



On the Atlantic–Pacific Niños connection: A multidecadal modulated mode

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Atlantic and Pacific "Niños" are the leading tropical oceanic variability phenomena at interannual timescales. Recent studies have demonstrated how the Atlantic Niño is able to influence on the dynamical processes triggering the development of the Pacific La Niña and vice versa. However, the stationarity of this interbasin connection is still controversial. Here we show for the first time that the Atlantic–Pacific Niños connection takes place at particular decades, coinciding with negative phases of the Atlantic Multidecadal Oscillation (AMO).

During these decades, the Atlantic–Pacific connection appears as the leading coupled covariability mode between Tropical Atlantic and Pacific interannual variability. The mode is defined by a predictor field, the summer Atlantic Sea Surface Temperature (SST), and a set of predictand fields which represent a chain of atmospheric and oceanic mechanisms to generate the Pacific El Niño phenomenon: alteration of the Walker circulation, surface winds in western Pacific, oceanic Kelvin wave propagating eastward and impacting on the eastern thermocline and changes in the Pacific SST by internal Bjerknes feedback. We suggest that the multidecadal component of the Atlantic acts as a switch for El Niño prediction during certain decades, putting forward the AMO as the modulator, acting through changes in the western equatorial Atlantic background convection and the equatorial Pacific SST variability. These results could have a major relevance for the decadal prediction systems.