



Pacific winds preventing ice sheet buildup over Siberia during the Ice Age climax

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At the culmination of the last Ice Age (~21,000 years ago), vast portions of the Northern Hemisphere land areas were buried under several-kilometer-thick ice sheets. Surprisingly, one of the coldest regions in the modern world, Northern Siberia, escaped this fate and remained largely ice free. To date, two potential mechanisms have been proposed to explain this phenomenon: A regional precipitation deficit that would not allow for a sufficient snow accumulation and an increased dust deposition that would enhance snow melt during the summer ablation period. Here we use high-resolution climate and ice sheet simulations of the Last Glacial Maximum, land proxy data and paleoglacial reconstructions to link the absence of extensive glaciations to changes in the large-scale atmospheric circulation. Our analysis suggests that a reorganization of major stationary pressure systems resulted in strong seasonal winds from the Pacific Ocean that maintained warm spring and summer conditions over the Siberian coasts during the coldest stage of the last glacial period. Both our simulations and proxy data indicate snow-free summers over much of Northern Siberia, in particular due to a pronounced warming of the Arctic shelf placed above the sea level during the Last Glacial Maximum. Although of a regional nature, our finding presents a challenge to the polar amplification theory that cannot reconcile modern-like or even warmer Arctic summers during the Ice Age climax.