Boron isotope systematics in cold water corals (*Lophelia pertusa*) along the Norwegian margin: zooming into a potential pH-proxy by combining bulk and high resolution approaches

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High-latitude cold-water coral (CWC) reefs are particularly vulnerable due to enhanced CO_2 uptake in these regions. For both modern and fossil *Lophelia pertusa* samples, retrieved along the Norwegian margin from Lopphavet (70.6°N) over Sula to Oslofjord (59°N), we have analysed the boron isotope systematics ($\delta^{11}B$) as a potential seawater pH proxy [1]. This case study investigated potential heterogeneities within single specimens and recent regional to local variations. Analyses were undertaken using MC-ICP-MS based bulk (solution) analyses and continuous laser ablation (LA) profiles, as well as secondary ion mass spectrometry (SIMS) spot measurements in combination with fluorescence microscopy. The latter provided a fast pre-screening routine for phase-specific subsampling.

Bulk analyses of around 5 mg milled from the massive thecal walls from samples of the main transect sites resulted in a recent average $\delta^{11}B$ value of 26.7 ‰ (± 0.3, 2SD). In contrast, an adjacent subsample dominated by centres of calcification (COC) gave 22.65 ‰, hence an offset of about -3 ‰, with an approximately 40% lower B/Ca ratio.

LA profiles [2] showed significant $\delta^{11}B$ single sample heterogeneities of up to 10 ‰. Supporting preliminary SIMS results yielded similar ranges, and indicate multiple COC zones as the source of low $\delta^{11}B$ values. This suggests stronger isotope fractionation occurred with lower B concentrations in the COC compared to the theca during mineralisation.

[1] Raddatz et al. (2016) *Paleoceanography,* **31,** 1350–1367.
[2] Fietzke et al. (2010) JAAS, 25 (12), 1953-1957.