Impacts of community composition and preservation on diatom-bound $\delta^{15}N$

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In nutrient replete marine environments, sedimentary nitrogen isotopes are a paleoceanographic proxy for relative nutrient consumption, and existing data represent key evidence for deciphering the role of the biological pump in regulating atmospheric CO_2. Diatom-bound nitrogen isotopes ($\delta^{15}N_{db}$) provide a more robust measurement of past nitrogen isotope conditions than bulk sediment because the silica shell in which the organic nitrogen is embedded is thought to protect it from post-depositional alteration. However, recent laboratory-based culture work indicates that diatom species fractionate nitrogen to varying degrees during incorporation of N into their microfossils, leading to a possible impact of surface diatom assemblage on the recorded $\delta^{15}N_{db}$ signal. In addition, preferential preservation of some diatom species during deposition and within the sediment may lead to an altered signal. We investigated the impact of community composition using two natural community growouts from 66°S and 61°S, both on 170°W, in the Southern Ocean during early 2017. We show that although the diatom assemblages are distinct, they both fractionate nitrate at about 4‰, close to the expected value. We will compare the nitrogen isotopic relationships observed in the community growouts to the relationships observed in sinking particles and underlying sediment at each site to assess how community composition and variable preservation impact the $\delta^{15}N_{db}$ signal.