Bridging the scales of evapotranspiration (BRIDGET)

Dr. Sibylle K. Hassler

Sibylle Hassler is interested in water transport across the interface of soil, vegetation and atmosphere. She completed her geoecology studies with a thesis on vegetation patterns induced by water availability in Namibian savannas. During her PhD she examined effects of reforestation and its vegetation characteristics on soil hydraulic properties in the Panama Canal Watershed. Recently she focused on measuring and understanding evapotranspiration (ET) as the integrating water flux across the soil-plant-atmosphere interface. While gaining most experience in sap flow as an in-situ ET measurement, she will also combine and integrate other methods within BRIDGET.

Project summary

Cross-compartment fluxes of mass and energy play a key role in the functioning of the earth system. Yet their understanding is largely hampered by the fact that related observations occur on multiple scales, involve multiple sensors, and data are collected across different research disciplines. BRIDGET aims to overcome this fragmentation by providing tools that will allow storage, merging and visualisation of multi-scale and multi-sensor data and ultimately facilitate their scientific analysis at the example of evapotranspiration (ET) data. ET holds key importance for the Earth's water and energy cycle and consequently its climate. Additionally, approaches to estimate ET are manifold with respect to the underlying observations, scales, footprints and uncertainties. In collaboration between KIT and UFZ, BRIDGET will develop an ET package in Python that can be used within an already existing and tested virtual research environment (V-FOR-WaTer) as well as independently. The package is intended to combine and scale the variety of common ET observations (e.g. eddy covariance data, sap flow data, lysimeter data) and develop the necessary metadata catalogue with special emphasis on uncertainty. Test datasets will come from the UFZ and KIT TERENO observatories. The package will be completed by the development of tools for visualisation and (geo-)statistical analysis of these data. The final system will ultimately facilitate merging different ET estimates across sensors and scales and thus provide in situ-based ground truth including uncertainty assessment for remote sensing and modelling.