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Validation of ocean-meteorological models in the Southeastern Bay of Biscay

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This contribution is focused on the validation of the modelling forecasts provided by the operational ocean-meteorological system established for the Basque Country region (Southeastern Bay of Biscay). The system, implemented and developed within the Framework of ETORTEK Programme (Department of Industry, Trade and Tourism of the Basque Government), brings together climatological, oceanographic and meteorological institutions, in order to improve the way in which these services are working presently and merge the products in a unique operational system. This modelling system, working at several time-scales, includes: (1) the Global Forecast System (GFS), and the PSU/NCAR mesoscale model (MM5) to provide atmospheric information; (2) the Wavewatch-III wind-wave forecast model (WW3); and (3) the Regional Ocean Modeling System (ROMS). Validation of the models is carried out using information from the operational observational system of the Basque Country: 6 coastal stations, 2 deep sea buoys – over ocean floors around 600 m depth – and an HF Radar array, together with satellite images of sea surface temperature (SST). Concerning the meteorological and wind wave models, some validation results for selected scenarios representative on ocean-meteorological situation over the study area are shown. On the other hand some statistical results for a pre-operational evaluation period are also exposed, focusing on relevant ocean-meteorological variables. With respect to the hydrodynamic model, comparisons with SST show that it is able to reproduce correctly the main patterns and variability observed in the Bay of Biscay. RMS errors for the annual SST show that, on average, models tend to overestimate the SST (RMS under 1.5 ºC). Moreover, high errors are observed in some locations, related to specific processes, as happens, for instance, in the Northeastern coast of the Iberian Peninsula (RMS errors around 2 ºC), where the model is not able to reproduce correctly the upwelling events within this area. Comparisons with buoy data, at 10m depth, show that the seasonal heating/cooling cycle of the surface water masses over the slope seems to be properly reproduced (RMS errors are between 0.52 and 0.63 ºC). In contrast, comparisons at deeper levels indicate some discrepancies between the model and observations, in terms of thermocline position and seasonal variability of intermediate waters.