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Bermuda Rise Deepwater Link to Abrupt Climate Change in Greenland: Interstadials 8-14

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North Atlantic Deep Water (NADW) mode flips are commonly proposed as a mechanism which drive millennial climate change such as the interstadial/stadial (IS/S) transitions seen in the Greenland ice core records. Yet apart from benthic carbon isotope evidence establishing an association between deep water and the larger of these events (in particular the "Heinrich" ice rafting debris events, HL-IRD), there is little deepwater observational data to support a link between NADW and the IS/S events, because most deep sea sediment cores do not have a sufficiently high accumulation rate (and/or adequate benthic foraminiferal abundances) to record millennial events. However, as shown in a moderate-resolution study by Keigwin and Boyle, the drift sediments of the Bermuda Rise have sufficient resolution to document links between interstadial events and deepwater chemistry. In this study, we have sampled IMAGES core MD 95-2036 (33º41.4'N, 57º34.5'W, 4461m) at 1cm resolution between 2560-2860meters (IS8-IS14). Stratigraphy for this interval is established from visible light reflectance (calcium carbonate percentage sensitive) and a detailed alkenone temperature record from Sachs and Lehman (1999), and paleomagnetic intensity fluctuations including the Laschamp event (Laj et al., in press). Benthic foraminifera picks were pooled across adjacent depth intervals as necessary to create a Cd/Ca record of the highest possible resolution. The presence of ice-rafted debris was noted in two intervals in this core; one (in proximity to the cooling following IS9) has previously been noted by Keigwin and Boyle (1999) as stratigraphically equivalent to HL4; the other (in the cool interval between IS10 and IS11) is observed at this site for the first time. These IRD events (spanning less than 10 cm, roughly 300 years at this site) are important because they are regional stratigraphic markers linking the event stratigraphy of cores throughout the northern North Atlantic. Benthic foraminiferal Cd/Ca in this interval varies between 0.07-0.20 umol/mol, signifying changes in the percentage of NADW at from values close to 90 percent (as found today) to undetectable levels. These changes are linked to the IS/S cycles, although there clearly are phase differentials between calcium carbonate, alkenone temperatures, and Cd/Ca. For example, the lowest Cd/Ca is found mid-way between the carbonate and alkenone T minima and maxima between HL4 and IS8, and the highest Cd/Ca is found during a brief warm preceding IS8 ("IS8a").

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