

SURFACE ACTIVE SUBSTANCES AND NUTRIENTS IN THE NORTHERN ADRIATIC SEA

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Abstract

Spatial distribution and seasonal variability of surface active substances (SAS) and nutrients were studied and correlated for the Northern Adriatic Sea in the period from February 2001 to October 2002.

Keywords : *Adriatic Sea, Organic Matter, Po Delta, Surfactants, Eutrophication.*

Dissolved organic matter in the sea is an important pool of carbon in the global carbon cycling [1]. A large fraction of OM has surface-active properties [2]. The Northern Adriatic Sea is the most productive region in the Mediterranean Sea. The most important source of the nutrients in the region is the Po River and the winter overturn of regenerated nutrients from the bottom layer [3]. As the SAS in the Northern Adriatic are highly dependent on the phytoplankton community production [4]. In this work we aimed to correlate SAS concentration with different nutrients. SAS were determined by phase-sensitive alternating current voltammetry by in-phase measurements using *o*-nitrophenol as an electrochemical probe [5]. Nutrients (nitrate-NO₃, nitrite-NO₂, ammonium-NH₄, orthophosphate-PO₄ and orthosilicate -SiO₄) were analyzed by widely used oceanographic methods. Concentration of SAS was correlated separately with the concentrations of different nutrients. The analysis was performed for the two stations 101 and 107 that were representative for the marine system that is under the direct influence of the Po River discharge, and oppositely the system that is rarely influenced by Po River waters, respectively, at water column layers; 0.5, 5, 10, 20, 30 m and bottom. Temporal distributions of SAS for bottom and surface water for two Stations 107 and 101 are presented in the Fig. 1.

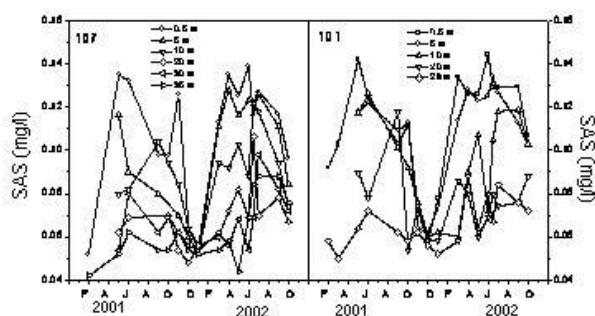


Fig. 1. The variations of SAS for the eastern Station 107 and western Station 101.

The concentration of SAS of the region varied from 0.042 to 0.145 mg/dm⁻³ equiv. T-X-100. The lower values were observed in February for all water column. The highest SAS values were recorded in surface layer during warm period of the years. In Fig. 2 are presented average concentrations of nutrients for the presented stations and investigated period. Nutrients concentrations were the most variable in low salinity surface water. Bottom layer experienced relatively higher values of all nutrients. Lower values of all nutrients concentrations in the water column were observed at Station 107 as compared to Station 101. Correlation between SAS and certain nutrient concentrations revealed that only statistically relevant correlation was found between SAS and nitrites at Station 107 and depths 0.5 to 20 m ($R = -0.51, -0.65, -0.57$ and -0.68). Found correlation is negative that might be expected as SAS pool is mainly increasing from nutrients pool. Although statistically irrelevant it is worth mentioning that correlation of SAS with orthophosphate and orthosilicate was mainly found to be negative. Low correlation might be explained with few facts. Northern Adriatic is oligo- to eutrophic region, especially on the western part, represented by Station 101. Therefore, phytoplankton was not limited by the nutrients. Also, phytoplankton activity is dynamic and dependant on many factors.

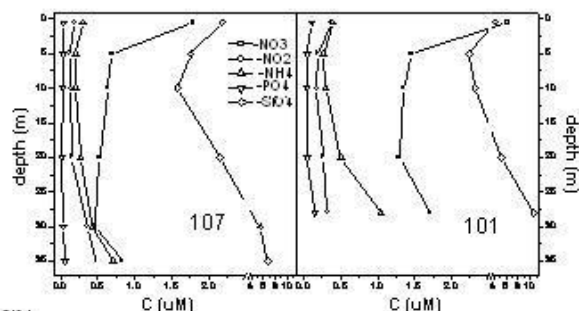


Fig. 2. Average nutrient concentrations for the eastern Station 107 and western Station 101.

References

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