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OXYGEN AND CARBON ISOTOPES IN *ADAMUSSIUM COLBECKI*: $\delta^{13}\text{C}$ PROXY FOR SEA-ICE PERSISTENCE?

CRONIN, Kelly E.¹, GILLIKIN, David P.², WALKER, Sally E.¹, CAMARRA, Stephen², PUHALSKI, Emma² and BOWSER, Samuel S.³,
(1)Department of Geology, University of Georgia, Athens, GA 30602, (2)Geology Department, Union College, Schenectady, NY 12308,
(3)Wadsworth Center, New York State Department of Health, Albany, NY 12201

The Antarctic scallop *Adamussium colbecki* is a promising proxy for sea-ice persistence and can potentially resolve subannual seawater conditions characteristic of annual and multiannual sea ice. Alternating groups of widely- and narrowly-spaced striae (small ridges on valve surfaces) are thought to indicate seasonal growth differences: wide groups in summer, narrow groups in winter. Shell oxygen ($\delta^{18}\text{O}_\text{s}$) and carbon ($\delta^{13}\text{C}_\text{s}$) in striae groups may therefore reflect seasonal seawater conditions. We expect lower $\delta^{18}\text{O}_\text{s}$ in wide summer striae groups under both annual and multiannual sea ice if glacial meltwater mixes through the water column. We also expect higher $\delta^{13}\text{C}_\text{s}$ in wide striae groups under annual sea ice but not under multiannual sea ice, as phytoplankton blooms post sea-ice breakout enrich seawater $\delta^{13}\text{C}_\text{DIC}$.

Scallops were collected from two sites in western McMurdo Sound (Ross Sea) located ~30 km apart: Explorers Cove (EC) has multiannual sea ice and Bay of Sails (BOS) has annual sea ice. Adults were collected live by divers at 9–18 m depth in 2008 from EC and BOS. Additional juveniles (< 2 yrs) were collected from EC in 2016. Two adults each from EC and BOS and two 2016 juveniles were serially sampled for stable isotopes. $\delta^{13}\text{C}_\text{s}$ decreases over ontogeny due to metabolic effects; the linear trend was removed to enable seasonal comparison. Detrended residuals are referred to as $\delta^{13}\text{C}_\text{s det}$.

Mean $\delta^{18}\text{O}_\text{s}$ (~3.7‰) is not different in narrow and wide striae groups under either annual or multiannual sea ice, suggesting negligible glacial meltwater mixing at depth and minimal seasonal temperature change at both sites. $\delta^{18}\text{O}_\text{s}$ values are within expected equilibrium range and decrease over ontogeny, suggesting increased growth during warmer temperatures in older scallops. In contrast, mean $\delta^{13}\text{C}_\text{s det}$ is ~1‰ higher in wide summer striae groups than narrow winter striae groups under annual sea ice at BOS, but not different between striae groups under multiannual sea ice in EC adults. $\delta^{13}\text{C}_\text{s det}$ is also higher in wide summer striae groups from 2016 EC juveniles, however sea ice broke out at EC in 2015, so juveniles experienced annual-like sea-ice conditions. Seasonal differences in $\delta^{13}\text{C}_\text{s}$ suggest that carbon isotopes coupled with striae width in *A. colbecki* may be a good proxy for sea-ice persistence in Antarctica both in modern and fossil assemblages.

Session No. 114

[T69. Polar Paleobiology and Paleoenvironmental Proxies](#)
Wednesday, 28 October 2020: 10:00 AM-12:00 PM

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Back to: [T69. Polar Paleobiology and Paleoenvironmental Proxies](#)

[<< Previous Abstract](#) | [Next Abstract >>](#)