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Variations of cadmium concentrations and cadmium isotopes in *Mytilus* from North Atlantic and Baltic Sea

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Cadmium (Cd) is an essential trace-micronutrient, and its distribution in modern ocean seawater columns is similar to major nutrients. Cadmium isotopes and cadmium concentrations [Cd] in seawater are useful proxies for reconstruction of ocean circulation, and for tracing the distribution of seawater nutrients from deep waters to surface waters. The preferred uptake of light Cd isotopes by phytoplankton renders surface seawater positively fractionated, and therefore the stable Cd isotopes and Cd concentrations are regarded as an indicator for primary producers in the photic zone. Herein we attempt to analyze Cd isotopes and [Cd] in filter-feeding *Mytilus* edulis in order to quantify, if at all, an isotopic effect recorded in their shell that can be attributed either to biological fractionation during uptake into the living organism and/or to fractionation in the shell forming process. Our preliminary test results from living mussel organism of *Mytilus* edulis from Danish waters of the Baltic Sea show [Cd] of 11-53 ppb and positively fractionated δ^{114}Cd values >1.7 ‰, and a negative offset in [Cd] of ~30 % and δ^{114}Cd of ~1.1 ‰ in their respective carbonate shells. Multiple analyses of *Mytilus* shells from the Baltic Sea yielded [Cd] of 2-42 ppb and an average Cd isotope signature of -0.18 ‰ ± 0.12 (2SD, n = 10) with variations from -0.72 to +1.16 ‰. Specimen analyzed from the North Atlantic yielded [Cd] of 8-30 ppb and an average Cd isotope signature of -0.43 ‰ ± 0.08 (2SD, n = 5), with variations from -1.64 to +0.19 ‰. Compared to [Cd] of ~3 ppb and δ^{114}Cd of ~0.64 ± 0.14 ‰ characterizing North Atlantic Surface Seawater [1], our results point to a Cd isotope fractionation and enrichment in [Cd] during uptake of dissolved Cd from seawater into the living organism. This process favors the uptake of isotopically heavier Cd into the living mussel and shell, and would be in contrast to uptake of isotopically light dissolved Cd into phytoplankton. Additional measurements of *Mytilus* specimen from other marine environments are necessary to confirm this trend.

1. Ripperger, S., et al., 2007. Earth and Planetary Science Letters, **261**(3): p. 670-684.