



## **Pedogenesis evolution of mine technosols: focus onto organic matter implication**

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Technosols include soils subject to strong anthropogenic pressure and particularly to soil influenced by human transformed materials. In this context, abandoned mine sites contain a large amount of transformed waste materials often enriched with metals and/or metalloids. The natural evolution of technosols (pedogenesis) may induces the change in contaminants behaviour in term of stability of bearing phases, modification of pH oxydo-reduction conditions, organic matter turnover, change in permeability, or influence of vegetation cover. The fate of these elements in the soil can induce major environmental problems (contamination of biosphere and water resource). This will contribute to a limited potential use of these soils, which represent yet a large area around the world. The initial contamination of the parental material suggests that the pedological cover would stabilize the soil; however, the chemical reactivity must be taken in consideration particularly with respect to potential metal leachings. In this case, it is quite important to understand the development of soil in this specific context.

Consequently, the global aims of this study are to understand the functioning of mine Technosols focusing onto the organic matter implication in their pedogenesis. Indeed, soil organic matter constitutes an heterogeneous fraction of organic compounds that plays an important role in the fate and the transport of metals and metalloids in soils.

Three different soil profiles were collected representative to various mining context (contamination, time, climat), respectively to Pb-Ag, Sn and Au exploitations. Several pedological parameters were determined like CEC, pH, %C<sub>org</sub>, %N<sub>tot</sub>, C/N ratio, grain size distribution and chemical composition. The evolution of the nature of organic matter in Technosol was studied by elemental analyses and thermochemolysis was realized on the total and lipidic fractions.

The sampling allows to observe natural mine Technosol organic matter for different exploitation type and different solum ages. The quantity and composition of organic matter vary according to soil depth and the soil profiles. The thermochemolysis of these soils shows a wide array of molecules from various origins: some are ubiquitous, other more specific to the microbial or plants presence. In addition, molecules resulting from the reaction with the parental material are highlighted for one soil profile. The results give a large evidence of similarities between mine soil and non-anthropized soil. But it seems to appear that the organic matters are affected by the mine technosols specificities. Theses relations between soil organic matters and the specific mineral background of mine soils will be discussed in relation to the general pedological functioning of non-anthropized soil.