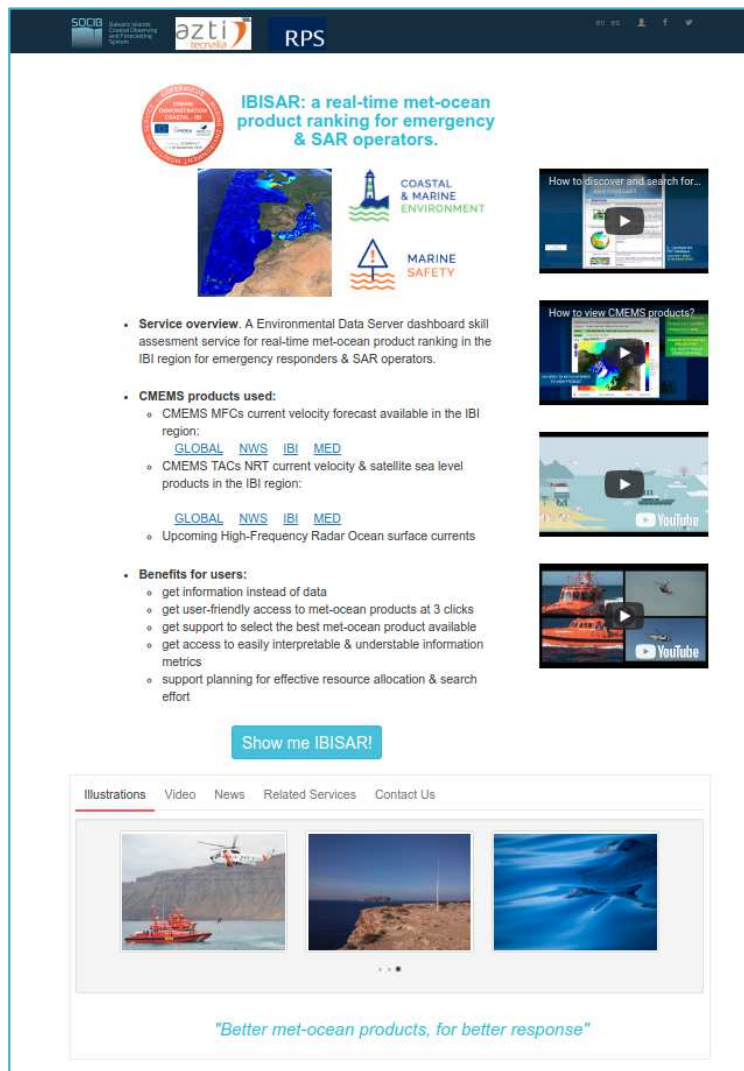
Figure 1: Draft of the dedicated webpage for the demonstration of the IBISAR downstream service

The improvement, validation and promotion of IBISAR service are being carried out by a Public-Private Partnership (PPP) between an advanced Marine Research Infrastructure and data provider (SOCIB, public sector), a Technological Centre with expertise on marine and food research (AZTI, private non-profit organization) and a Downstream Service Provider (RPS Ocean Science, private sector), under the umbrella of CMEMS (Copernicus Marine Environment Monitoring Service) User Uptake programme. Furthermore, the Spanish SAR Agency (one of the prime targeted users of this service) has been engaged with support of RPS Ocean Science. RPS has been providing added-value products and tailored services to this specific sector since more than a decade.

Knowing and understanding targeted users (e.g. SAR operators, emergency responders and other maritime safety, coastal and marine environment actors) needs, will enable IBISAR SA to serve as a decision-support tool to help guide users to choose the best available met-ocean product as input for their SAR and environmental risk modelling applications. Moreover, IBISAR service will help them to:

- Get information instead of data through a user-friendly, quick, and intuitive process.
- Get access to a dynamic and continually updated inventory of datasets.
- Get access to models assessments by means of easily interpretable metrics.
- Better support emergency management preparations at sea.
- Support immediate response and more secure search operations.
- Support planning for the most optimal search area.