Deep Water Dynamics in the Cape Basin during the Mid Pleistocene Transition

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The strength and configuration of deep ocean circulation corresponds with oscillations between glacial and interglacial(G/I) periods through its role in heat distribution and carbon storage. It is thus a critical component in understanding the switch from orbitally-induced 41 ky to 100 ky G/I cycles during the Mid-Pleistocene transition (MPT). This study uses Neodymium isotopes as a quasi-conservative water mass tracer to characterize the extent of North Atlantic Deep Water, and thus the strength of ocean circulation in the Cape Basin during the MPT. Results add to a growing base of data in the Cape Basin and confirm neodymium isotopes as a reliable water mass tracer that closely corresponds with climate oscillations reflected in $\delta^{18}O$ measurements. A sampled resolution of ~6ky reveals a lead/lag relationship between thermohaline circulation and climate oscillations that cannot be established solely through isotopic tracer analysis at times of peak G/I. The comparison between ε_{Nd} and $\delta^{13}C$, a less conservative water mass tracer, is used to understand the relationship between thermohaline circulation and carbon cycling. An $\varepsilon_{Nd}/\delta^{13}C$ cross plot helps to establish a steady state of ocean circulation using data from the early MPT and the last glacial maximum. Comparison with previously collected Nd data from the Cape Basin supports and helps constrain the depth of NADW shoaling.