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Investigation of Li/Ca variations in aragonitic shells of the ocean quahog *Arctica islandica*, northeast Iceland

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[1] Interannual and intra-annual variations in lithium-to-calcium ratio were investigated with high temporal resolution in the aragonitic outer shell layer of juvenile *Arctica islandica* (Mollusca; Bivalvia) collected alive in 2006 off northeast Iceland. Li/Ca_{shell} ranged between 7.00 and 11.12 μmol mol^{-1} and presented well-marked seasonal cycles with minimum values recorded at the annual growth lines; a general pattern was a progressive increase in Li/Ca_{shell} from March to May, followed by a plateau in June and a decrease down to minimum values in July–August. Li/Ca_{shell} was correlated with $\delta^{18}O_{shell}$-derived temperature, but the strength of this relationship was weak ($r^2 < 0.25$ and $p < 0.05$). It covaried significantly with microgrowth increment width and with the discharge from one of the closest rivers. Seasonal variations of Li/Ca_{shell} in *A. islandica* may most likely be explained (1) by calcification rate and/or (2) by significant river inputs of Li-rich silicate particles flowing to the sea as soon as snow melts. In the first case, Li/Ca_{shell} may be a useful proxy for addressing seasonal variations of growth rate in bivalves that lack discernable microgrowth patterns. Abrupt decreases of Li/Ca_{shell} may, in turn, help identify growth retardations due to harsh environmental conditions. Alternatively, if Li/Ca_{shell} variations are linked to particulate Li inputs by rivers, this could be a new proxy for the intensity of mechanical weathering of Icelandic basalts, with interesting perspectives for the reconstruction of frequency and intensity of past jökulhlaups (subglacial outburst floods). Further works, including experimental studies, are needed to test these hypotheses.

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