HEAVY METALS DISTRIBUTION IN GRADO LAGOON SEDIMENTS

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Sediments are repositories for physical and biological debris and sinks for a wide variety of chemicals (Theofanis, 2001), coming from freshwater rivers, air, marine pollution, etc. Sediments are the sinking device for pollutants but also could be a dangerous point of release of contaminants.

Source of pollution affecting Grado Lagoon are various industrial activities like steel plants, metallurgical industries, a plant producing cellulose and chlor-alkali. Besides agricultural, fish and mussel farming activities, stand on this sensitive environment, located in the inner part of lagoon characterized by deposition phenomena, show the higher metals concentration values. Moreover, the high concentrations of Hg and Ni in whole of sites, point out a probable anthropogenic source. A very strong correlation between concentrations of Ni and V (R² = 0.99) and between Ni and Pb (0.83) was found; further studies should be carried out in order to assess the relationship between anthropogenic activities and sediment quality.

Materials & Methods

The methods used in this work for the determination of Hg, Ni, Pb, V were described by Bittini et al (1996). Mercury concentrations in Marano Lagoon (Northern Adriatic sea, Italy) were determined by acid microwave digestion. The samples were analyzed by graphite furnace atomic absorption spectrophotometry (GFAAS).

Results & Discussion

The spatial distribution of non-cinnabar compounds results influenced by freshwater inputs, in particular Aussa-Corno river; it passes through Torviscosa industrial area where many activities, like chemical plants, metallurgical industries, are carried out in order to assess the source of pollution (e.g. Ni and V are commonly used as alloying addition to iron and steel).

Areas of greater metal accumulation coincide with areas of sediment deposition. Almost all metals distribution maps show a similar distribution: Hg and Ni maps have been here reported (Fig. 4).

The critical problem of Grado Lagoon is Mercury contamination of sediments, it has probably both natural and anthropic origin. Other studies (Pierl et al., 2005) identified the presence of both cinnabar and non-cinnabar (usually the chemical form more mobile) compounds in Marano Lagoon (Fig. 1) the spatial distribution of non-cinnabar compounds results influenced by freshwater inputs, in particular Aussa-Corno river; it passes through Torviscosa industrial area where many activities, like chemical plants, are present. High values of Hg in the eastern part of the basin are more probably due to leontice river input, coming from Idrija (SLO), a cinnabar mining zone.

Further studies could be useful to clarify Ni vs. V – Cu – Pb strong correlation.