



PP23C-1677 - Assessing the Benthic Mg/Ca-Temperature Proxy: A *Uvigerina* Core-Top Study from New Zealand



Tuesday, 10 December 2019



13:40 - 18:00



Moscone South - Poster Hall

Abstract

The magnesium to calcium ratio (Mg/Ca) of benthic foraminiferal calcite serves as an important tool for reconstructing past deep water temperature. Application of this proxy relies upon accurate calibrations and an understanding of the factors that may influence the Mg/Ca ratios of foraminifer tests. Core-top calibrations are a method of assessing the temperature sensitivity of deep-dwelling benthic taxa which are difficult to raise in culture. This study contributes a new set of Mg/Ca core-top measurements for the infaunal species *Uvigerina peregrina* derived from a suite of sediment cores in the Southwest Pacific spanning water depths of 600 to 4400 m.

Results agreed with previous calibrations for samples shallower than 2000 m, but unexpectedly high Mg/Ca values were found between the depths of 2400 and 3300 m, necessitating further investigation into potential non-temperature influences. Specimens of different morphotypes were analyzed separately, but variations between hispid and costate samples failed to account for the high-Mg anomaly observed. Lack of correlation between Mg/Ca and the contaminant indicators Mn/Ca, Al/Ca, Fe/Ca, and Ti/Ca suggests contaminant phases are not the source of excess Mg.

Laser ablation ICP-MS analysis of chamber cross-sections revealed that the high-Mg signature is located within the interior of test walls, rather than contained in an external coating or contaminant phase. The high-Mg anomaly observed in mid-depth New Zealand waters is likely related to a secondary, non-temperature control on Mg incorporation. Samples with excess Mg are those most strongly influenced by carbon-rich (high dissolved inorganic carbon, high alkalinity) waters flowing south from the northern Pacific, suggesting that inorganic carbonate chemistry plays a role.

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Multiproxy approaches (B/Ca, Mg/Ca, Sr/Ca, U/Ca, Li/Mg) to reconstructing sea surface temperature in the Great Barrier Reef

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Carbon system influences on the planktic foraminiferal Mg/Ca proxy in low seawater Mg/Ca

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Multiple elements separation(Fe-Mg-K-Ca) from a single rock digest and their isotope measurements on MC-ICPMS

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Foraminiferal I/Ca ratios: Ocean O₂ change during the Common Era in Santa Barbara Basin, CA

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