

## GSA 2020 Connects Online

Paper No. 134-10  
Presentation Time: 3:00 PM

### **QUANTIFYING DIAGENESIS, CONTRIBUTING FACTORS, AND RESULTING ISOTOPIC BIAS IN BENTHIC FORAMINIFERA USING THE FORAMINIFERAL PRESERVATION INDEX: MAJOR IMPLICATIONS FOR GEOCHEMICAL PROXY RECORDS (Invited Presentation)**

**POIRIER, Robert K.**, U.S. Geological Survey, Florence Bascom Geoscience Center, Reston, VA 20192, **GAETANO**, Madison Q., University of Cincinnati, Cincinnati, OH 45221, **ACEVEDO**, Kimberly, University of Massachusetts Amherst, Amherst, MA 01003, **SCHALLER**, Morgan F., Earth and Environmental Sciences, Rensselaer Polytechnic Institute, Jonsson-Rowland Science Center 1W19, 110 8th Street, Troy, NY 12180-3590, **RAYMO**, Maureen E., Lamont-Doherty Earth Observatory, Columbia U., 61 ROUTE 9W, Palisades, NY 10964 and **KOZDON**, Reinhard, Lamont-Doherty Earth Observatory, Columbia University, 209 Geoscience, 61 Route 9W - PO Box 1000, Palisades, NY 10964

Geochemical records generated from the calcite shells (tests) of benthic foraminifera, especially those of the genera *Cibicidoides* and *Uvigerina*, provide the basis of the majority of long-term climate records in a variety of proxy reconstructions. However, the extent to which benthic foraminifera are affected by post-depositional alteration is poorly constrained in the literature. Furthermore, how diagenesis may alter the geochemical composition of benthic foraminiferal tests, and thereby biasing a variety of proxy-based climate records, is also poorly constrained. We present the Foraminiferal Preservation Index (FPI) as a new metric to quantify preservation quality based on objective, well-defined criteria. The FPI is used to identify and quantify trends in diagenesis temporally, from modern coretop samples to the Mid-Pliocene Warm Period (0.0-3.3 million year ago), and spatially in the deep ocean. The FPI identifies the chemical composition of deep ocean water masses to be the primary driver of diagenesis through time, while also serving as a supplementary method of identifying periods of changing water mass influence at a given site through time. Additionally, we present stable isotope data ( $d^{18}O$ ,  $d^{13}C$ ) generated from individual *Cibicidoides* tests of various preservation quality that demonstrate the likelihood of significant biasing in a variety of geochemical proxy records, especially those used to reconstruct past changes in ice volume and sea level. These single-test data also demonstrate the robustness of paleorecords generated from carefully selected specimens of only the highest quality of preservation.

Session No. 134

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Wednesday, 28 October 2020: 1:30 PM-5:30 PM

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