Survival of benthic foraminifera (*Globobulimina turgida*) through intracellular nitrate respiration: A laboratory experiment

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Until very recently nitrate respiration has been considered a rare phenomenon in the eukaryotic empire. However, However the discovery of widespread occurrence of nitrate accumulation and denitrification among foraminifera [1] has challenged our understanding of the benthic N-cycling processes and the micro-organisms that mediate them. Foraminiferal denitrification is sustained through an intracellular nitrate pool. Thus, foraminifera actively collect and store nitrate in their cell, enabling them to maintain respiratory activities even when the desired electron acceptors (O_2 or NO_3^-) are absent from the environment. This experimental laboratory study was designed to monitor the survival strategies of *G. turgida* under different oxygen/nitrate conditions. The survival rates were recorded together with the cellular adenosine triphosphate levels. Results to date show that *G. turgida* is able to survive in an oxygen-free environment over 3 months if nitrate is readily available. Under oxygen and nitrate-free conditions, however, survival rates are reduced, but foraminifera can survive up to 2 months if utilising their internal nitrate pool only.

[1] Piña-Ochoa, Høgslund, Geslin, Cedhagen, Revsbech, Nielsen, Schweizer, Jorissen, Rysgaard & Risgaard-Petersen (2010) *PNAS* **107**, 1148–1153.

Fe(II) distribution in the Arabian Sea oxygen minimum zone and Western tropical Indian Ocean from GEOTRACES KH-09-5

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Fe is strongly enriched in the Arabian Sea Oxygen minimum zone during the SW monsoon because a substantial fraction is present as Fe (II) [1]. Dissolved Fe (II) was determined by chemiluminescense [2] in the Indian Ocean (18°N-20°S, 69°E) during the 2009 intermonsoon/NE monsoon on the first Japanese GEOTRACES cruise, to study the seasonal change of Fe (II) in the OMZ and its southernmost extent. Within the OMZ (Stn. ER5, ER6), Fe (II) maxima coincided with oxygen minima, but were 50% lower than during the SW monsoon [1]. However, Fe (II) extended over a broader depth range, suggesting net scavenging and vertical transport followed injection of remineralized Fe during the SW monsoon. Subsurface Fe (II) maxima were not detected in stations south of the OMZ. The implications for N cycling in the Arabian Sea will be discussed.

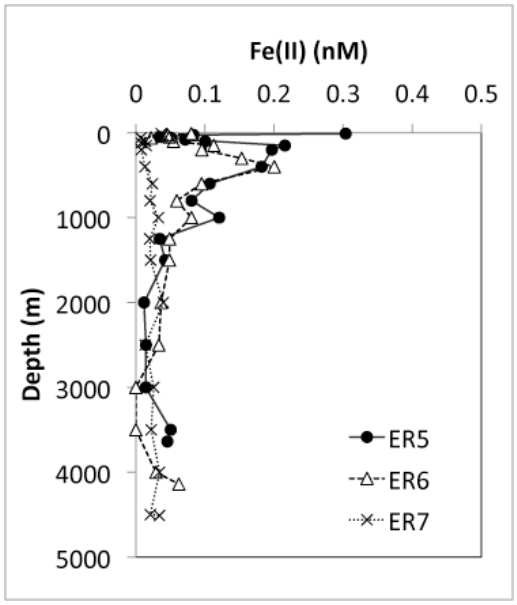

Figure 1: Fe(II) at Stn. ER5 (18ºN), ER6 (15ºN) and ER7 (10ºN).

[1] Moffett *et al.* (2007) *Deep-Sea Res.* I, **54**, 1341–1349.
[2] King *et al.* (1995) *Environ. Sci. Technol.* **29**, 818–823.