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Soil aggregate stability represents an important characteristic of soil structure, which is closely connected to soil erodibility, soil water regime, soil biota and soil nutrient availability. The soil particle arrangement into the aggregates has a significant impact on the soil pore system and consequently on the soil hydraulic properties. The degree of the soil aggregate influences water flux and solute transport within the soil profile (Kodešová et al. 2008, 2009a,b). The distribution of aggregate stability within the slope system is closely related to the terrain attributes (such as slope, curvature, aspect) through their impact on various soil properties.
Study on relationship between soil aggregates stability and chosen terrain and soil properties was performed on morphologically diverse study site in loess region of Southern Moravia. Haplic Chernozem is an original dominant soil unit in the wider area, nowadays progressively transformed into different soil units along with intensive soil erosion. An extremely diversified soil cover structure resulted from the erosion. Soil cover and material redistribution on the plot was studied by Zádorová et al. (2010).
Soil analyses and detailed digital elevation model processing were the main methods adopted in the study. Soil aggregate stability and various soil properties were analyzed in 15 sampling points located in representative terrain and soil cover positions. The indexes of water stable aggregates (WSA) were determined using the procedure presented by Nimmo & Perkins (2002). Topographic derivatives were obtained from a detailed digital elevation model (DEM) derived from ground laser scanning procedure (Zádorová et al. 2010) and calculated using integrated algorithms implemented in ILWIS 3.3 from the DEM: slope, plan, profile and mean curvature, topographic wetness index (TWI), sediment transport index (STI) and stream power index (SPI).
Results showed decrease of aggregates stability mainly in exposed parts of the slope. Stability increase is evident in stable and accumulation positions. Multiple linear regression showed dependency of WSA index on organic carbon content. This result fully corresponds with numerous studies on aggregates stability. Relationship between WSA and other analytic properties was not approved. Regression analysis showed strong dependency on plan curvature. Soil aggregate stability heterogeneity can be related to the strong material redistribution on the slope influencing particularly the organic carbon content in the plough layer. Terrain attributes, as one of the main factors actuating on the surface runoff, showed strong relationship to the structure stability through plan curvature index.

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