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The Black Sea physical reanalysis system for the Copernicus Marine Service: description and skill assessment

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The Black Sea physical reanalysis system (BS-RAN) is a Multi Year Product (MYP) of the CMEMS catalogue which delivers reanalyses of the main ocean physical parameters over the last decades. It is part of the BS-MFC numerical ocean prediction system. The quality of the reanalysis is assessed with the Estimated Accuracy Numbers (EANs), which represent a key information for the downstream services and users of both the short-term forecasts and reanalysis products.
The BS-RAN and its counterpart the BS Forecasting and Analysis System are both based on the same hydrodynamic and data assimilation cores. The hydrodynamic model NEMO version 3.4 is implemented over the whole BS basin with 31 vertical levels and an horizontal grid resolution of about 3 km (1/36° and 1/27° in the zonal and meridional directions, respectively). The data assimilation system OceanVar corrects the model forecast according to observations with a variational scheme (3DVAR) operating in EOF space. It was originally developed for the Mediterranean Sea and later extended also to the global ocean. The assimilated observations include in-situ profiles, along-track sea level anomalies (SLA), and gridded sea surface temperature (SST) provided by Copernicus TACs.
This work presents an overview of the BS-RAN quality assessment, along with sensitivity experiments conducted to improve the data assimilation system. It also investigates the possibility to routinely perform comparison with independent or quasi-independent datasets in the next system releases.