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Morphological evolution of menardiform globorotalids at ODP Hole 806C (Ontong-Java Plateau)

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The morphological evolution was investigated in the tropical Neogene planktonic foraminiferal lineage *Globorotalia menardii*, *G. limbata* and *G. multicamerata* during the past 8 million years at ODP Hole 806C (Ontong-Java Plateau). This research is an extension of previous studies from the Caribbean Sea, the tropical Atlantic and the Eastern Equatorial Pacific.

The peripheral influence of Agulhas Current faunal leakage of Indian Ocean or even Pacific menardiforms into the South Atlantic is suspected to be responsible for a transgressive, transatlantic expansion of large menardiforms from 2.3-2.06 Ma to 2.58-1.7 Ma, which installed after a Northern Hemisphere Glaciation (NHG) size incursion of menardiforms around 2.6 Ma (Knappertsbusch, 2007 and 2016; Knappertsbusch & Friesenhagen 2018). The investigation from Western Pacific Warm Pool (WPWP) ODP Hole 806C, i.e. from an area outside reach of Agulhas Current, serves as a blind test for this szenario. Here, stable warm environments prevailed back to Pliocene times, and influences of NHG are expected to bear less severely on shell size evolution than in the Atlantic Ocean.

For this study >5250 specimens comprising *G. menardii*, *G. limbata* and *G. multicamerata* from 33 stratigraphic levels were morphometrically investigated using imaging- and microfossil orientation robot *AMOR*. Attention was given to trends of spiral height (δX) versus axial length (δY) in keel view, for which bivariate contour- and volume density diagrams were constructed for visualization of evolutionary patterns.

In WPWP Hole 806C *G. menardii* evolved in a more gradual manner than in the Atlantic. Plots of δX versus δY reveal bimodality between 3.18 Ma – 2.55 Ma with a dominant mode of smaller *G. menardii* ($\delta X < \sim 300 \mu\text{m}$) persisting until the Late Quaternary, and a weak mode of larger *G. menardii* ($\delta X > \sim 300 \mu\text{m}$) until 2.63 Ma. Up-section, bimodality vanished but *G. menardii* populations shifted towards extra large shells between 2.19-1.95 Ma supporting the possibility of long-distance diversal in this group. Morphological evolution of *G. limbata* and its evolutionary successor *G. multicamerata* in the WPWP are also different from those in the tropical Atlantic, but analyses need still further investigation.

In summary, Pacific menardiform globorotalid patterns contrast those in the Atlantic realm. There is inter-oceanic morphological asymmetry with considerable regional environmental control over shell evolution and indication of long-distance dispersal of *G. menardii*, both with implications for

biostratigraphic applications.

References

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