Supplement of Clim. Past, 22, 861–877, 2026
https://doi.org/10.5194/cp-22-861-2026-supplement

Climate of the Past
Open Access
EGU

Supplement of

The Late Pliocene jet stream: Changes and drivers of the mean state and variability

Abigail E. C. Buchan et al.

Correspondence to: Abigail E. C. Buchan (eeaecb@leeds.ac.uk)

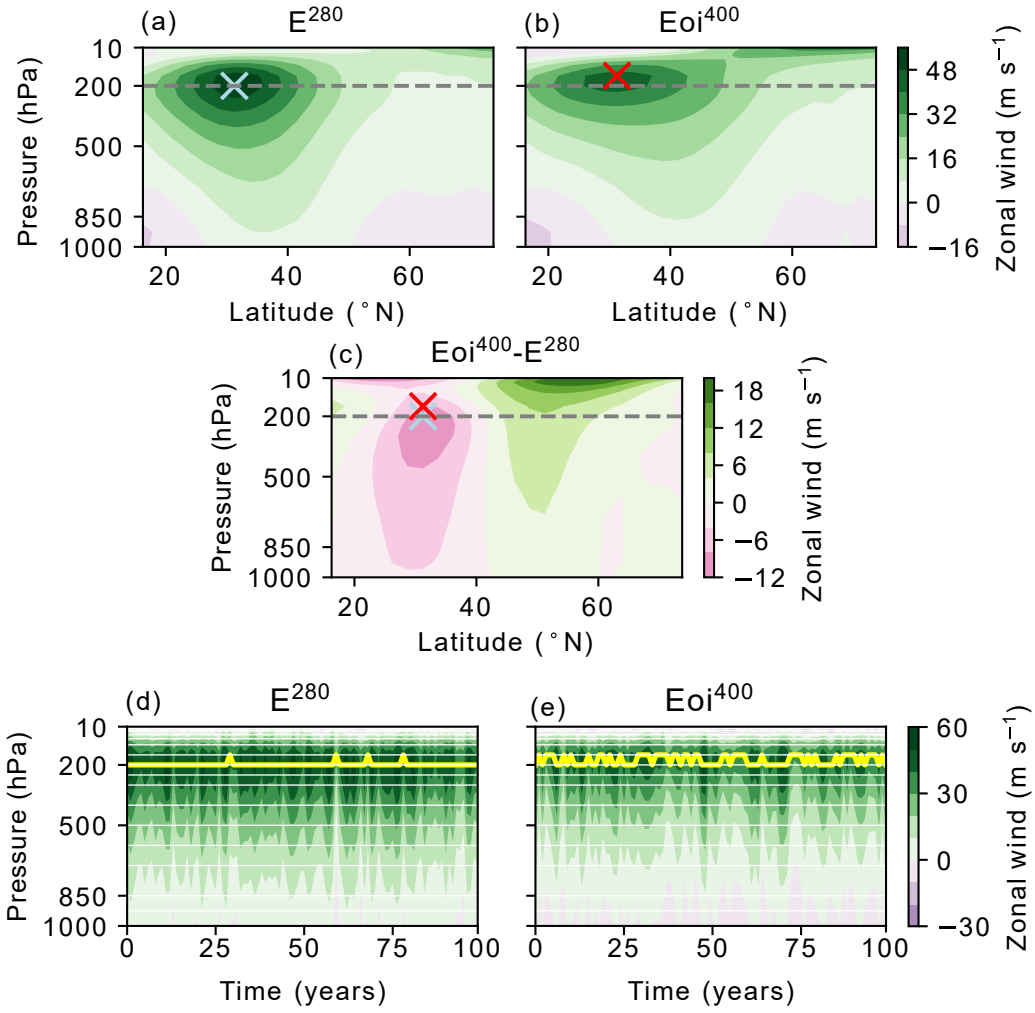

Figure S1. (a-c) Zonally averaged zonally January wind speed from HadCM3 in the pre-industrial (E^{280}), Late Pliocene (Eoi^{400}) and the difference (Eoi^{400}-E^{280}). The dashed gray line shows the 200 hPa level and the blue and red crosses show the location of the maximum zonal wind speed in the E^{280} and Eoi^{400} respectively. (d-e) Zonally averaged North Pacific wind speed between 20N and 40N through time. The yellow line shows the location of the maximum zonal wind speed.

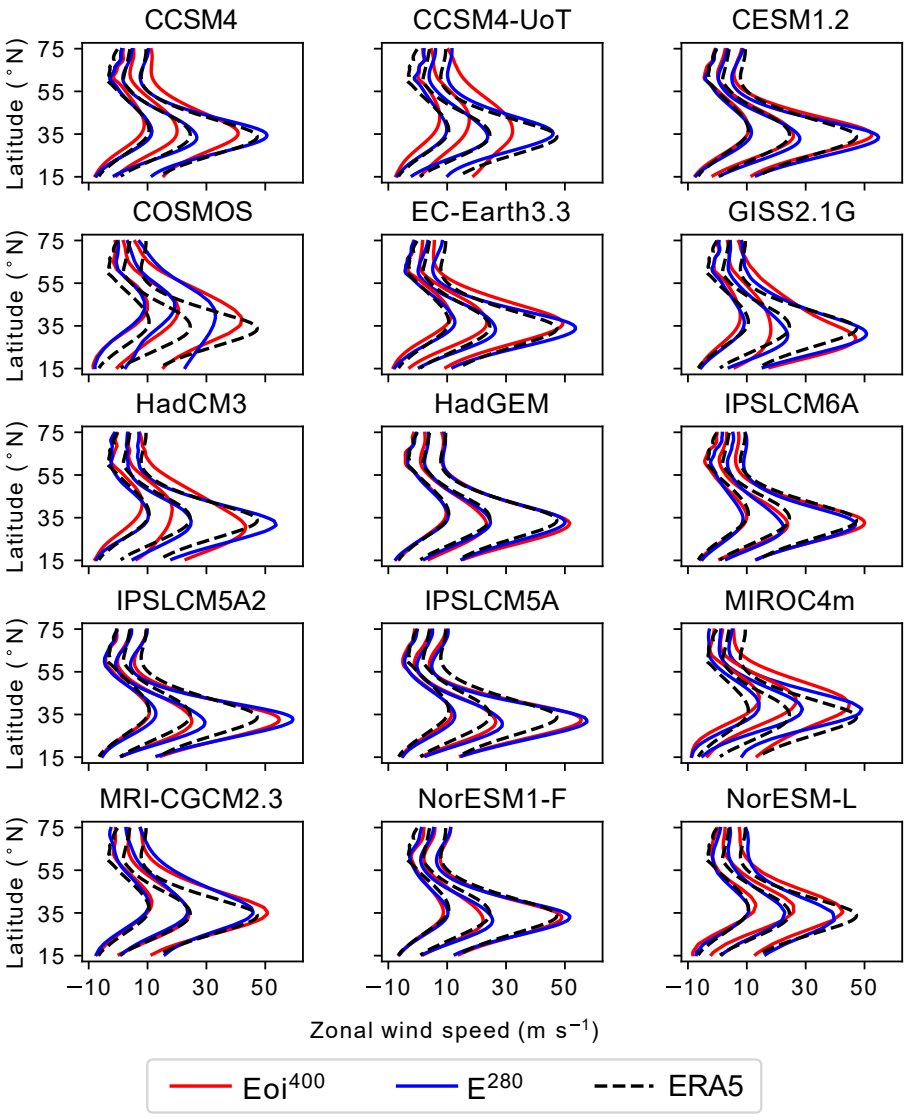

Figure S2. North Pacific DJF zonal wind speeds for the pre-industrial (E^{280}) (blue) and Late Pliocene (Eoi^{400}) (red) for each model at three pressure levels (200, 500 and 850 hPa). ERA5 reanalysis data is shown in the dashed black line.

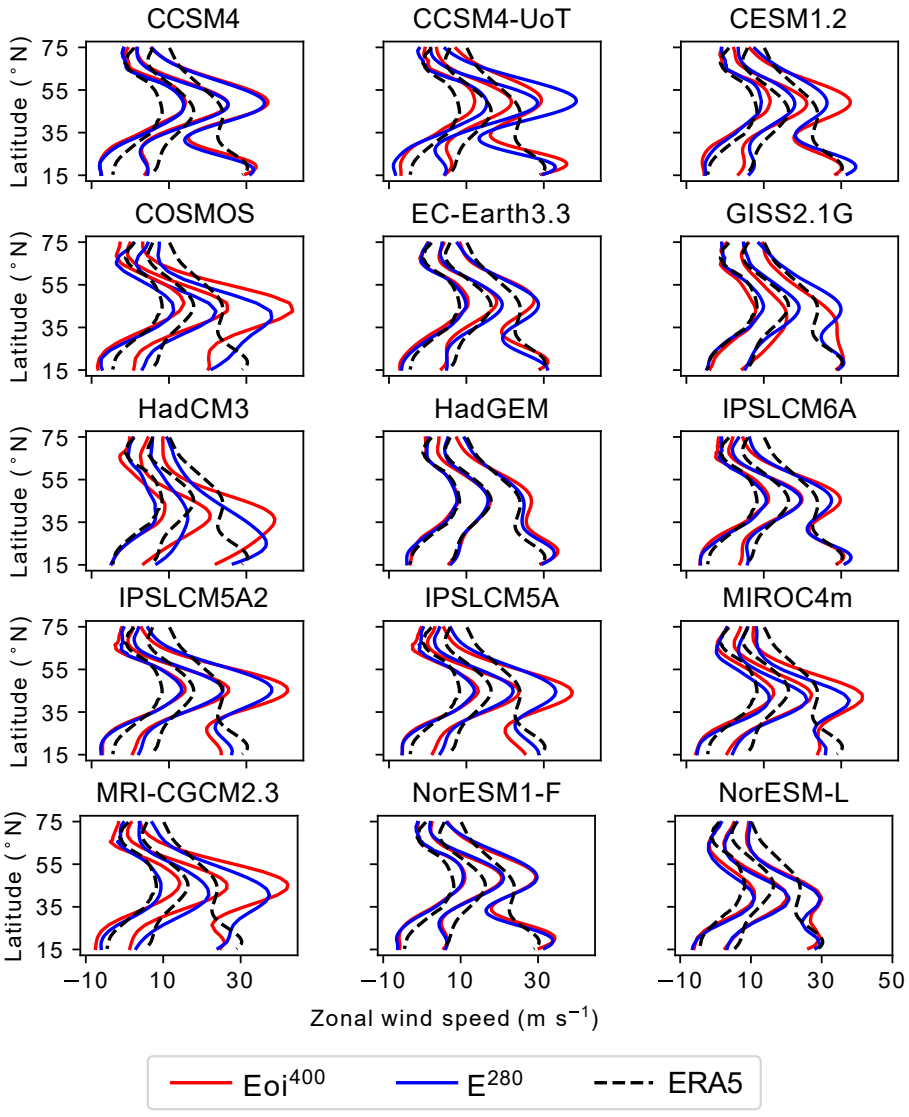

Figure S3. North Atlantic DJF zonal wind speeds for the pre-industrial (E^{280}) (blue) and Late Pliocene (Eoi^{400}) (red) for each model at three pressure levels (200, 500 and 850 hPa). ERA5 reanalysis data is shown in the dashed black line.

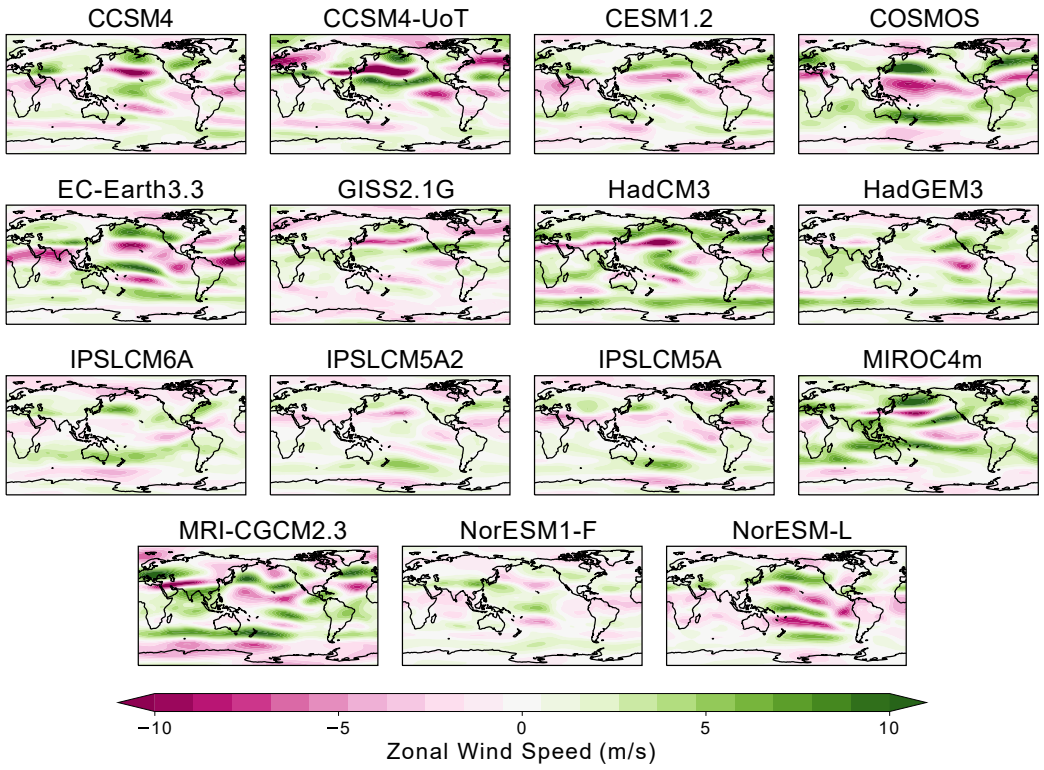

Figure S4. Zonal wind speed anomaly (Late Pliocene - pre-industrial) at 200 hPa for each model in December, January and February (DJF).

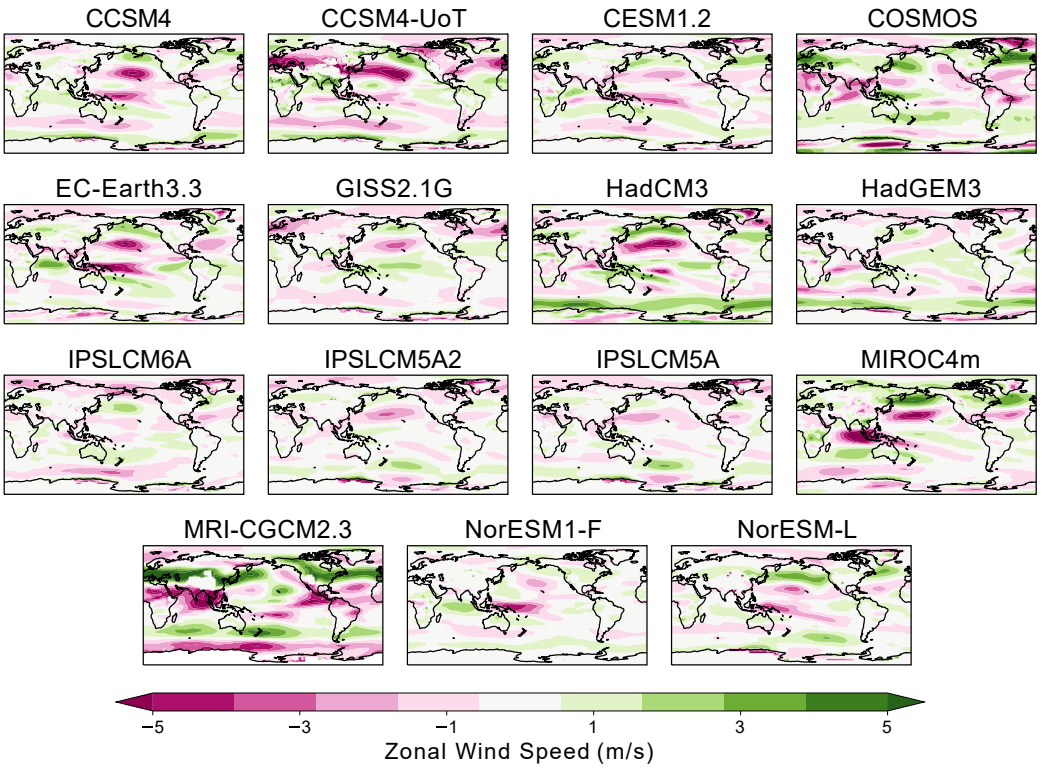

Figure S5. Zonal wind speed anomaly (Late Pliocene - pre-industrial) at 850 hPa for each model in December, January and February (DJF).

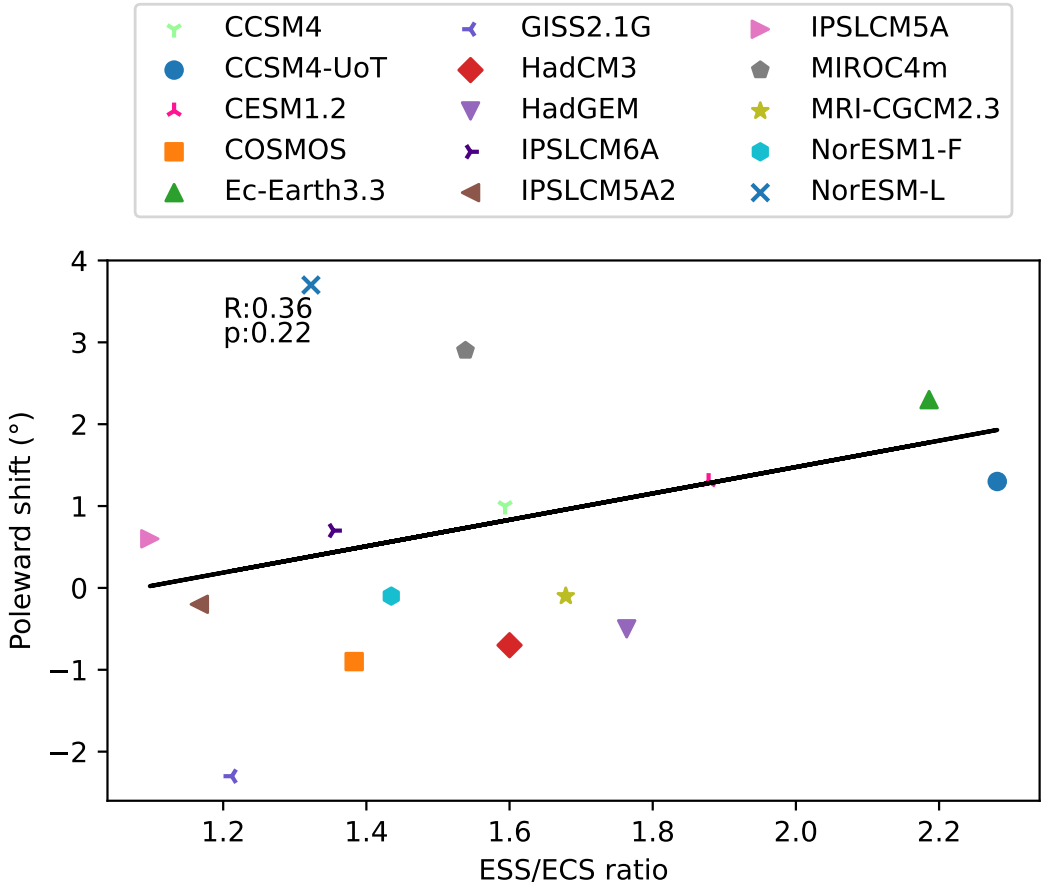

Figure S6. Ratio of Earth System Sensitivity (ESS) and Equilibrium Climate Sensitivity (ECS). The black line shows the line of best fit, with the Pearson correlation and p value shown in the top left. HadGEM3 and MRI-CGCM2.3 were not included in eh correlation as they retain a pre-industrial land sea mask (including these models gives a similar correlation R=0.30, p=0.27).

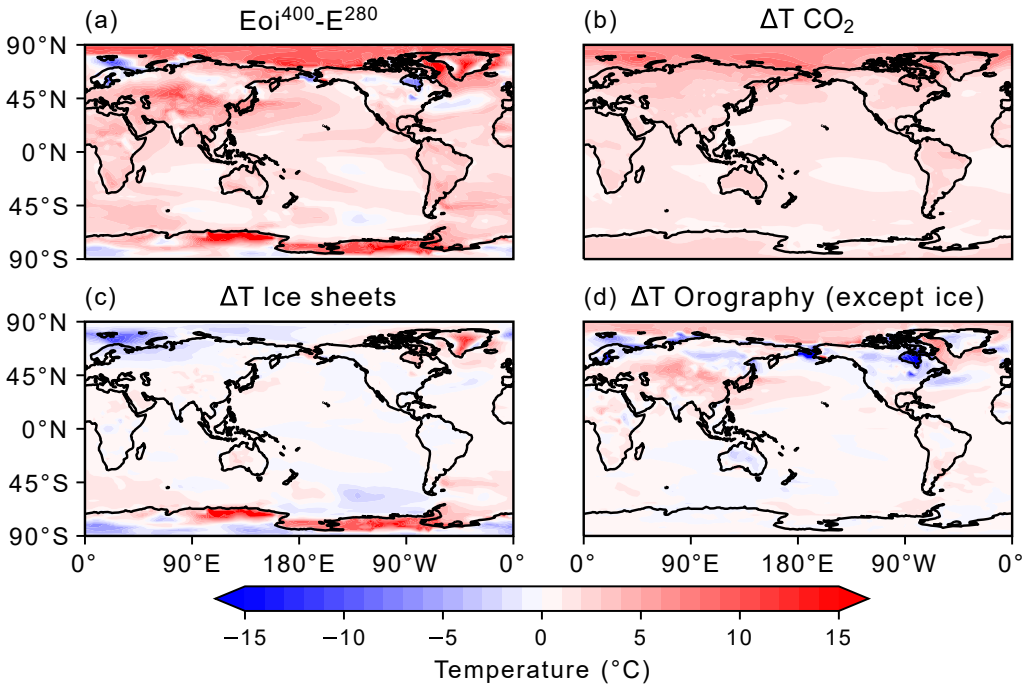

Figure S7. Change in boreal winter (DJF) surface temperature the Late Pliocene (Eoi^{400}) and the pre-industrial (E^{280}) in HadCM3 and the contribution of the change from CO_2, ice sheet and orography forcings to the total change.

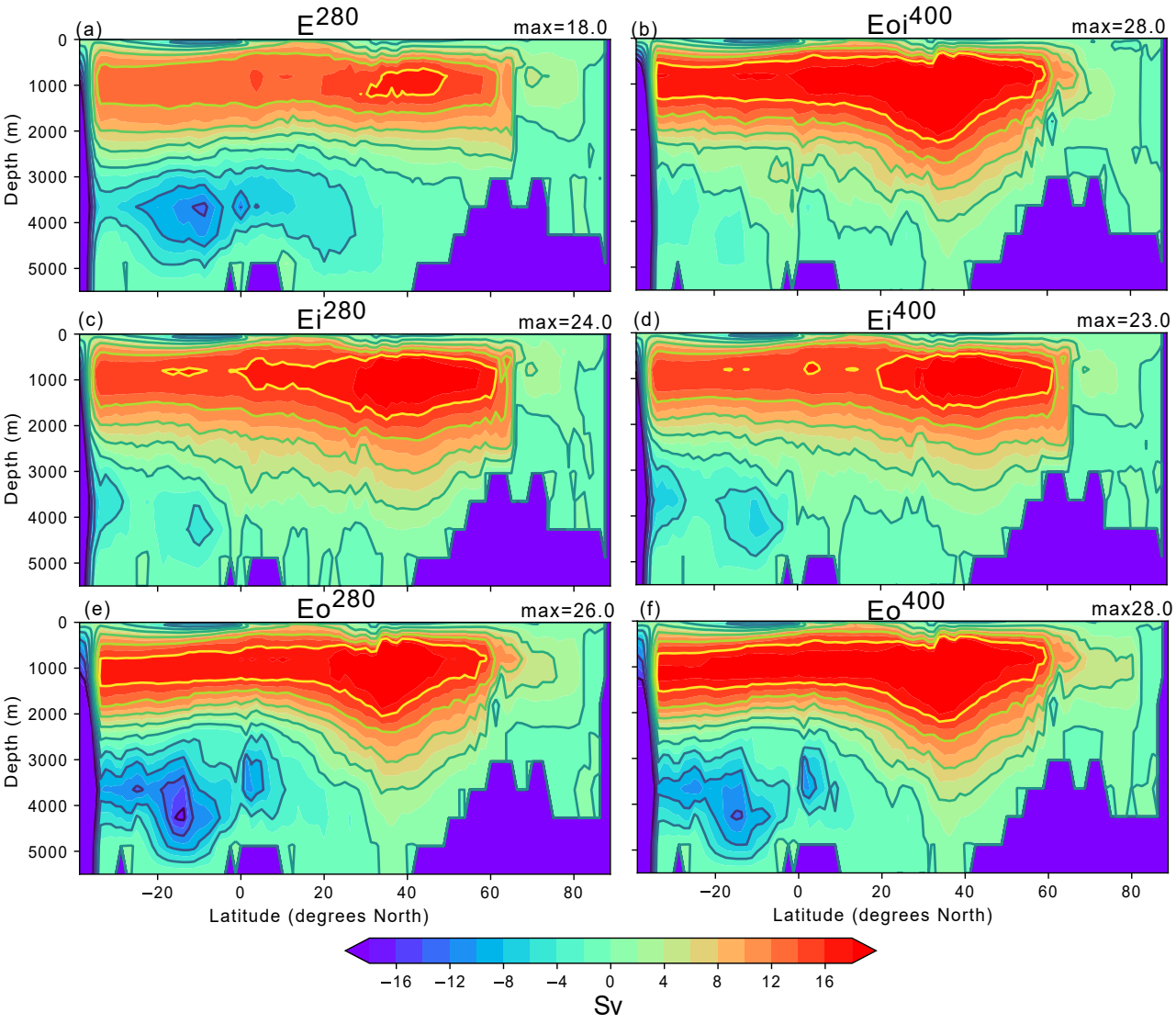

Figure S8. AMOC in the HadCM3 for the E^{280} (pre-industrial) and Eoi^{400} (Late Pliocene) and the four forcing factorisation experiments. The maximum value in each experiment is shown for each experiment.

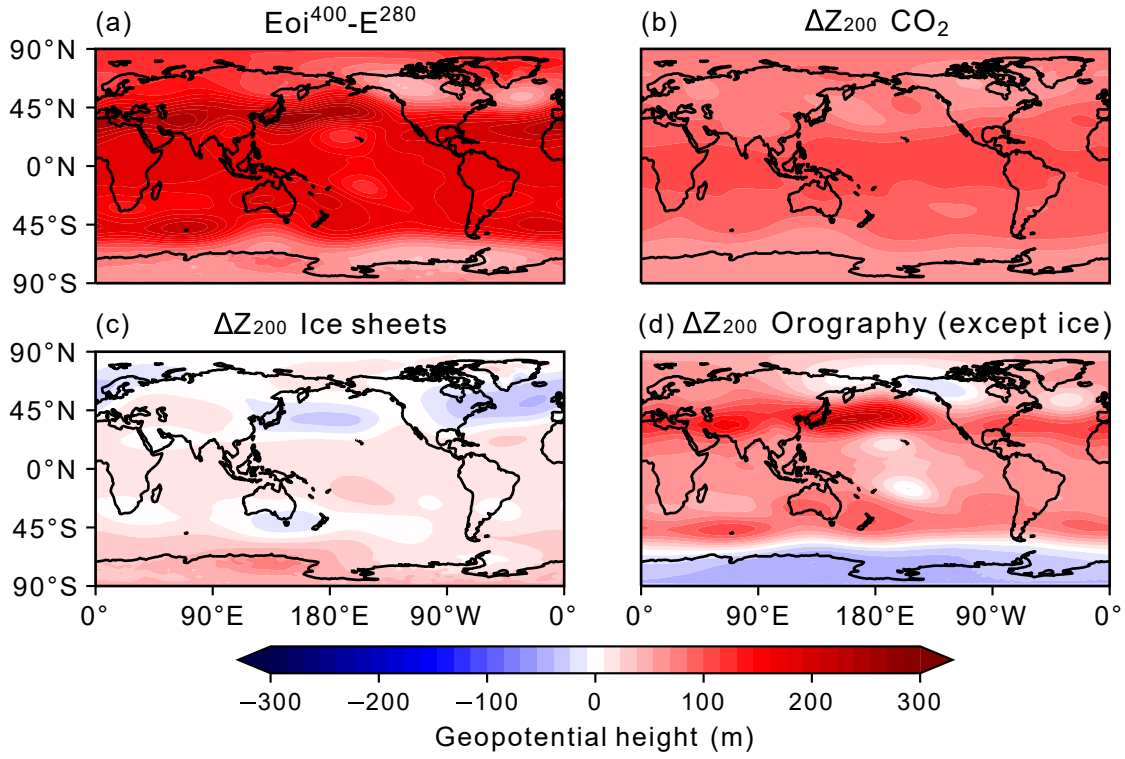

Figure S9. Change in boreal winter (DJF) geopotential height at 200 hPa between the Late Pliocene (Eoi^{400}) and the Pre-industrial (E^{280}) in HadCM3 and the contribution of the change from CO_2, ice sheet and orography forcings to the total change.

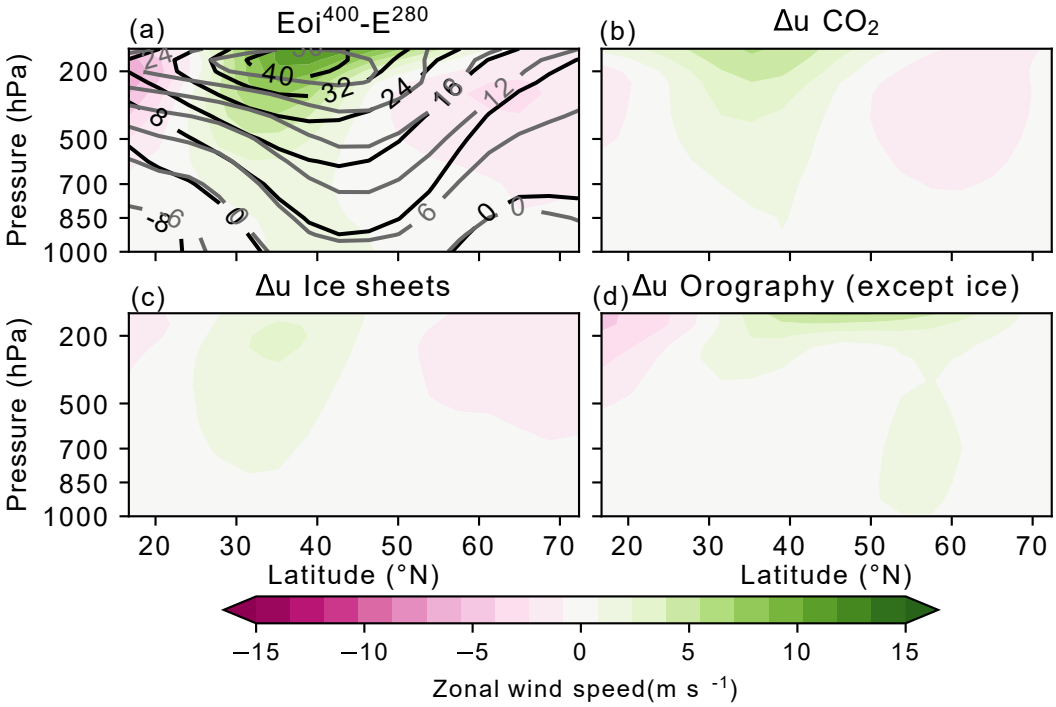

Figure S10. Change in boreal winter (DJF), zonally averaged, North Pacific zonal wind speed between the Late Pliocene (Eoi^{400}) and the pre-industrial (E^{280}) in COSMOS and the contribution of the change from CO_2, ice sheet and orography forcings to the total change. In plot (a) the gray contours represent the E^{280} values and the black contours represent the Eoi^{400} values.

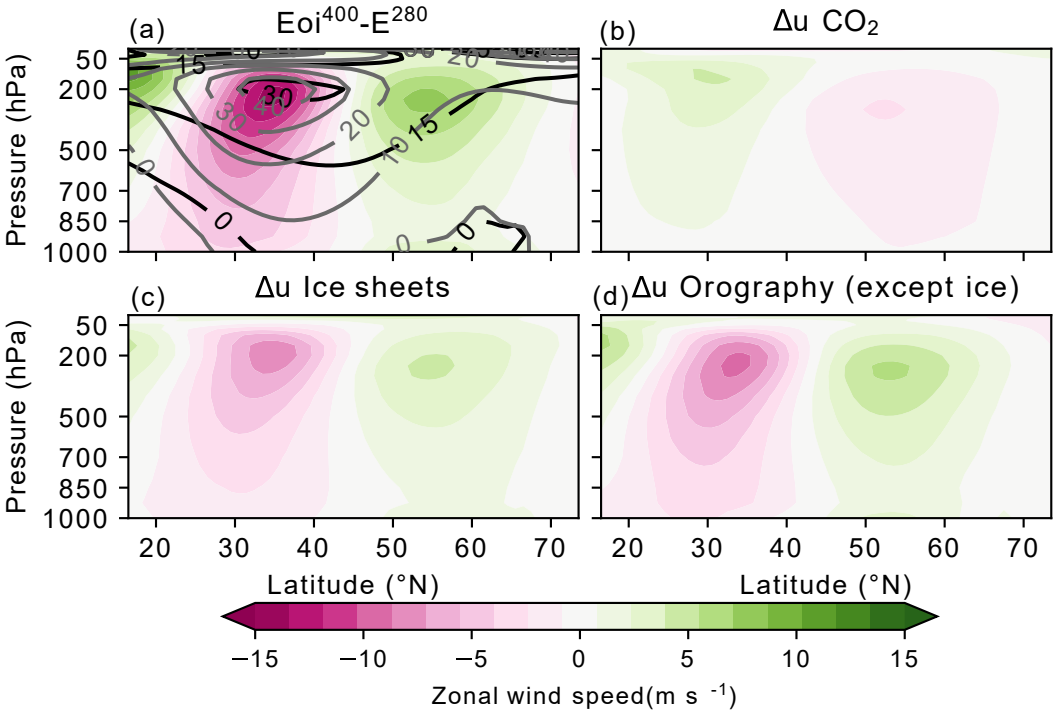

Figure S11. Change in boreal winter (DJF), zonally averaged, North Pacific zonal wind speed between the Late Pliocene (Eoi^{400}) and the pre-industrial (E^{280}) in CCSM4-UoT and the contribution of the change from CO_2, ice sheet and orography forcings to the total change. In plot (a) the gray contours represent the E^{280} values and the black contours represent the Eoi^{400} values.

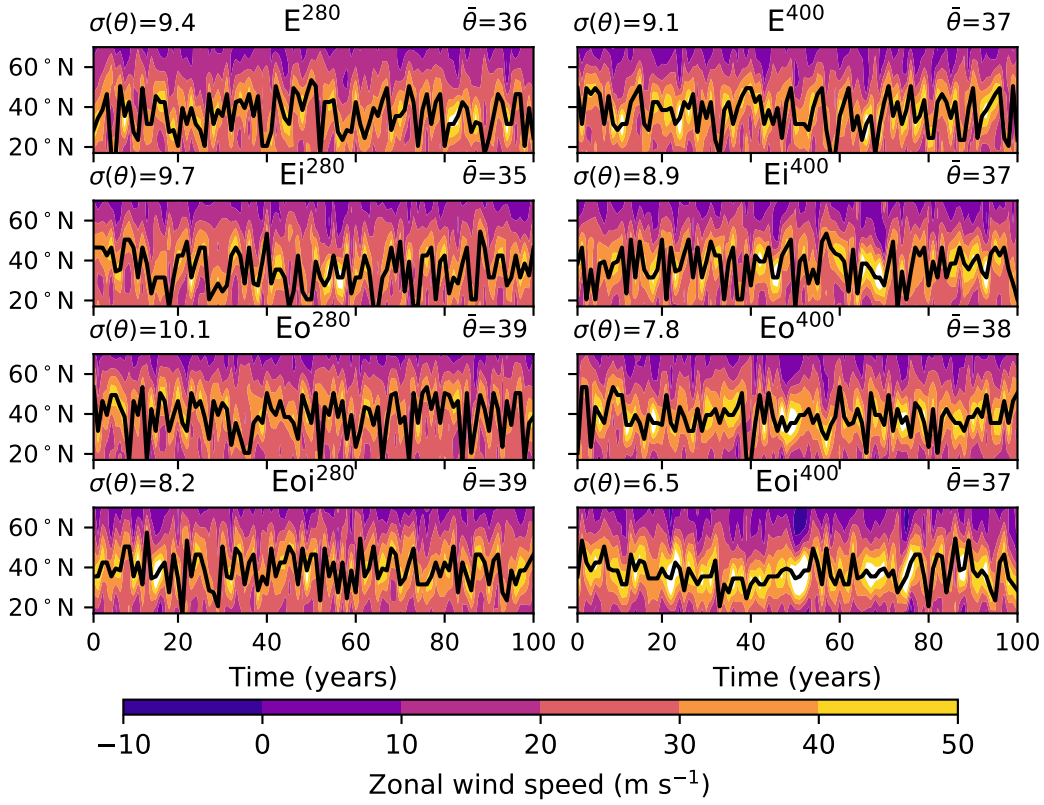

Figure S12. Hovmöller diagrams for the zonal mean wind speed at 200 hPa for 100 Januaries for the North Pacific from the eight COSMOS experiments. The black line indicates the latitude of maximum zonal wind speed. The mean latitude of the jet ($\bar{\theta}$), and the standard deviation in the latitude ($\sigma(\theta)$) are shown for each experiment.

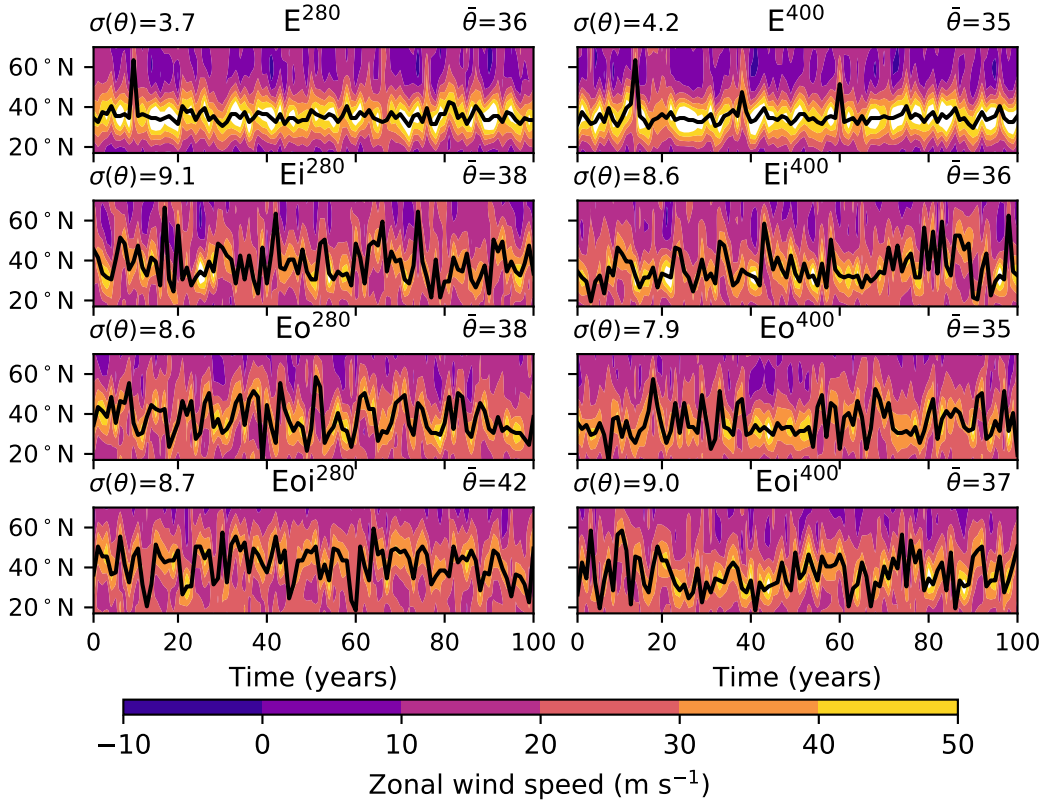

Figure S13. Hovmöller diagrams for the zonal mean wind speed at 200 hPa for 100 Januaries for the North Pacific from the eight CCSM4-UoT experiments. The black line indicates the latitude of maximum zonal wind speed. The mean latitude of the jet ($\bar{\theta}$), and the standard deviation in the latitude ($\sigma(\theta)$) are shown for each experiment.

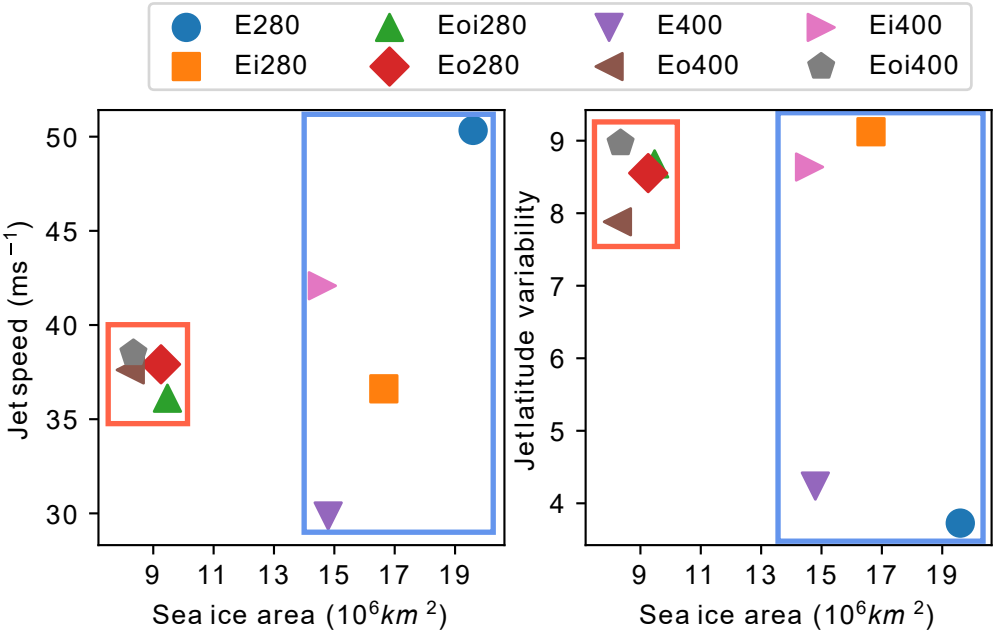

Figure S14. January Northern Hemisphere sea ice area and January North Pacific jet stream speed (left), and jet latitude variability (right) at 200 hPa in CCSM4-UoT. The red box groups experiments with Late Pliocene orography and the blue box groups experiments with pre-industrial orography.