



Shallow groundwater dynamics in relation to stream dynamics in a small headwater catchment

Lovrenc Pavlin (1), Borbála Széles (1,2), Gerhard Rab (2), Gunter Blöschl (1,2)

(1) Vienna University of Technology, Centre for Water Resources Systems, Vienna, Austria (pavlin@hydro.tuwien.ac.at), (2) Institute of Hydraulic Engineering and Water Resources Management, Faculty of Civil Engineering, Vienna University of Technology, Vienna, Austria

In order to better predict run-off generation and solute transport in headwater catchments, it is important to improve our understanding of connectivity of different discrete units of the landscape. The connection could be established through local shallow subsurface flows from hillslopes into the riparian zone and the stream. This phenomenon is non-linear, non-stationary and is dependent on many controls, i.e. subsurface topography, soil properties, event precipitation characteristics, and antecedent conditions. The objective of this study was to identify the patterns in the dynamics of the shallow groundwater and streamflow interactions in the Hydrological Open Air Laboratory (HOAL) in Austria (Blöschl et al., 2016). This is a predominately agricultural headwater catchment with an area of 66 ha where a wide range of hydro-meteorological characteristics are being monitored on a fine spatial and temporal scale. The connectivity between the hillslope and the stream was evaluated by analyzing the hysteresis relationship of the groundwater to the streamflow during rainfall events in a period of one year. We identified connectivity thresholds beyond the hillslope and the stream connect. These thresholds are event characteristics, distance from the stream, the depth of the groundwater table and antecedent moisture conditions. The study compares the results with similar studies in the literature.

Reference:

Blöschl, G., et al. (2016). The Hydrological Open Air Laboratory (HOAL) in Petzenkirchen: A hypothesis-driven observatory. *Hydrol. Earth Syst. Sci.*, 20(1), 227–255. doi: 10.5194/hess-20-227-2016.