



## **Applying a hydrochemical data-based model on multiple catchments: inferences for catchment physical controls of hydrologic processes.**

**I. Iorgulescu** (1), K.J. Beven (2) and A. Musy (1)

(1) Ecole Polytechnique Fédérale de Lausanne, Institute for Environmental Sciences and Technologies, CH-1015 Lausanne, Switzerland, (2) Institute of Environmental and Natural Sciences, Lancaster University, Lancaster LA1 4YQ, UK

We apply a recently developed hydrochemical model able to simulate discharge and reactive chemical tracer concentration (silica and calcium) in stream flow for the Haute-Mentue research basin (Switzerland) on multiple sub-catchments. The hydrochemical model is based on a parameterisation of the three components (direct precipitation (DP), acid soil water (SW), and deep groundwater (GW)) of a chemical mixing model. Each component is modelled through an identical structure consisting of a non-linear gain and a linear transfer function with two reservoirs (fast/slow) in parallel having a constant partition between them. Environmental tracer data on a quasi-continuous basis are available for five sub-catchments, and up to three in parallel. For each sub-catchment a representative sample of behavioural parameter sets is obtained through extensive Monte-Carlo simulations. Differences in marginal parameter distributions and those describing the non-linear and linear modules are then confronted to available information concerning physical catchment characteristics, soil and topography in particular. On this basis inferences are made concerning the major physical controls of catchment response.