Geophysical Research Abstracts
Vol. 17, EGU2015-12446, 2015
EGU General Assembly 2015

Monitoring of soil water storage along elevation transech on morphological diverse study-sites affected by soil erosion

Ondrej Jaksik, Radka Kodesova, Antonin Nikodem, Miroslav Fer, Ales Klement, and Josef Kratina
Czech University of Life Sciences Prague, Soil Science and Soil Protection, Prague, Czech Republic (jaksik@af.czu.cz)

Soil water availability is one of the key factors determining plant growth. Spatial distribution of soil water content is influenced by many factors. For the field-scale, one of the most important factors is terrain and its shape. The goal of our study was to characterize soil water storage within the soil profile with respect to terrain attributes. Two morphologically diverse study sites were chosen, in order to monitor soil water storage during vegetation season. The first site Brumovice in located in the Southern Moravian Region. The original soil unit was Haplic Chernozem developed on loess, which was gradually degraded by soil erosion. In the steepest parts, due to substantial loss of soil material, soil is transformed to Regosol. As a result of consequently sedimentation of previously eroded material in toe slopes and terrain depressions colluvial soils are formed. The second site Vidim is placed in the Central Bohemia. Dominant soil unit in wider area is Haplic Luvisol on loess loam. Similar process of progressive soil transformation was identified. On each study site, two elevation transects were delimited, where each consists of 5 monitoring spots. Access tubes were installed in order to measure soil moisture in six different depths (10, 20, 30 40, 60 a 100 cm) using Profile Probe PR2. The monitoring was conducted during vegetation season: April – July 2012 in Brumovice and May – July 2013 in Vidim. The average soil water contents were calculated for following three layers: topsoil A (0-20 cm), subsoil B (20-40cm), and substrate (40-100cm). The soil water storage within the soil profile was also expressed. Sensors TMS3 were also used for continual soil water content monitoring in the depth of 0-15 cm. In addition undisturbed soil samples were taken from topsoil to measure soil hydraulic properties using the multistep outflow experiment. Data were used to assess retention ability of erosion affected soils. The soil water storage and particularly average soil water content of the topsoil layers were dominantly affected by evapotranspiration (which apparently depended on aspect of the slope) and secondary by soil properties change due to soil erosion especially on steep slopes. Both transects in Brumovice a one transect in Vidim were located on north-facing slopes, while one transect in Vidim was located on south-facing slope. As result higher soil water contents were observed at the steepest part of all 3 transects (north aspects). We found strong significant relationship between slope and average soil moisture for both transects in Brumovice. In the case of the south-facing transect no apparent trend of soil water content with respect to terrain position was observed.
Acknowledgment: Authors acknowledge the financial support of the Ministry of Agriculture of the Czech Republic (grant No. QJ1230319).