



## **Benthic foraminifera: key members of benthic communities within the Arabian Sea OMZ**

Andrew Gooday (1), Kate Larkin (1), and Ana Aranda da Silva (2)

(1) National Oceanography Centre, George Deacon Division, Southampton, United Kingdom (ang@noc.soton.ac.uk), (2) Centro de Estudos do Ambiente e do Mar, Universidade de Aveiro, 3810-193 Aveiro, Portugal

Foraminifera are one of the few eukaryotic taxa able to tolerate severe oxygen depletion and are a consistently important component of benthic communities in hypoxic settings. Dense populations are often found in oxygen minimum zones, stratified basins and fjords, where strong sea-floor oxygen gradients are combined with a rich food supply. The mechanisms that allow foraminifera to flourish in these extreme conditions are not well understood, but include ultrastructural and physiological adaptations, as well as the presence of prokaryotic symbionts. Foraminiferal assemblages in hypoxic settings are dominated by a few species that play a key role in ecosystem functioning, including the processing of labile organic carbon. Many of the species that are tolerant of severe hypoxia are multichambered calcareous forms, but there is increasing evidence for the presence of agglutinated and organic-walled species in OMZs and other oxygen-depleted habitats. This contribution will provide a brief overview of foraminifera from cross-margin transects in the Arabian Sea off Oman, Pakistan and India. Foraminiferal assemblages from the core regions of these OMZs (400 m off Oman, 300 m off Pakistan, 500 m off India) exhibited some common features as well as differences. They were dominated by calcareous taxa, notably *Uvigerina* ex. gr. *semiornata* and *Bolivina* aff. *B. dilatata* in the  $>300\text{-}\mu\text{m}$  and finer fractions, respectively. Other calcareous species were present below the OMZ core, e.g. *Globobulimina* spp. and *Chilostomella* spp. On all three margins, agglutinated foraminifera were fairly common where oxygen levels were lowest. Species of *Reophax* were present in all areas and *Bathysiphon* spp was common off Oman and Pakistan. Monothalamous (single-chambered) taxa were also common at 400 m on the Oman margin possibly reflecting the somewhat higher oxygen levels on the western side of the Arabian Sea. Experimental studies and biomarker analyses on the Pakistan margin have revealed something of the functional role of these protists. Trophic responses appear to be species-specific with the calcareous species *Uvigerina* ex. gr. *semiornata* playing a very active role in the processing of labile organic carbon derived from photosynthetic production. In contrast, agglutinated species (including *Reophax* spp.) appear to be either unselective or to ingest bacteria rather than algal remains.