Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09588, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09588
EGU General Assembly 2008

Hydrologic and Crop Models in the Mesoscale: Review and integration Proposal

C. Jackisch, A. Hildebrandt and L. Samaniego

Dept. Computational Hydrosystems, Center for Environmental Research UFZ
(conrad.jackisch@ufz.de, Permoserstr. 15, 04318 Leipzig, Germany)

Although, the state-of-the-art in crop modeling has advanced considerably during the last decades, those models still lack a realistic representation of soil-surface-atmosphere processes, particularly on the mesoscale. However, models that are sensitive to the changing environment are a prerequisite for finding sustainable land use strategies and to assess the impacts of climate change.

We analyze three crop models (SWAP, SUCROS and DAISY) and find that their performance is rather insensitive to site characteristics. In particular, slope and aspect, vegetation self-organization and neighboring effects were neglected. Furthermore, the application of these models to the same data sets produce significantly different vegetation dynamics. Crop modeling mainly focus on fertilization and irrigation schemes on plotscale but oversimplifies the interactions of vegetation with the hydrological cycle.

The long term goal of this research is to built a vegetation module for a mesoscale hydrological model (HBV-UFZ), where the plant-ecosystem interactions are realistically represented. As a possible solution for this problem, we propose a regionalization approach that employs nonlinear transfer functions to relate vegetation model parameters with site specific attributes. Based on a regionalization of site and plant parameters the model shall be applicable under various conditions and thus allow more realistic strategy analysis under changing conditions. This approach plans also to integrate farming knowledge together with observational data from different scales

to gain an improved understanding about the relation of crop development within the abiotic environment in the mesoscale.