Linking ITCZ migrations to AMOC and North Atlantic/Pacific SST decadal variability:

Supplementary Material

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Content:

Supplementary Material contains Supplementary Figures 1 to 8.
Supp. Fig. 1: Lag-zero regression of yearly SST onto the a. Pcent, b. AMV, c. AMOC, and d. PDO in the forced ensemble (indices shown in Fig. 1). Calculations are done after detrending and filtering with an 11-year running mean, and only for the second half of the simulated period (years 151-300), when the Pcent, AMV, and AMOC show significant coherence (Fig. 2). Stippling masks regions where correlation coefficients are statistically significant at the 5% level accounting for effective degrees of freedom and serial autocorrelation. Note, however, that very few points show statistically significant values due to the very high autocorrelation in the time series and SSTs.
Supp. Fig. 2: As in Fig. 1 but for the band-pass filtered indices in the control simulation for the period between years 500 and 2000. SST changes lead by 24 years the Pcent. See text for further details.
**Supp. Fig. 3:** Power spectra of the indices in the ensemble of forced simulation (in Fig. 1). The dot-dash, dash, and continuous red lines set the confidence at the 10%, 5%, and 1% level respectively.
Supp. Fig. 4: Cross-correlation profiles between (a) the Pcent and (b) AMV and the other indices shown in Fig. 1. Correlation coefficients are calculated after applying an 11-year running mean and only in the second half of the ensemble mean (years 151–300), when the Pcent, AMV, and AMOC show significant coherence (Fig. 2). Correlation coefficients that are statistically significant at the 5% level are shown with larger, bold symbols. The maximum correlation coefficient with respect to the Pcent is 0.72 (at 4-year lag) for the AMV, 0.58 (at 10-year lag) for the AMOC, 0.72 (at 3-year lag) for the interhemispheric (NH–SH) temperature difference, and 0.54 (at a 4-year lag) for the PDO, and with respect to the AMV they are 0.91 (at 4-year lag) for the AMOC, 0.96 (at 1-year lag) for the interhemispheric temperature difference, and 0.27 (at 6-year lag) for the PDO.
**Supp. Fig. 5**: Power spectra of the indices in the control simulation (in Fig. 6). The dot-dash, dash, and continuous red lines set the confidence at the 10%, 5%, and 1% level respectively.
Supp. Fig. 6: Indices in the control simulation (in Fig. 6) after a band-pass filter with a period range between 200 and 300 years.
Supp. Fig. 7: Cross-correlation profiles, as in Supp. Fig. 4, between the band-pass filtered indices in the control simulation (in Supp. Fig. 6) for the period between years 500 and 2000. The maximum correlation coefficients with respect to the Pcent are 0.92 (at 24-year lag) for the AMV, 0.92 (at 24-year lag) for the AMOC, 0.90 (at 23-year lag) for the interhemispheric (NH–SH) temperature difference, and 0.54 (at a 74-year lag) for the PDO, and with respect to the AMV they are 0.98 (at 3-year lag) for the AMOC, 0.92 (at 1-year lag) for the interhemispheric temperature difference, and 0.63 (at 100-year lag) for the PDO.
Supp. Fig. 8: As in Fig. 5 but for the band-passed indices in the control simulation. Calculations are only for the period between years 500 and 2000, when the Pcent, AMV, and AMOC show coherence on centennial timescales (Fig. 7). The AMV and AMOC lead temperature anomalies by 1 and 4 years respectively, and the Pcent lags behind by 23 (values are derived from the cross-correlation profiles in Supp. Fig. 7). No lead or lag is applied to the PDO case.