**δ¹⁸O and Mg/Ca temperature in Brazil margin foraminifera species**

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Oxygen isotopes (δ¹⁸O) and Mg/Ca ratio observed in foraminiferal tests can be used to establish the ocean temperature from organism habitats.

Temperature values obtained from δ¹⁸O (T₁₈O) and Mg/Ca (TMg/Ca) in seven different planktonic and benthic foraminiferal species were compared in order to evaluate differences among these results in each species. Holocene samples were collected in two cores from slope of the Brazil margin in the Western Atlantic Ocean between 21° and 24°S (KF-D, 1503 m and KF-12, 1568 m).

Salinity (WOA 05, Locarnini et al. [1]) and δ¹⁸O seawater (South Atlantic equation, LeGrande & Schmidt [2]) were used to estimate the mean calcification depth, δ¹⁸O values were corrected from disequilibrium as described by Niebler et al. [3]. Local temperature was obtained from WOA05 (Antonov et al. [4]). We selected the paleotemperature equation that provided the best fit to each species.

In general TMg/Ca showed lower deviation from local temperature (-0.40 - 0.02) than TMg/Ca (-9.20 - 9.48).

In planktonic species (G. ruber and G. saccularis) both proxies present a good relationship with the local temperature; meanwhile in benthic species Uvigerina sp. presented the best fit.

C. corpulentus showed deviation of -9.20 °C and 0.03 °C for TMg/Ca and T₁₈O, respectively. These results suggest that T₁₈O from this species could probably be used to reconstruct temperature, but the mechanism that control Mg/Ca relationship could not be the same one observed in other Cibicidoides species of this work (C. wuellerstorfi and C. kullenbergii).

TMg/Ca in H. elegans was expected to present the best fit as it is an aragonitic species. Although, the deviation was 9.48 °C, much more than the temperature deviation observed in T₁₈O (0.11 °C). H. elegans are not commonly used in δ¹⁸O analyses, but the result show a good relationship between δ¹⁸O and temperature.


**Controls of H incorporation in pyroxenes and garnets from FTIR data on Kaapvaal craton xenoliths**

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Pyroxene (Px) and garnet (Grt) accommodate hydrogen (H) as defects bonded to structural oxygen. The present study aims at characterizing the control on incorporation of water (H contents calculated as H₂O ppm) in orthopyroxene (Opx), clinopyroxene (Cpx), and Grt using Fourier transform infrared spectrometry (FTIR). We want to test on natural peridotites from the Kaapvaal craton [1, 2] experimental results which suggest that H partitioning is controlled mainly by Al in px, and Si, Ti, and pressure (P) in Grt [3-7].

**Garnets**

Grt water contents range from 0 to 19 ppm H₂O, with 6 out of 19 samples having no detectable H. In Lihobong xenoliths, Cpx H₂O may increase with increasing Ti and decreasing oxygen fugacity. No correlations with Si content, P, or any other parameters are evident.

**Pyroxenes**

Opx water contents correlate negatively with Opx Al⁴⁺ indicating that H incorporation is charge coupled with Al⁴⁺. Cpx water contents correlate negatively with Cpx Ca contents and positively with Cpx Al⁶⁺ and Fe³⁺/ΣFe (Mössbauer data [8]), suggesting that substitutions on the M₁ and M₂ sites can control H. These correlations are most evident when examining xenolith locations individually. The intake of water by Px consequently appears to depend on the Px composition and the local mantle water conditions. In particular, Px from P > 3 GPa have a narrow range of H₂O contents (Opx: 119-251; Cpx: 149-398 ppm) compared to those from lower pressures (mainly off-craton; Opx: 5-460 ppm; Cpx: 5-957 ppm), and this corresponds to a narrow range of low px Al contents at P >3 GPa [9]. For a similar Px major element composition, water contents increase in Px from Lihobong, through Finsch Mine, Jagersfontein, to Kimberley xenoliths.