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Multidecadal Modulation of Tropical Atlantic impact on ENSO

B. Rodríguez de Fonseca (1,2), E. Mohino (2), T. Losada (3), M. Martin-Rey (1), and I. Polo (4)

(1) Universidad Complutense de Madrid, UCM-IGEO, (2) Universidad Complutense de Madrid, (3) Universidad de Castilla La Mancha, (4) University of Reading

Recent studies have addressed the presence, since the end of the 1970's, of a global tropical interannual mode in austral summer in which a warming in the equatorial Atlantic appears together with a cooling in the tropical Pacific and a warming in the Indian ocean, and the opposite. These studies have confirmed how the Equatorial Atlantic in summer is able to influence on the Pacific windstress helping to develop a Pacific ENSO event in the next winter, increasing in this way, the ENSO predictability. The impacts of this connection are numerous and strong, affecting the monsoons and the extratropical climate variability. The consequences of this finding are, thus, determinant for ENSO predictability.

This work presents additional research showing how this signal is not stationary and the tropical ocean connection switches at multidecadal timescales. In this way, and depending on the ocean mean state, the Atlantic Multidecadal Oscillation and the Global warming add their influence to the Equatorial Atlantic interannual signal, increasing its impact on the adjacent oceans.

The results are shown using observations and the outputs of long control coupled simulations from the CMIP5.

Current seasonal prediction system is based on ENSO. The role of the equatorial Atlantic in triggering the development of a Pacific ENSO is, thus, crutial for the correct ENSO forecast and its impacts.