

Controls on Sr/Ca incorporation into benthic foraminifera tests – a down-core and intra-shell variability perspective

JOANNA KERR*, ALEKSEY SADEKOV AND HARRY ELDERFIELD

University of Cambridge, Department of Earth Science, Cambridge (*correspondence: jk537@cam.ac.uk)

The cause of glacial-interglacial changes in the Sr/Ca ratio of benthic foraminifera is widely debated. Temperature, salinity, shell size, seawater Sr/Ca concentration, and $\Delta[\text{CO}_3^{2-}]$ have all been proposed as viable mechanisms to control benthic Sr/Ca ratios. Recent coupled B/Ca and Sr/Ca ratios measured in benthic foraminifera species *Cibicidoides wuellerstorfi* present convincing evidence that Sr/Ca ratios are primarily controlled by seawater $\Delta[\text{CO}_3^{2-}]$ [1]. We use the same approach to show that the Deep South Atlantic Ocean is an exception to this rule, recoding opposite glacial-interglacial changes in Sr/Ca and B/Ca ratios.

Intra-shell variability determined using LA-ICP-MS reveals significant and consistent chamber to chamber differences in B/Ca ratios of up to 100 $\mu\text{mol/mol}$. This greatly exceeds glacial-interglacial changes recorded in all major ocean basins. Chamber differences in Sr/Ca ratios are often coupled to B/Ca ratios, however under certain conditions they become decoupled. We explore possible causes of B/Ca and Sr/Ca ratio decoupling both in individual shells and down core records and discuss implications for paleo-oceanographic interpretation of down core records.

[1] Yu *et al.* (2014) *Quaternary Science Reviews* **98**, 1-6