

Evaluating the potential of boron isotopic composition of brachiopod calcite as a proxy for Phanerozoic seawater pH and secular variation in $\delta^{11}\text{B}_{\text{seawater}}$

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Abstract – The boron isotope paleo-pH proxy has been successfully used to reconstruct ocean pH and atmospheric CO_2 concentrations for the Pleistocene (Hönisch and Hemming, 2005) and Cenozoic (Pearson and Palmer, 2000). The two major obstacles preventing application of the proxy to earlier periods of Earth's history are a probable secular variation in the boron isotopic composition ($\delta^{11}\text{B}$) of seawater and the limited stratigraphic range of foraminifera, for which the proxy has been carefully calibrated. Brachiopods, due to their ubiquitous presence in the fossil record, are an excellent candidate for extending boron isotope-based paleo-pH and CO_2 reconstructions to the entire Phanerozoic. We propose a program to test the reliability of brachiopod shells to record seawater $\delta^{11}\text{B}$ and ocean pH with measurements of modern specimens. With this program we will generate pilot data for a NSF proposal.