

# Do the Trace Metal Concentrations in Barnacle Shells from Rye, Nyack, and Piermont Vary?

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The geochemistry of marine carbonates frequently reflects the environmental factors that influence their growth, such as climate and/or water quality. Barnacles are sessile crustaceans with shells that provide such environmental archiving. The bay barnacle, *Amphibalanus improvisus*, was found in the Hudson River at Piermont, NY and Nyack, NY and was the most abundant species identified. To expand the geographic perspective, *Amphibalanus eburneus* and *Semibalanus balanoides* barnacles were collected in Rye, NY on the Long Island Sound coast. However, this did not permit a perfect comparison as these species were not identified at the Hudson River sites. Barnacle samples were cleaned and organic matter removed with a multi-step process that included a vinegar scrub, short bleach bath, and ultrasonication in milli-Q water. Trace metals in calcium carbonate barnacle shells were analyzed via quadrupole mass spectrometer. The analysis focuses on Mg, Sr, Ba, Na, and Y to Ca ratios. There was geographic variation in barnacle Y/Ca, Ba/Ca, and Na/Ca values. This may indicate that the concentrations of these trace metals in the waters of the three places do vary, suggesting there could be potential to explore these measurements as an environmental proxy. The Mg/Ca and Sr/Ca inter-site variability was more difficult to quantify. Although Mg/Ca and Sr/Ca are known paleothermometers in other archives, more work needs to be done to determine their efficacy in these locations. Ultimately, this preliminary data and assessment shows that these metals can be recorded in barnacle shells and opens the door to future environmental- or climate-proxy development in the Hudson River and Long Island Sound.