

Modern stable isotope composition and apparent calcification depth of planktonic foraminifera in the Western Pacific Warm Pool

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Geochemical data from planktonic foraminifera collected with plankton tows can be used as a tool for characterizing the vertical structure of the upper ocean water masses and provide a tool for paleo-reconstructions. For realistic reconstructions the modern ecology of the different species should be known. However, the knowledge about the habitat and vital effects of these organisms from the central equatorial Pacific is limited. Here we present plankton tow data from the central equatorial Pacific (-3.051°S, -165.056°W).

Oxygen and carbon isotope measurements ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) on different test size classes of *Globigerinoides ruber*, *Globigerinoides sacculifer*, *Neogloboquadrina dutertrei*, *Pulleniatina obliquiloculata*, *Globorotalia menardii*, *Globorotalia tumida* and *Globorotaloides hexagonus* were used to assess their distribution and apparent calcification depth.

Our data indicate that the highest abundance of foraminifera >150 μm occurs within the thermocline. The standing stock of living foraminifera (>150 μm) decreases from 135/m³ in the surface layer to about 9/m³ in 500m water depth.

The isotope measurements on both foraminifera and water samples provide the opportunity to assess the apparent calcification depths for different foraminiferal species and compare those with their collection depths. The $\delta^{18}\text{O}$ values increase with increasing calcification depth. Accordingly, the mixed-layer dwellers *G. ruber* and *G. sacculifer* show distinctly lower values than those from the deeper dwellers, e.g. *G. hexagonus*. The offset from the equilibrium calcite profile is most pronounced in the surface dwellers such as *G. ruber* and *G. sacculifer* with values of up to -0.8 ‰. We found no apparent size-controlled $\delta^{18}\text{O}$ deviation from equilibrium calcite. In contrast, we observed a significant size-controlled $\delta^{13}\text{C}$ deviation between the foraminiferal test and the $\delta^{13}\text{C}_{\text{DIC}}$ profile. The test $\delta^{13}\text{C}$ values are marked by a trend towards heavier values with increasing test size.

To further constrain the calcification depths (habitat) of different foraminiferal species, we plan to measure foraminiferal Mg/Ca ratios to compare the Mg/Ca-derived water temperature with the *in situ* temperature profile. The assignment of modern habitat depths and identification of vital effects will be used for downcore reconstructions to analyse climate-driven changes in upper ocean stratification during the last 200,000 years.