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SEASONAL DYNAMICS OF SOUTHERN OCEAN PROTISTAN POPULATIONS ALONG 140ºE TRANSECT, TASMANIA – DUMONT D'URVILLE, 2002 - 2005

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Studies of carbon flux and ecosystem processes require models of the population dynamics of phytoplankton and other microbial organisms, but with over 500 protistan species known to inhabit these waters, it is not feasible to model them individually.

Instead, we are attempting to distinguish the different types of communities that exist, and determine where and when these communities develop in response to oceanographic and seasonal forcing.

Microbial communities have been regularly monitored in surface populations along the 140ºE transect, with 6 – 8 crossings per year between Hobart and the Antarctic coast (October-March each season, 2002-2005), in a collaborative program on the French vessel l'Astrolabe.

Phytoplankton populations have been characterised by HPLC-CHEMTAX analysis of chlorophylls and carotenoids, coupled with underway fluorometry and fast repetition rate fluorometric estimates of photosynthetic rates, microscopy of preserved phytoplankton and protozoa as well as simultaneous measurements of physical oceanography, nutrients and CO_2.

Chlorophyll concentrations varied by over two orders of magnitude (0.01 – 2.38 µg L^{-1}), and CHEMTAX analysis showed geographic variation in the composition of populations. The timing of blooms was quite variable, being observed in the Subantarctic Zone near Tasmania from Oct - mid Jan, in the Permanently Open Ocean Zone from late Dec - mid Feb, and along the retreating ice edge from early Dec - mid Jan.

Seasonal patterns of phytoplankton biomass were closely coupled with patterns of CO_2 drawdown. Changes in microbial communities revealed will be discussed in relationship to seasonal changes in oceanography and environment.