



Multidecadal modulations of the Atlantic Niño influence on the Pacific ENSO in CMIP5 simulations

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Current seasonal prediction system is based on ENSO. The role of the equatorial Atlantic in triggering the development of a Pacific ENSO is, thus, crucial for its correct forecast and determination of impacts. Several studies have confirmed that the Equatorial Atlantic in summer is able to influence the Pacific wind stress helping to develop a Pacific ENSO event in the next winter. It has also been shown that this anticorrelation between the Atlantic Niño and the Pacific ENSO in summer has taken place during the decades after the 1970's. The same relation has been observed at the beginning of the 20th century coinciding with low phases of the Atlantic Multidecadal Oscillation. The Atlantic Niño events during those decades are characterized by a basin scale warming (or cooling for the negative phase). Coupled models have strong bias in the eastern equatorial Atlantic which prevents the correct reproduction of this interannual mode of variability. Nevertheless off the equatorial region, the Atlantic Niño configuration is more reliable, a feature that can be used in the definition of this mode in coupled models.

This work analyses the Atlantic Niño in CMIP5 control simulations, presenting additional research about the Pacific Niño and the multidecadal modulation of the Atlantic-Pacific connection. In this way, in average, the Atlantic Niño appears anticorrelated with its Pacific counterpart in most of the models. However, this relationship is very weak in some models. The role of the multidecadal variability in the reproduction of this interbasin connection is also studied. Accordingly, multidecadal modulation of the Atlantic-Pacific connection is presented in most of the CMIP5 models, although only some models show anticorrelation between Atlantic Niño and its Pacific counterpart in particular time periods, as it is shown in the observation. Our results suggest that in the models which best perform the Atlantic and Pacific interannual variability (HadGEM2, GFDL-ESM2G, IPSL-CM5A-LR) an AMO-like pattern is modulating the Tropical Pacific variability and in turn, this is controlling the relationship with the Tropical Atlantic basin. This work highlights the importance of the teleconnections in reproducing some aspects of the tropical variability in coupled models.