HE44D-2145 - Evidence from the Subtropical North Atlantic Ocean for the Influence of Iceberg Discharge on Ocean Circulation and Climate during the Last Ice Age

Abstract
The Last Ice Age (~ 70 - 19 ka) and deglaciation (~ 18 - 11 ka) were characterized by a series of abrupt climate changes that were larger than any yet experienced by human societies. These changes were associated with variations in the Atlantic meridional overturning circulation (AMOC), regional sea surface temperature (SST), and a millennial bipolar see-saw in global climate. Prior research postulated that the likely cause of dramatic reductions in AMOC was the repeated onset of mass freshwater influx, most notably during catastrophic iceberg discharges in the North Atlantic region, termed Heinrich Events, that occurred approximately every 7,000 – 10,000 years. In this study, we looked in detail at rapidly accumulating sediments recovered in long core KNR 191 – CDH 19 from the Bermuda Rise, located in the western subtropical gyre and influenced two deep water masses, North Atlantic Deep Water (NADW) and Antarctic Bottom Water (AABW). The sequence of iceberg deposition of ice-rafted debris (IRD) within the core and its timing relative to changes in AMOC and SST allow us to assess the influence of meltwater on the ocean system. We find that episodic increases of IRD/g repeatedly occur prior to the indication of weak ocean circulation and coldest regional climate, indicating the important potential role of icebergs and meltwater in contributing to abrupt climate changes in the past. This finding confirms the sensitivity of AMOC to freshwater sources. Understanding the impact of icebergs and meltwater on the ocean is relevant to ongoing processes, as changes in ocean circulation in a warming climate have important potential consequences, both locally and globally.

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