



GSA Annual Meeting in Phoenix, Arizona, USA - 2019

Paper No. 37-3

Presentation Time: 9:00 AM-5:30 PM

NITROGEN AND OXYGEN ISOTOPES IN THE SHELL OF THE ANTARCTIC SCALLOP *ADAMUSSIUM COLBECKI* AS A PROXY FOR SEA ICE COVER IN ANTARCTICA

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Adamussium colbecki is a large thin-shelled scallop common in Antarctic waters and well represented in the fossil record. Shell oxygen ($\delta^{18}\text{O}_\text{s}$) and nitrogen isotopes in carbonate bound organic matter ($\delta^{15}\text{N}_{\text{CBOM}}$) have the potential to record sea ice state over time. To test this hypothesis we will analyze *A. colbecki* shells from Explorers Cove and Bay of Sails, western McMurdo Sound, Antarctica. These sites have different sea ice states: persistent (multiannual) sea ice at Explorers Cove and annual sea ice (that melts out every year) at Bay of Sails. Six adults shells collected at these sites in 2008 (3 from each site) and two juveniles collected in 2016 from Explorers Cove will be serially sampled for $\delta^{18}\text{O}_\text{s}$ values from the growing shell margin to the umbo. We hypothesize that melting glacial ice will pulse freshwater with low $\delta^{18}\text{O}$ values into the system, which will be recorded in as larger amplitude pulses in shells from the Bay of Sails, but as dampened pulses in Explorers Cove. Carbonate bound organic material will be sampled for $\delta^{15}\text{N}_{\text{CBOM}}$ values. Recent studies illustrated that $\delta^{15}\text{N}_{\text{CBOM}}$ values provide a similar proxy as soft tissue $\delta^{15}\text{N}$ values (Gillikin et al., 2017, GCA, 200, 55–66, doi: 10.1016/j.gca.2016.12.008). The organic content of the shell is low and the shells are thin, so $\delta^{15}\text{N}_{\text{CBOM}}$ values will be more time averaged than $\delta^{18}\text{O}_\text{s}$ values. Nevertheless, sea-ice organic N should have higher $\delta^{15}\text{N}$ values compared to open water organics due to nitrate draw down in the ice (Fripiat et al., 2014, Global Biogeochem. Cycles, 28, 115–130, doi:10.1002/2013GB004729). Thus we expect large differences between Explorers Cove with persistent sea ice cover and Bay of Sails where the sea ice melts out every year. We posit that oxygen and nitrogen isotopes in *A. colbecki* shells have a high potential to record sea ice cover.

Session No. 37--Booth# 196

T124. Advances in Ocean and Climate Reconstructions from Environmental Proxies (Posters)

Sunday, 22 September 2019: 9:00 AM-5:30 PM

Hall AB, North Building (Phoenix Convention Center)

Geological Society of America *Abstracts with Programs*. Vol. 51, No. 5

doi: 10.1130/abs/2019AM-338279

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