

# Basque Operational Ocean Forecasting System

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**Abstract:** CROCO (Coastal and Regional Ocean COmmunity model) is the numerical modelling tool used in EuskOOS (Basque Operational Oceanography System) to estimate the spatiotemporal evolution of the main physical variables of the marine environment in the southeastern Bay of Biscay. This model is based on a new non-hydrostatic and non-Boussinesq solver (Auclair et al., 2018), developed within the former ROMS kernel (Shchepetkin and McWilliams, 2005). CROCO is an extension of ROMS from which it inherited the robustness and efficiency of its time-splitting implementation, the accuracy of high-order methods, including its pressure gradient scheme for terrain-following coordinates, and computing performances. The CROCO domain used in EuskOOS covers the southeastern Bay of Biscay, extending from 43.24° N to 44° N and from 3.4° W to 1.3° W, with a mean horizontal resolution of 670 m. Vertically, the water column is divided into 32 sigma-coordinate levels. The bathymetry of the study domain was obtained from EMODnet (European Marine Observation and Data Network). The hourly atmospheric forcing data used in CROCO, with a 12-km horizontal resolution, are obtained using WRF (Weather Research and Forecasting model). The marine conditions applied to the open boundaries of the domain are estimated using data from the Copernicus Marine Service. Specifically, our CROCO configuration uses the hourly and three-dimensional data from the operational IBI (Iberian-Biscay-Irish) Ocean Analysis and Forecasting system. This system provides a 5-day hydrodynamic forecast obtained using NEMO (Nucleus for European Modelling of the Ocean). More information on NEMO can be found in Madec (2008). This model is run in the IBI region at 1/36° horizontal resolution. The NEMO variables used in CROCO are the following: sea surface height, potential temperature, salinity, and eastward and northward components of the velocity. The CROCO simulations also include the freshwater discharges of the main rivers in the study domain. The names of these rivers are the following: Barbadun, Nervion, Butron, Oka, Lea, Artibai, Deba, Urola, Oria, Urumea, Oiartzun, Bidasoa and Adour.

## References

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