

800,000 Years of Abrupt Climate Variability: Earth's Climate Is Capable of Very Rapid Transitions

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An international team of scientists, led by Dr Stephen Barker of Cardiff University, has produced a prediction of what climate records from Greenland might look like over the last 800,000 years.

Drill cores taken from Greenland's vast ice sheets provided the first clue that Earth's climate is capable of very rapid transitions and have led to vigorous scientific investigation into the possible causes of abrupt climate change.

Such evidence comes from the accumulation of layers of ancient snow, which compact to form the ice-sheets we see today. Each layer of ice can reveal past temperatures and even evidence for the timing and magnitude of distant storms or volcanic eruptions. By drilling cores in the ice scientists have reconstructed an incredible record of past climates. Until now such temperature records from Greenland have covered only the last 100,000 years or so.

The team's reconstruction is based on the much longer ice core temperature record retrieved from Antarctica and uses a mathematical formulation to extend the Greenland record beyond its current limit.

Dr Barker, Cardiff School of Earth and Ocean Sciences said: "Our approach is based on an earlier suggestion that the record of Antarctic temperature variability could be derived from the Greenland record.

"However, we turned this idea on its head to derive a much longer record for Greenland using the available records from Antarctica."

The research published in the journal *Science* (Sept. 8) demonstrates that abrupt climate change has been a systemic feature of Earth's climate for hundreds of thousands of years and may play an active role in longer term climate variability through its influence on ice age terminations.

Dr Barker added: "It is intriguing to get an insight into what abrupt climate variability may have looked like before the Greenland records begin. We now have to wait until longer Greenland records are produced so that we can see how successful our prediction is."

The new predictions provide an extended testing bed for the climate models that are used to predict future climate variability.

The collaborative research was funded in part by a Leverhulme Trust Philip Leverhulme Prize awarded to Dr Barker at Cardiff University. The prize recognises the achievement and potential of outstanding researchers at an early stage in their careers but who have already acquired an international reputation for their work. The Natural Environment Research Council and National Science Foundation in the United States also funded the research.

Story Source:

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Journal Reference:

1. Stephen Barker, Gregor Knorr, R. Lawrence Edwards, Frédéric Parrenin, Aaron E. Putnam, Luke C. Skinner, Eric Wolff, Martin Ziegler. **800,000 Years of Abrupt Climate Variability**. *Science*, 2011; DOI: [40.1126/science.1203580](https://doi.org/10.1126/science.1203580)