

Interstitial water composition in some small cores of the North Adriatic Sea

by

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Abstract

The influence of the major rivers entering the North Adriatic Sea on the chemical composition of interstitial water of recent sediments was evaluated from 13 cores having an average length of 60 cm. The following parameters were analyzed on pore water samples squeezed from sediment slices 5 cm thick : Cl, SO₄, Na, Mg, Ca, K and salinity, pH, Eh, and NH₃ were only determined in the zone interested by the Po River outflow. A hydraulic squeezer was employed for extraction.

Percent carbonate of sediment is also reported : relationships among carbonate, silicate and other major constituents of recent sediments were studied in previous works.

According to several Authors an enrichment in dissolved salts with respect to the supernatant water is generally verified.

Ratios between major constituents and chloride are plotted against depth and compared with the accepted values for sea water. No significant deviation of SO₄/Cl values was found in offshore stations, on the contrary the ratio decreases more or less regularly with depth in cores directly affected by the organic load carried by rivers.

Decomposition of organic material also controls the Ca/Cl behavior in inshore stations : the pH lowering, related to the CO₂ production, resolubilizes carbonate from the sediment in the upper layer, afterwards ratio decreases with depth in correspondence to the sulphate depletion.

Mg/Cl ratio is not heavily affected, however its behavior roughly resembles that experienced by Ca/Cl in the upper layer. Values of sulphate and calcium deficit are in good agreement with the simulation proposed by some chemical models for sulphate reduction at corresponding pH and Eh conditions. An inverse relationship is found between K/Cl and per cent carbonate of sediment, while no significant variation of the Na/Cl ratio is observed.

A downwards diffusion of ammonia is always verified from the sediment-sea water interface. This effect is distinguishable up to a depth of 20-40 cm. An upwards diffusion from deeper layers seems to be likely in those cores where a sulphate depletion occurs. In such a case, the vertical distribution shows an evident minimum at an intermediate and variable depth. Results concerning ammonia behavior are compared with those obtained by some Author as well as with the relative simulation proposed, employing different diffusion coefficients.

Finally the usefulness of this technique is discussed in connection with problems related to nutrients flux and balance.

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Discussion

Georgescu. — **Questions : 1** — What is the concentration of the Fe and Mn in the cores?

2 — At what pH predominate Si and Ca in the middle of the core?

Answers : 1 — Fe and Mn were determined only on surface sediment. Their concentration lies in the range 1-6 % and 0.06-0.5 % respectively.

2 — No systematic correlation was observed between pore water pH and silica or calcium prevalence in the sediment.

Cortecchi — **Question :** The reduction of sulfate in the sediments comports the presence of bacteria which are able to utilize the sulfate, organic matter and certain ions for their biosynthesis.

Answer : Yes, of course. Indeed, even if no specific analysis of bacteria was carried out, we observe that sulfate reduction appears to be evident only in those zones where a heavy organic load is supplied by rivers runoff.

Buljan — **Question :** What about H₂S in sediments?

Answer : Sulphide falls under detectable levels in pore water. This could be ascribed to the method employed for “squeerinz”, on the other hand the formation of iron sulphide cannot be excluded.