Geophysical Research Abstracts
Vol. 15, EGU2013-8496, 2013
EGU General Assembly 2013

Effect of spatial input data and landscape heterogeneity on performance and consistency of model structures

Tanja Euser (1), Hessel Winsemius (2), Markus Hrachowitz (1), Fabrizio Fenicia (1,3), Shervan Gharari (1,3), and Huub Savenije (1)

(1) Water Resources Section, Faculty of Civil Engineering and Geosciences, Delft University of Technology, P.O. Box 5048, NL-2600 GA Delft, The Netherlands, (2) Deltares, P.O. Box 177, 2600 MH Delft, The Netherlands, (3) Public Research Center-Gabriel Lippmann, rue du Brill 41, L-4422 Belvaux, Luxembourg

The use of flexible hydrological model structures for hypothesis testing requires an objective and diagnostic method to identify whether a rainfall-runoff model structure is suitable for a certain catchment. To determine if a model structure is realistic, i.e. if it captures the relevant runoff processes, both performance and consistency are important. Performance describes the ability of a model structure to mimic a specific part of the hydrological behaviour in a specific catchment. Consistency describes the ability of a model structure to adequately reproduce several hydrological signatures simultaneously. FARM (Framework to Assess the Realism of Model structures can be used to evaluate this performance and consistency, using different hydrological signatures. Results from FARM presented previously are only qualitative and for lumped catchment models, therefore, the research question of this study is: What is the effect if FARM is applied to model structures if some kind of spatial input data or landscape heterogeneity is accounted for? For this study a case study is performed in the Ourthe catchment, a tributary of the Meuse. The effects of incorporating different sources of heterogeneity, such as precipitation and landscape heterogeneity, are tested. These sources of heterogeneity are added stepwise and FARM is used to investigate whether metrics of performance and consistency change. In addition, with FARM it can also be identified how the reproduction of different signatures changes with the incorporation of different sources of heterogeneity. In this way FARM can be used to investigate if accounting for heterogeneity really adds value to a model structure.