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# Image analysis of soil thin sections to predict the evolution of a constructed Technosol's structure: quantification of descriptors of porosity and aggregation.

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Soil structure, through the architecture of pores and aggregates influences water infiltration and retention. Furthermore, changes in the geometric structure of pores and aggregates are reported to have relation with physical degradation of cultivated soils. In most of cases, these parameters are described qualitatively and synchronically which didn't make it possible to evaluate the evolution of soil structure with accuracy. Many parameters concerning soil structure are determined micro-morphologically or computably aid, some qualitative and others quantitative, but few works are carried out to dictate which are quantitatively better to describe the evolution of soil structure.

The aim of this work was to develop a quantitative computer aided method to study the evolution of constructed Technosol structure. For this achievement, an *in situ* 1 hectare plot of constructed Technosol was set up in 2007 on the experimental station of the French Scientific Interest Group. This station was divided in 24 plots. Undisturbed samples were collected in Kubiena boxes in 2008 and 2010 in each plot for thin section preparation. Soil structures (pores and aggregates with diameter > 25  $\mu\text{m}$ ) were quantified by analyzing thin sections images. Pores and aggregates were classified according to their diameter (four classes: diameter > 2000 $\mu\text{m}$ , 500-2000 $\mu\text{m}$ ; 50-500 $\mu\text{m}$ ; 25-50 $\mu\text{m}$ ). Eight descriptors were calculated: number, area, Crofton Perimeter, distance, volume, eccentricity, connectivity and diameter.

We will discuss the parameters which better describe the evolution of porosity and aggregation between 2008 and 2010 and the consequences of this evolution on the functioning of this new constructed Technosol.