



Bipolar climate couplings

Ice cores extracted from the Greenland and Antarctic ice sheets have preserved climate records for the past 100 000 years or more. Deep Greenland ice cores in particular have yielded records with subannual time resolution. Seeking comparably detailed Antarctic chronologies, researchers drilled in 2013–16 in the West Antarctic Ice Sheet (WAIS) Divide, which separates regions of ice flowing in opposing directions. At 10 cm in diameter and 3405 m in total length, the core they extracted provided well-preserved environmental records for the past 62 000 years. This photo shows a freshly extracted section.

Synchronization between the WAIS Divide core and Greenland ice cores showed that abrupt climate changes, known as Dansgaard–Oeschger events (see the article by Edouard Bard, *PHYSICS TODAY*, December 2002, page 32), in the North Atlantic Ocean triggered countervailing temperature changes in the Antarctic, with a lag of about 200 years. Christo Buizert (Oregon State University) and his colleagues have now used volcanic markers trapped in the ice to synchronize the WAIS core with four additional ice cores from other Antarctic regions. That multiway synchronization revealed regional climate variations and a second coupling mode between the two polar regions. In addition to the “bipolar seesaw,” which is mediated by deep ocean waters and is homogeneous across Antarctica, a synchronous, atmospheric mode shifts the Southern Hemisphere’s westerlies and produces varying regional temperature changes. (C. Buizert et al., *Nature* **563**, 681, 2018; photo by Tommy Cox.) —RJF

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