



## **A regional approach to the environmental risk assessment in the Campania region**

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Environmental risk assessment and analysis has a crucial role for guaranteeing the safety of the population, especially in intensive urbanized and industrialized areas, such as the Campania region (Italy). In Italy, since 2006, the human health risk assessment has become mandatory for contaminated soil and waters at contaminated sites. While traditional risk assessment procedures are usually run at site specific level (brownfields), with this work we would like to introduce a freshly developed method to assess risks at regional level by means of GIS, considering the hazard due to the presence in the environment of a contaminated media, the land use variability and the actual distribution of the population.

3535 top soils were collected across the whole Campania region (Italy) with a sampling density of 1 sample/4 km<sup>2</sup>. Samples were analyzed at ACME Analytical Lab. Ltd (Vancouver, Canada), to determine the concentration of 52 elements, with a combined methods of ICP-MS and ICP-ES following an aqua regia digestion. After a detailed statistical data analysis and geochemical mapping, we reclassified the interpolated maps of some potentially toxic elements (Sb, As, Be, Cd, Co, Cr, Hg, Ni, Pb, Se, Sn, Tl, V, Zn), in accordance with the Italian environmental law (D.Lgs 152/2006), on the base of the trigger and action limits (CSC) for human safety established by this latter. The obtained maps were summed up in the GIS environment in order to get a cumulative map of the potential hazard for the topsoils of Campania region.

Considering that environmental risk for the population is strongly influenced by the exposure pathways followed by contaminants to reach the human target, in the case of Campania region we evaluated as relevant pathways both the soil/dust and food ingestion.

Furthermore to consider the influence of the land use in the onset of the risk, each land use type was associated with a specific value of a Land Use Risk Coefficient (LURC) which is also dependent on pathways.

Maps of regional risk for soil/dust and food ingestion were obtained by using the product of the map of the potential hazard map and the respective maps of the LURC distribution. A final comparison of the regional distribution of risk and the demographic data, at the scale of municipality, was necessary to better assess in which regional municipality a relevant potential increase of risk could occur and to rank them in a list of environmental priorities.

In such priority areas follow-up investigations, with higher density sampling, have been carried out, in order to further understand the relationships between pollution and pathologies in the areas.