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The Determination of the Limiting Nutrient in Terms of Eutrophication Risk at Marmara and Black Sea Coasts

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When it is taken into consideration that the world population and the human activities increase constantly, the necessity for taking serious measures in the discharge of domestic and industrial wastes into the coastal waters, which have especially limited wastewater assimilation capacity, displays explicitly the ecological disintegrations observed in the coastal waters in the last twenty-five years. The daily loads of the wastes, arising from the coastal settling areas, where rapid population increase and industrialization exist, and of the organic substances and the nutrient salts (nitrogen, phosphorus), exceed the assimilation capacity of the recipient environment in time, and causes remarkable changes in the basic bio-chemical characteristics of the recipient environment.

The organic substances and the nutrient salts, which are moved into the sea by the wastewaters arising from the cities at the coastal areas, cause the eutrophication at seas and the disintegration of water quality and natural ecosystem. Although the entry of the organic substance into the sea environment becomes a source of nutrient for the sea organisms, the input of the nutrient salts yields to the excess proliferation of the phytoplankton mass, which is a single-cell organism, reproducing by photosynthesis. For the quantitative determination of the relationship between the phytoplankton proliferation and the abundance and the rates of the nutrient in the environment, the kinetic parameters, determining the photosynthesis rate, should be found/known, and the recipient environment basic oceanographic characteristics of the river and wastewater loads, reaching the coastal waters, along with the N/P rates, should be known. As a result of the synthesis of this information, the treatment levels, to be applied to the wastewaters, which will be delivered to the recipient environment, shall be discussable.

In this study, the studies of the limiting nutrient (LN) at the coastal waters, which are exposed to the urban and industrial effects at Marmara and Black Sea coasts, have been performed. In the seasons of spring and autumn, which are significant in terms of the eutrophication risk at Marmara and Black Sea coasts, the nutrient salts (inorganic nitrogen, phosphorus, silicate compounds, and trace metals), limiting the phytoplankton production, have been added to the surface sea water samples individually and in several combinations. The reactions (the photosynthesis rates) of the natural environment phytoplankton to the added nutrient have been determined by measuring the ¹⁴C isotope usage rate.

Keywords: Limiting nutrient, nitrogen, phosphorus

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Operational Oceanography and socio-economic development in the Cuban archipelago

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Numerous countries have designed and operated tools for environmental quality assessment and decision-making, depending on their scientific-technical development, institutional capacities and maturity in environmental management. At present, Cuba is prepared to avoid and/or mitigate impacts on its marine and coastal environment. The development of operational oceanography in Cuba has played a significant role in this preparedness. Near-real-time estimation of the state of the ocean around and in the Cuban archipelago has been developed during the last 15 years, simultaneously with the socioeconomic development plans, to contribute to the protection of the coastal and marine environment. Efforts are being focused particularly on the forecast of contaminant distribution in the sea and evaluation of the connectivity among marine ecosystems. From the search and retrieval of information, both primary and obtained from mathematical models with high space-time resolution, the digital processing of aerospace imagery and the use of Geographic Information Systems, systematic reports are prepared on the state of the ocean and timely accurate information is provided to decision-makers. This forecast on the state of the ocean contributes to cope with or perceive the risk in every situation, thus nurturing the technical development and accuracy of operational products. The presentation will show examples of works carried out in Cuba.

Keywords: Operational Oceanography, socioeconomic, Cuban archipelago