



Recent observational studies of nutrient loads on the Black Sea from riverine and atmospheric sources

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To establish the modern correct estimates of nutrient budgets for the Black Sea marine ecosystem, specified monitoring studies were organized and executed in Ukraine in frameworks of BSERP/GEF research program. Two main sources of freshwater and nutrients input were investigated:

- Direct discharge into the sea from the main regional rivers and estuaries;
- Atmospheric precipitations on the sea surface.

Regular weekly sampling and analyses of dissolved fractions of nitrogen, phosphorus and silicate was organized during the one year period (November 2003 – October 2004) in: Kiliya delta of Danube river; Tsargorod Strait (outlet from the Dniester estuary) and Dniester river (inlet to the estuary); Kinburn Strait (outlet from the Dnieper-Bug estuary); and Kerch Strait (integral account of the Azov Sea water influence). All these sampling programs were accompanied by direct current measurements and other hydrometeorological observations allowing calculate the water and substance discharge to the sea. Besides, analysis of archive data for all listed sites was performed in order to obtain the multi-annual statistics of nutrients discharge as the reference for this monitoring data interpretation. General database on the project was produced and first experimental results now are subjected by a comprehensive analysis.

Experimental monitoring of nutrient inputs with atmospheric precipitations was organized in 3 sites of Ukrainian seashore: Odessa, Sevastopol and Katsiveli (Southern seashore of Crimea), as well as in 1 point of Bulgarian coast - Varna. Besides, observational data on precipitation amount were attracted from other meteorological stations

of Ukrainian coast. Techniques of samples collection and chemical analyses was developed and unified. The main attention on this stage of studies was paid to the development of technology for correct account of precipitations coming on the sea interior using all available meteorological information, including nowcast and forecast maps from the Internet. Special computer software was produced for daily, monthly and yearly amounts of precipitation calculations in their horizontal distribution over the sea. Already at this time, rather correct estimates of water and nutrient inputs for the North-Western part of the Black Sea can be produced. However, further international efforts for the additional nutrients data collection around the Black Sea are extremely needed to estimate the nutrient inputs on the whole sea surface.