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Millennial Benthic O18 Variations Across the Hemispheres: Sealevel vs THC

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Benthic oxygen isotope records from the mid-depth SW Pacific (MD97-2120, Pahnke & Zahn, in press) and deep-water N Atlantic (MD95-2042, Shackleton et al., 2000) are coherent in variation and identical in absolute isotope values, despite different T-S hydrology at both core locations. Differential dw-salinity relationships between both regions are a function of offset meteoric O18 and confirm ambient equilibrium O18 (calcite) at both locations to be nearly identical while salinity is 0.5 psu higher in the N Atlantic (34.9, NADW; 34.3, SW Pacific/AAIW). Similarity in variation of both records and coherency with Antarctic ice core profiles supports the contention that sea level (Siddall et al., 2003; Rohling et al., 2004) played a role in shaping the O18 records, with Antarctica providing a significant contributing. Amplitudes of millennial O18 variations exceed those inferred from the Siddall sea level curve by 0.3-0.5 permil and indicate variability not supported by ice volume variation. Hydrographic implications of the benthic O18 anomalies are being assessed as a function of T-S-O18 linking using mean glacial T-S targets as reference and assuming a range of scenarios (full-temperature, full-salinity, mixed T-S responses). Density changes in these scenarios are indicative of isopycnal heave that would translate into changes of volume transports with implications for rates of water mass formation and THC. Coincidence of the O18 anomalies with benthic C13 excursions supports these scenarios and suggests ventilation changes did occur on regional isopycnals.