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Supplementary Materials for

Mid-Holocene Northern Hemisphere warming driven by Arctic amplification

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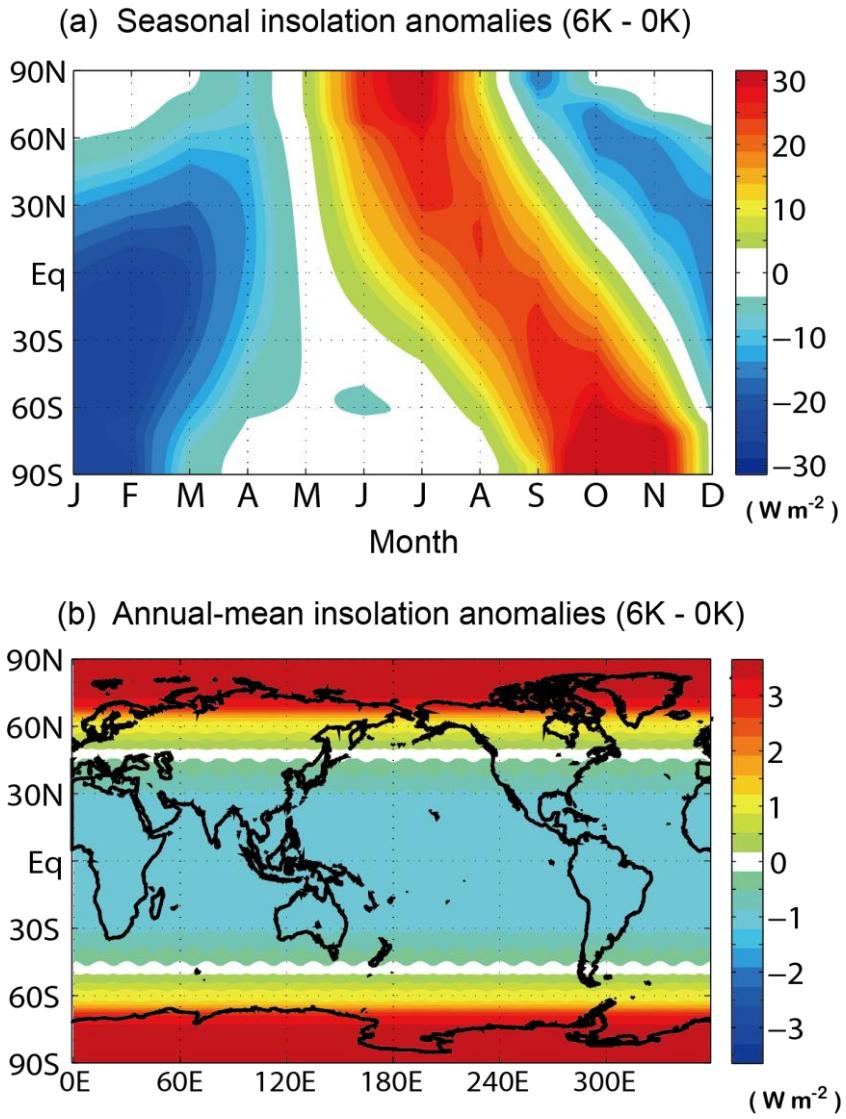

Fig. S1. Mid-Holocene insolation anomalies. (**a**) Seasonal and (**b**) annual-mean insolation differences (W m^{-2}) at the top of the atmosphere (differences between 6 ka and 0 k).

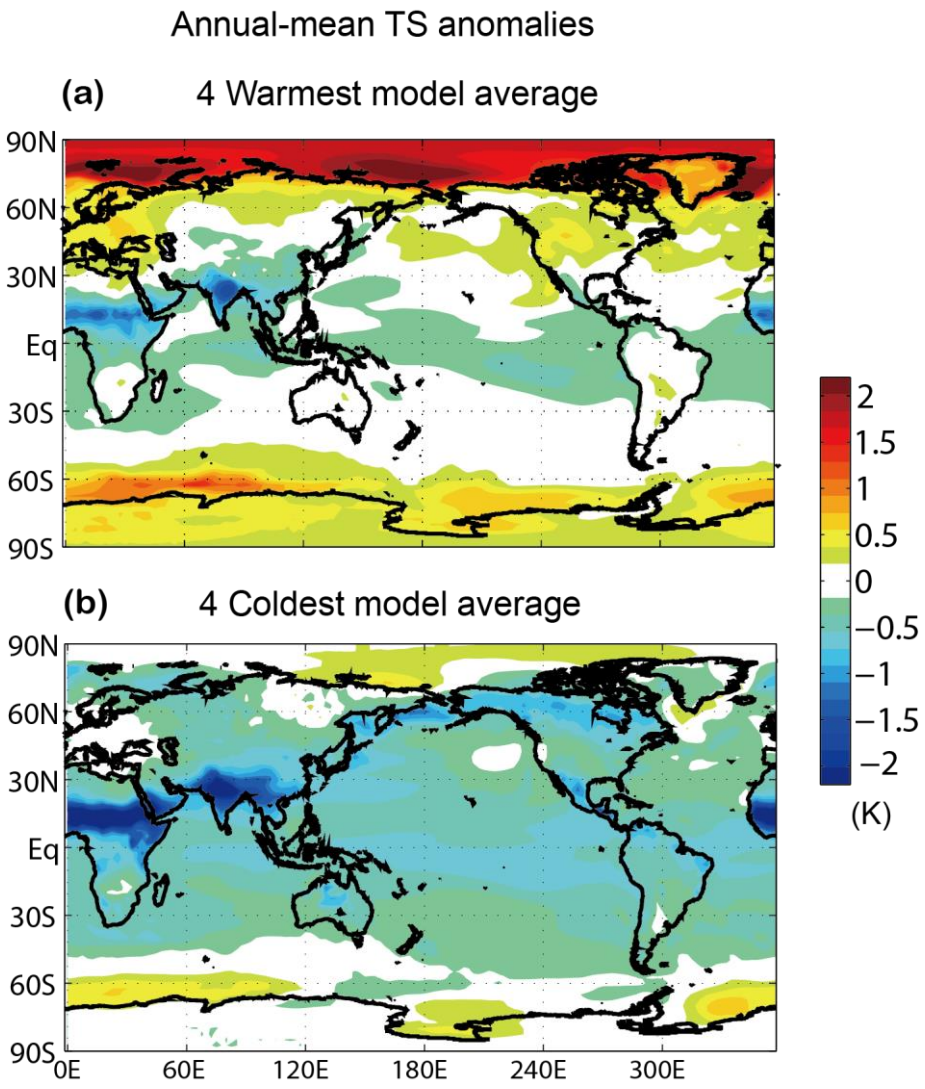

Fig. S2. Surface temperature anomalies simulated by climate models. Composite maps of the annual-mean surface temperature anomalies in the mid-Holocene, averaged for (**a**) the 4 warmest and (**b**) the 4 coldest models.

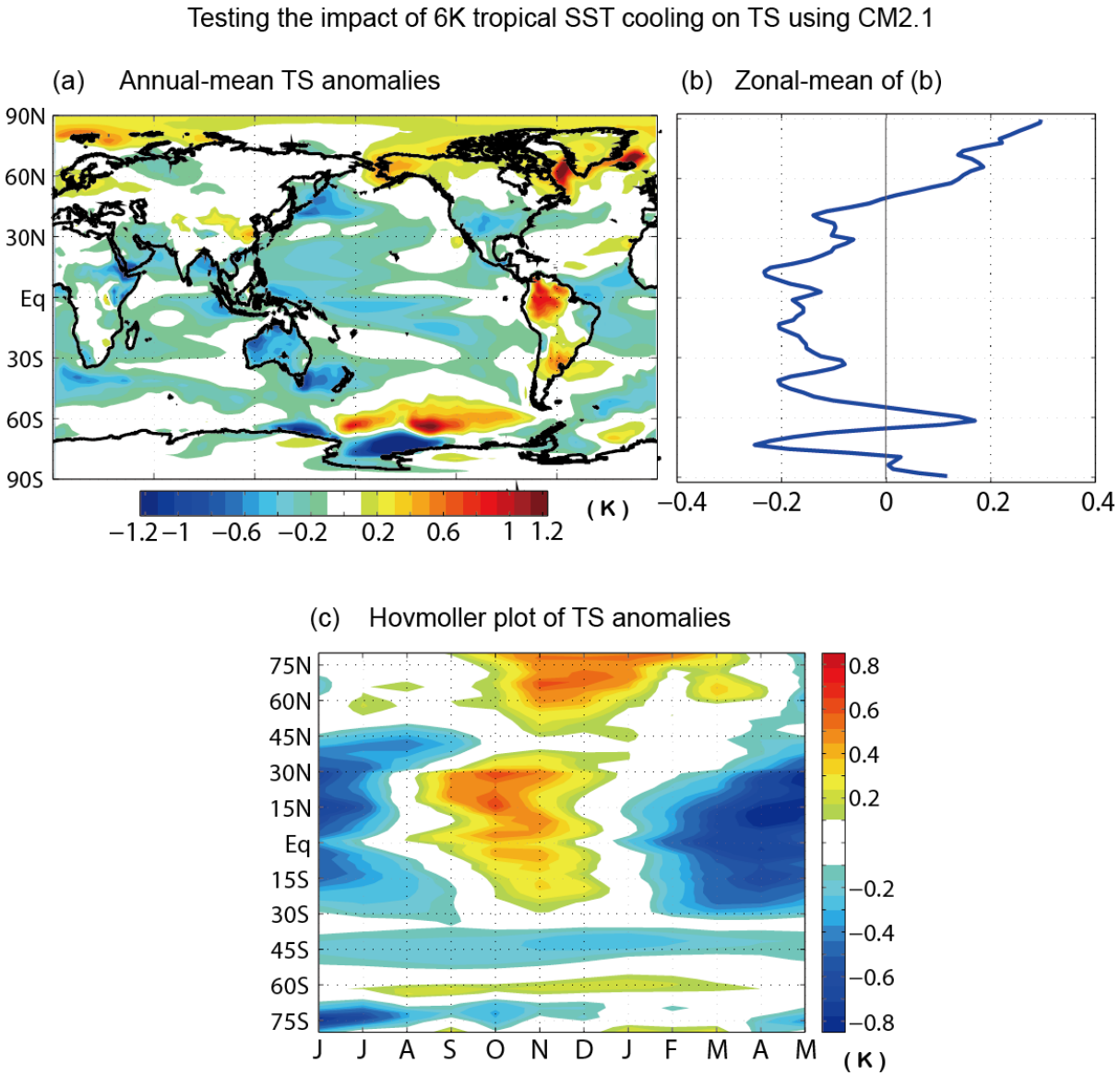

Fig. S3. Testing the impact of mid-Holocene tropical cooling using CM2.1. The impact of the mid-Holocene tropical SST cooling on (**a**) the annual-mean, (**b**) the zonal-mean of the annual-mean, and (**c**) zonally-averaged seasonal surface temperatures. In (**c**), the abscissa is time (months) and the ordinate is latitude.

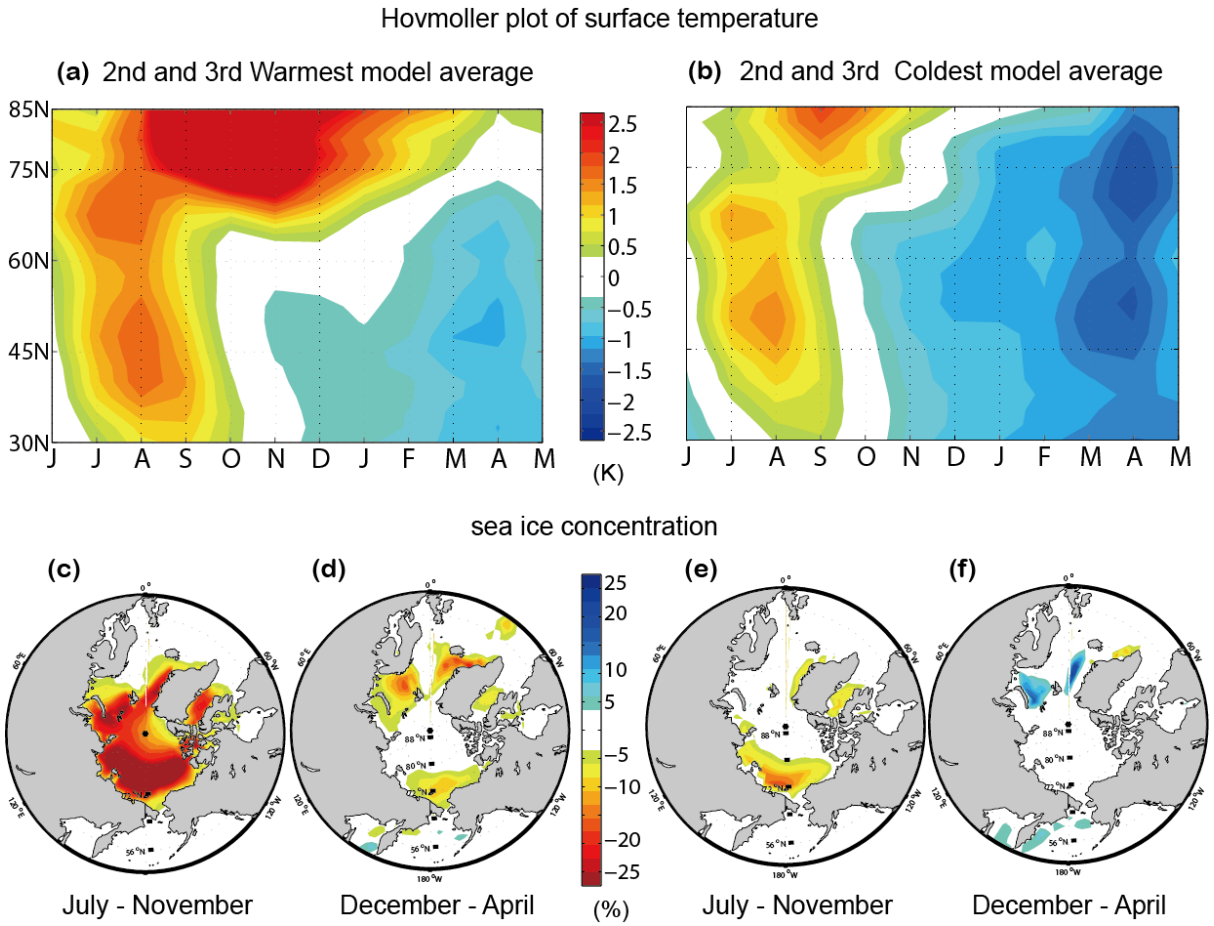

Fig. S4. Same as Fig. 2 except for the second and third warmest/coldest model composites. (**a**, **b**) Zonally averaged, latitude–time Hovmöller plots of surface temperature anomalies in (**a**) the 2nd and 3rd warmest models and (**b**) the 2nd and 3rd coldest models. The abscissa is time (months) and the ordinate is latitude. Arctic sea ice concentration (%) anomalies in (**c**, **d**) the 4 warmest models and (**e**, **f**) the 4 coldest models, averaged in (**c**, **e**) July–November and (**d**, **f**) December–April.

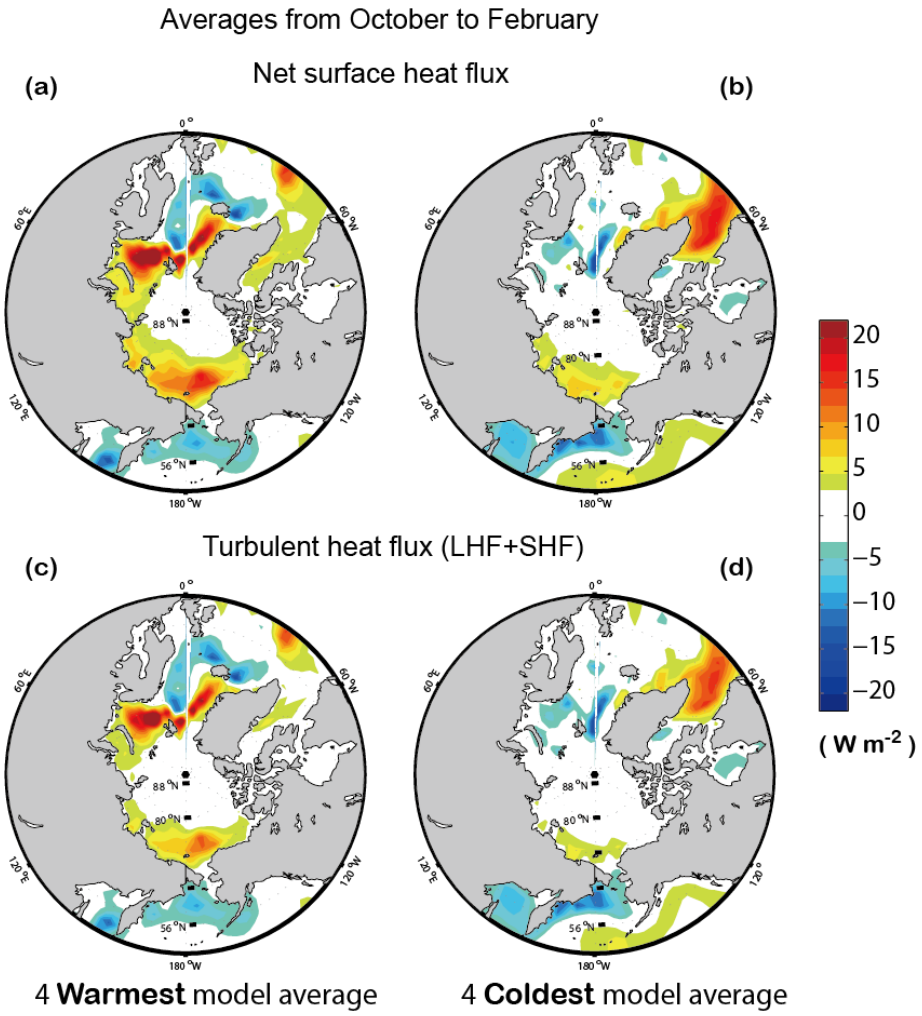

Fig. S5. Autumn-winter surface heat fluxes in the Arctic. The autumn-winter (Oct-Nov-Dec-Jan-Feb) (**a**, **b**) anomalous net surface heat flux ($F_{SW}{}^{\uparrow} - F_{SW}{}^{\downarrow} + F_{LW}{}^{\uparrow} - F_{LW}{}^{\downarrow} + SHF^{\uparrow} + LHF^{\uparrow}$; W m^{-2}) and (**c**, **d**) surface turbulent heat flux ($SHF^{\uparrow} + LHF^{\uparrow}$) averaged in (**a**, **c**) the 4 warmest models and (**b**, **d**) the 4 coldest models. Warm colors imply anomalously large fluxes from the ocean surface to the overlaying atmosphere.