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Ecological evolution of *Globigerinoides* and *Trilobatus genera* over the Late Neogene traced by geochemical proxies

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Reconstructing atmospheric carbon dioxide (CO_2) and climate sensitivity before ~800 ka relies on indirect proxies such as the boron isotopes of marine carbonates, which are intrinsically linked to seawater pH and thus CO_2. Due to their shallow calcification depth, the planktonic foraminifera *Globigerinoides* and *Trilobatus* are widely used to infer past (δ^{11}B-based) CO_2 levels. However, like all proxies, boron isotopes *are affected by physiological effects* ("***vital-effects***"), *that can vary through time due to evolutionary history biases*. An example of this is the documented ~100 ppm mismatch in Pliocene CO_2 derived from *G. ruber* (*ruber* and *albus*) and *T. sacculifer*, which is not evident in the Quaternary. Here we use their isotopes and elemental composition to **dissect** the palaeoecological history of surface-dwelling morphospecies from ODP Site 999 (Caribbean Sea). We focus on *Globigerinoides* (at 300–355 µm size fraction) and *Trilobatus* (at 425–500 µm) as the size ranges commonly analysed. To capture temporal trends, we analyse four time windows, spaced 1 Myr apart, with each spanning ~80 kyr. Our preliminary results (194 analyses) suggest different isotopic trends over the Late Neogene. For δ^{13}C, the difference between *G. elongatus* and *G. ruber* is smaller than the standard deviation (1SD) at 2 and 3 Ma samples, but exceeds the 1SD (~0.25‰) in the Late Pleistocene samples. For δ^{18}O, the difference in means remains smaller than the 1SD across all the samples. When grouped by *genus*, the δ^{13}C offset between *Globigerinoides* and *Trilobatus* decreases from 3 to 1 Ma but remains larger than the 1SD. In contrast, the difference in the δ^{18}O becomes larger as does the 1SD, suggesting more variability. Thus, as the δ^{18}O offset remains stable, our data does not support major shifts in calcification depth. However, changes in the δ^{13}C may reflect variations in photosymbiotic activity through time. If confirmed, enhanced photo-symbiosis in the Pliocene relative to the Late Pleistocene could explain previous lower CO_2 records (based on *Trilobatus*), as the foraminifera micro-environment pH is increased.