

INTRODUCTION

High-resolution sediment records from North Atlantic deep-sea sediments have been used to document millennial-scale abrupt climate oscillations during the last glacial cycle. Two 5-meter cores (DY081-GVY001, and DY081-GVY002, found at water depths of 3,721 meters and 1,170 meters) were recovered from a topographic high Orphan Knoll, Northwest Atlantic Ocean during the RRS Discovery Cruise ICY LAB in 2017 (figure 1). Sediments from the Orphan Knoll are analogous to Heinrich layers found in deep sea Atlantic Ocean sediments. High resolution Ca/Sr records have been previously determined for both cores, when compared to our IRD record it can be used as a proxy for already determined Heinrich events in the Atlantic Ocean.

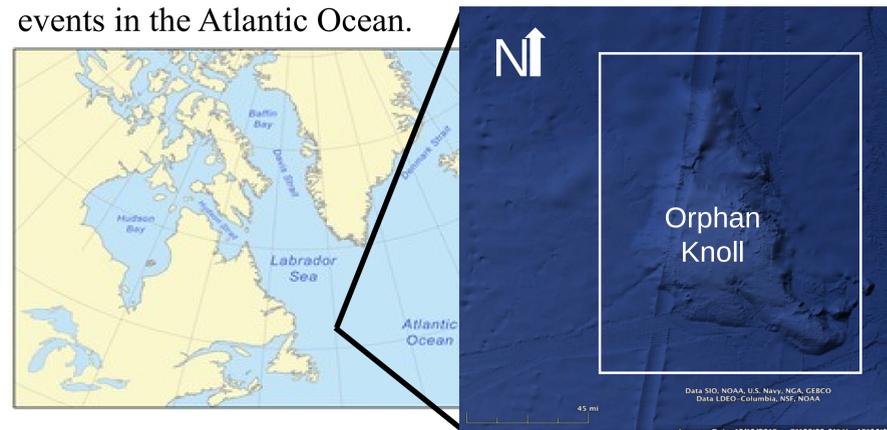


Figure 1: Map showing location of Orphan Knoll, a topographic high located in the Northwest Atlantic Ocean. This location is where cores GVY001 and GVY002 were taken during RRS Discovery Cruise 2017 ICY Lab. Orphan Knoll is located within the white box.

PURPOSE/METHODS

An IRD record for core GVY002 was previously analyzed by Guglielmi et al. (2020) (figure 2A). The purpose of this study is to create a higher resolution record of input of IRD for the upper 65cm of core GVY002 at the Orphan Knoll, Northwest Atlantic Ocean. This allows us to more accurately correlate the IRD record with the previously determined Ca/Sr ratio and evaluate the record within the context of North American Heinrich Events.

Forty-closely spaced samples from the top 65cm of core GVY002 (1-2 cm spacing) have been used to generate two proxies recording changes in ice-rafted detritus

1. **(IRD):** IRD/g, lithic grains >150µm per gram of sediment
2. **%IRD** ((number of lithic grains >150µm) / (number of lithic grains >150µm + number of planktic foraminifers >150µm)) x 100).

RESULTS

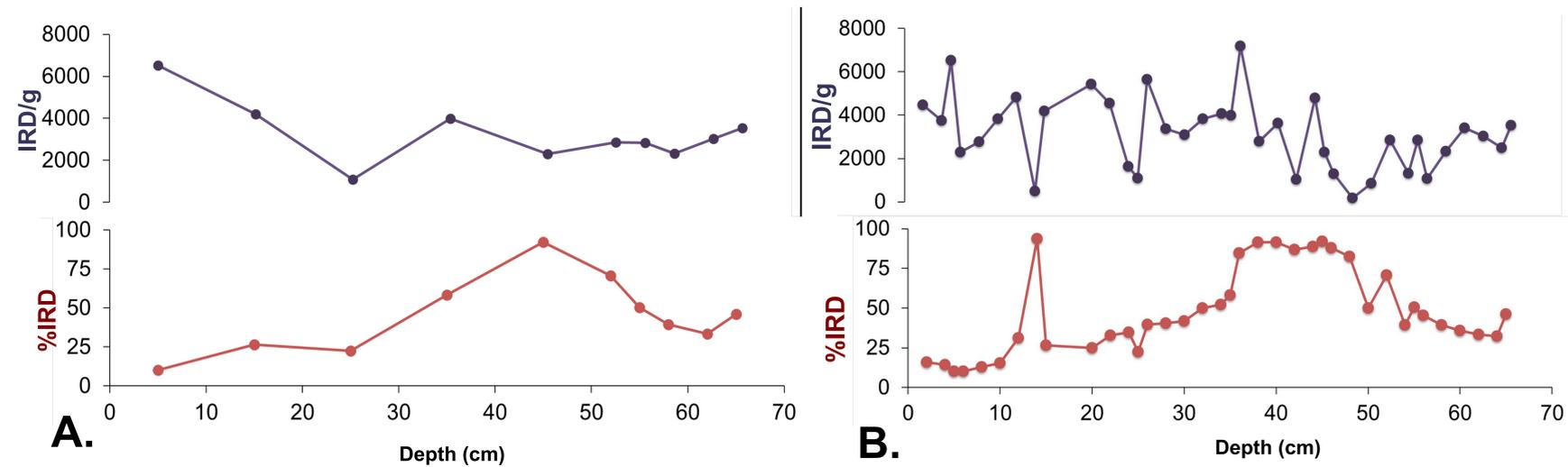


Figure 2: Comparison of low resolution and high resolution IRD records from core GVY002 taken at the Orphan Knoll, Northwest Atlantic Ocean. **A.** Low resolution record of IRD input at Orphan Knoll, Northwest Atlantic Ocean presented by Guglielmi et al. (2020). **B.** High resolution record of IRD input into the Northwest Atlantic Ocean at the Orphan Knoll presented by this study. Note the significant increase in number of IRD/g peaks in figure 1B.

IRD/g, %IRD & Ca/Sr Ratio for core GVY002:

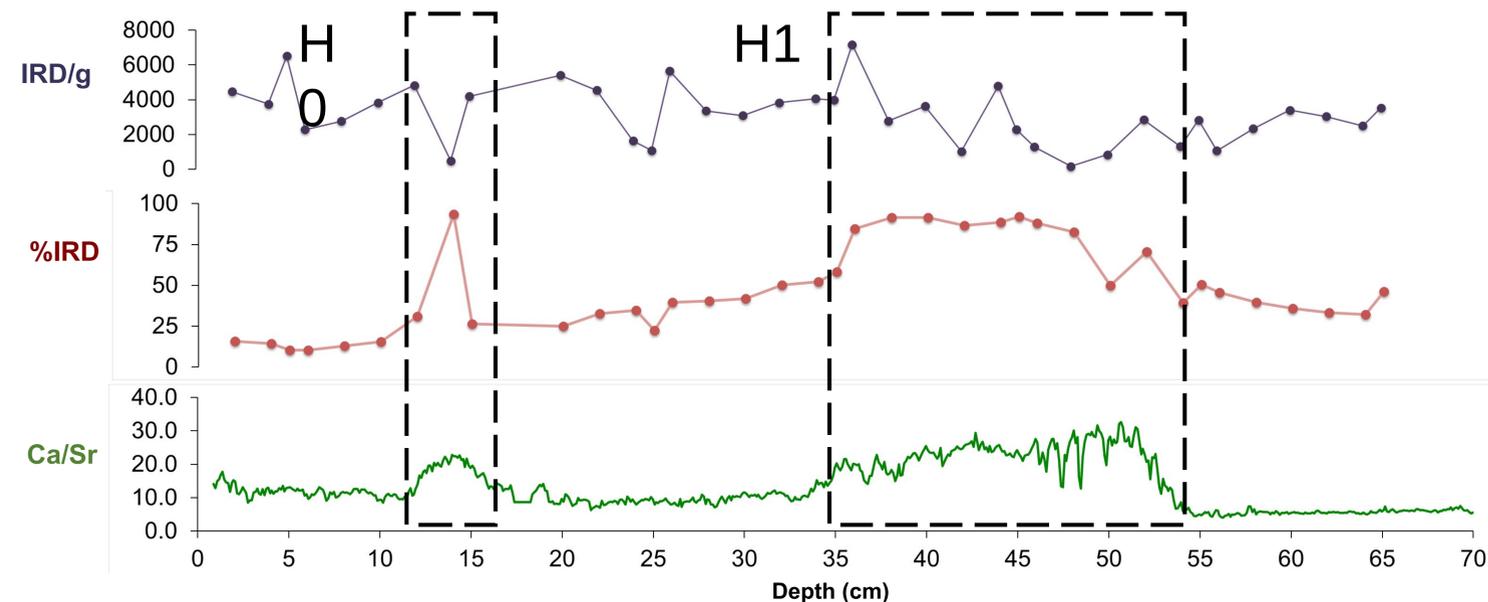


Figure 3: Comparison of IRD/g, %IRD and Ca/Sr ratio for the upper 65cm of core GVY002. Abrupt increases in IRD/g ranging from 4,000-7,200 lithics/g are revealed at 5cm, 10 cm, 25 cm, 38cm and 44cm. The %IRD record reveals high values over the interval of 34cm-50cm and a peak at 14cm. The intervals with a high Ca/Sr ratios and high %IRD have been tentatively correlated to Heinrich event 0 (H0) and Heinrich Event 1 (H1).

DISCUSSION/CONCLUSION

- ❖ When compared to the lower resolution record presented by Guglielmi et al. (2020) (figure 2A), our record shows 4 additional peaks in IRD input into Northwest Atlantic Ocean.
- ❖ The %IRD record reveals high values over the interval of 34cm-54cm that correspond to high IRD/g values, these values can be correlated to intervals of high Ca/Sr ratios, a proxy that has been previously used to indicate the input of detrital carbonates composed of dolomite and/or inorganic calcite (Hodell et al. 2008). We have preliminarily correlated this interval to Heinrich Event 1 (H1) (Figure 2).
- ❖ Another high interval in the Ca/Sr ratio occurs at 12-15cm this correlates to a peak in %IRD, this interval has been preliminarily correlated as H0.
- ❖ The other peaks in IRD/g that also record low %IRD occur when Ca/Sr ratios are at lower background levels, suggesting the decoupling of these proxies for reasons we have not been able to explain yet.
- ❖ Our data suggests a closer relationship between %IRD and Ca/Sr proxies, whereas IRD/g is more easily influenced by other factors.

REFERENCES

- ❖ Guglielmi, A., 2020, Records of the Late Glacial Influx of Ice-Rafted Detritus on the Orphan Knoll, Northwest Atlantic Ocean
- ❖ Hodell, D., Channell, J., Curtis J., Romero, O., Röhl, U., 2008, Onset of "Hudson Strait" Heinrich events in the eastern North Atlantic at the end of the middle Pleistocene transition (~640ka): *Paleoceanography*, v.23, p.4218