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Modelling the historical changes in physical soil properties caused by wind erosion process

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Soil physical properties could be significantly affected by land degradation processes. Spatial variation modelling of physical soil properties in time is important in areas where wind erosion occurs regularly. The objectives of this study were to determine the changes of spatial variability of sand, silt and clay % contents in selected area in Slovakia over 45 years using topsoil physical properties at European scale (using LUCAS topsoil) and historical Complex Soil Survey Data. The Complex Soil Survey was made in the period 1960-1970 for the whole of the Slovak Republic, using a unified methodology to build an important soil properties database including physical topsoil properties. Spatial model distribution using regression kriging algorithm created by Soil Science and Conservation Research Institute was used for comparison with LUCAS topsoil particle size distribution datasets and their derived products of clay, sand and silt % content. The results of this study will show the effects of wind erosion in long time scale. Continual total mass removal during wind erosion can produce dramatic changes in the texture of the soil surface. Fine particles are removed, which tend to concentrate sand as erosion continues. Wind erosion physically removes the most fertile portion of the soil which may lead to lower productivity or destroying the characteristics of topsoil beneficial to plant growth. Historical changes of physical soil properties are discussed in this study.