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# Atmospheric circulation at the last glacial as simulated by a complex coupled general circulation model

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The last glacial is characterized by rather regular successions of cold stadials and warm interstadials (Dansgaard-Oeschger cycles). So far, the mechanisms involved are not yet fully understood. It is unclear whether the tropics play a leading role in variations on Dansgaard-Oeschger timescales or whether they respond to high latitude climate changes. Both the Last Glacial Maximum and Marine Isotope Stage 3 are different from modern climate by northern hemisphere ice sheet configurations which are expected to significantly impact the extratropical atmospheric circulation such as jet streams, and stationary waves. We hypothesize that rapid atmospheric reorganization accomplishes the signal communication from high northern latitudes to the tropics and complements the slow signal communication by the ocean heat transport and circulation.

Here, we use the fully coupled complex general circulation model CCSM3 to perform sensitivity experiments focussing on 21 ky BP and 35 ky BP. The 21 ky ice sheets induce a pronounced split of the extratropical jetstream over the North American continent. In the upper-tropospheric wind field, a wave-like response pattern covering the whole northern hemisphere into the tropics is found and suggests an upper-tropospheric bridge to low latitudes. The African easterly jet is intensified and shifted southward. A significant large-scale drying over West Africa is simulated for all seasons. This indicates a more complex response than a purely meridional ITCZ shift suggested in previous studies. These results are largely confirmed by our experiments with the 35 ky ice sheet prescribed. In addition, a slowdown and a shallowing of the Atlantic ocean meridional overturning is simulated and possibly providing the back-

ground on which the atmospheric response is operating.