

Dansgaard-Oeschger events: rapid, rare and unexpected!?

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With the unambiguous detection of rapid climate variations in high-resolution ice core temperature records from Greenland in the early 1980s a new chapter of potential climate variability in the North Atlantic region has been opened both in speed and amplitude. The discovery of such rapid warmings in Greenland and tracing their larger scale climate imprint led to coining the name Dansgaard-Oeschger events for such variations occurring during the last glacial period. These extraordinary events are characterized by a Greenland warming of 10-15°C in only a few decades, which has been attributed to heat flux anomalies into the North Atlantic region.

In the meantime, these millennial climate variations have been identified in many other northern hemisphere terrestrial and marine climate records and the impact of the heat flux anomalies documented all the way to Antarctica. Moreover, it could be shown that the events were accompanied by drastic changes in global atmospheric circulation as well as in global biogeochemical cycles. Here I will present an overview of our progress in understanding Dansgaard-Oeschger events and in latest (isotopic) greenhouse gas measurements and high-resolution analyses on ice cores and other climate archives, providing an unprecedented view into the sequence of events and the global biogeochemical teleconnections accompanying them. While many of the impacts of Dansgaard-Oeschger events can now be reproduced in coupled climate models, the initial trigger for the events, however, remains a matter of debate.