



Variability and Predictability of West African Droughts. A review in the role of Sea Surface Temperature Anomalies

Belen Rodríguez de Fonseca (1,2), Elsa Mohino (1), and Carlos R. Mechoso (3)

(1) Universidad Complutense de Madrid, Facultad de Físicas, Geofísica y Meteorología, Madrid, Spain (brfonsec@fis.ucm.es), (2) Instituto de Geociencias (CSIC-UCM), Facultad de CC. Físicas, Madrid, Spain. , (3) Department of Atmospheric and Oceanic Sciences, University of California, Los Angeles, California, USA

The Sahel experienced a severe drought during the 1970's and 1980's after wet periods in the 1950's and 1960's. Although rainfall partially recovered since the 1990's, the drought had devastating impacts on societies. Most studies agree that this dry period resulted primarily from remote effects of sea surface temperature (SST) anomalies amplified by local land surface/atmospheric interactions. This paper reviews advances made during the last decade to better understand the impact of global SST variability on West African rainfall at interannual to decadal time scales.

At interannual time scales, a warming of the equatorial Atlantic and Pacific/Indian oceans results in rainfall reduction over the Sahel and positive SST anomalies over the Mediterranean sea tend to be associated with increased rainfall. At decadal time scales, a warming over the Tropics leads to drought over the Sahel, while the warming over the North Atlantic promotes increased rainfall. The skill of numerical forecasts has improved during the last decades, due to better dynamical vegetation schemes. Prediction systems have evolved from seasonal to decadal forecasting. The agreement among future projections has improved from CMIP3 to CMIP5, with a general tendency for slightly wetter conditions over central part, drier conditions over the western part and a delay in the monsoon onset. The role of the Indian ocean, the stationarity of teleconnections, the determination of the leader ocean basin in driving decadal variability, the antropogenic role, the reduction of the model rainfall spread and the improvement of some model components are among the most important remaining questions that will be the focus of current international projects.