Report of Expert Group on the Continuous Plankton Recorder (EG-CPR)

September 2009

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http://data.aad.gov.au/aadc/cpr/index.cfm

The 2007/08 Antarctic season was undoubtedly the busiest and most successful season since the survey started in 1991. Approximately, 90 tows were made from eight ships from seven nations, producing more than 5,000 plankton records in a circum-Antarctic survey in support of the Census of Antarctic Marine Life (CAML) (www.caml.aq) and the International Polar Year (IPY). This included the first tows in the Pacific sector of the Southern Ocean, between the Ross Sea and the Antarctic Peninsula.

Vessels used by the SO-CPR survey included vessels from the US and Russian Antarctic programmes, both new to the survey. Tows were also conducted on the *James Clark Ross* by BAS and SAHFOS. The SO-CPR produced a total of 88 tows between early September 2007 to the end of March 2008. The *Aurora Australis* (Australia) made 26 tows south and west of Australia. *Shirase* (Japan) completed its usual six tows during its resupply run between Australia and Syowa station. *Polarstern* (Germany) completed five tows south of Africa, *Umitaka Maru* completed 11 tows between Cape Town, Syowa and Fremantle and a further ten tows between Fremantle, the French station Dumont d'Urville and Hobart. The New Zealand research vessel *Tangaroa* completed nine routine tows between New Zealand and the Ross. It also conducted 14 short tows in the southern Ross Sea to collect plankton for genetic analysis for food web studies. These samples were preserved in ethanol instead of the usual formaldehyde. A new vessel in the fleet *Akademik Fedorov* (Russian) completed three tows through the Amundsen and Bellingshausen seas (between the Ross Sea and the Antarctic Peninsula). This is a region that has been poorly sampled in the past in terms of all marine organisms and not just plankton. Few ships traverse this region. The other new vessel in the survey, the *Yuzhmorgeologiya* used by the US Antarctic Marine Living Resources (AMLR) programme completed three replicate tows across the Drake Passage (between South America and the Antarctic Peninsula) between January and March 2008. This area is just west of the region surveyed by *James Clark Ross*.

Processing of all 2007/08 samples was complete by mid-March 2009 at the Australian Antarctic Division and National Institute of Polar Research, Tokyo laboratories. The 2007/08 tows combined represents about 26,000 nautical miles of transects around Antarctic which should contributed another 4,400 sample records to the data base, increasing the set to about 25,800 records for about 129,100 nautical miles. More importantly, the 2007/08 samples will provide a synoptic assessment of the current spatial patterns of plankton diversity around Antarctic for one season that can be used as a reference to monitor future changes. The 2007/08 tows are also the largest contribution to the pelagic component of the Census of Antarctic Marine Life. Hopefully, the new routes can be maintained, providing a regular circum-Antarctic comparison. At the very least, we will repeat the circum-Antarctic CPR survey during a future Census of Antarctic Marine Life in about 10 years. The 2007/08 season has also provided the opportunity to determine if species composition is consistent in the various zones within the Antarctic Circumpolar Current (ACC) by comparing transects collected at approximately the same point of time. A workshop supported by CAML and

hosted at the Sir Alister Hardy Foundation for Ocean Science (SAHFOS) was held in may 2009 to analyse the 2007/08 data. While latitudinal zonation was evident, no real longitudinal zonation could be found within the ACC indicating the species composition is consistent with the current. Results of this work was presented at the CAML Symposium in Genoa May 2009 and also at the 10th SCAR Biology Symposium in Sapporo July 2009.

There were two other CPR presentations at Sapporo. One was by Dr Kunio Takahashi NIPR looking at long term results from the CPR tows conducted by Japan. These showed a substantial increase in pelagic foraminiferan numbers in the 2004/05 season when they represented between 50 to 75% of total zooplankton numbers in much of the Indian Ocean sector instead of the pre-2004/05 levels of ~5%. Numbers seem to be decreasing to earlier levels. The second presentation advertised the production a zooplankton atlas based on the CPR data that we expect to publish in "Polar Sciences" as part of the proceedings of the SCAR Biology Symposium. The atlas will comprise distribution maps of the 50 most abundant species and focus on the region south and west of Australia where there is the highest density of CPR tows.

The SO-CPR database is held at the Australian Antarctic Data Centre and also at the SCAR Marine Biodiversity Network (SCAR-MarBIN) where it is the both the largest data set and receives the greatest number of enquiries. Data can be downloaded from SCAR-MarBIN in various formats for visualising the data in a range of popular GIS packages including Google Earth.

Survey Developments

New Zealand's Ministry of Fisheries in collaboration with the National Institute of Water and Atmospheric (NIWA) Research has secured funding for the next five years to run CPRs on toothfish fish vessels operating between New Zealand and Ross Sea Antarctic. This will improve sampling in the western Pacific region. Seven tows have already been collected in the 2008/09 season. The South American LA-CAML consortium of Brazil, Uruguay, Argentina, Chile, Peru, Ecuador and Venezuela have joined the SO-CPR Survey in 2008/09. Tows were conducted from the Brazilian vessel *Ary Rongel* and the Chilean vessel *Galvarino* They will conduct regular CPR tows across Drake Passage sharing a CPR between vessels. A training course was conducted at the AAD in October 2008 to train personnel from New Zealand and Brazil in the preparation, maintenance and deployment of CPR units. A follow up course will be conducted in March/April 2009 to provide further instruction in sample processing.

The SO-CPR Survey is now conducting phytoplankton colour index PCI measurements as from the 2007/08 season. This provides a quick assessment of the amount of phytoplankton trapped on the silk based on the "greenness". For most of the season and over much of the area the PCI scores have been quite low.

At SCAR XXX the CPR Action Group was elevated to Expert Group status due to its rapid expansion of this work, its projected long term nature, and its considerable linkages and success. The SO-CPR Survey is also now an official SCAR Business Product. The new Expert Group is co-chaired by Dr Graham Hosie (Australia) and Prof. Mitsuo Fukuchi (Japan). Other members come from Germany, NZ, UK, Brazil and Canada, plus associate members from SAHFOS, CCAMLR, and SCAR MarBIN.