



Relationships between Greenland and lower latitude climate over the last glacial period from new high resolution measurements of $\delta^{17}\text{O}$ -excess and δd -excess on the NorthGRIP ice core

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Greenland ice cores have long revealed the abrupt climatic variability characterizing the last glacial period (succession of Dansgaard-Oeschger events). Since then, many other continental and marine records have shown the northern hemispheric extent of these abrupt events with an associated signature in the southern hemisphere. While the water isotopic records ($\delta^{18}\text{O}$ or δD) records of Greenland ice cores have long been used as references for the northern hemisphere climatic variability, more and more pieces of evidence point to some decoupling between the climate variability in Greenland and the climate variability in lower latitudes. In particular, the Greenland temperature records derived from water and air isotopes do not exhibit any signature for the Heinrich events.

We present here new high resolution measurements of $\delta^{17}\text{O}$ -excess and δd -excess from the NorthGRIP ice core covering the abrupt climatic variability of the last deglaciation and the last glacial period. These second order parameters are particularly useful to decipher the local from the distant effect on the water isotopic records in polar ice cores since they are sensitive to climatic conditions at the oceanic evaporative regions and to the trajectories of the water mass toward the polar precipitation sites. These new measurements clearly highlight a decoupling between Greenland and lower latitudes between the cold phases (stadials) of the Dansgaard-Oeschger events that can be due to sea-ice extent or other modifications in the oceanic surface climatic conditions. A comparison between the δd -excess records of the GRIP and NGRIP ice core highlight different behaviours in the trajectories of moisture toward different regions Greenland that can again be linked to regional differences in sea-ice extent. Finally, our new sets of data also exhibit a particular behavior of the Greenland vs lower latitude climate during very short Dansgaard-Oeschger events.