

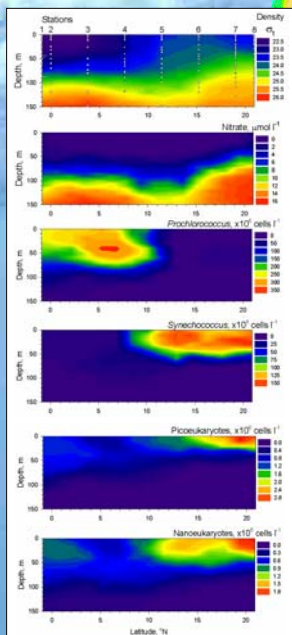
AMBITION

Analysing the microbial biodiversity of the Indian Ocean

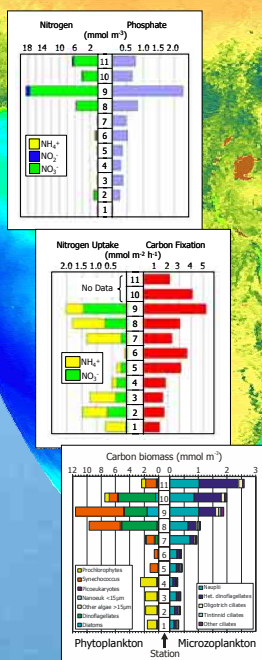
Introduction

The UK AMBITION research cruise was directed at the main players and processes in the surface mixed layer, the sub-surface chlorophyll maximum, and deeper oxygen-depleted waters. Sampling and experiments were carried out at 11 stations along a 5,500 km transect, mostly along 67°E, from Victoria, Seychelles to Muscat, Oman during inter-monsoon conditions (30 Aug - 29 Sept 2001). AMBITION involved researchers from five institutions, supported by the NERC Marine & Freshwater Microbial Biodiversity programme (M&FMB; see www.nsf.ac.uk/m&fmb for details of component projects).

Vertical profiles

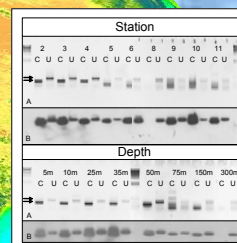


Mixed layer (0-50m) characteristics



Nitrogen fixation

A high diversity of nitrogen fixing autotrophic and heterotrophic bacteria was found throughout the AMBITION transect whereas *Trichodesmium* was confined to more southerly stations. A closely related clade of *nifH* phylotypes related to the γ -proteobacteria *Azotobacter* and *Azomonas* was present and active at every station including those that were not markedly N-depleted.

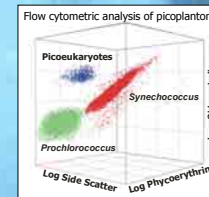


Upper panel: Molecular analyses showing that nitrogen fixers including the uncultured clade of γ -proteobacteria were present in surface waters at all stations (PCR products amplified using universal or clade-specific *nifH* primers shown in A and hybridized with a clade specific probe in B).
Lower panel: Depth profile of *nifH* gene expression at station 11 (RT-PCR using the same primer pairs and clade-specific probe as above) showing that members of the clade are active to a depth of at least 150m, not just in the N-depleted surface layers (top 50m). Key: C - clade-specific primers; U - universal primers.

Dinoflagellates (*Alexandria*) and a tintinnid (*Salpingella*) from the Arabian Sea.



Quantitative analysis of picoplankton was carried out in the laboratory.



Other outputs

- 1) *Prochlorococcus* distribution on the AMBITION transect is related to organic nitrogen uptake (Zubkov *et al* AEM 69: 1299-1304).
- 2) SeaWiFS estimates of chlorophyll concentration and abundance of picocellular algae and heterotrophic bacteria are strongly correlated off Malagasy (Zubkov & Quartly submitted).
- 3) Additional studies on pigments, picocellular taxonomy, and microbial culturing were also carried out as part of the AMBITION cruise programme.

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RRS Charles Darwin: our platform for AMBITION