Comparisons of lab results of anthropogenic formation and "natural" soil: granulometry, sand fractioning and pedological chemical analyses.

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May procedures used in pedological analyses be used for anthropogenic formations? What results can be reached, and which relations and comparisons can we establish among depositions made, directly and indirectly, by human action and soils? In this work, we show the results of several analyses that are commonly to be fulfilled when we work with soil investigations, and we propose discussions about how the human and natural processes are totally combined when there is a formation and transformation of these anthropogenic volumes. In this case study, in Rondonópolis (Mato Grosso, Brazil), we compare one pedological profile with three anthropogenic formations, including one that is, at the same time, anthropogenic deposition and vertical sequence of pedological profiles (in the initial phase of formation, with just "A" horizons and "C" horizons). In the sense of such discussion, we carried out fieldwork to collect samples in exposed outcrops, and granulometry, sand fractioning, and chemical (basic, pedological) analysis were used to provide data to compare with what was observed during the fieldwork (also using pedological manuals to recognize pedological characteristics). Among the results, called attention: 1) the "natural" soil can be classified, according to WRB/FAO (2015), as Arenosol; 2) the Sum of Bases, Cation Exchange Capacity and Base Saturation presented, in most cases, higher values for the anthropogenic depositions, as well as pH values; 3) the natural soil present higher values of Al than anthropogenic deposition; 4) depending on type of deposition, the percentage of sand fraction decrease in contrast to the measured values in the Arenosol. Nevertheless, the three anthropogenic formations have very different aspects besides these general considerations. One of them is totally formed by a horizontal layer with variable constituents, such as fragments of laterites and also a layer rich in organic carbonized matter, and the main reason for this formation seems to be the paving street (it was investigated through an opening outcrop in the occasion of sewage systems works). The second was originated in an attempt to ground an erosive process related to what seems to be the resumption of a water course. Moreover, the third one is an alluvial deposition that includes materials like layers with plastics, sediments, fragments of laterite, and, as recognized throughout the fieldwork and proven by the chemical analysis, some anthropogenic layers turned into soil horizon ("A"). We conclude that due to the specific characteristics of the region, with rainfall and high temperatures, it is possible to develop pedogenesis in these materials, since the possibility of a rapid weathering process. On the other hand, because of the concentration of rainfall in a few months, several layers, according to this position on the relief, may have no chance of developing pedogenesis on account of intensified erosive events.

Reference:

IUSS Working Group WRB. 2015. World Reference Base for Soil Resources 2014, update 2015 International soil classification system for naming soils and creating legends for soil maps. World Soil Resources Reports No. 106. FAO, Rome.

Grant 2019/21885-7, São Paulo Research Foundation (FAPESP).
The opinions, hypotheses, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of FAPESP.