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Ice core records of $\delta^{18}\text{O}_{\text{atm}}$ respond to abrupt climate change during the last glacial period

Monday, 3 October 2022 09:00 (20 minutes)

We present measurements of the isotopic composition of O_2 ($\delta^{18}\text{O}_{\text{atm}}$) at sub-centennial resolution from the South Pole and WAIS Divide ice cores. Millennial-scale changes in ice core records of $\delta^{18}\text{O}_{\text{atm}}$ are often interpreted as reflecting global signals related to changes in tropical precipitation and the spatial distribution of photosynthesis during Heinrich events. However, the unprecedented sub-centennial resolution of the South Pole and WAIS Divide ice cores allows us to investigate for the first time the response of $\delta^{18}\text{O}_{\text{atm}}$ to climate changes during Dansgaard-Oeschger events between 68 and 10 kyr BP.

During Heinrich stadials, when the North Atlantic region is cold, $\delta^{18}\text{O}_{\text{atm}}$ increases as tropical rain belts and terrestrial oxygen production shift to the south. Here, we show for the first time that $\delta^{18}\text{O}_{\text{atm}}$ also increases during non-Heinrich stadials and decreases during warm, interstadial periods, likely also due to changes in the position and or intensity of tropical precipitation.

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Track Classification: Rapid changes and teleconnections