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Comparison of soil moisture fields estimated by catchment modelling and remote sensing: a case study in South Africa.

Vischel T., Pegram GGS., Sinclair S.

Civil Engineering Programme, University of KwaZulu-Natal, Durban, South Africa. Emails: vischelt@ukzn.ac.za, pegram@ukzn.ac.za, sinclair@ukzn.ac.za

The amount of water in the soil acts as a vital switch between atmosphere and ground, governing many Earth-bound water processes: infiltration, evapotranspiration, interflow and ground-water recharge, as well as input to NWP models. If accurate spatial estimates of soil moisture over large areas were available, they would be useful in many applications in Hydrology and Meteorology, besides Agriculture. While only point measurements are available from field measurements, satellite remote sensing offers one of the most promising techniques to provide fine resolution soil moisture fields over large areas.

A physical-based hydrological modelling strategy is used here, to improve our capacity to simulate soil moisture fields and better understand the mechanisms that control the soil moisture patterns at regional scale. The TOPKAPI model (Liu and Todini, 2002) with a modified evapotranspiration module is applied on the Liebenbergsvlei catchment (South Africa, 4625 km^2). Remotely sensed rainfields are used as input to the model in order to provide time-continuous simulated soil moisture fields. A soil wetness index (SWI) based on the soil moisture content for individual soils is then defined and compared to a SWI computed from the brightness temperature gradients using METEOSAT-8 data in addition to the existing SWI estimated from ENVISAT by the Institute of Photogrammetry and Remote Sensing Group at the Vienna University of Technology, our partners in the ESA's TIGER SHARE project.