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Trace and Minor Element/Ca Ratios of Planktonic Foraminifera in the Iberian Margin During Heinrich Events

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During the last glacial and deglacial period (16kya-46kya), the Iberian Margin experienced local sea surface temperature fluctuations as a result of melting icebergs from catastrophic calvings of the Laurentide Ice Sheet (Heinrich Events). Coinciding with the coldest stadials of Dangaard-Oeschger cycles seen in the Greenland ice cores, Heinrich Events result in North Atlantic deep water changes that can have a widespread impact. Using planktonic foraminiferal Mg/Ca, we have reconstructed sea surface temperature for Heinrich Events one (H1), four (H4) and five (H5) from core MD99 2339 in the Gulf of Cadiz (35.88°N; 7.53°W, 1170m) and core MD95 2040 on the Iberian margin (35°34.91'N; 9°51.67' W, 2645m). Locally, all three of these events are quite intense showing oxygen isotope excursions of approximately 1.5 parts per mil.

Low Mg/Ca values during the Heinrich Events imply significant local and, possibly, regional cooling. For example, temperatures derived from Mg/Ca during H1, H4 and H5 in the Gulf of Cadiz show a temperature oscillation of approximately 6-7°C between the start and end of each Heinrich Event. While this is a large temperature oscillation, it is of slightly smaller amplitude than the approximate 10°C swing implied by assemblage data for winters (Voelker et al., 2006) in the Gulf of Cadiz. Using Mg/Ca in conjunction with O-18 also allows us to calculate changes in salinity that result from the melting of extremely isotopically light ice. Salinity changes help distinguish among potential drivers of temperature oscillations in these cores, including regional climatic change, circulation changes and melting ice.

In addition to Mg/Ca from the planktonic species *G. bulloides*, we measured eleven other trace and minor element/Ca ratios during H1, H4 and H5 in both MD99 2339 and MD95 2040. High sedimentation in core MD95 2040 allows for sampling at a resolution of approximately 90 years during H1. We focused on this period of extremely high resolution prior to, during and after the Heinrich Event to determine precise trends in each of the trace and minor element/Ca ratios. Ice rafted debris in the core allows us to identify the timing of local melting relative to other changes. Comparison of multi-element data from the two cores helps to identify links between temperature and shifts in ocean circulation.