

Plankton Diversity, food web dynamics and biogeochemical cycle in the Southern Ocean

Key Topics:

- phytoplankton dynamics, nutrient cycling, influence of icebergs, POM dynamics and biological carbon pump, macrozooplankton food webs and prokaryotic communities in different regions of the Southern Ocean
- microplastics studies in southern Australian waters and potential impacts on Southern Ocean.

Main Developments:

- icebergs influence primary production through micronutrient supply and other related drivers; not macronutrients.
- POM dynamics in the Indian Ocean are linked to phytoplankton community composition, but specifics vary with latitude and over seasonal and interannual timescales.
- Macrozooplankton food webs in the South Georgia region are more complex offshore than onshore, with many predator-prey relationships that influence higher trophic levels.
- Prokaryotic communities in deep waters are much more complex than previously recognised and more so than in surface waters.
- Dinoflagellates are found in Southern Ocean waters and have the potential to form harmful algal blooms, but more research is required.
- Results also available from Potter Cove (Argentina).

Open Questions/Future Directions:

- how do POM dynamics influence the biological carbon pump at the circumpolar scale?
- How have macrozooplankton food webs around South Georgia (and elsewhere) changed over time?
 - Archived samples currently being analysed to explore this.
 - Larger-scale patterns and change in prokaryotic communities across Southern Ocean – more research needed.
- Integration of existing and ongoing regional studies to create a circumpolar time-integrated view of existing knowledge.
- Further research into harmful algal blooms and associated environmental conditions and toxins in the Southern Ocean.

