
Calibration of Mg/Ca thermometry in planktonic foraminifera from Southern Ocean core tops: improving ocean paleotemperature estimation

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R esum e

Planktonic foraminiferal Mg/Ca ratios have become a commonly used temperature proxy in past climate reconstructions. Foraminiferal Mg/Ca ratios provide a proxy for estimating seawater temperature due to the temperature dependence of Mg uptake into calcite. Various attempts have been conducted to calibrate foraminiferal Mg/Ca ratios with temperature, including culture, core-top and sediments trap approaches. They have given very consistent results although differences in methodological techniques can produce offsets between laboratories, which need to be assessed and accounted for where possible. Recent studies also pointed out that biological processes exert a major influence on the co-precipitation of metals in biogenic carbonates, thus highlighting the need for species-specific empirical calibrations. Moreover, the comparison of tropical and high-latitude equations suggests that accurate temperature reconstructions based on foraminiferal Mg/Ca require the use of latitudinally appropriate calibration equations. Here we present species-specific calibrations of Mg/Ca vs. temperature for the planktonic foraminifera *Globigerina bulloides* and *Neoglobobulimina papyderma sinistral*, based on a series of Southern Ocean core-tops. For each

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core-top, we have quantified the influence of dissolution, and measured Mg/Ca ratios were compared with actual sea surface temperatures (SST) obtained from modern climatological data. The resulting calibrations have been applied to data from cores MD07-3076Q (44°09.20S, 14°13.69W, water depth 3770m) and MD97-2101 (43°29.74S, 79°50.30E, water depth 3145m) from the Southern Ocean and results are compared to SST estimates from published calibrations. Preliminary results indicate that our new calibrations improve the SST reconstructions.