



Weakening AMOC connects Equatorial Atlantic and Pacific interannual variability

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In recent studies a relation between the Equatorial Atlantic and Pacific Oceans has been identified, implying that the Atlantic can be important for prediction of the El Niño-Southern Oscillation (ENSO). The observed relation is variable in time, and the cause of this variation is not clear. Our study shows that in a freshwater hosing experiment with the Bergen Climate Model (BCM), a forced weakening Atlantic Meridional Overturning Circulation (AMOC) strengthens this relationship between the Atlantic and Pacific. The BCM version used in our study is flux-adjusted, and therefore the Atlantic variability is realistically simulated compared to many other models. We find a negative correlation between Equatorial Atlantic and Pacific sea surface temperature (SST) anomalies when the Atlantic is leading the Pacific by about a half a year, and during a weakening AMOC this correlation is strengthened. The correlation is comparable to the observed in the last 40 years. In contrast, the relationship is weak in the control run of the experiment. During a weakening AMOC precipitation and SST in the central Equatorial Atlantic increase, while the mean state of the Pacific experiences no significant changes. In addition, there is an increase in SST variability in the Equatorial Atlantic during boreal summer. The ENSO variability also shifts to higher frequencies. Our results indicate that in the BCM a weakening AMOC can change the Tropical Atlantic mean state, strengthening the relationship between the Tropical Atlantic and Pacific. This, in turn, can change Pacific variability.