



## **Biogeochemical modelling of the Black Sea. Impact of different physics on model performances.**

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The Biogeochemical Model for hypoxic and Benthic Influenced areas (BAMHBI) (Gregoire et al. 2008, 2011, Capet et al., 2016) describes the foodweb from bacteria to gelatinous carnivores through 24 state variables, several plankton functional types and an explicit representation of the bacterial loop. The model simulates oxygen, nitrogen, silicate and carbon cycling and explicitly represents processes in the anoxic layer, so that processes in the upper oxygenated layer are fully coupled with anaerobic processes in the deep waters, allowing performing long term simulations. In the frame of CMEMS (Copernicus Marine Environment Monitoring Service), BAMHBI is used to provide multidecadal analysis and to deliver each day a 10-day forecast ( <http://marine.copernicus.eu> ).

In this frame, BAMHBI has been coupled with 2 physical models: the GHER and NEMO models. Important differences between these 2 circulation models include different vertical discretizations (double-sigma and z-layers respectively), different numerical schemes (Euler and TVD; and Leap-frog and MUSCL schemes respectively) and different boundary conditions at the Bosphorus Strait. Results of the two coupled systems are compared and error statistics are estimated using satellite and in-situ observations.