Geophysical Research Abstracts, Vol. 8, 03713, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03713

Changes in the intensity and variability of the West African Monsoon simulated by the Global Circulation Model ECHAM5 coupled with a simple vegetation model

T. Brücher, M. Christoph, A. H. Fink and P. Speth

Institute of Geophysics and Meteorology, University of Cologne, Germany
(tbruech@meteo.uni-koeln.de / Fax: +49 221 470-5161)

Within the interdisciplinary research project IMPETUS (an integrated approach to the efficient management of scarce water resources in West Africa) the Global Circulation Model (GCM) ECHAM is coupled in its latest version with a modified version of the Simple Vegetation model (SVege). Focusing on the West African Monsoon (WAM), the importance of implementing the vegetation feedbacks will be shown by results of modeling the present-day African climate. Furthermore, climate change scenarios (IPCC SRES A1B, B1) simulated by this model version are analysed, too.

For the present-day climate, the coupled version shows an improvement in simulating the July to September (JAS) precipitation amount and its variability on the annual and decadal timescale especially in the Guinea Coast and Sudan. Compared to the observations the model reflects correlation patterns between the sea surface temperature (SST) and precipitation values, as well as the correlation between the Central Sahelian precipitation and the entire African precipitation amounts rather well, even though a small horizontal resolution (T42) is used.

In the A1B scenario, the signal for the time period 2070 to 2099 shows an increasing JAS precipitation amount for the Guinea Coast and the Central Sahel, as well as a decreasing of JAS rainfall in the West Sahel. By using the B1 forcing scenario, the simulated trend of precipitation over the entire Sahel is negative and again an increasing precipitation amount for the Guinea Coast is predicted. However, the magnitudes of these changes are somewhat smaller. In both climate simulations the year-to-year

variability increases. Due to the improved present-day climate simulated by this version of ECHAM5, it is tempting to state that these scenarios are more realistic with respect to future climate prediction.