



## **Problems with modelling crops in the water cycle**

C. Jackisch (1,2), L. Samaniego (2), and A. Hildebrandt (2)

(1) Technische Universität München, Hydrology and Water Resource Management, Munich, Germany (jackisch@bv.tum.de),

(2) UFZ-Helmholtz Centre for Environmental Research, Dept. Computational Hydrosystems, Leipzig, Germany

Vegetation plays a major role both in the atmospheric and terrestrial water cycle. Cropland covers a large proportion of the global terrestrial area (i.e. 38% globally in 2005, FAOSTAT). Accordingly, crop models have become increasingly prominent for studying the impact of Global Change both on economic welfare and on the influence of vegetation on climate and feedback mechanisms with hydrological processes. By doing so, it is implied that crop models properly reflect the crop-soil interactions, soil water balance and vertical exchange with the atmosphere - and that parameters are to some degree portable.

In this research we used data from eight lysimeters located at Brandis (Saxony, Germany), which have been planted with the crops of the surrounding farm to test the capability of the crop model in SWAP. The lysimeters contain different natural soil cores, leading to substantially different yield. This experiment gives the opportunity to test the crop model with regard to yield and the water cycle - i.e. whether a model calibrated with one crop and one climate can be moved to a different soil.

When using the default parameters for the respective environment, the model does neither quantitatively nor qualitatively reproduce the dynamics of the yield and the water-balance for the different lysimeters. A joint calibration of plant and soil parameters performed much better than that of a sequential calibration of the same parameters. Moreover, the cross validation of parameter sets for the same crop to a different soil indicates strong interrelations between the two parameter sets. This suggests that the model is not portable, and needs to be calibrated at each location. As we aim on dynamic crop modelling at the mesoscale with regionalized parameters, we propose to work on understanding the origin and effect of these discrepancies.