Supplementary Figures

Distinct seasonal changes and precession forcing of surface and subsurface temperatures in the mid-latitudinal North Atlantic during the onset of the Late Pliocene

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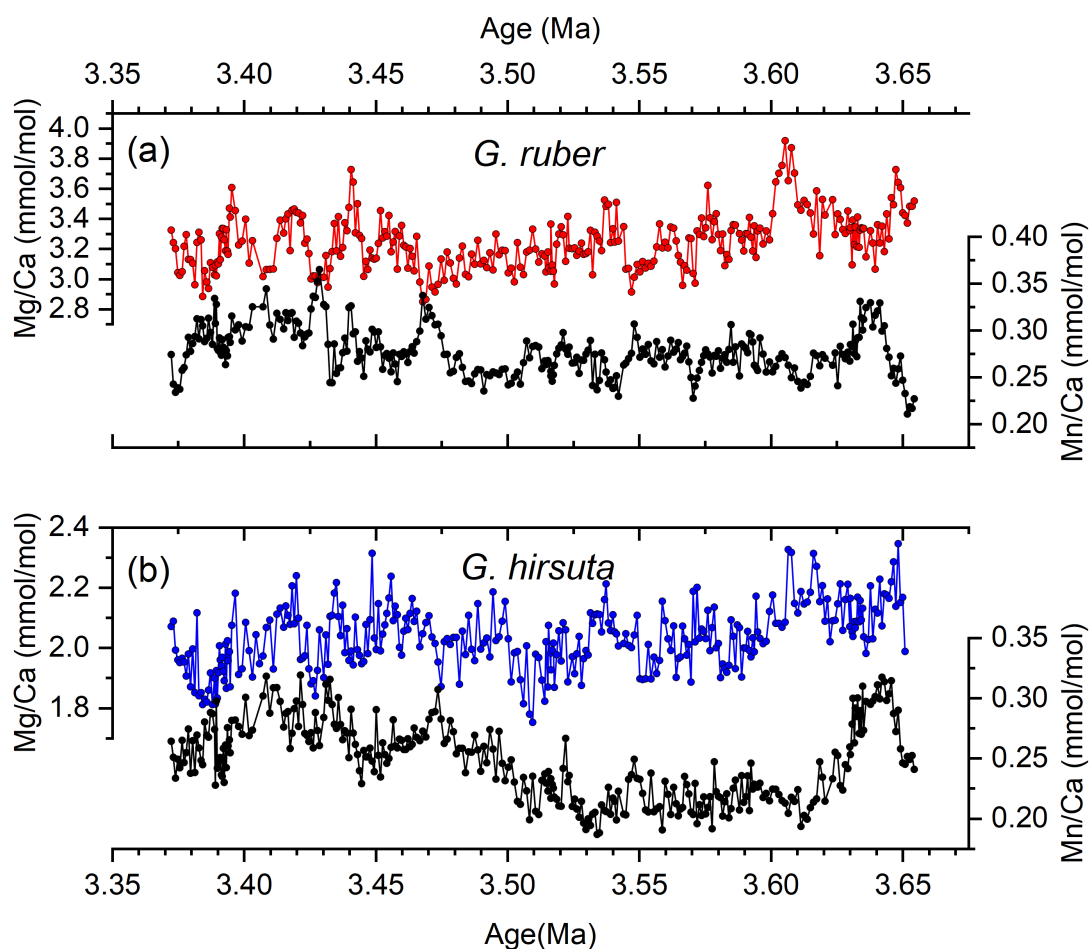
Figure S1. Site U1313 downcore Mg/Ca in comparison with Mn/Ca of species *G. ruber* white (a) and *G. hirsuta* (b). No corresponding anomalies were found.
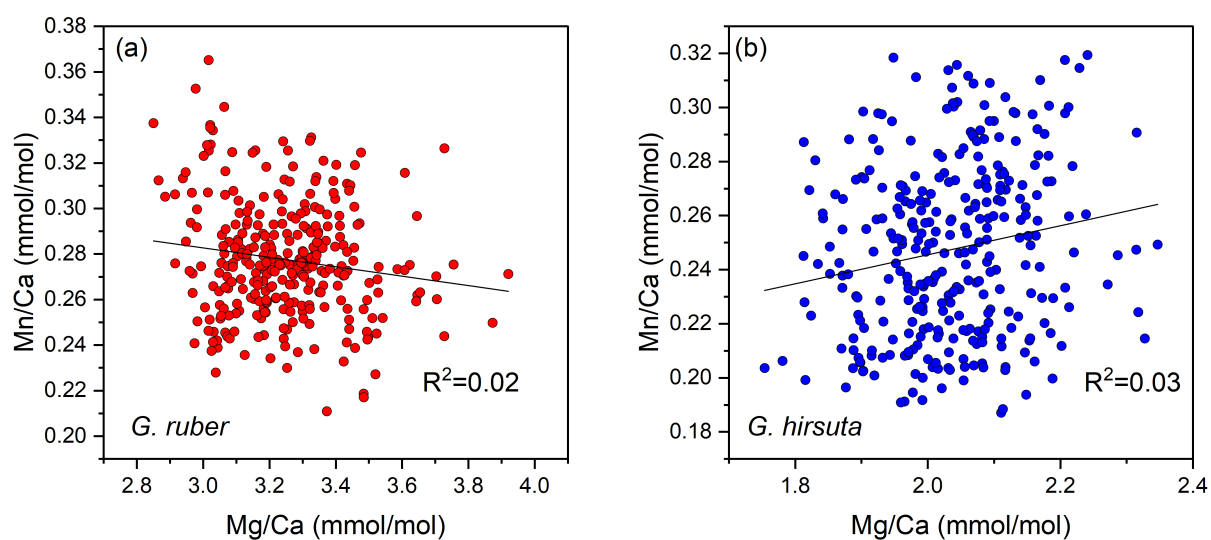
Figure S2. Scatter plots of Mg/Ca versus Mn/Ca for species *G. ruber* white (a) and *G. hirsuta* (b). Black line indicates the best linear fit, respectively. No significant relationship between Mg/Ca and Mn/Ca is observed for either species.
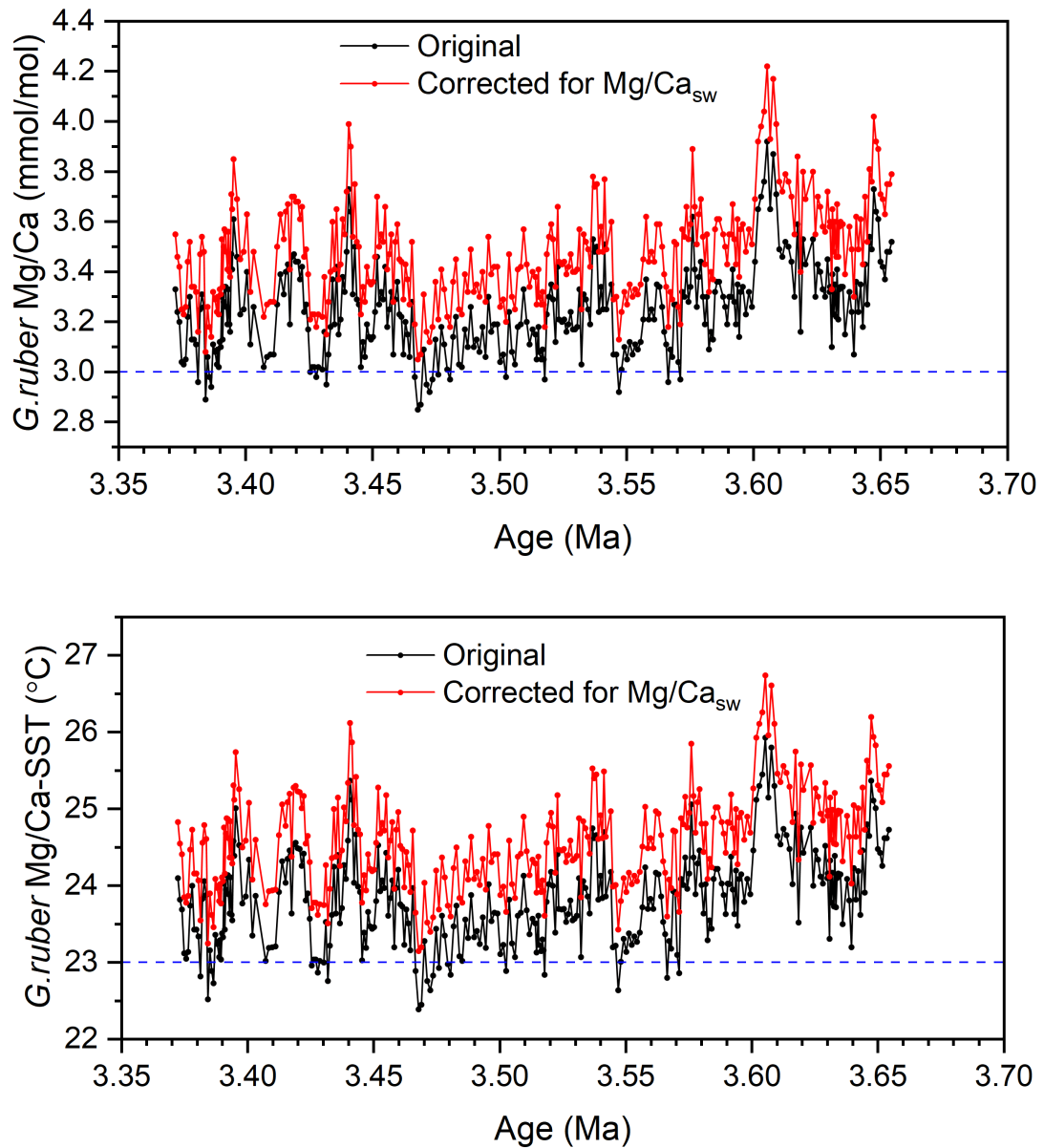
Figure S3. The upper panel displays the comparison between original *G. ruber* Mg/Ca ratios (black) and the Mg/Ca ratios (red) corrected for the secular changes in the seawater of Mg/Ca (Mg/Ca$_{sw}$), dashed line indicate the core top *G. ruber* Mg/Ca ratios from nearby core SU90-03. The lower panel shows the corresponding Mg/Ca-based SST records derived from the both original and corrected Mg/Ca ratios. The dashed line represents the modern summer SST of 23 °C at Site U1313.