Calibrating the boron isotope *p*H-proxy in *Globigerinoides ruber* by MC-ICPMS

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A key issue for reconstructing climate of the past is the need for accurate constraints on atmospheric concentration of CO_2. For timescales beyond the last 800 kyrs, further than the reach of the Antarctic ice cores, we have to rely on indirect proxy based estimates of CO_2. The boron isotope-pH proxy in foraminifera is gathering increasing momentum as a means to this end. This proxy has a firm theoretical grounding but tests of this understanding, with some recent exceptions [1], are restricted to a few culture based calibration studies (e.g. [2]). In this contribution we will present new attempts to calibrate the boron isotope pH proxy for *Globigerinoides ruber* – a surface dwelling tropical/subtropical species with symbiotic algae. We have cultured *G. ruber* at a range of pH values (8.2, 7.9, 7.6) and we will compare this data to published [3] and new core top data for this species. These data enable a determination of the pH sensitivity of $\delta^{11}B$ in *G. ruber* and provide valuable insights into the causes of "vital effects" that are known to influence the boron isotope system in planktonic foraminifera [2].

[1] Rae *et al.* (2011) *EPSL*, **302**, 403-413. [2] Sanyal *et al.* (1996) *Paleoceanography*, **11**, 513-517. [3] Foster (2008) *EPSL,* **271**, 254-266.

Comparison of XRF core scan data to conventional geochemical analyses: Usage in high resolution paleoenvironmental research

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Core scanning by X-ray fluorescence (XRF) is getting an increasingly common method to rapidly obtain paleo-environmental data from untreated (marine) sediments. A sediment surface is not an ideal substrate for XRF analysis; artifacts may occur relating to water content, grain size, surface roughness, water film formation, and sediment inhomogeneity. A high resolution analysis of an Eastern Mediterranean sediment core is used to get a grip on the signal-to-noise ratio of XRF core scan measurements. A suit of major elements (and elemental ratios), often used as paleoproxies, have been examined to indicate their relative correctness compared to 'real' data generated by both glass bead XRF and ICP-AES on distinct samples. Examples are shown to illustrate the consequences for the paleoproxy-interpretation.

XRF core scan data only reflects the chemical composition of a thin (few μm to hundreds of μm) layer of the sediment surface. The inhomogeneity in this surface can cause seemingly large paleoenvironmental variability. It is shown that (random) water rich spots can form underneath the Ultralene covering foil, having a substantial effect on the lighter elements with shallow response depths. This can create non-existing peaks in the XRF core-scan-produced paleoenvironmental record. Such deviations may especially occur for elemental ratios when elements are measured in different runs (e.g. other tube-voltage settings). This study promotes to verify certain high/low amplitudinal variability by means of a (destructive) conventional geochemical analysis prior to their interpretation.