

MEASURING SEA ICE THICKNESS

Antarctica is surrounded by a zone of sea ice which covers an area nearly three times the size of Australia at its maximum extent in spring. This sea ice zone is important in the global climate system as it helps drive the ocean circulation that redistributes heat from the equator to the poles.

Variations in sea ice extent, concentration and thickness are of interest to climate scientists, as together they provide the total ice volume, which can be monitored for the effects of climate change. Sea ice extent and concentration can be determined daily from satellites. However, the technology to accurately measure sea ice thickness is still developing, requiring scientists to compile information from a wide range of instruments, and rely on numerical models to help them understand how it might be varying.

In July 2006, the Australian Government Antarctic Division co-hosted a three day workshop of international experts on Antarctic sea ice to discuss ways to better measure and monitor sea ice thickness. The workshop brought together 60 participants from 13 countries, including

observational scientists, modelers and members of the satellite remote sensing community. The group assessed the current state of knowledge on Antarctic sea ice thickness and examined emerging technologies to measure sea ice thickness from the surface, ships, under-ice vehicles and moorings, airborne sensors and satellite sensors.

In the northern hemisphere, de-classified data from US and British navy submarines has shown conclusively that there has been a significant reduction (10% per decade) in Arctic sea ice thickness over the past several decades. There are no long-term submarine records in the Antarctic. However, in greenhouse scenarios, climate models indicate that Antarctic sea ice thickness decreases more rapidly than sea ice extent (suggesting that thickness may be a better indicator of climate change), and predict that these changes should already have started. In the absence of sufficient data, however, we do not know whether important changes in the thickness of Antarctic sea ice are currently going unnoticed.

International efforts to obtain widespread Antarctic sea ice thickness information are progressing. However the goal of a circumpolar baseline of high resolution Antarctic sea ice thickness data is yet to be achieved. The workshop outlined future collaborative programmes that will aim to achieve this in coming years, in particular during the International Polar Year, during which Australia has a leading programme of sea ice zone research.

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Sea ice workshop participants in Hobart.

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Aliens in Antarctica

The introduction of non-native species to Antarctica poses a threat to Antarctic animals and plants through disease.

Now a new Alien Invertebrate Collection Kit, developed by environmental officers at the Australian Government Antarctic Division, is available on ships and stations to enable expeditioners to collect anything suspicious.

Alien invertebrates include insects, slugs and spiders, which can stow away on personal clothing, baggage, food and in ships' cargo.

A recent outbreak of mushroom gnats (*Lycoriella ingenua*) at Casey station, for example, was thought to originate from tiny eggs deposited on fresh vegetables delivered on a resupply voyage. The eggs

were then washed down the kitchen sink and into the waste treatment plant where they hatched.

Despite strict quarantine procedures for food, vacuuming of clothing and baggage, and the scrubbing and sterilisation of footwear, aliens will still find their way into Antarctica. As tourist and research visits increase, so will the risk.

Operations Safety and Environment Advisor, Leslie Frost, said many people visiting Antarctica may have visited other cold or polar regions and could bring alien species with them that are well adapted to cold environments.

'These alien invertebrate kits provide an efficient collection and cataloguing process that will allow us to identify the most common aliens carried into Antarctica and where they are coming from.'

The kits include collection vials, bar codes and instructions for reporting the find on the Antarctic Division's incident reporting system, which enables tracking of the samples in an alien invertebrate database.



KATE KIEFER

The adult mushroom gnat, Lycoriella ingenua, found in the Casey waste treatment plant.