Expedition 369 in 2017, a nearly complete sequence of high-latitude Cenomanian (U1513A, U1513D, U1516C) were examined for relative abundance, percent planktonic carbonate, allowing for preservation in the fossil record. Samples from three drill holes (U1513A, U1515, U1516C) were examined for relative abundance, percent planktonic foraminifera, and stable oxygen and carbon isotope analysis. All sites were located at ~60°S during the Cenomanian.

Due to an incomplete recovery of pelagic sediment cores from previous ocean drill sites, there is a gap in paleoclimate data for the Cenomanian time interval (101-94 million years ago) at southern high-latitudes. During International Ocean Drilling Project (IODP) Expedition 369 in 2017, a nearly complete sequence of high-latitude Cenomanian sediment was recovered from the southeast Indian Ocean. This project is focused on examining the foraminiferal assemblages recovered from the Naturaliste Plateau (Plateau) 1 during IODP Expedition 369 in order to better understand the changing oceanic environment and water temperature during the Cenomanian. Foraminifera are a type of single celled marine organisms and are extremely sensitive to fluctuations in the environment and water temperature during the Cenomanian. Foraminifera were picked from >125 and >250 µm sieve fractions and mounted on slides for stable oxygen and carbon isotope analysis.

Each interval of sediment was wet-sieved with a >38 µm sieve, dried, and examined under a stereomicroscope (Figure 2). Planktonic abundance counts and 5planktonic foraminifera were achieved by splitting the ~65 µm fraction of each sample to ~300 planktonic specimens. The number of each planktonic taxa present and number of total benthic foraminifera was then counted and recorded. Foraminifera were picked from >125 and >250 µm sieve fractions and mounted on microslides for stable oxygen and carbon isotope analysis. The following benthic species and genera were picked for analysis: Gyrinalidinae globosa, Angulopavolinella sp., Berthelina sp., Planulinella sp., and Lenticulina sp. The following planktonic species and genera were picked for analysis: Microhedbergella praeplanispira, Shockmania conoidea, and Whiteinella sp.

~50 µg of each species or genera were picked for analysis; samples weighed using a CAHN 29 Automatic Electrobalance.

Filling the stratigraphic gap between the Early Cretaceous Warmhouse and the Late Cretaceous Hothouse is important for: characterizing the patterns of ocean temperature change prior to the onset of the Oceanic Anoxic Event 2 (OAE 2). OAE 2 was a short-lived episode of severely depleted oxygen in Earth’s atmosphere and enhanced organic carbon deposition occurring at the Cenomanian-Turonian Boundary. Revealing possible forcing mechanisms for OAE 2 by examining foraminiferal assemblages throughout the Cenomanian. Reconstructing the evolution of deep and surface ocean circulation during the breakup of Gondwanan continents.

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