



Factors influencing the Mg/Ca ratio in planktonic foraminifera: new evidence from plankton tows

M.A. Martínez-Botí (1), P.G. Mortyn (1), D. Vance (2), D.B. Field (3), D.N. Schmidt (2)

(1) Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Spain, (2) Department of Earth Sciences, University of Bristol, UK, (3) Monterey Bay Aquarium Research Institute, CA, USA (miquelangel.martinez@uab.cat / Fax: +34935813331 / Phone: +34935812503)

The use of planktonic foraminiferal Mg/Ca proxy for temperature has been established in cultures, sediment traps, and core-tops but not yet in the surface ocean habitat on a depth-discrete basis, leaving uncertainty about how upper oceanic processes influence the geochemical signature of different species. While each approach presents its own advantages and drawbacks, the use of plankton tows avoids the need to make assumptions about calcification temperatures, and allows comparison of geochemical data with in-situ environmental information.

Here we present results from depth-discrete plankton tow samples from the North Atlantic and Northeast Pacific, together with core-top data. In both study areas, Mg/Ca ratios in planktonic foraminifera are higher than those predicted with previous calibration equations, and correlate weakly with either collection or calcification temperatures. Furthermore, water-column ratios are systematically higher than the corresponding surface-sediment samples. The comparison of Mg/Ca with collection data shows relationships of this ratio with other environmental parameters (e.g. salinity).

The importance of the presence/absence of gametogenic calcite will also be discussed, and how this can modify the original upper ocean signal. Overall, the results of this work will help to improve the use of the Mg/Ca proxy for upper ocean temperatures, by deciphering the factors contributing to the formation of the climatic signal that

remains in the sedimentary record.