

OCEAN BIOGEOGRAPHY AND TAXONOMIC RESOLUTION: WHAT IS IN THE NAME?

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Monitoring of zooplankton communities in the northern hemisphere has provided valuable insights into plankton / climate interactions, and changes to plankton communities have been shown to impact significantly on higher trophic levels. The success of monitoring programs in other regions inspired the establishment of the Southern Ocean Continuous Plankton Recorder (CPR) Survey in 1991. Use of the CPR on primarily Australian and Japanese ships continues to collect an extensive mesozooplankton data set in the Southern Ocean south of Australia, up to and including the sea ice zone. These data have provided information on the biodiversity of the region, the physical determinants of plankton distribution patterns, and insights into their seasonal cycles. In the long-term the CPR data are expected to provide valuable data on the biological impacts of climate change in the Southern Ocean.

The Southern Ocean is divided zonally into distinct physical regions by oceanographic frontal systems. These physical zones are characterised by distinct zooplankton communities, differing from each other both in terms of species composition and the relative abundance of common species. In effect the gradation between zones provides a spatial proxy for temporal climate change. Here we investigate the value of biodiversity to identifying physical zones in the Southern Ocean, hence providing insight into the taxonomic parameters required to identify community changes in response to changes in the physical environment. Between 25 February and 3 March 2002 a 1171nm CPR transect was completed between 66.36°S and 47.02°S. The zooplankton identified from this transect were divided into 5 taxonomic levels (species, genus, family, order, class). Each taxonomic data set was then subjected to multivariate analysis, and their effectiveness at identifying physical zones quantified. We demonstrated that physical zones were identified at all taxonomic levels, indicating that species level data are not necessary for monitoring studies and that changing physical conditions are likely to have high order taxonomic impacts.