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Ice core records of δ18Oatm respond to abrupt climate change during the last glacial period

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We present measurements of the isotopic composition of O2 (δ18Oatm) at sub-centennial resolution from the South Pole and WAIS Divide ice cores. Millennial-scale changes in ice core records of δ18Oatm 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 δ18Oatm to climate changes during Dansgaard-Oeschger events between 68 and 10 kyr BP.

During Heinrich stadials, when the North Atlantic region is cold, δ18Oatm increases as tropical rain belts and terrestrial oxygen production shift to the south. Here, we show for the first time that δ18Oatm 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