Geophysical Research Abstracts
Vol. 16, EGU2014-11637, 2014
EGU General Assembly 2014

Experimental assessment of a schist hillslope in Luxembourg with a view to modelling

Anna Scaini (1,2), Fabrizio Fenicia (3), Keith Beven (2,4)

(1) CRP Gabriel Lippmann, Luxembourg (scaini@lippmann.lu), (2) Lancaster Environment Centre, Lancaster University, Lancaster, LA1 4YQ, UK, (3) Eawag, Swiss Federal Institute of Aquatic Science and Technology, 8600 Dübendorf, Switzerland, (4) Geocentrum, Uppsala University, Uppsala, Sweden

Although modelling is often the logical complement of fieldwork, experimenting and modelling are regularly carried out separately, which often causes a mismatch between the data that are available and those that are necessary. Our research aims to generate insights into flowpaths and mixing processes through a combined experimental and modelling approach. Experiments are therefore targeted to estimate relevant model parameters and test model assumptions. The experiments take place on a hillslope in the Weierbach catchment in Luxembourg. The Weierbach is a forested catchment underlain by schist, and is characterized by marked threshold behaviour. The schist formation tends to be fractured towards the surface, forming a system of local reservoirs where water can be stored. Lateral flow can therefore be interpreted as a movement of water across multiple temporarily connected reservoirs.

We carried out a sprinkling experiment with the use of deuterium-enriched water. We use ERT measurements and Thermal Infrared data are used to spatially characterize the heterogeneity of the subsurface at the experimental site. Observational data in the hillslope are used to estimate the response at the bottom of the hillslope. The signal distributed through time will help estimate the percentage of flow we expect. Flow and concentrations are measured at a fine enough time scale to capture the response of the hillslope at event scale. The objective of collecting the experimental data is to capture the downslope lateral component effect and estimate the residence times of water during wet conditions. Up to this phase, experimental results in wet conditions are analysed. The information presented will be used for testing the Multiple Interacting Pathways (MIPs) concept in the 2D version, in order to try to reproduce the movement of water through the soil. The main characteristic of MIPs model is that it tracks the movement of individual water particles. The movement of these particles is determined by system properties that are expressed in terms of probability distributions. Through the MIPs we will be able to simulate both breakthrough curve and flow. These experimental results are the basis for the application of the model. In terms of processes, we aim at understanding how the system is wetting up and when the connectivity of the system is reached, and in particular if there is a clear threshold for this specific hillslope.