Stationarity analysis of Sahelian rainfall predictability using data from stations

Roberto Suarez-Moreno (1,2), Belen Rodriguez-Fonseca (1,2), and Andreas H. Fink (3)

(1) Complutense University of Madrid (UCM), Geophysics and Meteorology, Madrid, Spain , (2) Institute of Geosciences (IGEO), Madrid, Spain, (3) Institute for Meteorology and Climate Research, Karlsruhe Institute for Technology, Karlsruhe, Germany

The Statistical Seasonal Sea Surface based Forecast model (S4CAST) has been applied to study the predictability of Sahelian rainfall variability, strongly influenced by sea surface tempertature anomalies in remote and nearby regions due to its influence on atmospheric circulation and thus on other climate-related variables, particularly the West African Monsoon. The S4CAST model uses statistical methods to establish the leading modes of covariability between sea surface temperature anomalies and rainfall and how these modes vary depending on the study period considered with consequent changes in predictability. Rainfall data corresponds to a station dataset spanning West Africa for the period from 1921 to 2010 in order to avoid controversy about using reanalysis. The results suggest the need to consider the stationarity when addressing predictability and possible low frequency modulations that can play a role.