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Assessing LGM water mass geometry using new internally consistent $\delta^{18}O$ records from the Brazil Margin and Ceará Rise

ERIN LEATHRUM[1], DAVID LUND[1], SARAH MCCART[1] AND CORNELIA HATFIELD[1,2]

[1]University of Connecticut
[2]University of Chicago

The Last Glacial Maximum (LGM; 19 – 23 ka) was marked by maximum Northern Hemisphere ice sheet extent, lower atmospheric pCO_2, and cooler mean surface temperatures. Reconstructions based on the stable carbon isotope ratio ($\delta^{13}C$) of benthic foraminifera suggest that shoaling of northern-sourced water (NSW) and expansion of southern-sourced water (SSW) occurred in the deep Atlantic during the LGM. In contrast, reconstructions based on neodymium isotopes (εNd) imply the LGM circulation was similar to today. Both $\delta^{13}C$ and εNd are non-conservative tracers, however, meaning they can be affected by organic matter remineralization and changes in deep water residence time. A conservative tracer like the oxygen isotope ratio ($\delta^{18}O$) of benthic foraminifera, which reflects temperature and the $\delta^{18}O$ of seawater, is therefore needed to constrain watermass extent. Modest spatial differences in LGM $\delta^{18}O$ values and interlaboratory $\delta^{18}O$ offsets have precluded the creation of a section for the Atlantic, highlighting the need for an internally consistent dataset. Here we present new benthic foraminiferal $\delta^{18}O$ records from core sites spanning ~2000-4000m water depth at the Brazil Margin and Ceará Rise. All samples were measured on a single mass spectrometer to eliminate interlaboratory offsets and cross-checked using a heavy external standard ($\delta^{18}O$ > 4 per mil). The LGM interval was constrained using new radiocarbon (^{14}C) dates to refine the stratigraphy in each core. Together, the two depth transects provide a framework for evaluating meridional differences in $\delta^{18}O$ to determine whether SSW expansion occurred in the deep tropical North Atlantic during the LGM.