Operational skill assessment of the IBI-MFC Ocean Forecasting System within the frame of the CMEMS.

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Since operational ocean forecasting systems (OOFSs) are increasingly used as tools to support high-stakes decision-making for coastal management, a rigorous skill assessment of model performance becomes essential. In this context, the IBI-MFC (Iberia-Biscay-Ireland Monitoring & Forecasting Centre) has been providing daily ocean model estimates and forecasts for the IBI regional seas since 2011, first in the frame of MyOcean projects and later as part of the Copernicus Marine Environment Monitoring Service (CMEMS). A comprehensive web validation tool named NARVAL (North Atlantic Regional VALidation) has been developed to routinely monitor IBI performance and to evaluate model's veracity and prognostic capabilities.

Three-dimensional comparisons are carried out on a different time basis ('online mode' – daily verifications - and 'delayed mode' – for longer time periods -) using a broad variety of in-situ (buoys, tide-gauges, ARGO-floats, drifters and gliders) and remote-sensing (satellite and HF radars) observational sources as reference fields to validate against the NEMO model solution. Product quality indicators and meaningful skill metrics are automatically computed not only averaged over the entire IBI domain but also over specific sub-regions of particular interest from a user perspective (i.e. coastal or shelf areas) in order to determine IBI spatial and temporal uncertainty levels.

A complementary aspect of NARVAL web tool is the intercomparison of different CMEMS forecast model solutions in overlapping areas. Noticeable efforts are in progress in order to quantitatively assess the quality and consistency of nested system outputs by setting up specific intercomparison exercises on different temporal and spatial scales, encompassing global configurations (CMEMS Global system), regional applications (NWS and MED ones) and local high-resolution coastal models (i.e. the PdE SAMPA system in the Gibraltar Strait).

NARVAL constitutes a powerful approach to increase our knowledge on the IBI-MFC forecast system and aids us to inform CMEMS end users about the provided ocean forecasting products' confidence level by routinely delivering QUality Information Documents (QUIDs). It allows the detection of strengths and weaknesses in the modeling of several key physical processes and the understanding of potential sources of discrepancies in IBI predictions. Once the numerical model shortcomings are identified, potential improvements can be achieved thanks to reliable upgrades, making evolve IBI OOFS towards more refined and advanced versions.