AGU 100 ADVANCING EARTH AND SPACE SCIENCE | **FALL MEETING**
Washington, D.C. | 10–14 Dec 2018

A44C-06: Monsoon Onset in West Africa: Regional Projections and Local Variability (Invited)

Thursday, 13 December 2018
17:15 - 17:30
📍 *Walter E Washington Convention Center - 144A-C*

While total rainfall and mean temperature are the main drivers of productivity for grains cultivated in the Sudanese and Sahelian regions of West Africa–with higher rainfall and cooler temperatures correlating with higher yield–the onset time of the rainy season provides a binary switch: if steady rains delay too long, plantings fail and the entire season is lost. Previous work has indicated that global warming is projected to reduce early rainfall in parts of West Africa and that rainfall might fall in more episodic downbursts. Both changes have the potential to increase the probability of rainy season failures.

Motivated by the need to provide regional farmers and policy makers with a reliable risk assessment for the spatial scale of their interest, we investigate the sources of uncertainty in the projected changes in rainy season failures at local and regional scales. First, we address the effect of temperature and evapotranspiration in exacerbating the effect of dry spells on crops and show that precipitation-based definition of agricultural monsoon onset remain relevant for future climate. Second, we use high-resolution observational datasets of daily rainfall to investigate the spatial scale of variability of monsoon onset when the latter is defined based on agricultural rainfall needs or on dynamics of the large-scale monsoon system; we then use the current relationship in a probabilistic framework linking local changes to regional predictions. Finally, we use global coupled models to investigate uncertainty in regional projections: the NCAR Large Ensemble (LENS) estimates the uncertainty that comes from natural variability and the CMIP5 ensemble estimates the role of structural (model) uncertainty. The source of model disagreement is discussed in terms of theories of monsoon dynamics.

Authors

Michela Biasutti
Columbia University of New York

Maurizio Bacci
C.N.R. - IBIMET

Politecnico di Torino

Alessandra Giannini
International Research Institute for Climate and Society, Columbia University

Find Similar

View Related Events

Day: Thursday, 13 December 2018