1. Introduction

Sea surface temperature is the key variable when tackling seasonal to decadal prediction. Thus, links between anomalies in sea surface temperature in remote areas with other climate-related variables determine predictability.

In this work, the recently developed S4CAST v2.0 (Sea Surface temperature based Statistical seasonal FORECAST model; Suárez-Moreno and Rodríguez-Fonseca, 2015) is described. A pair of cases are applied to test the predictability of Sahelian rainfall and tropical Pacific SST from tropical Atlantic SST, from which a non-stationary relationship has been found (Mohino et al., 2011; Losada et al., 2012; Rodríguez-Fonseca et al., 2011, 2015; Martin-Rey et al., 2014).

2. Data and methodology

Monthly sea surface temperature (SST) from NOAA Extended Reconstructed SST data set (ERSST V3b) with a resolution of 2.0° x 2.0° (Smith and Reynolds, 2003, 2004; Smith et al., 2008).

Precipitation from GPCC Full Data Reanalysis monthly means appended with GPCC monitoring dataset from 2011 onwards with a resolution of 1.0° x 1.0° covering Rudolf et al., (2010; Becker et al., 2013; Schneider et al., 2014).

3. Discussion and conclusions

Potential predictability of Sahelian rainfall during the monsoon season increases between the 1920s and 1970s, coinciding with the positive phase of the Atlantic Multidecadal Oscillation (AMO).

During that decade the Atlantic is not linked to the tropical Pacific SSTs. For that period, tropical Atlantic is considered as predictor of Sahelian rainfall but not of Pacific SSTs. An isolated signal is observed related to the rainfall dipole in West Africa (Mohino et al., 2011; Losada et al., 2012) which does not appear in other periods. In AMO negative periods the Atlantic is able to predict Pacific SSTs but not Sahelian rainfall. It could be concluded that non-stationary relationships must be considered when tackling the Atlantic influence on global climate. On the other hand, improvements in predictability are independent of significant relationships between predictor and predictand fields pointed in (Mohino et al., 2011; Rodríguez-Fonseca et al., 2011, 2015; Losada et al., 2012).

Additional references:

- Becker et al., 2013
- Schneider et al., 2013, 2014
- Martín-Rey et al., 2014