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Study on the state of microtoxics in Ravenna Province

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Heavy metals content, usually present in lithological matrix and also in soils, is now increasing due to anthropic activities.

In 2004, Ravenna Province funded a project on 'Study on the state and dynamics of microtoxics in the Province of Ravenna', in order to investigate the presence and distribution of some metals (Ag, Cd, Ni, Pb, Pd, Pl, Rh, Sn, Tl) produced from the anthropic activity in soils of a representative area of the provincial territory.

This area was marked as 'zone probably subject to the atmospheric fall-out from the Ravenna industrial complex' by the Regional Environmental Protection Agency (ARPA Emilia-Romagna).

Dealing mainly with cultivated land, the adopted depth of sampling has been fixed to 30 cm. An upper sampling depth, like that adopted in other studies, would have involved non comparable results between natural zones and cultivated zones. The resulting sampling density has been 0.29 points per Km.

After mineralization and extraction, soil samples have been analyzed by ICP-OES in their total and assimilable amount. The resulting data were compared with the law thresholds and the existing bibliographical data.

The results are shown through diagrams, tables and points regionalization using the distribution model (kriging). A further objective of this study was to estimate the incidence and intensity of industrial activity on the heavy metals pollution. Concentration trends of some heavy metals have been analyzed with reference to data regionalization depending on the increasing distances from the punctual and linear emission sources. That has been realized by the creation of contiguous areas bands and buffer areas, for which, spatial data medium values have been calculated.

With reference to linear sources linked to traffic emissions, 250 m wide buffer areas around the main streets have been set. Inside of these areas, trends of medium value relative to total Pb and Pt concentrations, have been studied.

The total Pb medium value constantly decreased at increasing distance of the buffer area from the emission sources. On the contrary, total Pt did not show this trend, probably because of low metal concentrations, which were often found near the instrumental detection limit.

For point sources, 2 Km wide buffer zones have been considered. Within these areas total Ni and Cd medium values showed a maximum between 4 and 6 km distance from sources.

The area buffer markings out and the calculation of medium values concentrations of the kriging data have been carried out by ArcView and Idrisi 32 softwares.