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Similarity Analysis between near surface soil moisture and streamflow during recession events in an alpine catchment

Raphael Mutzner, Steven V. Weijs, Andrea Rinaldo, and Marc B. Parlange
School of Architecture, Civil and Environmental Engineering, EPFL, Lausanne, Switzerland

Spatial and temporal variability of near surface soil moisture is important for understanding streamflow generation in high altitude mountain catchments since antecedent soil moisture plays an important role in the timing of runoff. For relatively small to medium sized catchments, the spatial variability of near surface soil moisture is hard to capture with remote sensing techniques and distributed point measurements are needed. Linking local measurements of soil moisture with integrating catchment scale streamflow measurements remains a great challenge in hydrological modeling. Since 2008, an alpine watershed of 20.4 km^2 has been intensively monitored in the Swiss Alps, with a deployment of a network of wireless meteorological stations, measuring soil moisture along with other meteorological forcings. The discharge is monitored at three different sites. We present some preliminary results from a statistical analysis linking the spatial variation of the soil moisture, measured at 20 and 40 cm, with the variation of the streamflow in the particular case of recession events. A classic parameterization of recession events relating the variation of the discharge dQ/dt to the discharge Q by $|dQ/dt| \propto Q^{\beta}$ is used and transposed to soil moisture data. The parameterized soil moisture variation is then partitioned into runoff and evapotranspiration leading to better knowledge of local processes at the hillslope scale.