

North American ice sheet decay decreased climate variability in the Southern Hemisphere

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New research led by the University of Colorado Boulder shows that the changing topography of ice sheets in the Northern Hemisphere during

the last Ice Age forced changes in the climate of Antarctica, a previously undocumented inter-polar climate change mechanism.

The new study—published today in the journal *Nature* and co-authored by researchers at the University of Bristol, University of Washington and UC Berkeley—suggests that substantial reduction of the Laurentide Ice Sheet that covered much of present-day North America approximately 16,000 years ago resulted in significant climate variations in the tropical Pacific and in West Antarctica.

"The results demonstrate how seemingly localized effects in one part of the world may have a large impact on climate elsewhere on Earth," said Tyler Jones, a research associate in CU Boulder's Institute of Arctic and Alpine Research (INSTAAR) and the lead author of the new study.

Jones and his colleagues studied an [ice core](#) collected from the West Antarctic Ice Sheet (WAIS) in order to document historical climate. The WAIS ice core is the first [climate record](#) to preserve year-to-year climate variability continuously as far back as 30,000 years ago.

"This ice core is really important because it contains long-term climate information that relates to the timescales that humans experience and remember," said Jones.

At INSTAAR's Stable Isotope Lab, the researchers slowly melted and then vaporized the ice cores for analysis using laser absorption spectroscopy, a new methodology that reveals the isotopic composition of the water. This method has improved the researchers' ability to measure [climate change](#) through ice cores, both by increasing measurement resolution and saving time.

When researchers examined the amplitude of year-to-year climate signals preserved in the WAIS [core](#), they noticed a large, abrupt decline

in the signal strength approximately 16,000 years ago. They subsequently determined that the anomaly was largely caused by the lowering of the Laurentide Ice Sheet.

"When there is a large ice sheet over North America, the circulation of the atmosphere becomes very different than today," said Jones. The new results corroborate another published research study suggesting that [ice sheet](#) changes during the same time period shifted the climate in the tropical Pacific enough to transform the terrestrial ecosystems of present-day Indonesia from a grassland savannah to a rainforest, which they remain today.

Overall, the study highlights that changes in the Earth's climate system can be linked across vast distances.

"No one has really investigated this kind of signal before. It potentially opens up new and exciting ways to think about [climate](#) data," said Jones.

More information: T. R. Jones et al, Southern Hemisphere climate variability forced by Northern Hemisphere ice-sheet topography, *Nature* (2018). [DOI: 10.1038/nature24669](https://doi.org/10.1038/nature24669)

Provided by University of Colorado at Boulder

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