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A service-based platform for integrated eco-hydrological system assessment

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Current efforts of understanding and assessing the impacts of climate and land use changes on environmental systems demand for an ever-increasing integration of data and knowledge, both in terms of spatio-temporal resolution and process representation detail. Software tools and frameworks that aim to address this challenge therefore have to cover a broad range of different functionalities, including (i) data and information management, (ii) analysis methods for geospatial data like maps or satellite imagery, and (iii) environmental process simulation for scenario-based projections of future developments. However, due to high hardware requirements, complex and error-prone configuration or restrictive licensing, these tools are often not easily usable for scientists, decision-makers and environmental planners.

The Integrated Land Management System V2.0 (ILMS^2) developed at the University of Jena addresses these challenges by providing a modular software platform that includes an environmental information system, remote sensing and geospatial analysis functions and a process-oriented environmental modelling system. All of the components are implemented as web-services and come with web-based user interfaces, ensuring minimal hardware and software requirements on the user's side and facilitating a collaborative processing of individual tasks in a seamless workflow. The integration of information management and processing capabilities in a web-based system further promotes the communication between domain scientists on one side and stakeholders, planners and policy makers on the other, thereby strongly supporting decision making processes based on scientific evidence and best available knowledge.

This presentation will give an overview of the ILMS^2 core functionalities and will demonstrate its application in the context of the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL). Within this joint initiative of Angola, Botswana, Namibia, South Africa, Zambia, and Germany, ILMS^2 is applied for environmental data management, eco-hydrological modelling and scenario-based impact assessment in four meso- to macro-scale watersheds in the southern African region. Examples from these applications will show how ILMS^2 can support the different steps of eco-hydrological system assessment workflows in the context of Integrated Water Resources Management.