ORIGIN OF MANGANESE, SULPHATES AND TRICHLOROMETHANE IN GROUNDWATER AT PORTOSCUSO (SARDINIA-ITALY)

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The municipality of Portoscuso extends over an area of about 39 km² on the west coast of Sulcis-Iglesiente region (South-Western Sardinia, Italy). It comprises the industrial area of Portovesme, which developed in the late 1960s. The large industrial development had a considerable environmental impact such that the whole territory has been designated as a contaminated site of national interest by the Italian Government (D.M., March 12, 2003). Groundwater contamination in the wide area is a serious environmental issue. A strong alkalization of the shallow groundwater in the industrial area and the presence of heavy metals and organic pollutants of clear anthropogenic origin were recognized (Barberi & Ghiglieri, 1998) and environmental remediation is still ongoing.

PREVIOUS STUDIES

The whole municipal territory outside the industrial area has been investigated between July 2009 and March 2010 (Vecchio et al., 2010; Vecchio et al. 2012). Besides the diffuse presence in soil of elements such as Zn, Pb and Cd, due to fall-out from the industrial area, groundwater up-gradient the industrial district showed screening levels exceeding only for Mn (50 µg/L), SO₄ (250 mg/L) and trichloromethane (0.15 µg/L). In order to verify the origin of such elements, studies on stable S and Sr isotope ratios (87Sr/86Sr) in soils and groundwater and further insights on mineralogy of Mn mineralizations and on the sources of trichloromethane are now ongoing.

GEOCHEMICAL AND HYDROGEOLOGICAL SURVEY: Preliminary results

A new hydrogeological and geochemical survey has been carried out on March 2013. Sampling sites are reported in figure 6 and in table 1. Aquifers with variable permeability from low to medium, depending on vertical and lateral extension of the deposits and on the structural framework of the area, have been identified. (fig. 6)

Higher values of manganese occur in reducing waters, both in deep and shallow groundwater. In piezometers with high manganese concentration a decreasing Eh and saturation of O₂ with depth was observed.

Further mineralogical and isotope investigation are in progress.

References: