



Investigation of soil water changes under different land use types at a small Balaton catchment in Hungary

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Agricultural lands are among the most sensitive ecosystems subject to climate change, which can have substantial effects on soil erosion rates. The present study is part of an on-going monitoring effort, which is being carried out on three reference watersheds around Lake Balaton, Hungary, where plot- and catchment scale processes are being monitored. The selected catchment presented in this study has an area of 21.3 km², with land use types including forest, grassland, and agricultural land use of vineyard and wheat. Soil water content and soil temperature were continuously measured while weather data were obtained either from local measurements at the sites for precipitation, or from meteorological stations close to the pilot area for other meteorological variables. We investigated the effects of antecedent soil water (ASW) content on soil erosion rates and aggregate stability, also on the amount of total suspended sediments (TSS) leaving the catchment. HYDRUS-1D was used to simulate the soil water content, infiltration, evaporation, and percolation of water through soils under different land use types. Based on single rain events on a short term, the soil water contents stayed relatively constant at 15, 40, and 70 cm below surface in case when cumulative rainfall amounts were approximately 10 mm. During a month long period with no major rain events (precipitation < 0.5 mm), the largest change in VWC was observed in the soil cover under forest. In these soils the water content decreased by 14% at 70 cm depth, while in the 15 cm layer this change was much less pronounced, with only 7% decrease. Changes in TSS values during single rainfall events showed good correlation with initial soil moisture conditions; however we need further data collection to draw more precise conclusions. Preliminary data also suggests that ASW has a major effect on soil aggregate stability and TSS rate.