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Service-based Environmental Modelling with the JAMS Framework

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Current challenges of understanding and assessing the impacts of climate and land use changes on hydrological ecosystems worldwide demand for an ever increasing integration of data and process knowledge in eco-hydrological simulation models. While the growing performance of High Performance Computing (HPC) systems provides the basis to address this demand, their seamless utilization often remains a crucial challenge. Here, service-based modelling can provide a way to easily access and use remote HPC systems. This work presents a RESTful Web-service implementation that allows to run and control environmental simulation models that are based on the JAMS modelling framework. JAMS is an Open-Source software platform for the design and application of environmental models, mainly used for eco-hydrological modelling in the context of climate impact analysis (e.g. Adamovic et al. 2016, Nepal et al. 2014, Steudel et al. 2013). This presentation will give an overview about the architecture of the implemented service and the methodology applied to adapt JAMS models in such a way that they can make use of multi-processor environments. The capabilities of the Web-service will be demonstrated using two typical, computationally complex application scenarios: the concurrent processing of a spatially-distributed hydrological model and the concurrent simulation of multiple models during parameter calibration.

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