

## COCCOLITHOPHORES DURING THE AUSTRAL SUMMER OF 2004 ALONG THE 45° E TRANSECT IN THE INDIAN SECTOR OF THE SOUTHERN OCEAN

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Coccolithophores were investigated from the water samples (0-200 m) to understand latitudinal variation and their implication on hydrography during austral summer (January - March 2004) along the 45° E meridian between south of Madagascar and Antarctica from the Indian sector of the Southern Ocean. Three floral assemblages viz: Sub Tropical, Sub Antarctic and Polar assemblages were identified based on twenty six species encountered. These assemblages showed a good correlation with the variation in temperature at all the three waterfronts: Subtropical Front (STF), Sub Antarctic Front (SAF) and Polar Front (PF). The overall diversity and abundance of coccolithophores progressively decreased pole wards as also vertically from surface to deeper depths. The species diversity sharply declined from twenty-six to monospecific (*Emiliana huxleyi*). Among the coccolithophores, *E. huxleyi*, *Umbellosphaera irregularis* and *U. tenuis* were the major taxa encountered.

*E. huxleyi* with three morphotypes of A, C and D were observed. The heavily calcified morphotype A was found to be predominant across the STF. While, the morphotypes C and D with lesser calcification were largely restricted to SAF and PF respectively. Except for *E. huxleyi* and occasional appearance of *Calcidiscus leptoporus* which were present throughout the study area, the remaining major and minor species were restricted to STF only. The low concentration of *Gephyrocapsa oceanica* across the study area might be attributed to depletion of nutrients and also possibly due to lowered temperatures. It was inferred that the coccolithophores displayed close relationship with the temperature and nutrient concentrations. Furthermore, it was also observed that the production of coccolithophores ceased below 2°C isotherm owing to their preference for optimum temperatures greater than 8°C. The concentration of nutrients progressively increased from STF to further deep south towards PF. Silicate concentrations were showing inverse relationship with the abundance of coccolithophore population. On the other hand, this population increased with the enhanced nitrate concentration. Supply of nitrates to the upper photic zone of cold STF waters might have been a major controlling factor. *U. irregularis* and *U. tenuis* showed their clear affinity to nutrient depleted waters (oligotrophic), whereas, *Florisphaera profunda* showed its preference to the waters with elevated phosphate concentrations.

As the temperatures decreased between 5.5°C and 2.6°C in the photic zone pole wards, the cell density remained largely restricted to the surface and with some extent to 50 m depth showing signs of corrosion affected by cold Antarctic waters. This is also substantiated by the abundance occurrence of *E. huxleyi* morphotype D. The oceanic frontal regimes played a prominent role in the abundance and diversity associated with major changes occurred across the STF and SAF. The variation in monospecific cell density of *E. huxleyi* decreased at or below 8°C to 2°C isotherm beyond which production of coccolithophores ceased. Interestingly, the total absence of *Coccolithus pelagicus* a dominantly cold water species was observed in the water column of the study area. However, it has been reported elsewhere in the sediment from the southern hemisphere which was hitherto believed to be restricted only to the northern hemisphere.