

NUTRIENT AND TRACE METAL DISTRIBUTION IN THE GULF OF ASTAKOS, AETOLOAKARNANIA, GREECE.

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EXTENDED ABSTRACT

The Gulf of Astakos is a very important embayment of the Ionian Sea, as it offers an ideal environment for extensive aquacultures with tourism, agriculture and commercial activities. In view of the need for sustainable development of the region, the state of the gulf's quality was assessed on the basis of determinations of nutrients (NO_3^- , NO_2^- , PO_4^{3-} , SiO_4^{4-} , and NH_4^+) and trace metals (Cd, Cu, Fe, Pb, Ni and Zn) along with physicochemical parameters in the seawater. The samples were collected in three sampling cruises during February 2000, May 2000 and July 2000 from ten sampling stations.

Nutrients were determined by standard colorimetric methods UV-Vis, using a Varian spectrophotometer. Dissolved metals were pre-concentrated using Chelex-100 resin. Particulate metals were digested following a hot plate digestion in teflon bombs. Metal concentrations were determined by Flame or Graphite Furnace Atomic Absorption techniques with a Varian spectrometer equipped with Zeeman background correction according to the concentration levels.

The nutrient concentrations were ranged: for NO_3^- from 0,2 $\mu\text{g-at/l}$ to 158,3 $\mu\text{g-at/l}$, for NO_2^- from 0,015 $\mu\text{g-at/l}$ to 0,74 $\mu\text{g-at/l}$, for PO_4^{3-} from 0,018 $\mu\text{g-at/l}$ to 7,4 $\mu\text{g-at/l}$, for SiO_4^{4-} from 0,1 $\mu\text{g-at/l}$ to 108,5 $\mu\text{g-at/l}$ and for NH_4^+ from 0,9 $\mu\text{g-at/l}$ to 57,5 $\mu\text{g-at/l}$. The dissolved metal concentrations recorded were ranged: from 0,2 to 1,3 $\mu\text{g/l}$ for Cd, from 0,04 to 4,59 $\mu\text{g/l}$ for Cu, from 2,58 to 150,7 $\mu\text{g/l}$ for Fe, from 0,28 to 2,3 $\mu\text{g/l}$ for Pb, from 0,17 to 2,79 $\mu\text{g/l}$ for Ni and from 1,14 to 30,5 $\mu\text{g/l}$ for Zn. The particulate metal concentrations (per seawater volume) were ranged: from 0,01 to 1,69 $\mu\text{g/l}$ for Cd, from 0,22 to 2,95 $\mu\text{g/l}$ for Cu, from 1,85 to 293,77 $\mu\text{g/l}$ for Fe, from 0,22 to 2,02 $\mu\text{g/l}$ for Pb, from 0,06 to 1,88 $\mu\text{g/l}$ for Ni and from 1,41 to 38,56 $\mu\text{g/l}$ for Zn. In comparison to nutrient concentrations in other greek bays and the open Ionian Sea the concentrations estimated for Astakos bay are fairly high. The trace metal concentrations were reported to be higher than those of the open Ionian Sea, and paralleled with the concentrations observed in Patraikos, Maliakos and Gera Gulf. Regarding the partitioning between dissolved and particulate phase, in average 54% of Cd, 49% of Cu, 35% of Fe, 54% of Pb, 66% of Ni and 58% of Zn were found in the dissolved phase.

Seasonal fluctuations were recorded in both nutrient and metal concentrations presenting proportional fluctuations with those of the marine euphotic zones. The reduction of concentrations can be attributed to the low rainfall seasonal height, the reduced flow of the streams and in the bioaccumulation and consumption from the phytoplankton cells that bloomed during spring and early summer.

Key words: Astakos Bay, Aetoloakarnania, Nutrient Concentrations, Trace metals, Water Column