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Census of Antarctic Marine Life (CAML)

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Information paper submitted by Australia and SCAR

Introduction

The Census of Antarctic Marine Life (CAML) is both a major IPY initiative and a key SCAR activity. Its objectives are to develop a robust benchmark of the distribution and abundance of marine biodiversity in Antarctic waters, against which future change in the marine environment can be assessed. Up to 16 ships are scheduled to participate in field work, with tourist and other-purpose vessels additionally participating in data gathering (see Figure 1).

CAML's first research voyage

CAML's field work started in November 2006 with the departure from Cape Town of the RV Polarstern. The objective of the first voyage was to visit the areas of the eastern Peninsula previously covered by the Larsen A and Larsen B ice shelves. Larsen A collapsed some 12 years ago, with Larsen B collapsing 5 years ago. The collapse of these ice shelves has opened up near-pristine portions of the ocean floor and enabled investigation normally possible only through small ice holes.

Under each former ice shelf the fauna living on the sea floor was very sparse when compared to sea beds elsewhere in the eastern Weddell sea. Vast beds of sea lilies normally found in deeper waters, sea cucumbers and urchins were abundant, indicating that these organisms have an ability to adapt to areas where food resources are low. That the seabed in Larsen B has been colonised since the break-up of the ice was evidenced by a large abundance of sea squirts which are characteristic of the early stages of colonisation of disturbed sea floor. Young specimens of slow growing glass sponges in Larsen B and older specimens in Larsen A gave an indication of the rate at which ecosystems change following collapse of the surface ice layer. The Larsen region has proved to be a unique site for understanding how marine ecosystems in Antarctic respond to global warming. The first CAML voyage reported some 15 potentially new species of crustacean (one 10 cm long), and four new species related to the corals, sea anemones and jellyfish.

Data management

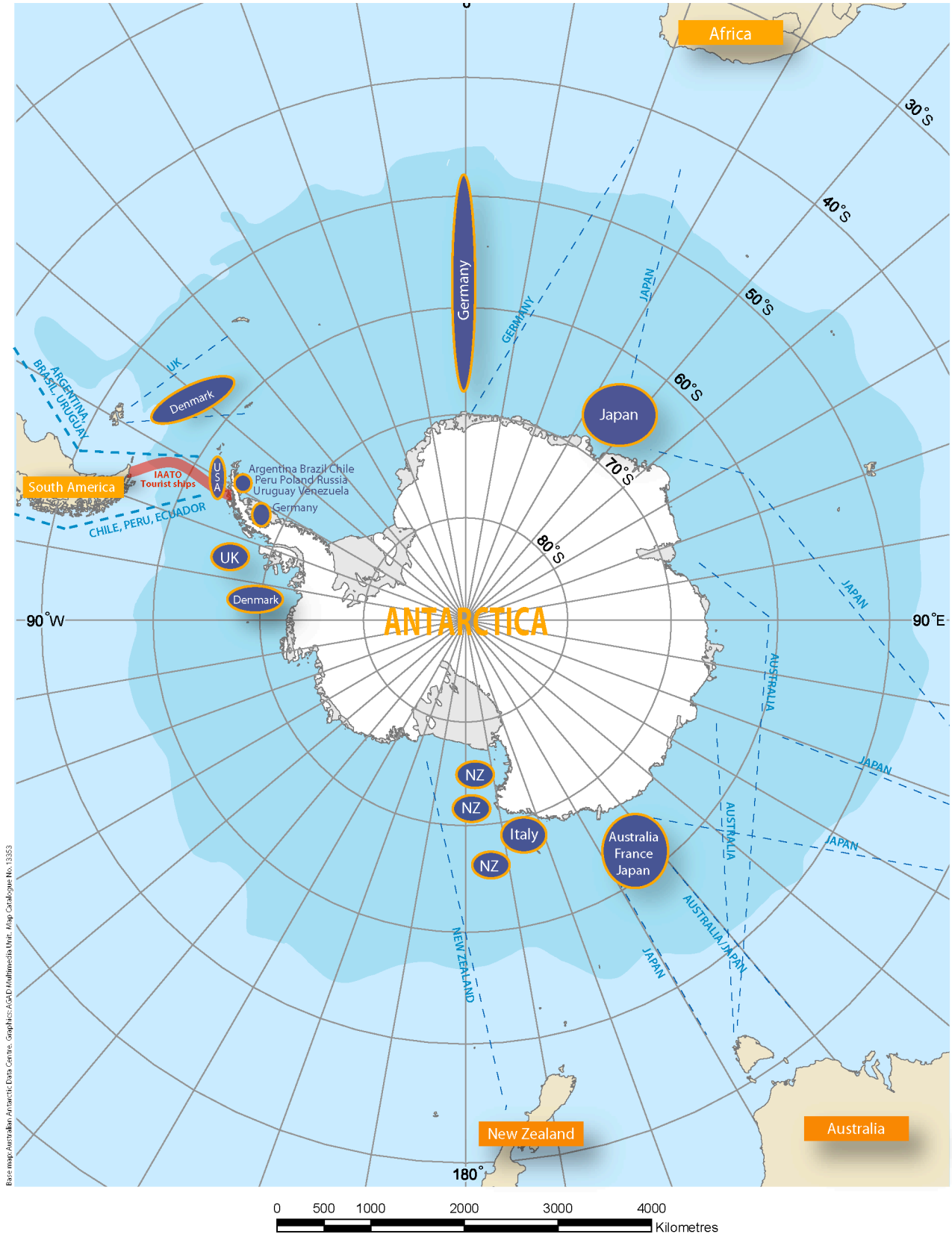
A key element of CAML is its close relationship with SCAR's Marine Biodiversity Information Network (MarBIN) (www.scarmarbin.be), funded through the generosity of the Belgian Government. SCAR-MarBIN is constructing the Antarctic portal to the Ocean Biogeographic Information System (www.obis.org), the largest marine database in the world. Already there are over 380,000 data points in the SCAR-MarBIN dataset, having been transferred from already existing but dispersed databases around the world. CAML is working to ensure that collections of Antarctic marine organisms made up to 6 decades ago are catalogued and brought into the database. Analytical and data visualisation tools are being developed; by the time CAML ends in 2010 its most significant legacy will a fully operational and interoperable database to serve as a scientific basis for future ocean management.

Legacy

CAML is already showing how it can contribute to our knowledge of Antarctic marine biodiversity and global warming with the work completed at the Larsen A and B regions. During the coming Antarctic season 2007/08 it will undertake further research voyages and contribute many data into the SCAR MarBIN database. A site of particular interest to CAML on account of almost four decades of research having been carried out there is Admiralty Bay in King George Island. This site will be revisited by a multi-national research team to collect data from the deeper parts of the Bay, where least work has been conducted. Such work in the Larsen region and at Admiralty Bay will be of great value to CCAMLR and the CEP in assisting

the bioregionalisation of the Southern Ocean, and can help point the way towards important areas which might warrant future consideration as legacy sites requiring special protection.

Figure 1. CAML Ships in IPY



Dark blue areas denote benthic sampling, following the plan at **www.caml.aq**. The locations are shown for each national program. The dashed lines are transects using the Continuous Plankton Recorder. The shaded red area near South America will be sampled by tourist vessels under IAATO. The darker of the two ocean colours indicates the

position of the Subantarctic Front. The locations and ships are subject to change. Additional nations are providing historical data on marine biodiversity Research is governed by the animal welfare rules for each nation. All data are contributed to the Antarctic data portal www.scarmarbin.be under the data sharing agreement of IPY.

Field season 2007/08

The majority of CAML's field surveys will be completed in the 2007/08 Antarctic season. The attached map shows the locations for the main research voyages scheduled, though a number of other ships will be contributing data. An implementation plan, providing details on the specific objectives of each voyage, will soon appear on the CAML website. All vessels participating in CAML will apply agreed standard sampling protocols for all habitat types and biological realms and write their field data into a specially developed computer program which enables easy download into the main SCAR MarBIN database. Standard protocols include those for genetic analysis ('barcoding') and a range of taxonomic groups have been selected for particular attention (sea spiders - which show a very high level of endemism in Antarctic waters; octopus; fish; microbes). CAML is cooperating with the Scientific Committee of CCAMLR to extend the range of CCAMLR's pelagic research during IPY.

CAML is scheduled to end in 2010 with a major contribution on the distribution and abundance of Southern Ocean biodiversity to the Census of Marine Life.

For further information, please visit the CAML website www.caml.aq or contact the Project Administrator, Professor Michael Stoddart, at caml@aad.gov.au.