Processus de décontamination de l'eau interstitielle par les métaux-traces pendant une expérience *in situ*

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La plupart des études environnementales ont comme objet l'impact de la pollution sur le milieu marin. Dans le cas de la recherche actuelle était étudié un processus inverse : celui de la décontamination des sédiments superficiels.

Des sédiments provenant d'un site pollué (station 1) ont été transplantés dans un site considéré comme "non pollué" (station 2) ayant les mêmes caractéristiques, à l'exception des sources de pollution (Fig. 1).

On a surveillé l'évolution des teneurs de Cd, Pb et Cu dans l'eau interstitielle pendant cette *in situ* expérience en vue d'étudier la possibilité et le degré de contamination après leur transplantation.

Méthodologie

L'eau interstitielle a été obtenue par centrifugation des sédiments. L'analyse des métaux traces a été réalisée par D.P.A.S.V. (Differential Pulse Anodic Stripping Voltammetry), après filtration et U.V. irradiation des filtrées. Tout le processus était effectué sous hotte à flux laminaire, (pression positive, classe 100), dans un laboratoire spécial, à "poussière limitée", (MART L., 1982).

Résultats-Discussion

Au début de l' expérience les sédiments provenant du site "pollué" présentaient des concentrations plus élevées (en moyenne 107.2 ng/l Cd, 1107.45 ng/l Pb et 1177.10 ng/l Cu) que celles au site de transplantation, ("non pollué"), (en moyenne 8.40 ng/l Cd, 201.63 ng/l Pb et 466.40 ng/l Cu), (Fig.2, 3, 4). Les valeurs élevées des sédiments du site pollué sont attribuées à l'existence des conditions réductantes du milieu pendant l'été; ce qui provoque la formation des complexes polysulfurés stables - Surtout pour le Cd et le Cu, (BOULEQUE, 1981).

Dix-neuf mois après la transplantation les sédiments "pollués" ont présenté une diminution des concentrations des métaux-traces importante. Cette baisse s'élevait au 90.95% du Cd, 73.63% du Pb et 70.74% du Cu de leur valeur initiale, (Fig. 2, 3, 4).

Il est remarquable de noter que les niveaux des concentrations ont présenté des variations au long de l'expérience, attribuées probablement à l'équilibre dynamique entre l'eau interstitielle et la phase solide, (CATSIKI V.A.).

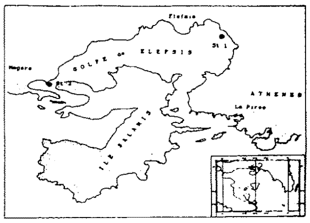

Figure 1: Station 1: site des sediments pollués; Station 2: site de transplantation).

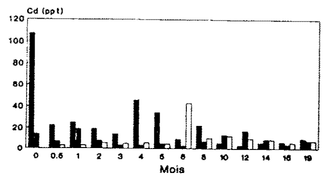

Figure 2: Evolution des taux de Cd dans l'eau interstitielle

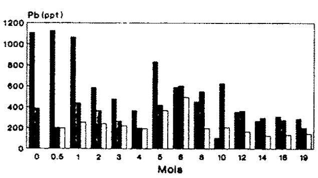

Figure 3: Evolution des taux de Pb dans l'eau interstitielle

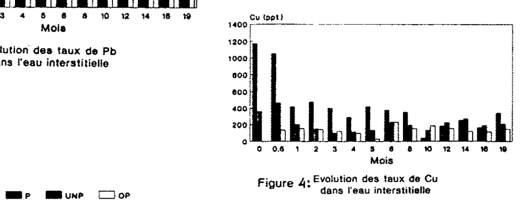

Figure 4: Evolution des taux de Cu dans l'eau interstitielle

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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.

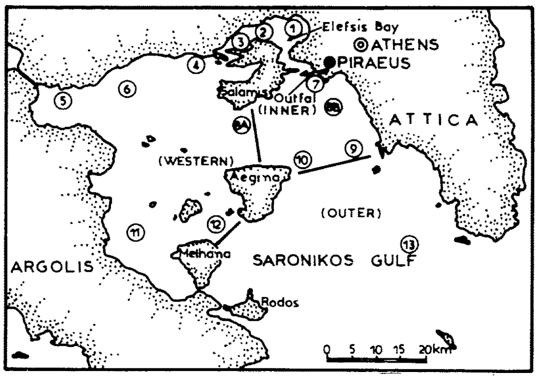

Fig. 1: Oceanographic subregions of the Saronikos Gulf.

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.

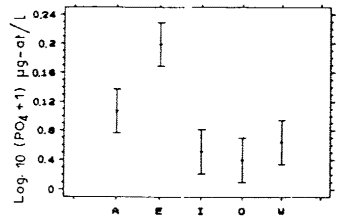

Fig. 2 : Statistical analysis of PO_4 data.

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).

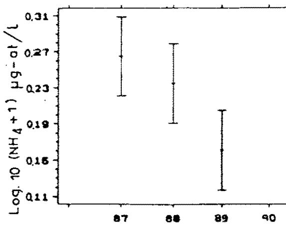

Fig. 3: Statistical analysis of NH_4 data.

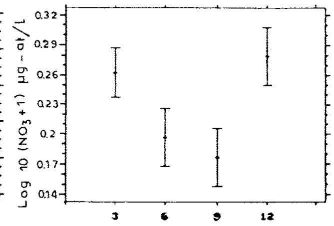

Fig. 4: Statistical analysis of NO_3 data.

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