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*Supplement of*

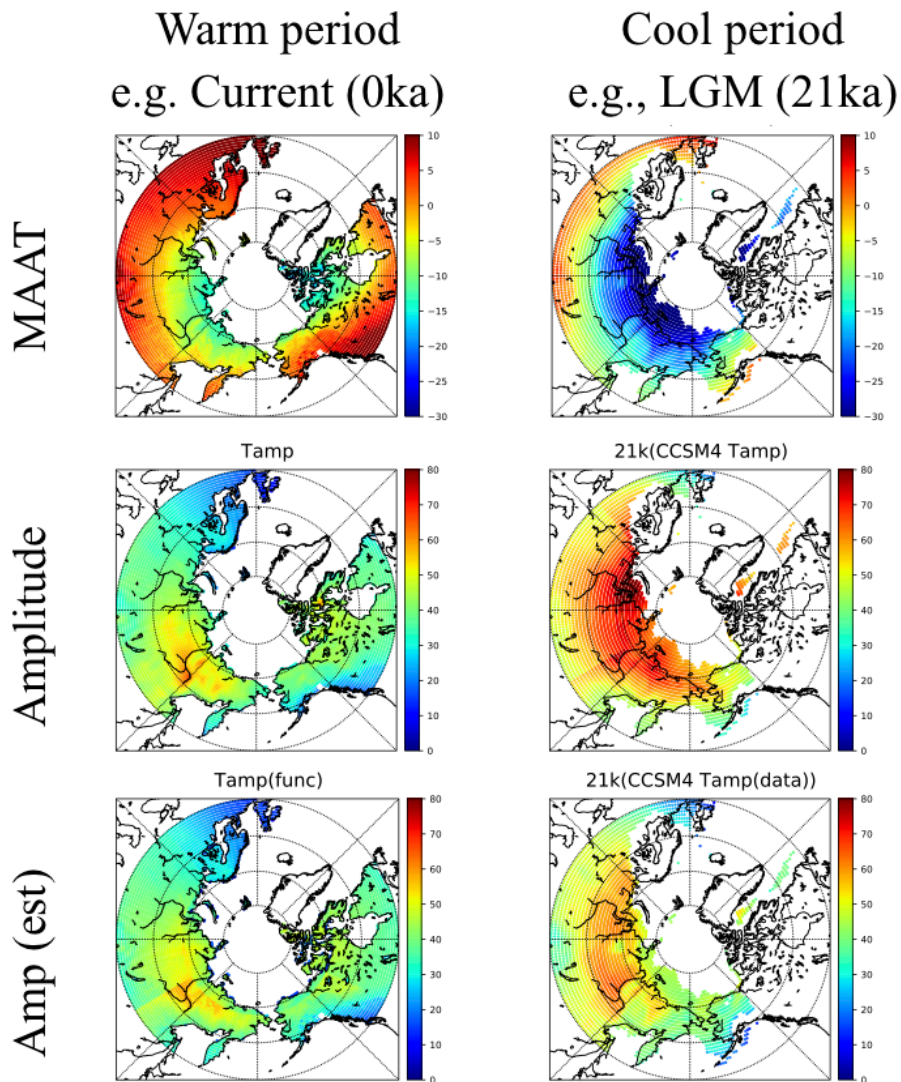
## **Numerical model to simulate long-term soil organic carbon and ground ice budget with permafrost and ice sheets (SOC-ICE-v1.0)**

**Kazuyuki Saito et al.**

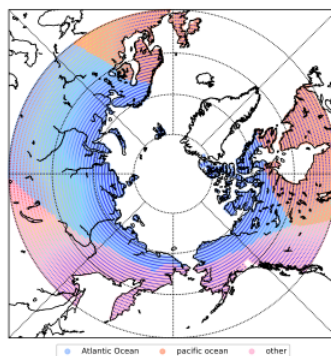
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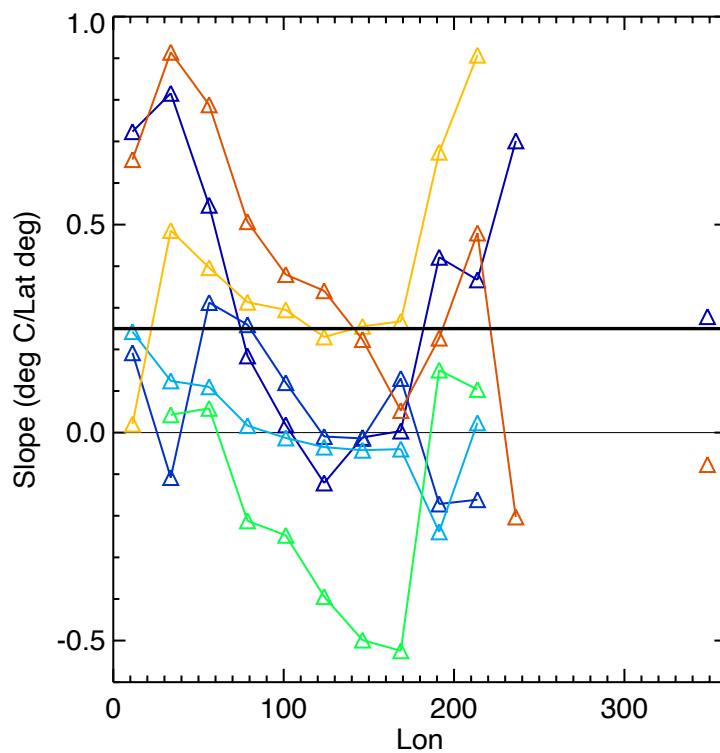
(a)



(b)



**Supplementary Figure 1: a) Climatology of the mean annual air temperature (MAAT, top) and annual amplitude (middle) calculated from the climate data, and the results of the derived function for the annual amplitude (bottom) for respective warm (left column) and cool (right column) period. The warm period climatology was computed from the ERA-Interim reanalysis data, while the cool period climatology was computed from the LGM simulation by CCSM4. CCSM4 was taken because it had the highest horizontal resolution. b) Sections of the present-day land to compute the distance to the closest oceans.**



Supplementary Figure 2: Meridional gradient  $[\partial(\delta T_a)/\partial lat]$  of 6 PMIP3 models.  $\delta T_a$  denotes difference in the surface air temperature climatology between the LGM (21ka) and mid-Holocene (6ka) simulations. The used models are CCSM4 (dark blue), CNRM-CM5 (blue), IPSL-CM5A-LR (pale blue), MIROC-ESM (pale green), MPI-ESM-P (yellow), and MRI-CGCM3 (red). The triangle symbol denotes the gradient calculated in each longitudinal band with the width of  $22.5^\circ$ .