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Supporting Information for

Towards ocean hindcasts in earth system models: AMOC variability in a partially coupled model at eddying resolution.

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Introduction

This file contains additional figures supporting the analysis presented in the main text: The ability of partial coupling to reproduce the correct timing of ENSO and equatorial Pacific heat fluxes is demonstrated in Figure S1.
In addition to the AMOC in depth coordinates, we provide the mean AMOC in density coordinates from all model experiments in Figure S2.
Complementing our analysis of the annual mean Atlantic heat flux variability, we include a Figure (S3) of winter (DJF) heat flux variability. It is especially the winter heat flux that is expected to have an impact on the AMOC.
To provide further information on the correlation between the partially coupled and un-coupled experiments on decadal timescales, we provide timeseries of the AMOC and Sverdrup transports at the RAPID and SAMOC sections in Figure S4.

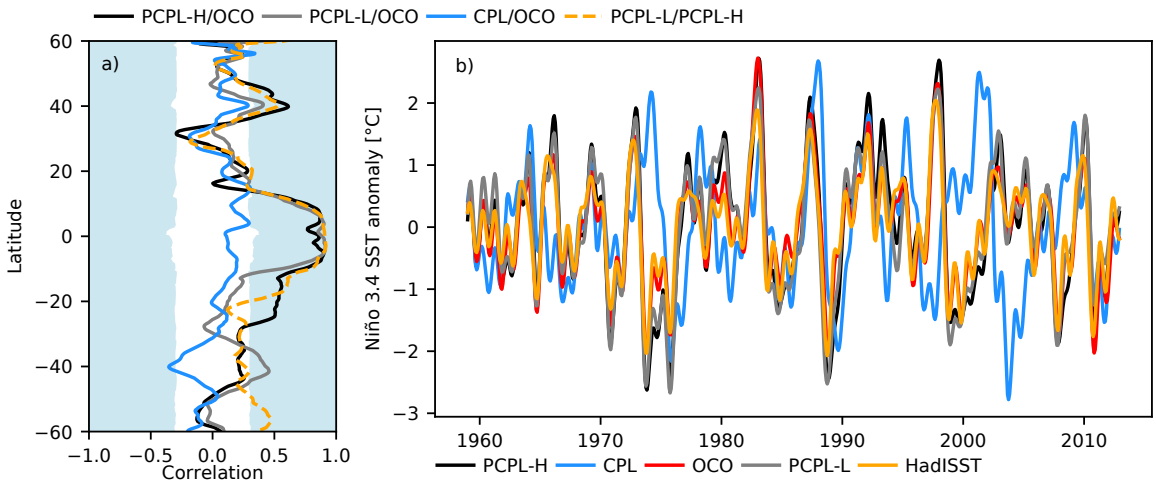

Figure S1. a) Correlation of detrended annual and zonal mean heat fluxes in the Pacific (derived from the coarse resolution host model). The fluxes were smoothed with a 7-grid point (3°) boxcar filter before calculating correlations. b) ENSO timeseries. Here the Niño3.4 Sea Surface Temperature anomaly is used as the ENSO index.

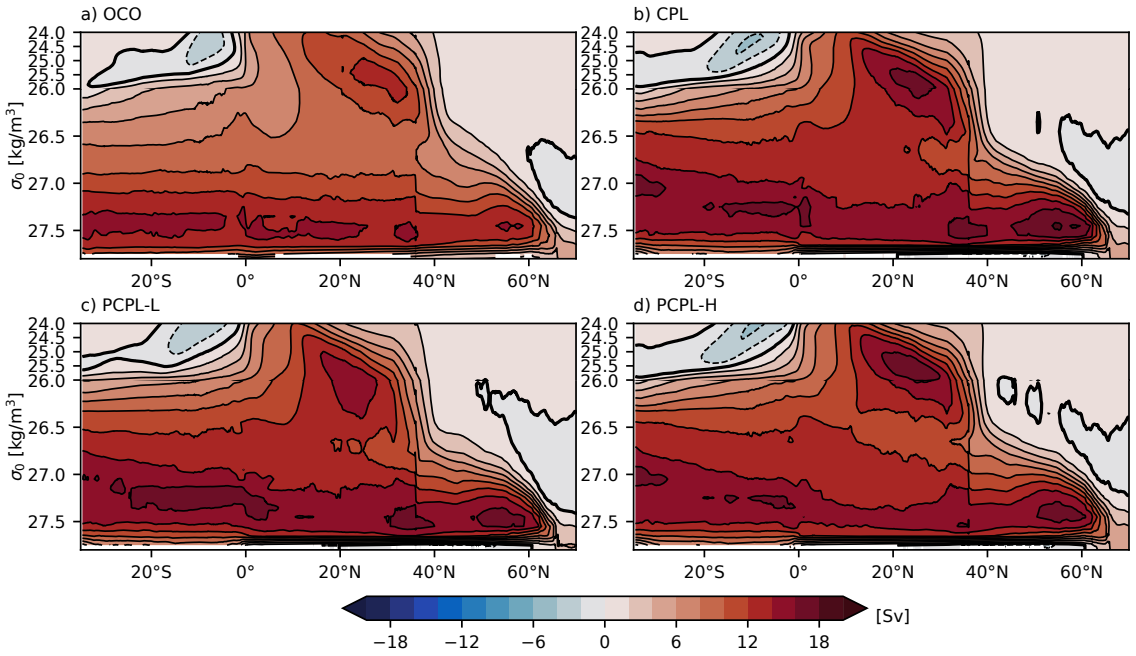

Figure S2. Mean 1970-2013 Meridional Overturning Streamfunction in σ_0 coordinates in OCO (a), CPL (b), PCPL-L (c) and PCPL-H (d). Contours are drawn with an interval of 2 Sv (the zero contour is drawn bold).

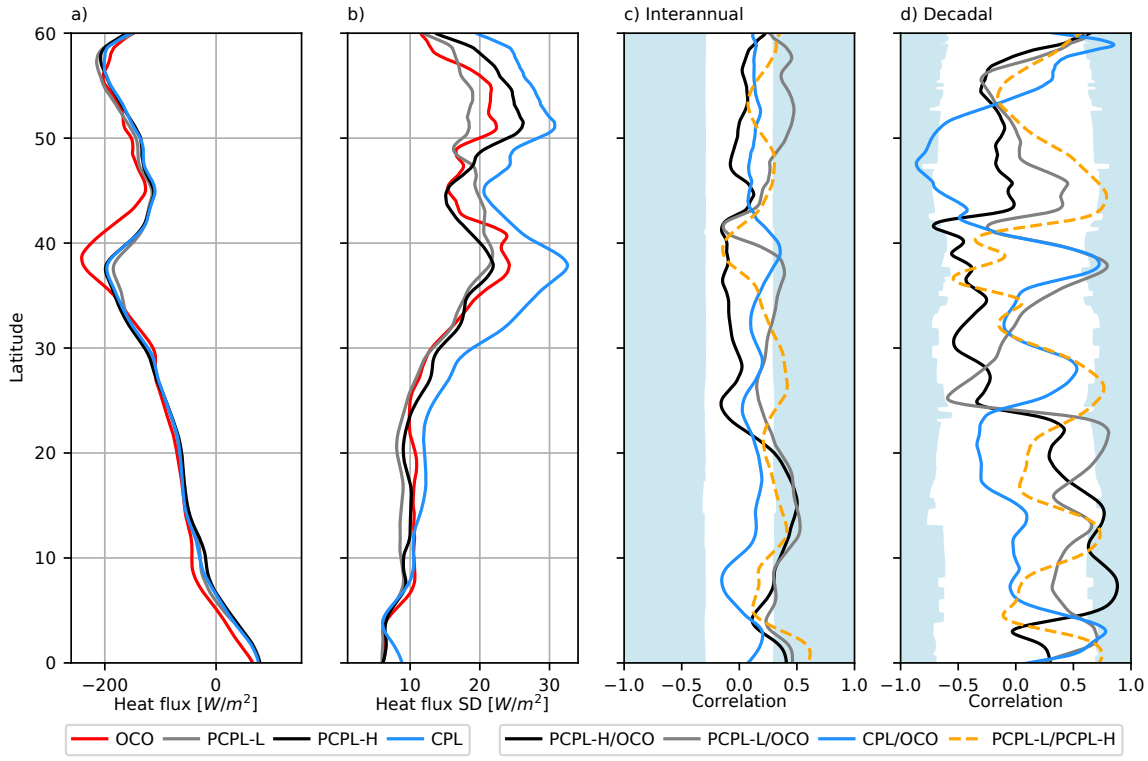

Figure S3. 1970-2013 northern hemisphere zonal mean heat flux in winter (DJF; a) and its standard deviation (b) in the Atlantic (including the Atlantic sector of the Southern Ocean). c) Correlations of the zonal mean heat flux based on winter means and d) based on 10-year lowpass filtered winter means. The fluxes were smoothed with a 31-grid point (3°) boxcar filter before calculating correlations. All timeseries were detrended before calculating the standard deviation, or correlation.

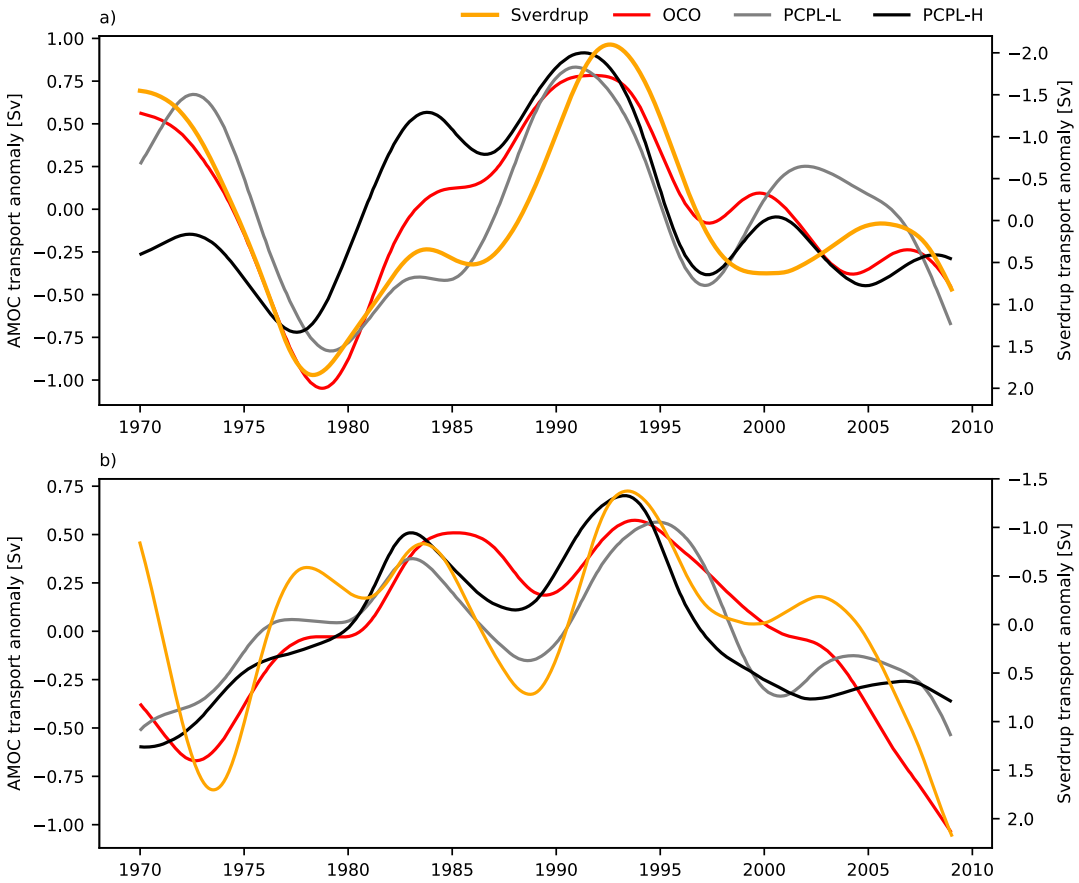

Figure S4. Decadal (10-year lowpass filtered) anomalies of the Sverdrup and AMOC transports at 26.5°N (a) and 34.5°S (b). The Sverdrup transport was calculated from wind stress derived from the JRA55-do wind using offline bulk formulae.