Ocean paleotemperatures from ostracode Mg/Ca ratios

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We investigated ostracode Mg/Ca ratios as a benthic marine paleothermometer. Our research has focused on Mg/Ca ratios in the calcite shells of two common marine genera: deep-sea genus *Krithe* and shallow marine/estuarine genus *Loxoconcha.* Calibration studies, including analysis of modern and laboratory-raised specimens across a wide range of temperature and salinity conditions, confirms that *Krithe* and *Loxoconcha* Mg/Ca ratios are dominantly controlled by water temperature. We also evaluated *in vivo* effects including genus, species, gender, ontogeny, shell size, intra-shell Mg/Ca heterogeneity and possible diagenetic effects including partial dissolution and recrystallization. Phylogenetic and ontogenetic effects are indicated, including different Mg-thermodependence and intra-shell Mg distribution between *Krithe* and *Loxoconcha*. Dissolution is the dominant diagenetic effect on marine ostracode shells, but appears to have only a slight impact (decrease) on Mg/Ca ratios. Down-core applications, including results from deep and intermediate waters as well as from estuarine sites, collectively provide evidence for temperature variability at a range of timescales; from orbital to decadal. When coupled with benthic oxygen isotope records, deep-sea Mg/Ca-based temperature records allow for assessment of the timing and extent of continental ice-volume changes, whereas coupled estuarine records permit reconstruction of regional temperature and precipitation histories.