Australian Government
Geoscience Australia

AUSGEO news
ISSUE 84 Dec 2006

Looking *for life below the sea ice*

New project assesses biodiversity in Antarctic seas

Philip E O'Brien, Alix Post and Victoria Wadley (Australian Government Antarctic Division)

Geoscience Australia's Marine and Coastal Group is contributing expertise in sea floor mapping to a major international effort to research the biodiversity of Antarctic waters.

The Census of Antarctic Marine Life (CAML) is a multinational project to improve our knowledge of Antarctic marine life through a series of coordinated research surveys during the International Polar Year of 2007/2008. Coordinated by the Australian Government Antarctic Division, CAML is sponsored by the Sloan Foundation under its Census of Marine Life project. So far, 13 countries are involved and eight marine surveys are planned.

CAML has five major goals:

- Develop an inventory of species of the Antarctic slopes and abyssal plains.
- Develop an inventory of benthic fauna under disintegrating ice shelves.
- Develop an inventory of plankton, nekton and sea-ice associated biota at all levels of biological organisation, from viruses to vertebrates.
- Assess critical habitats of the Antarctic's top predators.
- Develop a coordinated network of interoperable databases for all Antarctic biodiversity data.

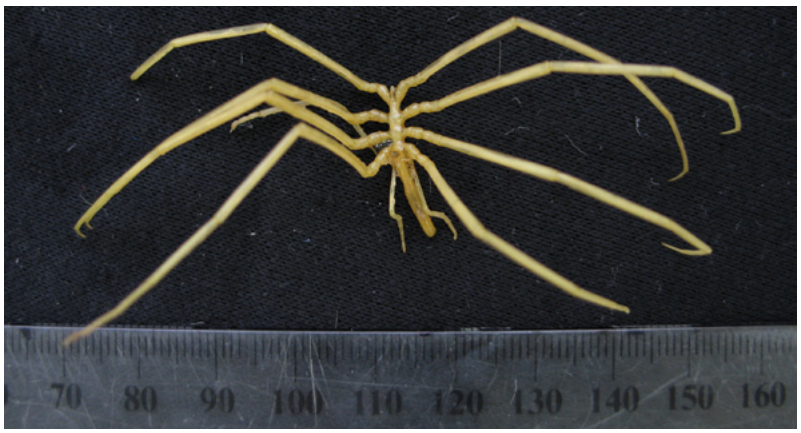

Figure 1. Sea spiders (pycnogonids) from the Southern Ocean near Heard Island. Pycnogonids are one of the more fascinating but poorly known groups of animals that will be studied during the Census of Antarctic Marine Life. In shallow tropical waters they grow up to five millimetres across, but in the Antarctic they reach 50 centimetres.

Geoscience Australia is contributing to themes 1 and 2 by applying methods developed over the past 10 years for mapping benthic habitats and understanding marine processing to help plan sampling regimes for surveys of benthic biota and demersal fish. An Australian–French survey to George V Land will use habitat maps of the shelf near the Mertz Glacier, developed by Robin Beaman (now of James Cook University) and Peter Harris as part of the Antarctic CRC program. Continental slope sampling will use benthic mapping based on multibeam data collected by the Italian vessel OGS *Explora* in 2006 and processed by Michele Spinoccia of Geoscience Australia and Laura De Santis of Italy's National Institute of Oceanography and Applied Geophysics (OGS).

The George V shelf study (Beaman & Harris 2005) was the first systematic attempt to understand the habitat of Antarctic benthos using multibeam bathymetry, sub-bottom profiler data, and sedimentological and oceanographic data. The CAML survey will use the habitat map produced by that study

Figure 2. Sea spiders (pycnogonids) from the Southern Ocean near Heard Island.

to inform its sampling design. This will enable the widest sampling of biodiversity in the area and provide some control on the physical parameters that affect the benthic ecology. This approach is important because the Antarctic shelf is one of the most variable marine environments, mainly because icebergs commonly plough the sea floor, causing major disruption of the benthos.

"Geoscience Australia will also contribute to CAML Theme 2 with studies of a remarkable set of cores collected from beneath the Amery Ice Shelf"

Geoscience Australia will also contribute to CAML Theme 2 with studies of a remarkable set of cores collected from beneath the Amery Ice Shelf. The Australian Government Antarctic Division is collecting oceanographic data, video footage and sediment cores through hot-water drill holes in the Amery Ice Shelf. The sediment cores are collected using a corer designed and built by Geoscience Australia. This project has now produced four cores.

The only other core ever obtained from beneath an extant ice shelf—from under the Ross Ice Shelf in the early 1970s—showed no signs of life. However, several Amery cores contain diatom-rich sediments, and one contains a succession of benthic faunas that indicate progressive colonisation of the sub-ice sea floor as ice retreated and currents began to seep nutrients and plankton into the sub-ice shelf cavity.

This work has helped oceanographic modelling studies in the Antarctic Climate and Ecosystems CRC, by indicating the extent and strength of current activity beneath the Amery Ice Shelf.

CAML research will contribute to the long-term conservation of the Antarctic environment by helping us understand some of the lesser known animal groups that inhabit the sea floor and water column. While less fashionable than penguins and seals, these organisms form an integral part of Antarctic ecosystems and some, like Antarctic sea spiders (figures 1 and 2), have their own fascination.

For more information

phone Phil O'Brien
+61 2 6249 9409
email phil.obrien@ga.gov.au

References

Beaman RJ & Harris PT. 2005. Bioregionalisation of the George Vth shelf, East Antarctica. Continental Shelf Research 25:1657–1691.

Related websites

Census of Antarctic Marine Life
http://www.caml.aq/
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