PhD. Thesis Title

"Assessment of Multiple Stressor Cumulative Effects on Marine Ecosystems – Eutrophication & Contamination"

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Abstract

This thesis analyzes the dynamics of nutrients and heavy metal pollution in the coastal ecosystem of the Black Sea, focusing on the Romanian sector — a semi-enclosed marine system vulnerable to both anthropogenic and natural pressures. The main objective of the research is to highlight the complex interactions between eutrophication processes, heavy metal contamination, and the responses of the marine ecosystem, with the aim of supporting sustainable coastal management. The study integrates information from the three main components of the marine environment — water, sediments, and biota — to assess the levels and spatial distribution of heavy metals (Cd, Cu, Cr, Ni, Pb) and to analyze the long-term trends in nutrient dynamics, particularly nitrogen and phosphorus. By combining the evaluation of eutrophication, the spatial distribution of heavy metals, and their bioaccumulation in mollusk species, the thesis provides an integrated perspective on the ecological status of the Black Sea. The results contribute to a better understanding of pollutant fluxes and their effects on coastal ecosystems, offering valuable scientific support for the development of monitoring and marine environmental protection strategies.