



Teleconnections of ENSO and the tropical South Atlantic in a CMIP5 model ensemble

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The link between the tropical Atlantic and Pacific Oceans induced by warm and cold water events (El Niño/La Niña and Atlantic Niño/Niña for the Pacific and Atlantic Oceans, respectively) is controversially discussed. On the one hand, a Pacific El Niño in boreal winter can initiate both an Atlantic Niña and an Atlantic Niño in the subsequent summer months. Several atmospheric and oceanic pre-conditions, for instance, the sea surface temperatures (SSTs) of the equatorial South-Atlantic, the SSTs of the northern tropical Atlantic and the strength of the atmospheric signal transport of anomalies decide whether a warm or a cold or no response results in the Atlantic Ocean.

On the other hand, the equatorial Atlantic mode in summer is assumed to have an influence on the Pacific Ocean SSTs about half a year later. The Atlantic Niño reinforces the Pacific Walker circulation and thus the trade winds and the equatorial easterlies in the Pacific Ocean are strengthened. This induces the shallowing of the thermocline in the eastern Pacific and favors the development of a Pacific La Niña.

In our investigation, 15 state-of-the-art fully coupled General Circulation Models (GCMs) and Earth System Models (ESMs) from the fifth phase of the Coupled Model Intercomparison Project (CMIP5) without prescribed SSTs are used to study the mechanisms of the teleconnections between the tropical Atlantic and Pacific Oceans. Not all models simulate each of the teleconnections described above. In particular, the Atlantic Niña event following a Pacific El Niño is only present in 10 of the 15 analyzed models. This is likely due to strong SST biases in the cold upwelling regions off the coast of southwest Africa.