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Supplement of

Revisiting carbonate chemistry controls on planktic foraminifera Mg / Ca: implications for sea surface temperature and hydrology shifts over the Paleocene–Eocene Thermal Maximum and Eocene–Oligocene transition

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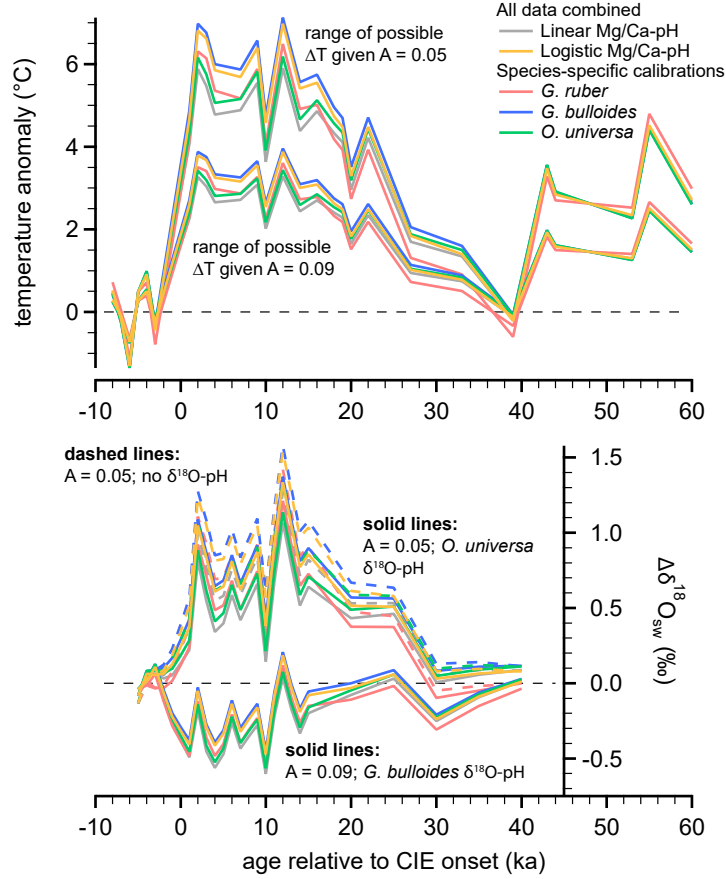*Correspondence to:* D. Evans (d.evans@yale.edu)

Figure SM1: The legend refers to the way in which the relationship between Mg/Ca and pH is defined. Both linear and logistic calibrations using data for all species, as well as species-specific calibrations are shown.

Figure SM1 displays the range of possible temperature and $\delta^{18}O_{sw}$ shifts over the PETM at ODP Site 1209, accounting for uncertainty in (1) the sensitivity of the Mg/Ca-temperature relationship (i.e. the exponential coefficient A) during the Palaeogene, (2) the relationship between $\delta^{18}O$ and pH, and (3) whether a species-specific calibration between Mg/Ca and pH should be used. This latter uncertainty was not shown in main text figure 6 for clarity. However, it is a small source of error in relative temperature and hydrology shifts over transient climatic events compared to the first two uncertainties listed above. For this reason, we recommend using the multi-species logistic relationship between Mg/Ca and temperature, as this is better constrained than the species specific calibrations which may be biased by experimental design and uncertainty.

The species-specific Mg/Ca-pH regressions are:

G. ruber ($R^2 = 0.84$):

$$Mg/Ca = \frac{0.80}{1 + \exp(10.0 \times (pH - 7.9))} + 0.72$$

G. bulloides ($R^2 = 0.99$):

$$Mg/Ca = \frac{0.80}{1 + \exp(4.4 \times (pH - 8.1))} + 0.57$$

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O. universa ($R^2 = 0.81$):

$$\text{Mg/Ca} = \frac{6.0}{1 + \exp(0.78 \times (\text{pH} - 5.4))} + 0.36$$