Geophysical Research Abstracts
Vol. 12, EGU2010-12398, 2010
EGU General Assembly 2010

On the advantage of a dynamic evaluation of catchment models - two Swedish case studies

Ilaria Clemenzi (1), Jan Seibert (1), Fabrizio Fenicia (2), Dmitri Kavetski (3), Steve Lyon (4), and Hjalmar Laudon (5)

(1) Department of Geography, University of Zurich, Switzerland, (2) Centre de Recherche Public - Gabriel Lippmann, Belvaux, Luxembourg, (3) School of Engineering, University of Newcastle, Callaghan, New South Wales, Australia, (4) Physical Geography and Quaternary Geology, Stockholm University, Sweden, (5) Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, Umea°, Sweden

In two different case studies we illustrate how the application of a "dynamic identifiability analysis" approach can be a useful tool both for identifying model deficiencies, and thus guiding model improvement, and for detecting changes of catchments characteristics over time. This type of analysis consists of evaluating a hydrological model in a moving time window, which allows the assessment of time-variable parameter values. Here, the analysis was performed using the SuperFlex modeling framework, which is a hydrological modeling tool that allows the generation of multiple alternative model structures.
The first case study consists of applying the analysis on the Krycklan catchment, situated in the north-east of Sweden. The available hydrological data series cover a period of ten years (1997-2007) during which no significant changes occurred in the catchment. In the second case-study, the approach was applied to the sub-arctic Abiskojokken catchment located in northern Sweden. The available time series range from 1918 to 2007 and previous investigations indicated a time-change of catchment characteristics due to changing permafrost.
In the first case study, the dynamic analysis helped identifying deficiencies in the model structure, which could subsequently be improved. In the second case study, the analysis contributed to evaluating changes of catchment characteristics and functioning. Time variable model parameters could be associated to time changing catchment characteristics. Overall, this study demonstrated how the dynamic model evaluation is a powerful diagnostic tool that can increase the understanding of catchment behavior.