IAHS2017-351-1
IAHS Scientific Assembly 2017

Using remote sensing to inform a fine-scale hydrological model over sub-Saharan Africa at the daily scale

Scott Sinclair (1,2) and Geoff Pegram (1,2)
(1) University of KwaZulu-Natal, Civil Engineering, Durban, South Africa, (2) Pegram and Associates, South Africa

Distributed hydrological models present a useful tool to integrate in-situ observations and remote sensing estimates of water cycle components into a consistent data-set at space and time-scales of interest.

PyTOPKAPI is a BSD licensed Python library implementing the TOPKAPI Hydrological model (Liu and Todini, 2002). The model is a physically-based and fully distributed (grid-based) hydrological model, which has already been successfully applied in several countries around the world.

The model uses gridded static data-sets (soil properties etc.) and remote sensing derived forcing data (rainfall and evapotranspiration) to model the water balance at application targeted time and spatial scales. PyTOPKAPI differs from SVAT models in that it is a full catchment model and is able to directly represent lateral transfers of water within a network of interconnected model cells, based on local topography.

We present an overview of the model, as well as results from an application of PyTOPKAPI to model soil moisture and evapotranspiration over southern Africa. These modelled outputs are frequently updated and directed towards agricultural uses and flash flood forecasting.