



Long term changes in soil structure of microbial crusts: quantification by X-ray Micro-CT and hydrological measurements

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Highly eroded environments can be stabilised using plant structures which often produce crusted soil layers. In the steppified desert region of Shapotou (China) a vegetated protection system was progressively established since the 1950s up to 2004. Initially, a sand barrier was built with woven willow branches or bamboos to reduce wind erosion. Behind the sand barrier, straw chequerboards (wheat or rice straw) were installed, usually with sections of 1 m² area. The fixed sand surface led to the formation of very different microbial soil crusts although applied on the same soil according to the age of the straw structures. In situ disc tension infiltrometer measurements and X-ray Micro-CT scanning have been used in order to physically characterise three very different aggregates representing such long term structure evolution. Soil composition analysis of the stabilized dune sand with and without microbiotic soil crust have also been carried out.

3D image reconstruction and analysis allowed to visualize and quantify internal structure changes of the aggregates in terms of pore size distribution and connectivity. Hydraulic conductivity curves showed a strong correlation with pore size distribution from 3D image analysis.