

QUANTIFICATION OF THE EFFECTS OF POINT AND NON-POINT NUTRIENT SOURCES IN THE SEAWATER QUALITY OF THE ARGOLIKOS GULF.

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ABSTRACT

A modelling procedure was developed for the quantitative assessment of the nutrient loading from various terrestrial sources to coastal marine eutrophication. The study area was the Argolikos gulf, northeastern Peloponnesus, an open and shallow gulf surrounded by an intensively cultivated watershed. A modification of the Curve Number Equation formed the basis for the estimation of the nutrient fluxes due to agricultural runoff. Nutrient loads from the atmosphere, the sediment, the domestic effluents and the industrial activity were also considered. Furthermore, a simulation model was developed to describe the nitrate, ammonia, phosphate, silicate and phytoplankton dynamics in the seawater column. The model has shown good fit to the experimental data and it was further used for the assessment of the role of various exogenous sources of nutrients. The results indicated that nutrient loading from agricultural runoff could be considerable, especially after episodic rainfall events, resulting in an increase of the nutrient stock from 40 to 60%. The responses of the autotrophs are regulated from the residence time of excessive nutrient loads within the gulf that ranges from 5 to 10 days. This modelling approach should be considered as a simple and reliable methodological tool for testing various scenarios concerning the sustainable development of the coastal zone.