



Is there a specific geochemical signature of urban soils dedicated to stormwater infiltration?

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Stormwater infiltration devices are widely used in urban areas to recharge aquifers. They consequently store and concentrate on small surfaces, suspended particles coming from the erosion of the urban watershed carried out by stormwater are deposited at the surface of the receiving soil. This leads to a sedimentary layer that could be considered as a technosol where pedogenesis is occurring in relation with the receiving underlying soil.

The knowledge related to these specific soils comes from a very small number of urban catchment. Moreover, few data are available concerning their main agronomic characteristics and the presence of others contaminants related to urban, industrial or agricultural activities. Our objective was to see if there is a generic specific geochemical signature that could characterize these technosols or if it is mostly explained by the catchment characteristics.

For the first time, the surface soil of 19 infiltration basins situated in the East of Lyon were sampled in spring 2012 and chosen to represent a diversity of urban catchment typology. A mean representative surface layer sample was obtained with a mixture of 8 to 20 subsamples (depending on the basin surface) collected randomly on each basin. Numerous geochemical parameters were measured : pH, Total Organic Matter, Total Organic Carbon, carbonate content, texture, visible and infra-red spectra, phosphorus speciation, total nitrogen, total Zn, Cu, Ni, Cd, Pb, Cr, 7 pesticides, 16 PAHs, sum of 17 Dioxines, sum of the 7 indicator PCB, alkylphenols.

A first analysis of the results underlines the great variability of the different parameters due to the diversity of management and design of basins. Nevertheless a stable chemical "signature" can be precised in relation to the concomitant presence of componants in rather stable proportions. We confirm that these specific urban soils are highly organic (4 to 20% dry weight) with high total PAHs and heavy metals contents with a silty texture. We show specifically that these soils are good phosphorus sink (1 to 3 g/kg dw) with a great proportion of available P . Dioxines and PCB are detected in all the 19 samples with contents varying from 2 to 30 ng/kg dw for the sum of 17 dioxines and 8 to 500 mg/kg dw for the sum of the 7 indicator PCB. Diuron was measured in half of the basins and para-ter-octylphénol (30 to 100 mg/kg dw) and 4-nonylphénol (300 to 1300 mg/kg dw) were quantified in all the samples.

In order to see if there is a co-structure between the geochemical properties of the 19 sites and the catchment characteristics, a STATIS analysis was used to carry out a multi-table analysis with the 6 tables characterizing the sites (catchment characteristics, heavy metal content, main geochemical properties, organic pollutant content, infra-red spectra, visible spectra) and is still under way. This first results of this analysis confirm that the geochemical characteristics are independant from land use and mostly linked to an "urban geochemical specificity" in relation to air quality and urban surfaces characteristics.