



## **The detection of structural inadequacy in process based hydrological models: a particle filtering approach**

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This presentation introduces work on the detection of inadequacy within the structure of non-linear hydrological models. Structural inadequacy is considered to be the failure of a given model structure, with a constant parameter set, to reproduce the observed data, both input and output, to the accuracy required by the modeller. Using a computational strategy based upon particle filtering the structural inadequacy is mapped into the parameter space resulting in evolving distributions of parameters as the model attempts to adequately recreate the observed data. These parameter, and corresponding state, distributions can then be used, along with the modeller's perception of the processes, to propose improvements to the model structure. An example of the use of this methodology is provided by the consideration of rainfall-runoff data from the Leaf River catchment, Mississippi, USA.