

Introduction

Records were obtained using deep sea sediment cores that were taken from a topographic high called Orphan Knoll, at the mouth of the Labrador Sea, in the North Atlantic Ocean. These records tell us specifically about icebergs and their ice sheet dynamics which then helps us relate that data to climate. We do this by looking at two proxies. 1.) the number of lithic grains that are greater than a certain size (150 micrometers/ grain size). 2.) compare the composition of lithic grains per planktic Foraminifera. Heinrich events are layers in the sediment that are abundant in detrital carbonate grains, suggesting a large influence by the Laurentide ice sheet breaking off icebergs from Canada that travel through the Hudson Strait, which may or may not be driven by climate change. These layers are in sync with the fluctuations with the sediments Ca/Sr ratio due to an overall lowering in the Sr in the recorder indicating a lack of foraminifers presents or an influx of detrital carbonate. Core GVV001 has Heinrich events H0-H4 correlated to the Ca/Sr peaks.



Figure 1: Locus Map of Orphan Knoll, Mouth of Labrador Sea, NW Atlantic Ocean

Results

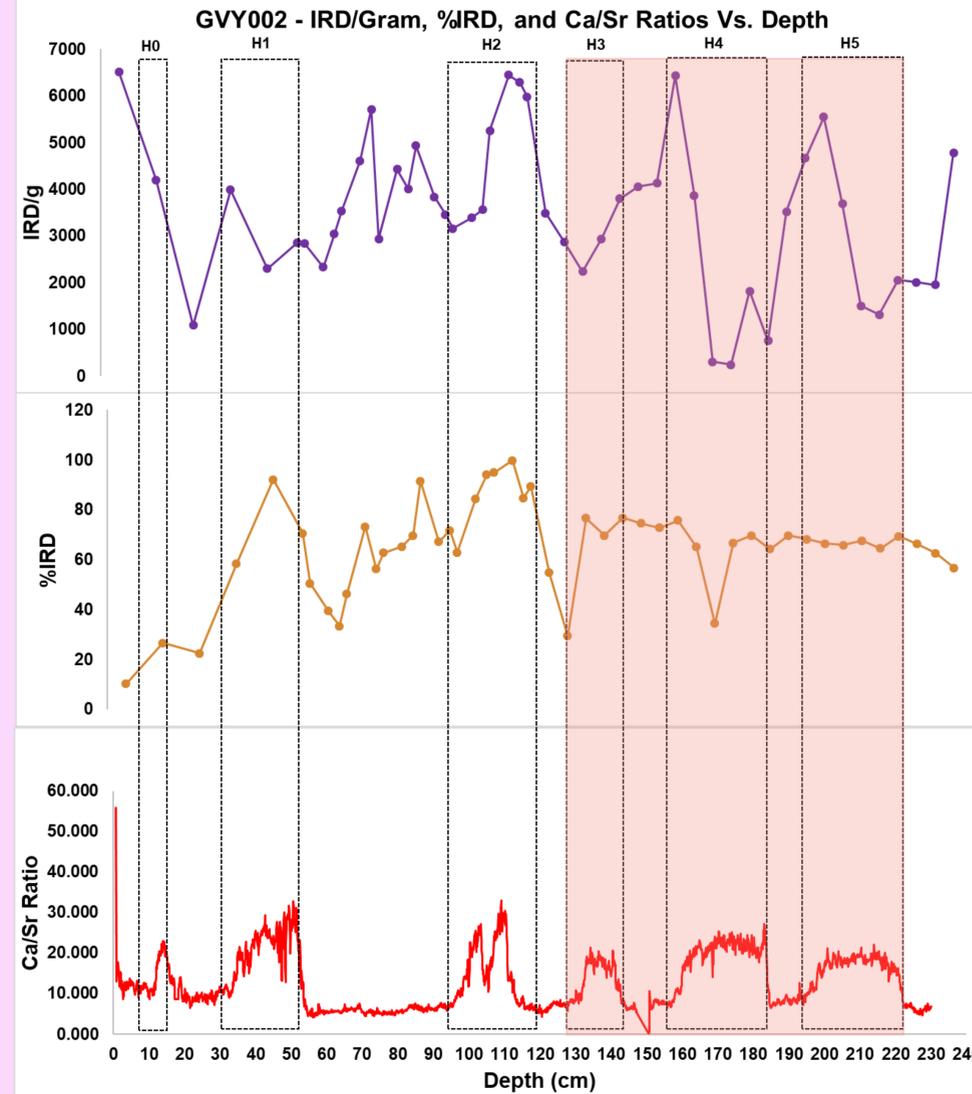


Figure 2: Comparison of IRD/g, %IRD (>150 micrometers), and Ca/Sr ratios for core GVV002 until 230 centimeters downcore. Heinrich Events H0, H1, H2, H3, H4, and H5 have been identified. Heinrich events H0 – H2 are marked by peaks in the IRD/g, %IRD, and Ca/Sr count ratio for the upper 126 cm. Heinrich events H3 – H5 are marked by peaks in the %IRD and Ca/Sr count ratios, and troughs in the IRD/g for the upper 130-230 cm. The highlighted part of the record is the data that I have analyzed and contributed to GVV002.

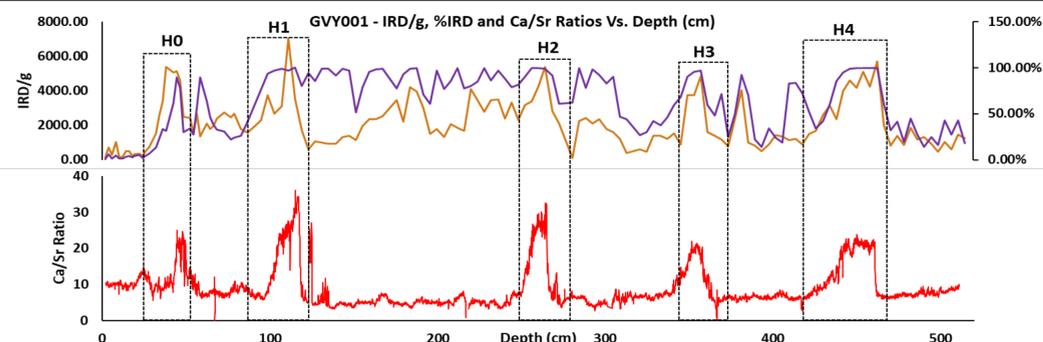


Figure 3: Comparison of the IRD/g, %IRD (>150 micrometers), and Ca/Sr count ratios for the upper 510 cm of core GVV001. This core was analyzed every 2 cm throughout its entire core depth. This method of correlation, which was the same as used in GVV002, is based on Hendry, et al. (2019), who tentatively correlated the shallowest peaks in Ca/Sr ratios in GVV011 with Heinrich events H0 – H4 by correlation the Ca/Sr ratio records in GVV001 to the $\delta^{18}O$ records of *N. Pachyderma* (s.).

Hypothesis

I hypothesize to see a continuation in an abrupt increase of ice-rafted debris (IRD) in correlation with the Ca/Sr ratio data. I expect to see correlations relating to Heinrich events occurring after H2.

Methodology

- Weigh and sieve each sediment sample to 150 micrometers.
- Split the new working samples
- Analyzed each sample to contain 300-500 foraminifers.
- Analyzed each sample for IRD count.

Discussion

Our additional one meter (130-230 centimeters, highlighted in pink) reveals 2 additional peaks of greater than 5,000 lithic grains per gram at 155 cm and 195 cm. The additional meter also records three intervals of high % IRD at 130-140 cm, 160-180 cm, and 200-220 cm. The % IRD intervals correlate with intervals of high Ca/Sr ratios in the core, a proxy that has been previously used to indicate the input of detrital carbonate grains composed of dolomite and/or inorganic calcite. We have preliminarily correlated these three intervals with Heinrich events H3, H4, and H5. The peaks in IRD/gram recorded in our extended record seem to be completely decoupled from the other two proxies, occurring at depths recording low values of %IRD and low Ca/Sr ratios for reasons we have not yet been able to explain. Core GVV002 has a lower sedimentation rate than GVV001, so correlation of Heinrich events can be seen further back.

References Cited

- I.) Heinrich, H., 1988, Origin and consequences of cyclic ice rafting in the Northeast Atlantic Ocean during the past 130,000 years: *Quaternary Research*, v. 29, p. 142.
- II.) Guglielmi, A., 2019, Thesis Proposal: “High Resolution Records of Ice- Rafted Debris at Site DY081-GVY002, Northwest Atlantic Ocean”