



TEST AREA n°3

Toulouse, France



Innovative approaches for the robust interpolation of Scarce, Imprecise, Clustered (SIC) soil data, for the identification of hot spots in the Toulouse Metropolis, France

Scale

600 km², i.e., approximately 25km x 25km for the Extended Toulouse Metropolis perimeter (shown in grey on the map).

Special focus

The Toulouse Metropolis will serve as a test area for the development of algorithms for the:

- robust interpolation of soil data from existing measurements;
- establishment of geochemical baselines;
- identification of hot spots with reference to the baselines.

A particular focus of this effort is the recognition of different types of uncertainties affecting the soil data:

- stochastic uncertainties (associated with the natural variability of soil data);
- epistemic uncertainties, associated with knowledge gaps inferred by "SIC" data; Scarce, Imprecise, Clustered.

Ambition for the end of the project

The Toulouse Metropolis dataset will serve to test innovative algorithms that will allow the interpolation of soil concentration maps from which geochemical baselines can be defined and hot spots or anomalies can be identified. Interpolation will seek to "explain" soil concentrations based on more or less complex geo-spatial factors (geological, topographical, climatic, anthropogenic, etc.).

The analysis will serve to identify mixed populations that allow a zoning of the geochemical background within coherent geographical entities. Resulting maps will serve to identify risks based on the SPR (Source-Pathway-Receptor) methodology. Combined with an analysis of technical remediation opportunities and economic constraints, this information will feed into the defining of a prioritization strategy.

Type of soil contaminants

Metallic trace elements (including Lead, Cadmium, Arsenic, Chromium); Polycyclic aromatic hydrocarbons (PAHs); Polychlorinated biphenyls (PCBs); Benzene, toluene, ethylbenzene and xylenes (BTEX); hydrocarbons and dioxines.



Current status of Test Area

The Toulouse Metropolis test area offers around fifty surface soil samples collected through the ETS project (Risks for buildings welcoming children and adolescents located on contaminated soils). This set of samples has been augmented by others acquired during site diagnostics commissioned by the Toulouse Metropolis, including areas devoid of contamination, during two sampling campaigns specific to the ETS project in 2019. These campaigns collected 40 surface soil samples and 100 deep samples taken every metre from 20 5m-deep boreholes.

Ambition beyond the project

As there are currently no trans-European limit values defining what is a "contaminated soil", the methodology that will be developed based on this ITA is key to applying circular thinking to materials excavated from contaminated sites. Calculation of urban anthropized pedo-geochemical background values for other metropolises will help stakeholders apply common management principles such as the "stand-still" principle (the excavated soil which will be applied must be of the same or better quality compared to the quality of the soil it is applied on).