



## **Model evaluation by data partitioning: a discussion of concepts and a methodology using regression trees**

**I. Iorgulescu** (1) and K.J. Beven

(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

Data partitioning for model evaluation, which has its roots in expert model calibration by visual inspection of model results, is becoming increasingly popular. Several methods have been proposed and used in the literature both in the 'optimality' and 'equifinality' parameter set frameworks. We will discuss concepts that are particularly relevant in this context, such as: "behavioural model", "information content in data", "model complexity", "interference in parameter estimation", "model and error structure". We will then present and discuss a new partitioning method that is based on the "nonparametric direct mapping of rainfall-runoff relationships" approach we recently introduced. This method performs a recursive binary partitioning of input space using regression trees, a non-linear, non-parametric, identification algorithm. We will show that the latter improves the consistency of some otherwise subjective choices involved in other partitioning methods used for model evaluation. A first application of the proposed methodology on real data will be presented. In particular we will test two hypotheses: (1) low-parametric, dominant mode models are not consistent with the available information content in data, and (2) the constraints imposed on higher-parametric models drastically reduces the number of behavioural parameter sets.