



## **How to handle spatial heterogeneity in hydrological models.**

Ralf Loritz (1), Malte Neuper (1), Hoshin Gupta (2), and Erwin Zehe (1)

(1) Karlsruhe Institute of Technology (KIT), Institute of water and river basin management, Hydrology, Karlsruhe, Germany (ralf.loritz@kit.edu), (2) University of Arizona, Hydrology and Atmospheric Sciences, Systems Analysis

The amount of data we observe in our environmental systems is larger than ever. This leads to a new kind of problem where hydrological modelers can have access to large datasets with various quantitative and qualitative observations but are uncertain about the information content with respect to the hydrological functioning of a landscape. For example digital elevation models obviously contain plenty of information about the topography of a landscape; however the question of relevance for Hydrology is how much of this information is important for the hydrological functioning of a landscape. This kind of question is not limited to topography and we can ask similar questions when handling distributed rainfall data or geophysical images.

In this study we would like to show how one can separate dominant patterns in the landscape from idiosyncratic system details. We use a 2D numerical hillslope model in combination with an extensive research data set to test a variety of different model setups that are built upon different landscape characteristics and run by different rainfalls measurements. With the help of information theory based measures we can identify and learn how much heterogeneity is really necessary for successful hydrological simulations and how much of it we can neglect.