

# The variability of zooplankton community structure in the Southern Ocean based on Continuous Plankton Recorder data

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The SO-CPR Survey commenced in January 1991 with the purpose of mapping the seasonal, inter-annual and spatial variation in plankton diversity and to use plankton as sensitive indicators of environmental change to monitor the health of the Southern Ocean. The Survey will celebrate its 20 year anniversary in January 2011. It has extended from a few tows south of Australia to being nearly circum-Antarctic, involving 14 nations. The highest concentration of tows have occurred south and west of Australia, between 60 and 160°E through the combined efforts of Australia and Japan. A change in species composition in the sea-ice zone (SIZ) was identified around year 2000 with an apparent shift from euphausiids to smaller mesozooplankton. Euphausiids *Euphausia superba* and *Thysanoessa macrura* were more abundant in the 1990's but were collectively less abundant after the 1999/2000 summer with the exception of 2000/01. Mesozooplankton comprising the cyclopoid *Oithona similis*, small calanoid copepods, foraminiferans and larvaceans were more abundant in season 1999/2000 and from 2001/02 onwards. The mesozooplankton species were also common throughout the permanent open ocean zone (POOZ) north of the SIZ. The euphausiid group appears to be associated with cooler water, low chlorophyll maxima (this could be a function of grazing) and were more abundant soon after ice melt rather than later. On the other hand, the mesozooplankton were associated more with warmer water temperatures, higher chlorophyll *a* maxima and were more dominant in samples later after sea-ice melt. The cause of the shift has not yet been identified. However, the results of Iida *et al.* (this symposium) has shown a stepwise increase in surface chlorophyll *a* concentrations in the 1999/2000 summer at 60°S, which may have caused a subsequent change in euphausiid/zooplankton distribution or abundances patterns. On top of this, a substantial increase in foraminiferans numbers was observed in the 2004/05 season, with abundances approximately 10 times normal levels. In the SIZ foraminiferans exceeded 80% of total zooplankton abundance, and the POOZ the foraminiferan numbers were approximately 40%. The large increase in foraminiferan numbers corresponded with substantial decreases in mesozooplankton abundances. The cause of this bloom is not clear, nor if there was a flow on effect to higher trophic levels.