# Sea ice variability influences zooplankton distribution and larval fish stomach fullness at a coastal Antarctic site

Kerrie Swadling[1,2], Philippe Koubbi[3]
[1]*Antarctic Climate and Ecosystems Cooperative Research Centre, Australia*
[2]*Institute for Marine and Antarctic Studies, Australia*
[3]*Université Pierre et Marie Curie, France*

Zooplankton that live at high latitudes are influenced by seasonal cycles in primary productivity, the strength and position of major oceanographic currents and the growth and decay of sea ice. Zooplankton are important prey for fish, especially in sheltered coastal regions that act as nurseries for larvae and juveniles. To describe the influence of sea ice dynamics on the long term distribution of zooplankton and, in turn, their availability as prey for fish, sampling in the fast ice zone near Dumont d'Urville Station, located along the coast of Adélie Land in east Antarctica, has been carried out continually from 2000. In the last fifteen years there have been five annual and ten summer field surveys that have sampled the underice zooplankton and ice-associated fish, focussing on the stomach contents of the fish and abundance and diversity of the zooplankton. The fast ice of the region has been mapped via satellites since 2001. Sampling of the sea ice itself began in 2003, with the ice meiofauna counted and identified from multiple ice cores.

The sea ice around Dumont d'Urville Station fluctuates in extent, thickness and timing of breakout and this has flow on effects on the biological communities of the area. Notably, the abundance of zooplankton has varied at least 10-fold between years, producing consequences for the fish species that prey on them: in years of low zooplankton abundance the gut fullness of the fish is correspondingly low. The species of zooplankton recorded for the coastal region are typical of other Antarctic coastal areas and consist of small copepods such as *Oithona* spp., *Oncaea* spp. and *Stephos longipes*, larger copepods such as *Metridia* spp. and *Calanoides acutus*, meroplanktonic larvae, appendicularians and euphausiids. Meiofauna in the fast ice is dominated by copepods, particularly *Drescheriella glacialis*, *Paralabidocera antarctica* and *Stephos longipes*. The reduced predictability of sea ice around Dumont d'Urville has led to variations in the life cycles of these key species, as compared to regions where the ice is more predictable from year to year. As such, the region provides important insights into how key zooplankton species and their fish predators might be affected under future conditions of reduced ice cover.