GSA Annual Meeting in Seattle, Washington, USA - 2017

Paper No. 272-57
Presentation Time: 9:00 AM-6:30 PM

UPDATE ON THE POTENTIAL EFFECTS OF OCEAN ACIDIFICATION ON ANTARCTIC MARINE BIVALVES

WEBSTER, Claire[1], WALKER, Sally E.[1], TEETER, William H.[2] and BOWSER, Samuel S.[3], (1)Department of Geology, University of Georgia, Athens, GA 30602, (2)Geology, University of Georgia, Athens, GA 30602, (3)Wadsworth Center, New York State Department of Health, Albany, NY 12201, claire.webster25@uga.edu

Since the industrial revolution, carbon dioxide in the atmosphere has increased significantly via anthropogenic emissions and deforestation. This change in the atmosphere has led to uptake of more CO_2 in the oceans, a phenomenon known as ocean acidification, in which the pH and saturation state of calcium carbonate is lowered. Even slight decreases in pH and saturation states can prove devastating to communities of marine calcifying organisms. Recent studies have mainly focused on planktonic organisms and corals located in temperate and tropical regions. However, it has been suggested that higher latitude marine regions, such as the Antarctic, are more vulnerable to ocean acidification with undersaturated conditions predicted to be common by 2050. Our study examines shell mineralogy, outer shell microstructure, and bathymetric data for 41 families of bivalves representing 122 species located south of the Antarctic Convergence and their vulnerability to dissolution.

All Antarctic bivalves examined have shells formed of either a composite of calcite/aragonite or aragonite. Of the 41 families in the study, 34 families (83%) have hard parts constructed of aragonite, which is reported to be approximately 35% more soluble than its calcite counterpart. Microstructures were classified and ranked based on resistance to dissolution. Bivalves with more resistant shell microstructures (complex cross-lamellar) will likely have higher survival rates in undersaturated waters than those with weaker microstructures (e.g., prismatic). However, the two microstructures that are least resistant to dissolution, simple prismatic and composite prismatic, account for 39% of family diversity, while the most resistant microstructure, complex cross-lamellar, accounts for only 2.4% of family diversity. Deep-water bathymetric distributions may provide a refuge for some bivalve species, although carbonate saturation states are inherently lower in deeper waters. The paucity of Antarctic bivalves with hard parts constructed from dissolution-resistant microstructures and mineralogy does not bode well for their survival under global warming/ocean acidification scenarios.

Session No. 272--Booth# 282

D17. Paleontology, Paleoecology/Taphonomy (Posters)
Tuesday, 24 October 2017: 9:00 AM-6:30 PM

Halls 4EF (Washington State Convention Center)

Geological Society of America *Abstracts with Programs.* Vol. 49, No. 6
doi: 10.1130/abs/2017AM-308140