Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03662, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03662
EGU General Assembly 2008

Including tropical croplands in a terrestrial biosphere model: application to West Africa.

A Berg (1), B Sultan (1), N de Noblet (2)

1. Laboratoire d'Océanographie et du Climat: Expérimentation et Approches Numériques (LOCEAN), Paris, France (alexis.berg@locean-ipsl.upmc.fr, benjamin.sultan@locean-ipsl.upmc.fr)
2. Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Gif-sur-Yvette, France. (nathalie.de-noblet@lsce.ipsl.fr)

Studying the large-scale relationships between climate and agriculture rises two different issues: the impact of climate on crops, and the potential feedbacks to climate from croplands. Extending existing Dynamic Global Vegetation Models to account accurately for croplands offers a relevant and consistent framework to address this twofold issue. By introducing into the terrestrial biosphere model ORCHIDEE (IPSL) parameterizations from the crop model SARRAH (CIRAD) which is calibrated over the West African region, we developed an original large-scale model for tropical crops, ORCHmil. It realistically simulates growth and yield of millet when compared to the original crop model on an experimental station in Senegal. The model is then applied over West Africa using a 36-year climate reanalysis dataset. The model is tested against national yields from the FAO database. The ability of the model to simulate the spatial and temporal variability of millet yields is assessed, as well as its ability to model the observed relationship between weather and yields. Effect of crop duration on the skill of the model is examined. Effects of croplands on surface energy fluxes are also considered. Results underline the need for some further development and validation of the model. In the frame of the AMMA project (African Monsoon Multidisciplinary Analysis), potential applications of the model include seasonal predictions of tropical cereals yields, agricultural impacts of climate change in West Africa, and impacts of agricultural land-use on the land surface Water and Carbon budgets over West Africa.