

**Distribution and speciation of metals in a polluted site of Basilicata
(Southern Italy)**

Claudia Belviso¹, Francesco Cavalcante¹, Saverio Fiore¹, Spartaco Di Gennaro²
Luca Medici¹, Achille Palma², Pietro P. Ragone¹

¹Istituto di Metodologie per l'Analisi Ambientale – IMAA, CNR , Tito Scalo (PZ)- Italy
ragone@imaa.cnr.it

²Metapontum Agrobios, SS 106 Jonica, - Metaponto (MT)- Italy

Speciation analysis represents the most suitable method for the study of mobility and bioavailability of the metals in soils and sediments subordinates to various anthropic pressures. To investigate the distribution and fate of some trace elements in an industrial area of the Basilicata (Tito Scalo, southern Italy), 75 samples at various depths (0, 0.5, 12, 18 e 23 meters) were collected. The samples have been characterized by powder X-ray diffraction and chemically by ICP-MS (Al, As, Be, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Se, Sn, Ti, V e Zn) after sequential selective extraction and total digestion. In particular: i) exchangeable and carbonates bound metals have been extracted with ammonium acetate to pH 5; ii) fraction bounds to amorphous and poorly crystalline oxy-hydroxides has been removed by hydrochloric hydroxylamine in acetic acid at 25%; iii) metals bound to organic matter have been extracted with 30% hydrogen peroxide in HNO₃. The bulk sample was digested for complete dissolution with an acid mixture of HNO₃-HF-HClO in a microwave system. The results obtained have shown that the main mineralogical components (quartz, feldspars, carbonates, gypsum, illite/smectite mixed layer, illite, chlorite and kaolinite) exert a minor role in controlling element distribution. Metals are mainly associated to Al-Fe-Mn oxy-hydroxides and to organic matter; some of which are also major constituents of trace minerals (Lettino et al.; this volume). Among all the elements analyzed, those that show more elevated degrees of mobility are respectively: Cd>Mn>Ti>Se>Zn in exchangeable-carbonate fraction; Mn>Cd>Co>Be>Pb in oxy-hydroxides; Se>Pb>Cd>Be>Cr in organic matter. Potential geochemical risk for human health is negligible.