O65. CARBONATE SYSTEM TRANSFORMATION IN THE SEVASTOPOL BAY (THE BLACK SEA)

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A 20% increase of the carbon dioxide concentration in the atmosphere during the last century and a dramatic increase in nutrient load to marine systems due to human activity have resulted in pronounced carbon cycle transformation in coastal areas. Acidification and carbon dioxide increasing in the water column and appearance of oxygen minimum zones are reported for the worldwide coast. This makes ecological assessment of aquatic systems, including key cycles of elements, an important social and scientific task.
In this study, we present information on the inorganic part of the carbon cycle and its transformation in the Sevastopol Bay (the Black Sea). This semi-enclosed coastal area has been under heavy anthropogenic pressure over the last century. Municipal and industrial sewage discharge, maritime activities, including excavation of bottom sediments, provide additional sources of nutrients and organic carbon. We present data on dynamics of the inorganic part of the carbon cycle from 1998 – 2015. Values of pH and total alkalinity were obtained analytically, whereas CO2, HCO3-, CO32- concentrations and pCO2 values were calculated. Dissolved inorganic carbon (DIC) and its partitioning into CO2, HCO3-, CO32- demonstrate the state of the carbon cycle and its evolution. Our observations reveal up to 2% increase of DIC from 1998 – 2015, but the value of pCO2 has increased by up to 20% in line with declining pH (acidification). Seasonal variations are far more pronounced and reveal extremes for areas of oxygen minimum zones. This results in negative consequences for the ecosystem, but these consequences for the Sevastopol Bay's ecosystem remain reversible and the carbonate system can be restored to its natural state.