Geophysical Research Abstracts
Vol. 12, EGU2010-14405, 2010
EGU General Assembly 2010

Interannual vs decadal SST forced responses of the West African monsoon

Belen Rodríguez-Fonseca and the Belen Rodriguez de Fonseca Team
F. CC. Físicas, Universidad Complutense de Madrid, Geofísica y Meteorología, Madrid, Spain (brfonsec@fis.ucm.es)

One of the strongest interdecadal signals on the planet has been observed in the Sahelian rainfall during the second half of the XXth century, from wet conditions in the 50's and 60's to drier conditions after the 70's. Parallel to this, several decadal signals have experienced a change from the 70's, and also the influence of the global warming has increased from this decade.
From a global perspective the West African rainfall variability is highly modulated by SST forced signals. Many works have pointed out to the Atlantic and Pacific equatorial modes influence on interannual timescales; and to the AMO and the Pacific and Indian Ocean at multidecadal timescales.
In the AMMA-EU context the modulation of the interannual modes by the decadal variability together with the influence of the GW has been studied by analysing the interannual modes of variability before and after the 70's.
The results indicate the presence of different interannual telecconections between these two periods and, hence, of different anomalous rainfall responses.
The importance of the background state modulated by multidecadal variability in the interannual modes is stated in this work. Also, an interesting discussion appears if we wonder whether or not the background state is affected, in turn, by anthropogenic climate change.

Recent observational and GCM studies have shown, following the results of Polo et al. (2008), how the Atlantic and Pacific Niños present a dynamical link during the last decades of the XX century (Rodriguez-Fonseca et al., 2009). In this way, the positive (negative) phase of the summer Pacific Niño signal has been found to be connected with a negative (positive) phase of the Equatorial Atlantic mode (EM or Atlantic Niño, Polo et al., 2008); a pattern which leads the summer Atlantic variability.
The determinant impact of this connection on the WA monsoon has been addressed by defining a global summer tropical mode accounting for more than the 60% of the rainfall variance.
The rainfall response to an isolated Pacific forcing has been documented to be a decrease of rainfall over Sahel whilst, the response associated to an isolated EM is a Guinean-Sahel rainfall dipolar pattern. Nevertheless, the rainfall response to the Pacific ENSO- Atlantic Niña forcing observed from the 70's has a unified behavior in the WA region.
In order to deeply analyse the dynamics involved in the concomitant action of the Atlantic and Pacific in summer and in the subsequent months, different sensitivity experiments have been performed separating the global Atlantic-IndoPacific contribution to the independent Pacific and Atlantic ones.
Some dynamical aspects in relation to the extratropical North Atlantic teleconnections in the following seasons are also included.