Geophysical Research Abstracts, Vol. 7, 03073, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03073

1 Influence of different land use on saturated hydraulic conductivity in alluvial landscape.

2 A. Halabuk

Institute of Landscape Ecology, Slovak Academy of Sciences, Bratislava, Slovak Republic (andrej.halabuk@savba.sk / Phone: 00421/37/7335601 / Fax: 00421/37/7335608)

Wetland areas and grasslands represent specific landscape features that may have significant importance for water regime in landscape. Their character, especially soil physical properties and vegetation may cause a well-known influence on hydrological processes, e.g. evapotranspiration, infiltration or water retention. We focused on their influence on transport of water in alluvial landscape. Saturated hydraulic conductivity of topsoil was chosen as an indicator of water transport process. The main approach was based on the comparative analysis of saturated hydraulic conductivity among wetlands, mown grasslands and arable land in alluvial landscape. Wetlands were represented by reed marshes, tall sedges and wet unmanaged grasslands; mown grasslands were represented by regularly managed alluvial grasslands. This was done by one-way analysis of variance with a different type of landscape feature as the factor. The crucial step allowing correct interpretation of results was the selection of study sites and sampling design. Standard analyses of basic landscape variables (soil type, relief, geology) in one hand with QuickBird satellite image interpretation using standard GIS tools were used for selection of two representative areas designated for sampling (one in the upper part, the second in the central part of the catchment). The occurrence of mosaic pattern of wetlands and grasslands in alluvial landscape was the main criterion for this selection. Adjacent arable lands were added to sample areas for comparison. A stratified random sampling design was performed on selected sample areas with 63 sample sites in total. A standard methodology of estimation of saturated

hydraulic conductivity using falling head technique on 250 cm^3 soil cores was used. Soil samples were taken after smooth removal of vegetation from litter horizon (about 5 cm). To minimize the big time variability of saturated hydraulic conductivity we made all field sampling and analyses in a relatively dry period of July 2004. Results have shown significantly higher values of saturated hydraulic conductivity in wetlands (6.14 m/day on average) compared to mown grasslands (1.47 m/day) and arable land (0.78 m/day). This indicates a specific significance of wetlands in regards of water transport processes in alluvial landscape. In catchment scale thus, wetland areas may positively influence relevant hydrological functions like infiltration, percolation, and baseflow support that subsequently affect the water regime in a catchment.