

“The trophic and metabolic pathways of foraminifera in the Arabian Sea: evidence from cellular stable isotopes”

The authors investigated benthic foraminifera from the Arabian Sea and their isotopic composition in different habitats. The goal of the study is to better understand feeding strategies of foraminifera and if they differ between environments in the Arabian Sea. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of single species of foraminifera were measured and compared to the isotopic signatures of potential food sources (POM, SOM, jellyfish, bacteria). Foraminiferal signatures were compared between two margins in the Arabian Sea (Pakistan and Oman), along depth transects covering the OMZ, and between foraminiferal groups. Results show that foraminifera utilize several food sources and species demonstrate different feeding types (e.g. for fresh or degraded OM, unselective feeding, bacteria). On the Pakistan margin foraminifera seem to select for fresh phytodetritus at depths where it is abundant and are able to store nitrate for metabolic processes. Feeding on bacteria by foraminifera is suggested to be present on both margins though particular on the Oman margin. At the time of sampling dead jellyfish were present on the Oman margin. Based on $\delta^{15}\text{N}$ values, associated bacteria can provide an additional food source for foraminifera.

General comments

The manuscript is very interesting, well-written and informative. The authors give detailed information on the work done and the discussion part is well structured based on results. Authors provide a large dataset on the stable isotopic composition of single species of Arabian Sea foraminifera (in relation to depth, location) that can be used for further studies on trophic structures in the deep sea. The use of stable isotopes to identify the trophic position of foraminifera in the deep-sea sediments is well shown. The statistical analyses to decipher trends in the diet of foraminifera from different habitats are extensive. Therefore, the publication is suitable to be published in Biogeosciences. I have only a few small comments to make.

Specific comments.

- 1) Data for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ POM is available for the Pakistan margin, not for Oman margin. Authors state in the discussion part that foraminifera seem to select for fresh phytodetritus on the Pakistan margin (p. 18162, line 17-23) based on POM data while Oman margin foraminifera reflect SOM signatures (p. 18162, 23). Could it be possible that foraminifera from the Oman margin also feed on fresh phytodetritus but it has not been detected as POM data is missing? In line 4 of the same page the $\delta^{13}\text{C}$ of Oman margin foraminifera is said to be typical for phytoplankton.
- 2) Can you please provide short information on how the Hydrogen Index is calculated (p. 18151, line 3)? Its use is later given on page 18154 (line 6). This could be moved also to the M&M part.
- 3) The results part is very informative and detailed. Yet the reading is a bit exhausting. Especially the naming of the used statistical tests and the p and F values distract from the results. I would recommend to provide the information and outcome of statistical tests in form of (supplementary) tables.

Technical corrections (errors are underlined)

p. 18150, line 24: „... in (Breuer et al. 2009).“

p. 18157, line 13: “... did not differ significantly across ...”

p. 18162, line 20: “... below the OMZ at the Pakistan margin Foraminifera below the OMZ ...” (In both sentences the same phrase is used. Maybe try to omit one.)

p.18164, line 4: “at the Oman margin could lead its more efficient benthic ...”

p. 18165, line 19: “... fatty acid biomarkers₂. Larkin (2006)”

Fig. 1: If possible, please mark the two smaller maps with “(a)” and “(b)” or draw arrows from the larger map to the two others.

Fig 3 caption (line 1): “... foraminifera (> 300 mm) from ...”

Fig 5 caption (line 1): “... foraminifera (> 300 mm) from ...”

Fig 5 caption (line 4): “... . The isotopic compoistion ...”

Table S2 caption: Please explain the abbreviations of the different zones (UTZ, LB, SHB). Explanations are not given in the manuscript text.

Table S2 caption: “The Tubothalamea marked i and ii and have agglutinated ...”