The BS-MFC service and system evolutions within Copernicus Marine Service

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The BS-MFC (Black Sea Monitoring and Forecasting Centre) since 2016 is guaranteeing production and delivery of high quality ocean analysis, forecast and reanalysis fields for essential variables, biogeochemical quantities and waves in the Black Sea region within the Copernicus Marine Service. A reliable and robust service infrastructure serves both the production systems and data delivery, through ad hoc technical interfaces, for an efficient update of the catalogue, which includes 22 datasets for physical variables, 22 for biogeochemical variables and 4 for waves. Additionally, a Local Service Desk is in charge for ensuring connections among BS-MFC, CMEMS and Users with the scope to support end-users in using BS-MFC data for downstream applications from the technical and scientific perspectives. The production centres are the core of the BS-MFC: Physics, Biogeochemistry and Waves units implemented, over the Copernicus 2 Programme, state-of-the-art and advanced numerical approaches to improve the quality of the near real time and multi year products. In the 2020, in particular, the BS-Physics team proposed a new reanalysis product, based on new version of the hydrodynamical core model, based on NEMO v3.6, with assimilation of CMEMS observations (e.g. insitu temperature and salinity profiles, including also historical dataset provided by SeaDataNet, and sea level anomaly satellite data) and forced by ECMWF ERA5. The BS-Physics team is working also on preparing the new version of the near real time system, that will provide spatial high resolution analysis and forecast products, using a new version based on NEMO v4.0, online coupled to data assimilation scheme, with optimal interface with the Mediterranean Sea. BS-Biogeochemistry team updated the overall catalogue, with new near real time system, based on NEMO v3.6 online coupled to BAHMBI model, with new carbonate model, able to assimilate new chlorophyll satellite data provided by the CMEMS OC TAC; regarding multi year product, the BS-Biogeochemistry team delivered new datasets, generated by the new NEMO-BAHMBI coupled system forced by ECMWF ERAS – totally aligned with the near real time
system, without data assimilation - for reconstructing the past biogeochemical sea state in the Black Sea. BS-Waves team updated the overall catalogue as well, with new near real time system based on state-of-the-art WAM Cycle 6.0, one-way coupled with hourly currents fields provided by the BS-Physics near real time system; a new reanalysis, from 1979 to 2019, has been also delivered, based on same core model as the near real time system, forced by ECMWF ERA5 atmospheric forcing, and able to assimilate the significant wave height provided by CMEMS SL TAC. Systems are monitored through a product quality dashboard, based on standards inherited from GODAE/Oceanpredict and MERSEA/MyOcean (which includes CLASS 1, 2 and 4 metrics).