

Role of the Tropical Atlantic in the mid-70' s ENSO shift

*Noel S Keenlyside^{1,2}, Hui Ding³, Marta Martin-Rey^{3,4}, Belen Rodriguez-Fonseca⁵, Mojib Latif⁶

1. Geophysical Institute, University of Bergen and Bjerknes Centre, 2. Nansen Environmental and Remote Sensing Center, 3. Cooperative Institute for Research in Environmental Sciences, NOAA, USA, 4. LOCEAN-IPSL, UPMC, France, 5. University Complutense of Madrid, Spain, 6. GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

A number of recent studies have argued that tropical Atlantic variability (TAV) can influence variability in the Indo-Pacific, and may even enhance the predictability of major El Niño events. However, the influence of the Atlantic on the Pacific appears to be non-stationary, being present after the 1970' s and absent during the period 1930-1970. Here we study the impact of TAV on the Indo-Pacific in partial coupled model experiments in which model sea surface temperature (SST) are restored strongly to observation over the tropical Atlantic while elsewhere the model is full coupled. For robustness we perform experiments with a full (ECHAM5/MPIOM) and reduced (SPEEDY-reduced gravity ocean model) complexity coupled models. Both models reproduce the strengthening of Atlantic-Pacific relation after the 70' s, and this enhances ENSO variability, consistent with observations. The strengthening of the Atlantic-Pacific relation appears related to a warming of the South Atlantic that leads to a southward shift of the ITCZ in the Atlantic and a corresponding enhancement of the atmospheric response to local equatorial SST variability. The Atlantic Niño pattern also extends further to the west after the 70' s, also favouring a stronger teleconnection. The role of the Atlantic in the 2015/2016 El Niño event will be discussed.

Keywords: Tropical Atlantic variability, ENSO, Climate prediction