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Climatic changes in hydrological and biological characteristics of the North-Western Black Sea region

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The last decades have shown considerable climatic changes in all components of the Earth System. In particular, a hydrological regime of river runoffs in the North-Western Black Sea (NWBS) shows changes on seasonal and interannual scales. A general reduction in annual runoff occurs, while winter flow increases and spring flow decreases. This can be explained by the fact that the snow cover becomes less important with regional warming. Changes in the hydrological regime affect the vertical thermohaline structure and circulation in the NWBS. Observations in coastal waters show that both the temperature and salinity changed remarkably for the winter, while there are no significant variations for the summer season. Moreover, for the winter season, temperature has increased by about 2 [U+F0B0] C within the upper layer of 0-10 m and more than 3 [U+F0B0] C in the benthonic layer. Changes of salinity in the upper and benthonic layers are of opposite signs leading to weakening of the vertical water exchange between two layers. The changes in hydrological environment lead to consequent changes of diversity and population of hydrobiota. Biological components are less sensitive to the interannual changes and work like a natural filter smoothing this temporal scale and emphasizing longer fluctuations. Due to the warming, the spring peak of phytoplankton has moved from May to late March – early April and its population during the last decade considerably increased. The major contribution of this growth is associated with the green and blue-green seaweed microalgae, coming into the NWBS with river runoff. The increasing amount of microalgae while decreasing the biomass means the degradation of macrocells species of microalgae. The peaks of population and biomass of zooplankton follow in 2-4 weeks after microalgae, which is the forage reserve. Diversity and amount of zooplankton have been degradated in the past decades. The spring peak associated with the zooplankton has especially decreased during last decade. Some species of decapods larvae disappeared totally. Thus, the basic signature of destabilization in hydrobiology environment during climate changes is the reduction of diversity in favour of simplest species and the increase of seasonal amplitude of their population.