Geophysical Research Abstracts
Vol. 12, EGU2010-10887-1, 2010
EGU General Assembly 2010

What are the dominant features of rainfall leading to realistic large-scale crop yield simulations in West Africa ?

Alexis Berg (1), Benjamin Sultan (2), and Nathalie de Noblet (3)

(1) Institut Pierre-Simon Laplace (IPSL), LOCEAN, Paris, France (alexis.berg@locean-ipsl.upmc.fr), (2) Institut Pierre-Simon Laplace (IPSL), LOCEAN, Paris, France (benjamin.sultan@locean-ipsl.upmc.fr), (3) Institut Pierre-Simon Laplace (IPSL), LSCE, Gif-sur-Yvette, France (Nathalie.de-noblet@lsce.ipsl.fr)

A large-scale crop model is forced by a range of climate datasets to test the sensitivity of simulated yields over West Africa to errors in input rainfall. The model skill, defined as the correlation between observed and simulated yield anomalies over 1968-1990 at the country scale, is used for assessment. We show that there are two essential rainfall features for the model to skilfully simulate interannual yield variability at the country scale: cumulative annual variability and frequency. At such a scale, providing additional information on intraseasonal variability, such as the chronology of rain events, does not improve the model skill. We suggest that such information is relevant at smaller spatial scales but is not spatially consistent enough to impact large-scale yield variability. Although our results are limited to West Africa, we feel confident that they can be generalized to similar water-limited rainfed crop regions.

These results point to the characteristics of rainfall that climate models should ideally be able to simulate if seasonal climate forecasts are to be used to feed large-scale crop models. The increase in model score in this study, as input rainfall is progressively corrected, suggests that improvements in GCM simulations are likely to translate into more accurate yield predictions.