



## **Dansgaard-Oeschger cycles in the deep South Atlantic: important insights into the dynamics of Atlantic overturning and interhemispheric teleconnections**

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Dansgaard-Oeschger (DO) cycles are a characteristic climate pattern of the northern hemisphere during the last glacial period. It is generally assumed that DO cycles are caused by variations of the Atlantic Meridional Overturning Circulation (AMOC) and associated sea ice feedback mechanisms. However, until recently, it was unclear whether significant AMOC changes contributed to all DO cycles or only to strong and long-lasting DO events associated with Heinrich events. In this contribution, we outline recent proxy evidence for persistent perturbations of the AMOC geometry/overturning across the entire Atlantic Ocean during each DO cycle of the last glacial period. Specifically, we present decadal to sub-millennially resolved proxy records from the South Atlantic (sediment cores MD07-3076Q and TN057-21) that indicate abrupt variations in the carbonate saturation state of the deep South Atlantic in parallel with abrupt climate variability over Greenland. We argue that these variations manifest abrupt shifts in the presence of northern- versus southern-sourced water masses in time with North Atlantic climate events. The quasi-instantaneous transmission of North Atlantic climate anomalies to the deep South Atlantic raises questions on the mechanisms of interhemispheric climate connectivity which we will discuss in the light of numerical model output data. Decadal ocean processes such as the propagation of oceanic waves and advective adjustments are particularly important in this context. Although our findings leave the cause of DO cycles yet unresolved, they contribute to the understanding of the mechanisms that make DO events an Atlantic-wide, if not global, glacial climate phenomenon.