

Total P and extractable Si in superficial sediments of Northern Adriatic Sea

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On the purpose to verify the presence of a seasonal variability of the amounts of total P and extractable Si, 72 samples of marine sediments collected in 9 sampling stations during 8 cruises carried out in 1990 in Northern Adriatic Sea were analyzed (Fig. 1). The sediments were sampled with a box corer and a layer of two centimeters was subsampled for the chemical analysis and stored frozen until the analysis.

Triplicate extractions of the two nutrients from sediments were performed after a 2 hours combustion at 550°C and extraction with HCl 1M according to ASPILA (1); this method was found to be quantitative for total extractable Si as well; the analytical determinations were performed by visible spectroscopy (2).

The application of a multivariate statistical analysis (PCA) showed no evidence of dependence of nutrients values on the geographical parameters (Fig. 2).

A next statistical re-examination of the data by Cluster Analysis confirmed a large variability of the concentrations of the nutrients within a same season. This was larger for Si and smaller for P.

P ranged between 160 and 540 mg/Kg d.w. (average value 350 mg/Kg, rsd. 32.2%); these values are comparable with those reported by other studies (3,4). Extractable Si ranged between 90 and 790 mg/Kg (average value 198 mg/Kg, rsd. 66.38%) excluding the data of the October cruise, which were considerably higher ranging between 1510 and 6340 mg/Kg. At the moment this variability can be hardly explained.

The influence of Po river was evident in station 4 (Po mouth) where P and Si levels were higher at 95% level of significance than in the offshore station (St.3), on the relic sand zone, where the depositional contribute is lower.

Total P and extractable Si average concentrations were respectively 501 and 240 mg/Kg for St. 4, while on the relic sands St. 3 the values were 319 and 132 mg/Kg.

An observed correlation between the sediment water content and P concentration can indicate the alloctonous origin of this compound (corr. coeff. 0.589 at 95% level of significance). On the contrary this correlation was not observed for Si.

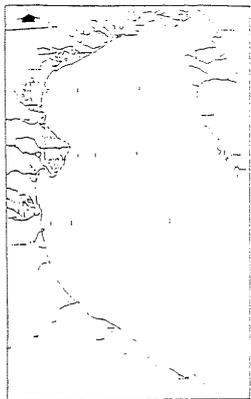


Fig. 1 Sampling stations in Northern Adriatic Sea

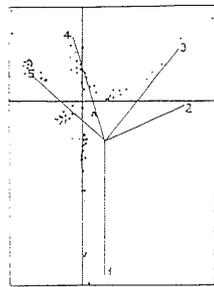


Fig. 2 Plot of PCA; 1 depth, 2 longitude, 3 latitude, 4 total P, 5 total Si

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Mercury and Chromium in organisms of the coastal marine area between Po Delta and Ravenna Harbour

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Samples of marine sediments and organisms were collected in March 1990 from the coastal area of the northern Adriatic Sea between Po River Delta and Ravenna Harbour (Fig. 1). In this area, influenced by Po River waters (BARALE *et al.*, 1986), a high deposition of fine materials takes place at a depth higher than 10 m, especially in winter (BORTOLUZZI *et al.*, 1984). Dredging materials from Ravenna Harbour are disposed in a rectangular dumping site (Fig. 1).

Table 1 shows the Hg and Cr contents in the superficial sediments of the studied area (GIANI *et al.*, 1992). Hg and Cr decrease from Delta Po southwards. The maximum Hg concentration is in the harbour-zone due to general pollution of the channel harbour and surrounded salt marshes caused by chemical plants (MISEROCCHI *et al.*, 1990).

The organisms collected were classified, weighed and their length measured. Muscle tissue of specimens of *Gobius niger jozo* (n=10), *Squilla mantis* (n=7) and soft tissue pools (1-8) of specimens of *Ostrea edulis* (n=17), *Crassostrea gigas* (n=45) and *Natica millepunctata* (n=8) caught in the different zones were digested in teflon bombs with nitric acid by a microwave digester. Hg was determined by CVAAS after reduction by SnCl₂ and Cr analysis was performed by GFAAS (Fig. 1 and Fig. 2). The recoveries with respect to MA-A-2(TM) reference material were 100% for total Hg and 88% for total Cr.

Mercury. Hg values are low. There are no differences between the Hg levels in the same species caught in the different zones. *S. mantis* and *C. gigas* seemed to be the better Hg-concentrating species. In *G. niger jozo* Hg increases with the total length but the values are five-fold lower than those reported by other authors for the same area and about *S. mantis* and *N. millepunctata* our data are lower than the ones too (CIUSA and GIACCIO, 1984). In *O. edulis* and *C. gigas* Hg concentrations are generally lower than the ones found in the Venezia lagoon (PERDICARO, 1989).

Chromium. The Cr literature data are often not sufficient and not comparable. Fig. 1 shows higher Cr concentration in the bivalves and a gradual decrease from the specimens of the A-zone towards B and P-zone. This observation and the apparent Cr concentration decrease with the total length of the *S. mantis* need further research.

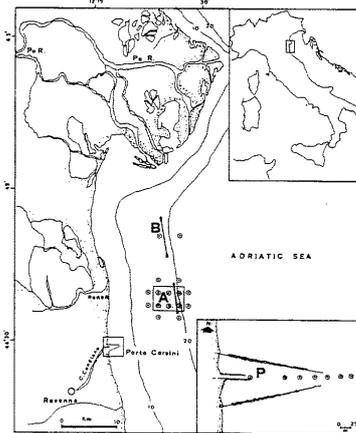


Fig. 1 - Study area and sampling stations (A : dumping-zone ; B : Po-delta-zone ; P : harbour-zone ; ⊙ : sediments ; → : organisms).

Table 1 - Hg and Cr concentrations (μg/g d.w.) in surface sediments.

Zone	N° of samples	Hg		Cr	
		Range	Av. ± S.D.	Range	Av. ± S.D.
A	14	0.130-0.460	0.278 ± 0.102	123-162	135 ± 14
B	2	0.380-0.508	0.444 ± 0.064	161-171	166 ± 5
C	6	0.120-1.932	0.607 ± 0.653	92-124	113 ± 15

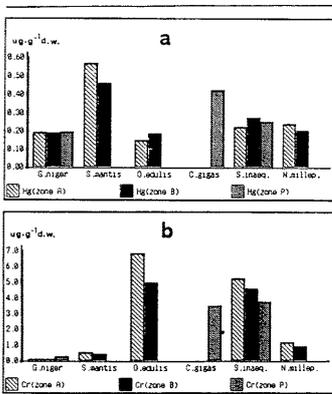


Fig. 2 - Hg average concentration (a) and Cr average concentration (b) in some species caught in the different zones.

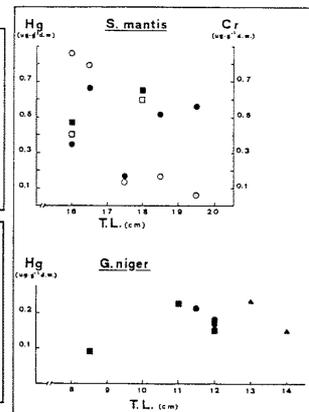


Fig. 3 - Hg and Cr contents versus Total Length (T.L.). Zone A: Hg (□) and Cr (□). Zone B: Hg (●) and Cr (●). Zone P: Hg (▲) and Cr (▲).

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