Simulations of the present-day climate of West Africa using a simple vegetation model within ECHAM5

T. Brücher (1,2), T. Engel (1), A.H. Fink (1)

(1) Institute of Geophysics and Meteorology, University of Cologne, Germany (2) Centre for Applied Computer Sciences, University of Cologne, Germany (bruecher@uni-koeln.de/+49 221 470-5161)

Whereas a significant temperature increase in tropical West Africa in IPCC SRES scenario runs is consistently projected by among global climate models, the precipitation changes range from a substantial increase to a significant decrease. To obtain improved projections of precipitation changes in sub-Saharan Africa, further important regional climate feedbacks are incorporated into the models, like vegetation feedbacks.

Within the interdisciplinary research project IMPETUS ("An Integrated Approach to the Efficient Management of Scarce Water Resources in West Africa") a simple model (SVege - Simple Vegetation) is implemented to the global circulation model ECHAM5 to include the dynamical feedback of vegetation. The focus is on the reproduction of the West African Monsoon (WAM) of today's and future (SRES A1B and B1 scenarios) climate using ensemble simulations.

For the present-day climate, the simulations are compared to the ECMWF reanalysis data (ERA 40) and the VASCLIMO rainfall dataset, respectively. Three different areas showing distinct differences in observed interannual to decadal precipitation variability: the Guinea Coast, the Central Sahel and West Sahel. The version coupled to the simple dynamic vegetation model reproduces a realistic seasonal cycle of the albedo and results show precipitation patterns similar to the observations. Well known corellation patterns between the sea surface temperature (SST) and precipitation values are simulated by the model, too.

There are only few differences between the standard and coupled version in the repro-

duction of precipitation amounts and their variability at daily to decadel timescales. Actually, the comparison of temperature patterns of both versions show, that there are only small, insignificant differences. This might be the reason of low changes in the simulation of precipitation amounts and their variability. The differences of the surface temperature and the radiation budgets will also be shown. Actually, the sophisticated version of ECHAM5 seems to be insensitve to the simple aproach of the vegetation model.