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Paleometeorology: Visualizing Mid-Latitude Dynamics at the Synoptic Level during the Last Glacial Maximum

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Synoptic-scale weather conditions of the Last Glacial Maximum (LGM) are simulated using the National Center for Atmospheric Research (NCAR) Community Climate Model version 3 (CCM3.6) on a globally resolved T170 ($\sim$75 km) grid domain. Model outputs have been saved at hourly intervals in order to better resolve diurnal features. The simulation has been run in tandem with a lower temporally resolved simulation of Kim et al. (2008) to enable a first-pass assessment of the significance of features in the shorter run. Both simulations were forced with modified CLIMAP sea ice and sea surface temperatures (SSTs), reduced global CO2, ice sheet topography, lower sea level, and 21,000 BP orbital parameters. Results from the North Pacific show continued high storm activity during the LGM, whereas the North Atlantic tends to be more quiescent. Plots of storm tracks indicate that all North Pacific storms were steered northward into the Gulf of Alaska, bringing relatively warm air and precipitation into the region. This result is consistent with increased poleward heat transport into the region in the LGM climatological run, as well as the absence of evidence for glaciation in middle Alaska. Disturbances exiting the Pacific track are confined to the Labrador Sea and never hit the coast of Greenland suggesting that moisture sources may be scale dependant. Storm-track trajectories should also have decreased upwelling along the Northwest American coast – a response consistent with some geological data. Further investigation of these runs may provide additional insight into features such as wave-wave interactions, which have previously been unavailable to the research community for an alternate-Earth climate that has been at least as common as the present one over the last 500,000 years.