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Interactive comment on “Reconciling single chamber Mg/Ca with whole test $\delta^{18}\text{O}$ in surface to deep dwelling planktonic foraminifera from the Mozambique Channel” by J. Steinhardt et al.

J. Steinhardt et al.

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Short comment M. Weinkauf: This is a very interesting paper. Upon skimming through it I just stumbled over one little curiosity. You state yourself several times (p. 17268, lines 11–12; Eq. (4); caption of Fig. 4) that the supposed relationship between $\delta^{18}\text{O}$ temperature and Mg/Ca should be positive exponential. Why then (according to your caption and from the looks of it) are you fitting a polynomial second degree to your data (Fig. 4, right panel)? An exponential function would be much more reasonable on a mechanistically basis (as you state yourself). Unless you have a particular reason to believe that the relationship should have a local minimum at around 8°C and then rise

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again, but then some of your other statements are incorrect and this would have to be discussed. Best regards, Manuel Weinkauf

Author's response: We have corrected figure 4 to an exponential fit ($f = a \cdot \exp(b \cdot x)$, $a = 0.7 \pm 0.1$, $b = 0.06 \pm 0.005$; $r^2 = 0.47$), although this slope is very similar to the previous polynomial slope that was fitted previously. The correlation coefficient also indicates that close to 60 percent of the observed variability is not due to temperature alone. Part of the variability is related to comparing single chamber and whole shell data. These observations have now been added to the manuscript in the Figure caption of Fig. 4: "Figure 4: Scatter plot of Mg/Ca versus $\delta^{18}\text{O}_{\text{cc}}$ (left panel). Right panel: single chamber Mg/Ca exponential relationship with $\delta^{18}\text{O}$ -derived Temperatures calculated using Kim & O'Neil (1997). Regression: $f = a \cdot \exp(b \cdot x)$, with $a = -0.7$, $b = 0.06$, $r^2 = 0.47$ using F-1/2 Mg/Ca from *G. ruber*, F-0 for *N. dutertrei*, *P. obliquiloculata* and *G. scitula* (black circles). F-1 for *N. dutertrei*, *P. obliquiloculata* and *G. scitula* (red circles) and F-2 for *N. dutertrei*, *P. obliquiloculata* and *G. scitula* (blue circles). Mg/Ca data from Steinhardt et al. (2014). Note that the correlation coefficient also indicates that approximately 60% of the observed variability is not due to temperature alone."

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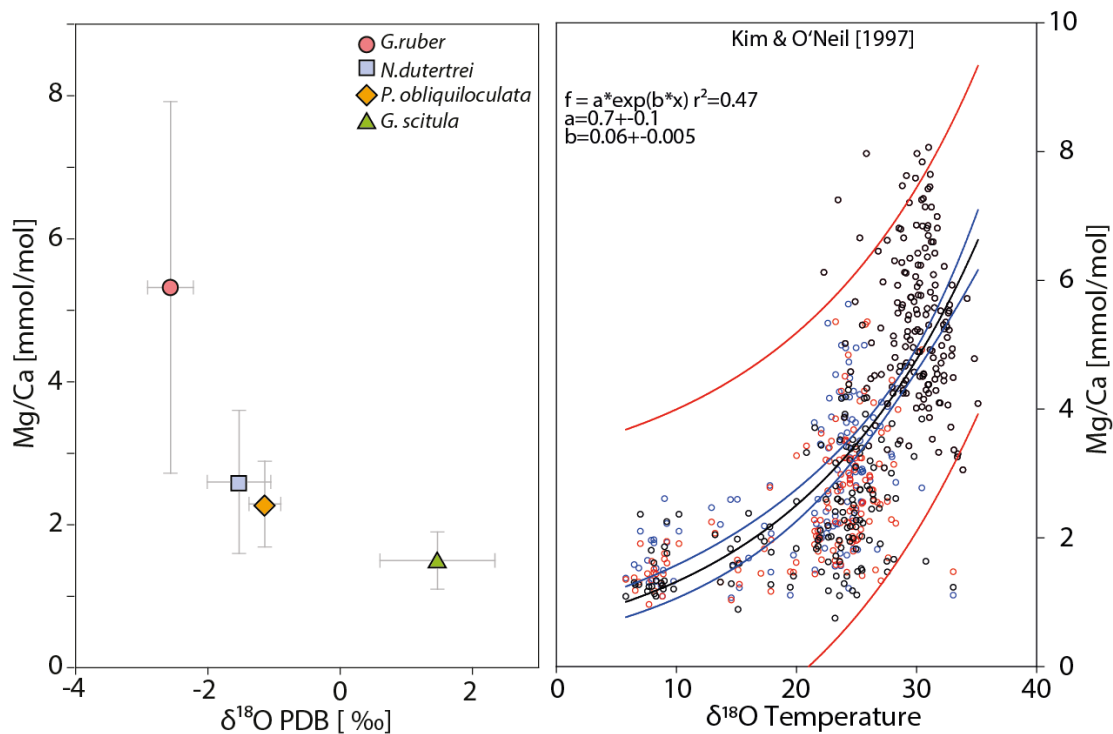
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Fig. 1. Figure 4

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