

Introducing "UrbanEnviron@Lisbon 2008" a GIS-platform for environmental and human health data management

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The project untitled "PTDC/CTE-GEX/68523/2006 URBSOIL-LISBON: Geochemical survey of Lisbon urban soils: a baseline for future human health studies" proposes an urban geochemistry study of Lisbon city focusing the contamination of its environmental compartments (soil and ground-level dust) by urban activities, in order to assess the risk that potentially harmful substances (PHS), inorganic elements and organic compounds, in those environmental compartments may pose to human health.

The main aim of the project was to establish a geochemical baseline (concentration at a specific point in time of a chemical parameter in a sample of geological material) in a GIS format, intuitive and accessible to potential end-users and stakeholders (scientists, general public, policy makers/legislators and urban designers/planners). But, a dramatic cutback in the initial budget has led to dramatic changes in the research plan. The project became a target survey, despite all the constraints attached to the challenge of doing a target survey without a previous systematic survey. Instead of a target land use/area survey we used a strategy based on a target land use/vulnerable organism survey. As children are particularly vulnerable to PHS only urban recreational spaces used by them were sampled. Bryophytes were used as biomonitors of the urban environmental quality. Fifty one topsoil and 50 ground-level dust samples were collected in playgrounds, schoolyards, urban parks and public gardens. At each site, 1 uncontaminated moss transplant was fixed to a horizontal tree limb, which remained in situ for a period of 6 months. Such a low number of samples (0.6 samples/km²) doesn't fulfill the requirements of a baseline but enables gathering a GIS platform (UrbanEnviron@Lisbon 2008) with relevant data for future environmental/public health studies in Lisbon city.

Geochemical, geological, topographic, geographic, environmental, demographic data and site specific parameters like land use, soil/dust size fraction, soil/dust mineralogy, oral bioaccessibility estimates and PHE partitioning among the soil phases were assembled and integrated in the GIS database. Data on biomonitors were also integrated in GIS platform. This database was used to identify areas of probable risk within the city of Lisbon that were selected to carry out studies on human health.

Data integration was carried out through statistical methods like Multiple Regression Analysis, Cluster Analysis, Principal Component Analysis and Correspondence Analysis. The GIS-platform is intended to be a suitable tool, freely at the disposal of end-users and stakeholders to support those delivering recommendations on land management requirements (management of the environment),

show how to ensure that new urban recreational outdoor spaces are fit for purpose, including ensuring that there are no unacceptable risks to human health from PHS, and perhaps promoting platforms of analysis and engagement for ongoing cooperation among all stakeholders.