Exploring small-scale boron isotope variations within tropical coral skeletons by LA-MC-ICP-MS and their implications for the boron isotope pH proxy

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Boron isotope analysis ($\delta^{11}B$) of marine carbonates such as corals offers an important proxy for the pH of the seawater in which they mineralised. Large isotopic heterogeneities across the coral structure of a specimen have the potential to bias interpretations of the proxy in terms of pH, depending on the sampling strategy employed. However, such heterogeneities have rarely been investigated in detail except for a few instances with regards to deep sea corals [1,2]. This was, in part, due to the absence of time-efficient analytical techniques capable of accurate and precise isotopic determination on the sub-millimetre scale, yet recent development of laser ablation multi-collector inductively coupled plasma mass spectrometry (LA-MC-ICP-MS) methods [3] now enables such investigations to take place at a sub-100 μm scale with accuracy and precision better than ±0.5 ‰ (2σ). Here we employ LA-MC-ICP-MS to explore subannual boron isotope variations in tropical corals, investigate scales of variation relating to differences in the structural component analysed, and explore the implications these have on both the boron isotope proxy and coral calcification.

[1] Blamart et al. (2007) *Geochem. Geophys. Geosyst.* **8**, Q12001. [2] Jurikova et al. (2019) *Chem. Geol.* **513**, 143–152. [3] Standish et al. (in press) *Rapid Commun. Mass Sp*.