



## Projecting climate changes effects on the Black Sea's physical and biogeochemical environment.

The surface temperature of the Black Sea has increased due to climate change during the 20th century and continues to exhibit a rising trend. Modern studies show that in recent decades, the processes of change in the physical and biogeochemical parameters of the Black Sea have intensified, indicating an increasing vulnerability of the marine ecosystem. This research aims to provide a comprehensive assessment of the impact of global climate change on the Black Sea ecosystem in the 21st century. Climate change effect in the Black Sea is projected using a coupled physical-biogeochemical model. The physical model is the Nucleus for European Modelling of the Ocean (NEMO v4.2.0) and the biogeochemical model is the Biogeochemical Model for Hypoxic and Benthic Influenced areas (BAMHBI v1.1). The coupled model is forced by the regional atmospheric model (MAR). Simulations are performed over 1950-2100 under two scenarios of changes corresponding to SSP1 (Sustainability) and SSP5 (Fossil-fueled Development). The generated datasets are then used to assess changes and tipping point like for instance the evolution of the cold intermediate layer cold water content, the depth of the oxygenated layer, primary production, and carbon export. We compare the averaged state simulated at the end of the 21st century with the current situation and identify regions of rapid changes and connected them with ecosystem dynamics.

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