Nutrient investigation in the Saronikos Gulf, Aegean Sea, (1987-1990)

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The seasonal variation of the distribution of the nutrient salts phosphates, silicates, ammonia, nitrites and nitrates as well as of the dissolved oxygen from the standard depths was examined in 14 stations in the Saronikos Gulf, (Fig. 1), during the years 1987-1990.

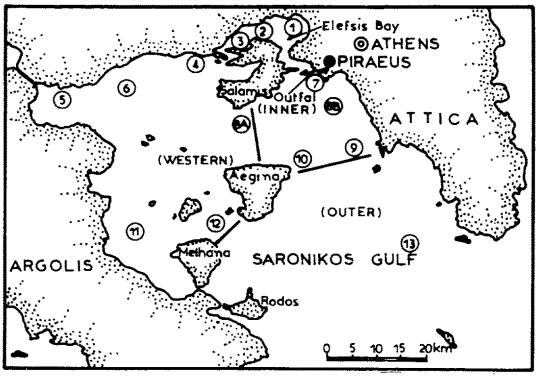

Fig. 1: Oceanographic subregions of the Saronikos Gulf.

The analysis of nutrients was done using a Technicon Autoanalyser according HAGER *et al.*, (1968).

In order to investigate whether the determined values of nutrients were statistically different concerning their geographical, seasonal and annual distribution, the results were treated using the two-way analysis of variance and the Tukey test (TUKEY, 1953). The statistical analysis revealed significant differences among the five subareas of the Saronikos Gulf. Elefsis Bay characterised by a strong eutrophication, presented the highest values of nutrients especially for phosphates (0.08-1.56µg-at P/l) (Fig. 2) as well as for silicates (1.97-9.77 µg-at Si/l) and nitrogen (0.15-3.89 µg-at N/l), while the outer Gulf presented the characteristics of the Aegean Sea with lower nutrient concentrations (0.04-0.22 µg-at P/l and 0.20-1.54 µg-at N/l).

A significant enrichment of nutrients was found in the outlet of the sewage outfall (0.07-1.97 µg-at P/l and 0.59-2.91 µg-at N/l).

A relative accumulation of nutrients, mainly nitrates, was found in the bottom layer of the Western Gulf which, due to its depth and the slow water exchange, acts as a nutrient trap (FRILIGOS, 1983).

As far as the annual distribution of nutrients is concerned a tendency of decrease was found from 1987 to 1989. This was valid mainly for total nitrogen, but not statistically significant (Fig. 3).

The seasonal variations presented significant differences for nitrites and nitrates (Fig. 4). Two maxima were found in March and December, while the lowest values were observed during summer. Ammonia reached its lowest value in June.

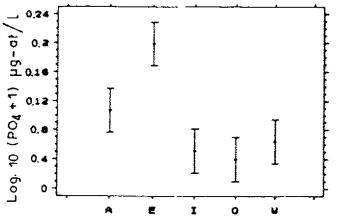

Fig. 2 : Statistical analysis of PO_4 data.

Finally the concentrations of phosphates and silicates presented an irregular seasonal pattern, with no significant statistical differences.

It has to be noted that the differences between dissolved oxygen levels in summer and winter, mainly in Elefsis Bay, were found statistically significant, whereas significant difference was not found between the five subareas. Moreover Elefsis Bay presented the lower values of D.O. (0.00-5.76 ml/l), while the outer Gulf presented the highest (4.75-5.81 ml/l).

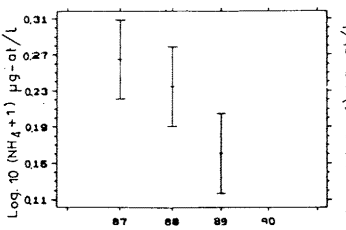

Fig. 3: Statistical analysis of NH_4 data.

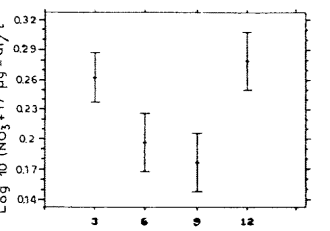

Fig. 4: Statistical analysis of NO_3 data.

REFERENCES

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