Ba/Ca ratios in benthic foraminifera: Species offsets, down-core preservation and the effect of cleaning

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Ba/Ca ratios in the tests of benthic foraminifera have been used to study palaeoceanographic changes in ocean circulation [1-4]. Their use as such requires knowledge of differences in Ba/Ca between species, the preservation of the Ba/Ca signal in sediments and the effect of the cleaning process (a prerequisite to measuring Ba/Ca). Here, we investigate these topics using new trace metal data from a 26 cm-long South Atlantic sediment core at 1 cm resolution.

Firstly, we investigate species specific variations by presenting Ba/Ca ratios from three species of benthic foraminifera from the same sediment horizons: *Melonis barleeanus*, *Oridorsalis umbonatus* and *Uvigerina* spp. Secondly, we investigate down-core changes caused by post-depositional effects and those caused by temporal changes in seawater barium concentrations, using several X/Ca ratios measured in conjunction to Ba/Ca and XRF data.

Lastly, we present results of cleaning experiments. Foraminifera may undergo several stages of cleaning before Ba/Ca is measured, including a barite-removal step using DTPA. However, the effect of DTPA on benthic foraminfera (*Uvigerina* spp. and *Cibicidoides wuellerstorfi*) has been variable in previous studies [5] [6]. Here, we extend these findings by investigating the effect of DTPA on two more species of benthic foraminifera: *Melonis barleeanus* and *Oridorsalis umbonatus*.

Our results shed light on the processes that influence Ba incorporation into benthic foraminiferal calcite, and we discuss the implications for the use of Ba/Ca as a palaeoproxy in marine sediments.

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