How an Operational Validation Framework Supports Reliable Regional Forecasts and Coastal Services

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Operational ocean prediction services require systematic and traceable evaluation to ensure that model developments improve forecast quality and that delivered products remain fit for downstream applications. Within the Copernicus Marine Service, the Iberia-Biscay-Ireland Monitoring and Forecasting Centre (IBI-MFC) has established an operational product quality framework that links scientific verification, pre-operational release qualification, routine operational validation monitoring, and feedback from users (especially, coastal downstream services). This contribution presents that framework and illustrates how regional forecast evaluation can support service-oriented decisions in the European North-East Atlantic and adjacent shelf seas as well as scientific evolutions.

IBI-MFC provides 1/36° physical, wave, and biogeochemical products through near-real-time analyses and forecasts with lead times of up to 10 days, together with multi-year reanalyses beginning in 1993 (and in 1980 for waves). Product quality is assessed through NARVAL multi-observation and multi-model approach that combines satellite and in situ reference data with comparisons against other forecasting systems in a robust validation framework based on GODAE/OceanPredict best practices. This framework also evaluates whether regional products provide suitable information for downstream services. To further support downstream use of regional Copernicus Marine core products, IBI-MFC continues to refine and expand its product portfolio. For instance, in the upcoming operational IBI-MFC November 2026 release, the IBI product portfolio will include a new wave spectra dataset, enabling improved operational nesting of coastal wave models within the IBI regional wave solution.

Moving toward the coastal downstreaming side, the EUSCOMvu project (fostered by the Copernicus Marine User Engagement Program) applies a multi-parameter operational assessment to the EUSkadi coastal forecasting system in the Gulf of Biscay. The service supports search and rescue, marine environmental management and protection, and coastal planning. Comparisons between the coastal system and its IBI parent solution demonstrated the added value of high-resolution coastal downscaling and identified limitations in the regional representation of river freshwater inputs. This assessment has supported and informed the introduction of improved river forcing in the incoming IBI-MFC release, based on the uses of the Copernicus Emergency Management Service - European Flood Awareness System product.