



When will changes in ENSO teleconnections be observable?

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As the world climate is non-stationary, ENSO teleconnections also change over time. This has been the case in the past 150 years due to decadal variability, and these changes are getting more pronounced as the world warms. A problem in detecting these changes is that ENSO teleconnections are relatively weak and only explain a small fraction of variance. Random noise in the rest of the weather obscures the decadal variability in the teleconnections. We investigated whether changes in ENSO teleconnections in sea-level pressure and z500 are detectable above this noise, both for observations over the last 150 years and projections for the next 100 years.

A Monte Carlo study of SLP reconstructions and ERA-40 shows no significant deviations from the null hypothesis of stationary teleconnections with noise. Even in ensembles of GCMs decadal variability in the teleconnections is not observable. This implies that they can be assumed constant for all practical purposes.

In a future climate there are changes in the most realistic GCM we studied, ECHAM5/MPI-OM. In the central Pacific, the ENSO pattern shifts westward, and the Florida pole of the PNA-like teleconnections to z500 over North America extends further across the Atlantic towards Europe. However, up to 2100 these changes are only detectable in an ensemble of 3 experiments. After 2100 the changes are strong enough to become visible in a single realisation, and hence probably in reality.