Boron, Lithium and Magnesium Isotopes in Cold Water Corals (*Lophelia pertusa*)

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Boron (B), lithium (Li) and magnesium (Mg) isotopes in marine biogenic carbonates such as coral skeletons, bivalve shells or foraminifera are increasingly used to decipher paleoclimatic and paleooceanographic conditions. However, vital effects of the organisms can lead to large uncertainties in their application. For their use as paleo-proxies it is crucial to understand the impacts of these vital effects on the different isotope systems and element concentrations.

We analysed B, Li and Mg isotopes of modern *Lophelia pertusa* samples. The advantage of using cold-water corals, such as *L. pertusa*, is that they occur in upper (near coast) and deeper (proximal) environments and therefore, offer the possibility to reconstruct environmental and climatic changes on regional and global scales. To investigate the biological and environmental controls on the different isotope systems we chose *L. pertusa* samples from several locations within the Mediteranean, Atlantic and Baltic Sea in order to cover a wide range of ocean pH, temperature and salinities. Further, we conducted experiments to examine sample heterogeneities for large sample sizes (mm- to cm-scale) and to investigate the effects of different cleaning procedures (no cleaning, physical cleaning, FeMn leaching, oxidative cleaning) on the isotopic compositions and element ratios.

Variations of Mg, Li and B isotope ratios within single specimens are small when using large sample sizes and are mainly within analytical uncertainty. In contrast, we observe differences of up to 1.2‰ for $\delta^{11}B$ and large differences in the Li/Mg ratios using different cleaning steps. These data reflect the importance of a proper physical and oxidative cleaning to remove e.g. organic matter or coatings and to separate theca wall from the centres of calcification.

Modern *L. pertusa* samples show variations of about 4.5‰ for $\delta^{11}B$, about 1.5‰ for $\delta^{7}Li$ and about 0.25‰ for $\delta^{26}Mg$. These data will be discussed in context with physical and chemical parameters prevailing at the different sample sites and will give new insights on the behaviour of B, Li and Mg isotopes during incorporation into *L. pertusa*.