Session: C3 Poster: W219A

Predictability of rainfall descriptors in East Africa

Joseph Boyard-Micheau[†];
[†] CRC-UMR5210, France
Leading author: quintar@u-bourgogne.fr

Kenya and northern Tanzania mainly display bimodal rainfall regimes, which are controlled by the annual migration of the Intertropical Convergence Zone on both sides of the equator. In the low-income, semi-arid areas, food security is highly dependent on cereal yields (maize, millet and sorghum). Vulnerability is aggravated by the fact that these crops are mostly rainfed, and rely on the performance of the two, relatively brief rainy seasons. This performance depends on a combination of several rainy season characteristics, or rainfall descriptors, such as the onset and cessation dates of the rains, the frequency of rainy days, their intensity and the occurrence of wet/dry spells. The prediction of these descriptors some time (>15 days) before the real onset of the rainy season can be seen as a useful tool to help in the establishment of agricultural adaptation strategies. Collaboration with socio-ethnologist has provided a better understanding of the Kenyan farmers' expectations concerning climate prediction, and of which rainfall season descriptors they would like to know before the beginning of the rainy season. The main objective is then to understand linkages between regional variability of these rainfall descriptors and global modes of the climate system, in order to set up efficient predictive tools based on Model Output Statistics (MOS). The rainfall descriptors are computed from daily rainfall data collected for the period 1961-2001 from the Kenya Meteorological Department, the IGAD Climate Prediction and Application Center and the Tanzania Meteorological Agency. An initial spatial coherence analysis assesses the potential predictability of each descriptor, permitting eventually to eliminate those which are not spatially coherent, on the assumption that low spatial coherence denotes low potential predictability. Rainfall in East Africa simulated by a 24-ensemble member of the ECHAM 4.5 atmospheric general circulation model is compared with observations, to test the reproducibility of the rainfall descriptors. Canonical Correlation Analysis is next used to find predictor variables, exploring successively the synchronous and lagged relationships between the rainfall descriptors and the main modes of the climate system, including those already known to affect East Africa rainfall such as El Niño Southern Oscillation (ENSO) and the Indian Ocean dipole (IOD). Candidate climatic fields include sea surface temperature, geopotential height, vertical velocity, moisture fluxes and winds at lower (850 hPa) and mid (500 hPa) tropospheric levels. As an ultimate step, the usefulness of the rainfall predictions for sorghum yield estimation will be tested using the SARRA-H plant model.