

Internal variability has a large effect on ocean temperature adjustment

Objective

Quantify the effect of internal variability on ocean temperature adjustment under anthropogenic global warming in large Earth system model ensembles.

Approach

Analyze ocean adjustment timescales using two fully-coupled CESM ensembles with different initializations:

1. sampling joint internal variability of the ocean-atmosphere system: CESM-AO
2. sampling the internal variability of the atmosphere only: CESM-A

Impact

Internal variability within the ocean is represented differently in the two ensembles.

The ensemble sampling only the atmospheric initial conditions under-represents the internal ocean variability, which in turn affects temperature evolution of the global ocean.

Results have important implications for quantifying model drift, biases, and uncertainties in climate model ensemble projections.

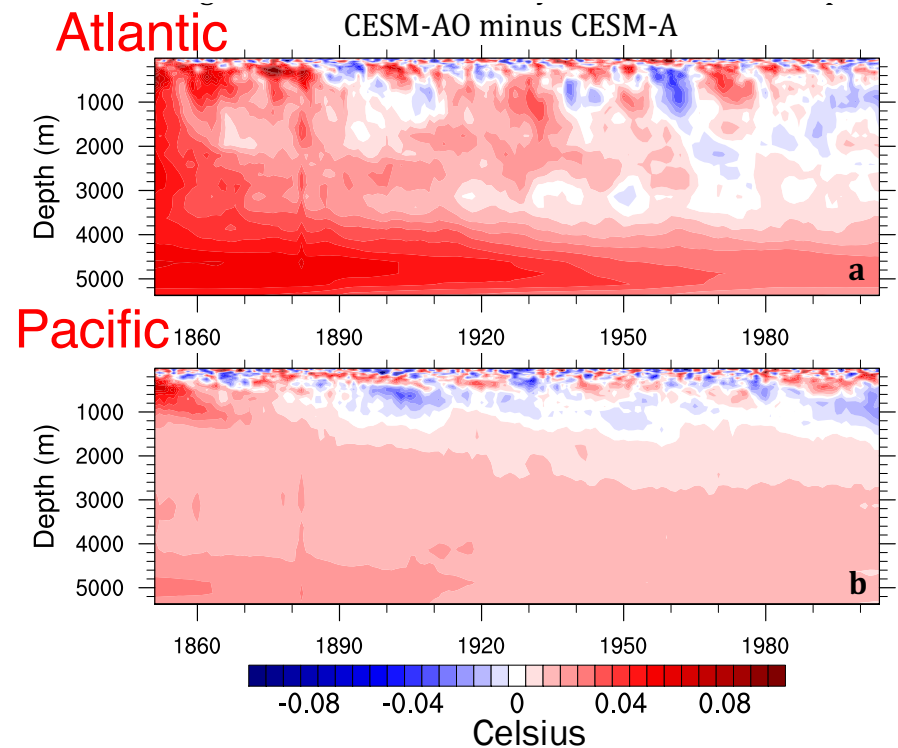


Figure: Ocean temperature adjustment timescale as a function of depth for the Atlantic (upper) and Pacific (lower) basins. Colors show the differences in temperature between the CESM ensembles CESM-AO minus CESM-A

Hogan, E. E., Sriver, R. L. (2019), The effect of internal variability on ocean temperature adjustment in a low-resolution CESM initial conditions ensemble, *Journal of Geophysical Research – Oceans*, doi:10.1029/2018JC014535



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