



Does ENSO change under anthropogenic forcing?

N. Maher (1,2), D. Matei (1), and J. Marotzke (1)

(1) Max Planck Institute for Meteorology, The Ocean in the Earth System, Hamburg, Germany
(nicola.maher@mpimet.mpg.de), (2) Alexander von Humboldt-Stiftung Foundation, Germany

There is little consensus in the literature as to how the El Niño Southern Oscillation (ENSO) may change under future greenhouse gas warming, with climate models showing a large range of future projections. This project utilises the large ensemble of the MPI-ESM-LR climate model to address the range of internal variability in the system and determine whether ENSO changes under a variety of anthropogenic warming scenarios.

The large ensemble allows us to quantify the ENSO pattern and how it changes over time. Here, an EOF analysis is applied over the ensemble dimension. We find that the canonical ENSO pattern is robust, while the central Pacific pattern is only affected by strong warming scenarios. The ensemble also allows the identification of the influence of internal variations on future projections. Here, the variability is large and may explain why projections from different models have such a large range and show little consensus. Finally, we quantify tropical Pacific sea surface temperature, sea level pressure, wind speed, thermocline depth and precipitation during extreme ENSO events in both a weak and strong warming scenario.