



SCAR XXXII Delegates' Meeting

Portland, USA, 13-25 July 2012

Agenda Item: 5.2.2

Person Responsible: Kathleen Conlan

SSG Life Sciences

Report to the Delegates

Executive Summary

SSG Life Sciences

Kathleen Conlan

Introduction/ Background:

Scientific Research Programme Proposals: Following approval by the Delegates, Don Cowan (SA) developed AntEco (State of the Antarctic Ecosystem) and Julian Gutt (GER) developed AnT-ERA (Antarctic Thresholds – Ecosystem Resilience and Adaptation) in consultation with the largest possible diversity of scientists. In Jan. 2012 leaders of the five programme proposals met to maximize interconnections among the life, physical and geosciences. The proposals were submitted in Apr. 2012 and positive reviews were received in June 2012.

EG-Human Biology and Medicine has merged with its COMNAP counterpart and now has Draft membership, mission and science statements. It is currently researching and/or advising on: aliens in food, infectious diseases, telemedicine, Antarctica as a space analogue, Lyme Disease, vitamin D deficiency, a common summer medical standard and electronic health records.

EG-Continuous Plankton Recorder and the SCAR Southern Ocean CPR Survey now involves over a dozen countries and completes 45-50 tows/yr. By the end of 2012, its database will comprise 36,000+ records, equalling 180,000 nautical miles of survey from nearly 650 tows. A major finding this year was of a bloom of warm-water associated *Noctiluca* 242 km further into the Southern Ocean than previously known. This dinoflagellate causes “red tide” and is a competitor of copepods, which are essential food for many top predators in the Southern Ocean.

EG-Birds and Marine Mammals has participated in the long-term effort of collecting and compiling data for several databases: The references database (3450 references concerning 102 SCAR species), the Synthesis of Antarctic Tracking Data (collaborating with CCAMLR and Birdlife International), the Penguin Book database (outreach for the general public) and the Census of Antarctic Marine Life database (436 699 at-sea sightings comprising 244 866 bird sightings, 178 480 seal sightings and 13 353 cetacean sightings). Products planned are a CCAMLR report on biodiversity of the d’Urville Sea (East Antarctica) and The Biogeographic Atlas of the Census of Antarctic Marine Life.

The Antarctic Biodiversity Information Facility is developing or expanding websites for identification guides, biogeographic information, online publishing and data sharing. A new focus is on microbial data. ANTABIF requires SCAR support to ensure sustainability.

Recommendations/Actions and Justification:

1. The SSG-LS recommends that the proposed SRP, State of the Antarctic Ecosystem (AntEco), that is crucial to SCAR and its biology community be adopted by the SCAR delegates for implementation. AntECO will be the next generation program for studying and understanding the biodiversity and evolution of Antarctic organisms, and will provide essential data and insights for establishing policies for management and conservation. AntECO and its complementary biological program AntERA are integral to the success of SCAR’s cross program approach.
2. The SSG-LS recommends that the proposed SRP, Antarctic Thresholds - Ecosystem Resilience and Adaptation (AnT-ERA), that is crucial to SCAR and its biology community be adopted by the SCAR delegates for implementation. Ant-ERA will be the next generation program for characterizing the resistance and resilience of Antarctic organisms to ongoing and future climate change. This program will address key questions about the vulnerability of the Antarctic ecosystem to environmental perturbations on variety of temporal and spatial scales. AnT-ERA and its complementary biological program AntEco are integral to the success of SCAR’s cross program approach
3. The SSG-LS recommends that the delegates approve the nomination of Dr. Anne Hicks of the United Kingdom as the SCAR representative to the International Union of Circumpolar Health (IUCH). She will replace, with thanks, Dr. Giichiro Ohno of Japan.

4. Because of the increasing need for high resolution imagery from Antarctica and the advances in technology that allow the use of such imagery to assist in the study of many physical and biological processes, the SSG-LS recommends the formation of a new cross action group to coordinate the development and adaptation of remote sensing methodology to promote new avenues of research.
5. Regarding the rehabilitation of wildlife to the Antarctic, the SSG-LS recommends that SCAR remind the CEP/ATS and CCAMLR of the 1999 SCAR recommendation XXIV-3. The SSG-LS proposes that this recommendation be updated as follows: "SCAR discourages the practice of returning rehabilitated wildlife to the Antarctic environment to reduce the risk of transfer of disease to Antarctic ecosystems and to ensure the health of Antarctic wildlife populations".
6. The Cross SSGs Group, Advancing TecHnological and ENvironmental stewardship for subglacial exploration in Antarctica (ATHENA) has made great progress in their work and require addition time to complete their charge. The SSG-LS requests a one-year extension for the ATHENA expert group to finalize its work.
7. To improve efficiency and engage a wider range of experts in pollution issues, the SSG-LS recommends the merger of the Action Group on Antarctic Fuel Spills (AGAFS) with the action group on Environmental Contamination in Antarctica (ECA).
8. The achievements and crucial usefulness of Antarctic Biodiversity Information Facility (ANTABIF), which has superceded SCAR MarBin, has been clearly demonstrated. The SSG-LS asks that the Delegates recommend that SCAR expresses its strong support to the Belgian Science Policy Office (BELSPO), encouraging the integration of ANTABIF in the EU Lifewatch infrastructure, leading to its long-term sustainability; that SCAR urge the National Committees to endorse ANTABIF as the primary repository for Antarctic biodiversity data for their national Antarctic programs and that National Committees encourage their funding agencies to initiate and/or continue support for ANTABIF through SCAR, as an open access service to the community. This will enable SCAR to continue to efficiently contribute primary data and expertise to subsidiary bodies and interested parties, enable ANTABIF to be the main biodiversity data provider to SOOS, and enable SCAR to be actively associated with emerging global initiatives.
9. The SSG-LS recognizes the excellent efforts and accomplishments of the Action Group for Antarctic Biodiversity Information Facility (ANTABIF) and recommends the transition to an Expert Group on Antarctic Biodiversity Informatics (EG-ABI) (see Appendix).
10. The SSG-LS expresses its appreciation to EBA and recommends the retirement of this program upon the approval of the two new SRPs.

Expected Benefits/Outcomes and Partnerships:

AntEco and AnT-ERA deal with the most topical and societally important questions of this century and have close interconnectedness with SOOS and ICED as well as with the other proposed SCAR SRPs, especially AntClim²¹ and SERCE. They will propel SCAR forward as the leading advisory organization on the Antarctic. ANTABIF is the prime focal point for data from these LS programmes as well as from CAML, EG-CPR and EG-BAMM. These groups are in turn essential for the success of SCAR and provide important advice and support to CEP and CCAMLR. The JEG-HB&M is an important resource and advisor for both SCAR and COMNAP. All groups mentor the next generation (within and outside APECS) and provide outreach, especially via ANTABIF and APECS. They also provide insight, data and linkages to the Arctic Science community through IASC.

Budget Implications: 2013: 31K USD; 2014: 30K USD

SSG Life Sciences

1. Chief Officers

CO: to July 2012: Kathleen Conlan (CAN); after July 2012: Graham Hosie (AUS)
 Deputy CO: to July 2012: Marc Shepanek (USA); after July 2012: Marc Shepanek (USA)
 Secretary: to July 2012: Deneb Karentz (USA); after July 2012: Yan Ropert-Coudert (FRA)

2. Major Future Initiatives and Actions

i) Recommendations on proposed new Scientific Research Programmes:

Following highly positive external reviews, the Delegates are asked to approve AntEco and AnT-ERA.

ii) Report on proposed new groups, future meetings and activities:

Proposed new groups:

- Expert Group on Antarctic Biodiversity Informatics (EG-ABI) to replace the Action Group ANTABIF (Antarctic Biodiversity Information Facility).
- New cross action group on remote sensing methodology
- Merger of the Action Group on Antarctic Fuel Spills (AGAFS) with the Action Group on Environmental Contamination in Antarctica (ECA).

Future meetings:

- The next SCAR Biology Symposium will be held in Barcelona, Spain in July 2013. July 15-19 2013. CosmoCaixa Hotel, Barcelona. Website: www.icm.csic.es-XIthSCARBiologySymposium. Museum venue is free in return for the local organizers to give outreach lectures in the fall. There will be two parallel sessions with large auditoriums (200+ people each) plus small rooms for workshops. Sub themes are, terrestrial biocomplexity, Krill to top predators, Human impacts, Physical/biogeochemistry and Marine biodiversity. First circular will be in September.
- SCAR-CCAMLR: LS representative Mark Hindell will join Renuka Bahde (SCAR Secretariat) and Steven Chown (SC-ATS) at the Oct 2012 CCAMLR meeting to represent SCAR.

3. Major Activities and Significant Progress

i) Meetings:

The SSG-LS hosted the SCAR Cross-linkages Workshop in Ottawa, Canada in May 2011 and participated in the SCAR EXCOM meeting in Edinburgh, UK in July 2011 and the Programme Planning Group meeting in Modena, Italy in Jan. 2012.

ii) Subsidiary Bodies Outcomes:

Joint Expert Group on Human Biology and Medicine (HB&M)

Background.

Following discussions over several years, agreement reached, at COMNAP XXII / SCAR XXXI in Buenos Aires 2010 and in Stockholm 2011, that the Expert Group in Human Biology and Medicine of SCAR and the COMNAP Medical Network should merge to form a joint group, reporting to both parent organizations and responsive to their needs.

The Terms of reference have been circulated and have \ been agreed by members of EXCOM and

EXSCAR. (Annex A). Members have been nominated by members of both SCAR and COMNAP. (Annex B.) The Joint Expert Group on Human Biology and Medicine has been established. Membership, mission and science statements have been prepared.

Progress

The task was to continue the implementation of the Joint group. The group has worked to align its objectives and ways of working with the aims and strategies of both COMNAP and SCAR. From the COMNAP viewpoint, we have considered the 2008 constitution and have concluded that we are best able to support this as follows:

To develop and promote best practice in managing the support of scientific research in Antarctica, by:

Serving as a forum to develop practices that improve effectiveness of activities in a safe, efficient and responsible manner

- The medical expert group brings together a large cross section of doctors, psychologists and human physiologists and biologists who are actively engaged in medicine and biomedical research in the Antarctic, as well as linkages to the Arctic, Space Medicine, and other areas where healthcare is undertaken in remote and austere environments.
- Links with SCAR allow the group to facilitate applied research to answer specific questions regarding healthcare provision in the Antarctic informing policy and ATCM.
- Effective solutions to problems can be shared across national programs.
- Cooperative working between stations and nations is enhanced, particularly in areas where physical links are possible (such as aeromedical evacuation)
- Guidance on such areas as infection control, major incident planning, etc can readily be produced, with mechanisms to allow rapid response to developing situations, calling on a high level of expertise.
- Practical solutions can be devised in response to issues raised by COMNAP.

Facilitating and promoting international partnerships:

- The medical expert group has already worked to promote partnership working. The confidence gained by meeting and knowing international colleagues, allows greater recognition of each other's systems and allows reciprocal arrangements as far as, for example, medical fitness clearance is concerned.
- There are many areas in which further cooperation could be achieved.
- Regional discussion groups are being developed to foster communication.
- There is unanimous agreement amongst members that although a lot of business can be conducted electronically, regular if relatively infrequent (2 yearly) face to face meetings where progress can be presented, current research discussed, and solutions agreed are essential to the effective running of the group. These meetings allow people to meet each other and develop confidence which supports working together.

Providing opportunities and systems for information exchange

- A medical facilities database has been for the most part developed however with changing COMNAP website development needs further investigation of transferability. This will provide a comprehensive information source about the medical facilities which exist in Antarctica, and advice on basic medical capability standards.

Unfortunately this progress has been lost with a change of COMNAP platforms but will be progressed on the new COMNAP.

The secure workspace will be maintained on COMNAP website. The group wishes to have a presence on both the COMNAP and SCAR websites and will maintain a public medical Antarctica website and domain to direct to the SCAR and COMNA site.

Providing the Antarctic Treaty System with objective and practical, technical and non-political advice drawn from the National Antarctic Programs' pool of expertise.

- The group has been asked to comment on Paper ATCM34: WP053. “Measures to reduce the risk of non-native species introductions to the Antarctic region associated with fresh foods”. A report was presented to COMNAP XXIII in Stockholm.
- The medical expert group is the only collaborative forum of Antarctic medical expertise and is ideally placed to provide objective and practical advice through COMNAP to the Antarctic Treaty system.

Research Strategy

We have developed a research strategy which is aligned to the current SCAR research strategy. We believe that the joint group is ideally situated to help coordinate and facilitate medical research in the Antarctic. In particular we have knowledge of the capabilities, facilities and nature of the various stations in Antarctica, and can direct prospective researchers to the best locations and partners for their work. (Annex C).

There is considerable international interest in the Antarctic as an analogue for other remote environments, notably space. Members of the Group attended a workshop in Houston earlier this year where progress was made on developing this field. Further development in this area is recommended.

Leadership

Jeff Ayton has assumed the Chair of the JEGHB&M. The Expert Group has in the past had an organized succession plan where the deputy chair becomes chairman, the secretary becomes the deputy chair, and a new secretary is appointed. This has been very successful in allowing continuity and knowledge transfer and we suggest a similar approach continue.

The Executive has been approved and is as follows:

Chair: Dr Jeff Ayton, AAD Chief Medical Officer and Australian SCAR SSG-LS delegate.

Deputy Chair: Dr Eberhard Kohlberg, SMO AWI and German SCAR nominee.

Secretary: Prof Sergio Pillon, SCAR Italian Nominee.

Representative and Deputy Chief Officer of SCAR SSG-LS: Dr Marc Shepanek, US SCAR Nominee.

Matters discussed at SCAR Portland 2012

The Expert group notes that the following matters presented and discussed in Portland:

1. Confirmation of ToR's, ways of working and leadership of the Joint Expert Group Human Biology and Medicine.
2. Future and transferability of medical facilities database, and consideration of future work on facilities database to assist National Antarctic programs share information
3. Telemedicine in Antarctica including planning for workshop and project in 2013.
4. ATCM paper on Alien Species in Food –completed
5. Translation of Vitamin D research from USA/Australia/Japan and international evidence into Antarctic health policy: a recommendation on consideration of this risk of service in Antarctica to National Antarctic programs has been developed.
6. International Union of Circumpolar Health (IUCH) nominee from JEGHBM Dr Giichiro Ohno (Japan) has served for some 9 years and requested consideration of renewal to this representation. See recommendation forwarded separately. This is an important position which sits on IUCH council and facilitates the linkages between Arctic and Antarctic Health
7. Development of a common Human Biology and Medicine Research Informed Consent Form will be progressed to facilitate appropriate ethical consent for future research and facilitate international collaboration
8. The group discussed a workplan for Space analogue collaboration

9. Continuation of interdisciplinary projects with SSG-LS on Lyme Disease and *Borrelia* species(UK) and seabirds
10. Electronic Health records were discussed to assist delivery of health care and screening.
11. Linkages with APECS was thought to be of high priority given human biology and Medicine research currently is not a recognized stream in their life sciences considerations. This is particularly important to ensure future generations of Antarctic and extreme environment human biology and medicine researchers and inspiring future Antarctic clinical practitioners.
12. The group noted the successful Asian Human Biology and Medicine annual symposium and encourages linkages with this and other groups of researchers.
13. The Group will investigate linkages if relevant with International Arctic Science Committee(IASC)
14. Medical Screening processes will be documented and communicated for efficiencies to facilitate international collaboration during Austral summer expeditions whilst maintaining National program health and safety standards within legislative frameworks.

The JEGHBM recommends:

1. That the Terms of reference and Strategic research plan are noted for the Joint Group are noted.
2. That SCAR and COMNAP secretariat ask all members to nominate and confirm people to join the joint group.
3. That the leadership is noted.
4. That we develop a communications platform through COMNAP website and secure workspace with a public space in www.medicalantarctica.org and potentially other electronic for a such as biomedexperts, linkedIn to ensure visibility of for career in Antarctic medicine and research.
5. That the Antarctic Medical Facilities Database be re-established and recommended to COMNAP members and populated as a useful resource
6. That the Expert group continue with the following actions and produce reports on
 - The utility of telemedicine and eHealth in Antarctica 2013
 - The use of Antarctica as an Analogue in remote healthcare research 2014
 That support be given for a workshop and action plan on these subjects.

Draft Budget for proposed activities (In Euros as at July 2012)

Current estimates for development and management of the website and communication strategy approximately: 2,000 Euros

Current estimate to help support a Telemedicine workplan and meeting in 2013 approximately: 6,000 Euros.

EG-Continuous Plankton Recorder and the SCAR Southern Ocean CPR Survey (CPR)

Report of EG-CPR & the SCAR Southern Ocean CPR Survey

Dr Graham Hosie and Prof. Mitsuo Fukuchi, Co-Chairs Expert Group on CPR Research

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Background paper: GACS Newsletter No. 1.

Full Report

Year 2011 was a year of highlights for the SO-CPR Survey, starting with the celebration of 20 years of the survey, then participating in the celebration of 80 years of the North Sea CPR Survey during Plankton 2011, then working with the other regional CPR surveys to create a global CPR network the Global Alliance of CPR Surveys (GACS).

20th Anniversary

SO-CPR Survey officially commenced with Tow 1 on 12 January 1991 deployed from the RSV *Aurora Australis* on route between Mawson and Hobart. The corresponding tow at close to the same time in 2011 was Tow 572 on 15 January in the Ross Sea by the Sanford Limited fishing vessel *San Aotea II* on route back to New Zealand. The Survey has grown from a one-ship survey, to a survey involving more than a dozen countries and 15 Antarctic vessels from Australian, Japan, New Zealand, Germany, USA, Russia, Brazil, and Chile. Approximately 70% of the region around Antarctica has been surveyed and complements the tows conducted in the southern Atlantic/South Georgia area conducted by UK (SAHFOS and the British Antarctic Survey) and the South Georgia Government.

Global Alliance of CPR Surveys

Later in September 2011, several members of the SO-CPR international consortium, plus members of the IMOS AusCPR team joined other plankton researchers at the Plankton 2011 Symposium Plymouth UK, to celebrate the 80th anniversary of the North Sea CPR Survey, the longest running marine biological survey. The Sir Alister Hardy Foundation for Ocean Science, which runs the North Sea, Atlantic and North Pacific CPR Surveys, has long had a vision of creating a global network of CPR surveys to monitor changes in plankton biodiversity as an indication of the health of marine ecosystems. The Symposium proved the opportune time for the heads of the nine regional CPR surveys to meet and establish the Global Alliance of CPR Surveys (GACS). An MoU was signed by the partners and witnessed by representatives from IOC/GOOS, POGO and PICES. SCAR and the SO-CPR Survey were represented by EG-CPR Co-Chairs Dr Graham Hosie and Prof. Mitsuo Fukuchi. The general goal of GACS is to understand changes in plankton biodiversity at ocean basin scales through a global alliance of CPR surveys. GACS will provide that global perspective of changing plankton biodiversity using CPR data. It will also allow us to assess changes and events at a local or regional level in a world-wide context. The group has a Board of Governance comprising members from nine regional CPR surveys – Australia, UK, Canada, USA, Japan, New Zealand, South Africa, Brazil and China. Dr Hosie is the first Chair of the Board, and other members of EG-CPR are on the BoG. GACS will also enhance our relationship with IOC, GOOS and POGO. Working groups have been established to develop a joint database and maintain working standards and methodologies. Other specific aims of GACS are to produce a regular ecological status report for global plankton biodiversity, and to provide an interface for plankton biodiversity with other global ocean observation programmes. Further details are available at www.globalcpr.org.

Field Work and Data

The SO-CPR Survey continues to average 45 to 50 tows each year mainly from Australian, Japanese, New Zealand and UK vessels but also includes new tows by Chile across Drake Passage, complementing previous tows by Brazil and the US-AMLR Program. The database currently holds 31,083 records for more than 200 zooplankton taxa and about 90 protistan taxa, complete with environmental data to March 2010. The addition of data from the 2010-11 Antarctic season (sample processing nearly finished) and 2011-12 (field season just completed) will see the database increase to 36,000+ records equivalent to 180,000 nautical miles of records for about 650 tows. The data are currently stored at the Australian Antarctic Data Centre and in SCAR-MarBIN, which is then distributed to OBIS the data portal for the Census of Marine Life. The data will also be contributed to the GACS database to allow global analyses of plankton trends. Copies of the data are also held by SO-CPR partners and is freely available from the AADC, SCAR-MarBIN or upon request to SO-CPR. The SO-CPR website is located at <http://data.aad.gov.au/aadc/cpr/index.cfm>.

The Southern Ocean CPR Survey completed 48 tows from four vessels during the 2010-11 season, October to March. Australia completed 22 tows south and west of Australia from the

Australian icebreaker RSV *Aurora Australis*. Japan supplemented this with another seven tows in the same region from their new icebreaker *Shirase* and a further nine tows from the TRV *Umitaka Maru*. New Zealand completed ten tows between New Zealand and the Ross Sea from the Sanford Limited fishing vessel *San Aotea II*. In total 2,901 samples were collected. Processing of those samples are nearly completed and data are now being verified and being added to the database. This should all be complete by the end of 2012. The 2011/12 season produced 43 tows from five vessels; 18 from *Aurora Australis*, eight from *San Aotea II*, seven from *Shirase*, 9 from *Umitaka Maru* and one from a Chilean vessel. Additional tows were conducted south of Cape Town on *Polarstern* by the Benguela Current CPR Survey in collaboration with the Sir Alister Hardy Foundation for Ocean Science (SAHFOS) and GACS.

The British Antarctic Survey and SAHFOS have been conducting separate tows in the Scotia Arc region over the last five years. Data from these summer surveys are kept within the SAHFOS database. BAS and SAHFOS are now working with the South Georgia Government to conduct regular tows throughout the year around South Georgia using the Fishery Patrol Vessel *Pharos SG*. Again, these tows are in addition to the SO-CPR Survey, and we collaborate through GACS.

Major Data Analyses and Outputs

The Southern Ocean CPR zooplankton atlas recently published in *Polar Science* volume 4 in 2010 has proved popular (McLeod et al, 2010). SO-CPR continues to provide and analyse data for the SCAR Biogeographic Synthesis Atlas. The new atlas is expected to be a major tool for future Antarctic research, conservation and management of the region. The focus of the analysis to date has been developing predictive models of the distribution patterns of whole zooplankton assemblages around Antarctica, by month and season, using Generalised Dissimilarity Modelling. Follow up analyses will include more specific predictive spatial models of individual species using the same Boosted Regression Tree method used to model the circum-Antarctic distribution patterns of the copepod *Oithona similis* (Pinkerton et al., 2010, Deep-Sea Research 57, 469–485).

Time series analysis has continued using both observed data and modelled patterns to understand the variability and trends being observed in zooplankton distributions, abundances and composition in relation to various environmental variables such as temperature, salinity, chlorophyll, sea-ice. This work is a major contribution to a joint Australia-Japan collaboration funded by both governments to establish a benchmark on Southern Ocean plankton biodiversity, distribution and abundance in order to study future climate change impacts. New time series analysis is now underway using a number of new population and community metrics as part of the first GACS Ecological Status Report expected to be published before September 2012. One new index is average copepod community size. First analysis shows a shift to larger copepod species in the Sea-Ice, Permanent Open Ocean, Polar Frontal and Sub-Antarctic Zones, with a uniform increase in copepod sizes of ~30%.

An important result this year was the finding of the red-tide forming, heterotrophic dinoflagellate *Noctiluca scintillans* in the Southern Ocean well south of Tasmania in December 2010. It was first detected 200 km south of Tasmania during a CPR transect conducted between Tasmania and Antarctica as part of the Southern Ocean CPR (SO-CPR) and Australian CPR (AusCPR) Surveys (McLeod et al. 2012). The 'bloom' of *Noctiluca* extended over 242 km further south. This record of *Noctiluca* is the most southerly, oceanic record globally and can be linked to the intensification of the East Australian Current (EAC), a situation apparently caused by altered circulation patterns associated with global warming. *Noctiluca* is thought to be a neritic species with oceanic occurrences uncommon. The *Noctiluca* cells found in this study appeared 'healthy' and 'well-fed', seemingly full of mainly diatom prey. This indicates that despite their apparent unplanned venture into the oceanic environment they were able to feed on Southern Ocean productivity. Data from the same CPR transect showed that copepod abundance was apparently limited by the presence of the *Noctiluca* indicating potential competition for food. If viable populations of *Noctiluca* become established in the Southern Ocean in the future, there is likely to be additional competition for phytoplankton with copepod grazers, with unknown effects for the food web. Given predictions that the EAC is likely to continue to strengthen and transport more warm water and eddies further south there may be more frequent seeding of *Noctiluca* into cooler waters in the future and *Noctiluca* could well become resident in the Southern Ocean.

The results of this finding have recently been published online in the Journal of Plankton Research (McLeod et al. 2012, Journal of Plankton Research Vol. 34, 332-337, doi:10.1093/plankt/fbr112).

Meetings and Workshops

The results of both the temporal and spatial analyses, and the *Noctiluca* extension were presented at a number of workshops and symposiums during the year including:

- The JST-DIISR Project Final Symposium “Establishing a benchmark to assess climate change impact in the eastern Antarctic Marine System”, Hobart, Australia, February 2011.
- Presentation to UN Ambassadors, Australian Antarctic Division, March 2011 and February 2012.
- Second SCAR Biogeographic Synthesis Atlas Workshop, Brest, France, May 2011
- 2011 Annual Conference of The Australian Marine Sciences Association. Fremantle, Australia, July 2011.
- Plankton 2011: Biodiversity & Global Change, Plymouth, U.K., September 2011.
- XXXIII Symposium on Polar Biology, National Institute of Polar Research, Tokyo, November 2011.
- New Zealand-Australia Symposium in Ocean Observing and Data Management. University of Tasmania, December 2011.
- 2012 combined annual conferences of The Australian Marine Sciences Association and New Zealand Marine Sciences Society, Hobart, Australia, July 2012.
- SCAR Open Science Conference, Buenos Aires and Portland.

CPR data were used at the CCAMLR “Marion and Prince Edward Islands, the Del Cano Rise and the Crozet Archipelago” Planning Domain 5 Workshop in St Pierre, La Réunion, France from 15th May to 18th May, 2012. The report was submitted to the CCAMLR WG-EMM Meeting, July 2012. CPR data were also used at the Biogeographic Synthesis Atlas analysis workshop, Villefranche-sur-mer, June 2012.

The Plankton 2011 Symposium provided an opportunity to hold another standards workshop with the SAHFOS and SO-CPR analysts to ensure our taxonomic accuracy was being maintained between laboratories. The previous Southern Ocean standards workshop was held in Tokyo, November 2010, and attended by both SO-CPR and SAHFOS analysts. The Tokyo workshop focussed on zooplankton. The Plymouth workshop focussed on the taxonomy of Southern Ocean phytoplankton and protists. It was also an opportunity for the Southern Ocean analysts to hone their phytoplankton counting and Phytoplankton Colour Index (PCI) assessment techniques with the help of the SAHFOS team. We plan to continue holding the standards workshops annually, which will not only benefit analysts working on Southern Ocean plankton but also maintain standards and foster exchanges within the spirit of GACS.

Another training workshop on preparation, maintenance and deployment of the CPR was conducted at the NIWA laboratories, Wellington New Zealand in June 2012. We are planning additional training workshops in September-October 2012 to train French, Brazilian and Korean scientists.

Future Work and Expansion

Future data analyses will continue to focus on the Biogeographic Synthesis Atlas in the short term, in the slightly longer term predictive spatial modelling of individual key zooplankton species using Boosted Regression Tree modelling, plus corresponding temporal analyses of the same species to monitor changes. We will be working more closely with the GACS community to develop and publish new global analyses, which will put Antarctic regional observation in a global context.

We have been working with Prof. Philippe Koubbi to help establish a new CPR survey and monitoring in the Kerguelen that will benefit both the French programme and SO-CPR/GACS. We hope to have that operating in the 2012/13 season. We have also had productive discussion with Dr Hyoung-Chul Shin to conduct tows from their new ship *Araon* in the near future. These tows will be conducted in the Ross Sea area, which will complement the New Zealand work, as well as in the Pacific sector which is an area that has been poorly sampled, other than a few informative tows

by the Russian vessel RV *Akademik Fedorov*. Korea already has a CPR, and training is being organised for later in 2012.

Budget

Current 2011 and 2012 allocated funds of \$6,000 have not been used. The funds are targeted to run training workshop in September or October 2012 at the Australian Antarctic Division with the main aim of establishing a satellite CPR processing centre in South America, similar to those established at Australia, Japan, New Zealand and UK, as well as training Korean and French scientists. The workshop will provide training in service and maintenance of the CPR, deployment at sea, processing of samples and data logging.

\$5,000 is requested each for 2013 and 2014 for continued annual standards and analyses workshops and for training personnel. The location and timing of these workshops are yet to be set, but one is likely to be conducted in association with another meeting to maximise available travel funds, and one at the AAD, Australia.

References

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EG-Birds and Marine Mammals (BAMM)

Yan Ropert-Coudert on behalf of the Birds and Marine Mammals Group

EGBAMM has participated in the long-term effort of collecting and compiling data for several databases (see below).

Core members met at the 4th Bio-logging Symposium, Hobart, 2011 to discuss the Tracking Retrospective Analysis.

EGBAMM was also represented by Yan Ropert-Coudert at the CEAMARC-MPA-CAML meeting, Brest, 2011 where the distribution of at-sea top predators was examined using the EGBAMM network. Two outputs are planned for these data:

- A CCAMLR report, tentatively entitled “Estimating the biodiversity of the shelf and oceanic zone of the d’Urville Sea (East Antarctica)
- The Biogeographic Atlas of the Census of Antarctic Marine Life (details below).

The EGBAMM community is now able to benefit from the Integrated Publishing Toolkit (IPT) that ANTABIF has been developing over the past year. <http://ipt.gbif.org/>.

- *The people database*: a comprehensive list of all researchers working on birds and marine mammals has been built and is used to interact with this community (currently 171 members from 22 countries).
- *The references database*:
As of 15 December 2011, 3450 references concerning 102 SCAR species have been compiled. Yannick Bertho will develop a search engine so that the wider community can start using it. The development will occur over Jan-Jun 2012.
- *The Synthesis of Antarctic Tracking Data (SATD)*:
The gathering of raw tracking data of top predators from SCAR-marBIN database is on-going but suffered two major delays in 2011. Firstly, while in the process of conducting a small -scale

analysis of the data from the Australian regions, we realized that some of the data, which were listed as publicly available in the Australian Antarctic Division database were actually not public due to a mistake in the database regulations issued by the AAD. The issue is about to be solved but this has considerably delayed accessing those data. In addition, we are now extremely careful when accessing data so as to ensure that we have the authorizations to use them. Secondly, Mark Hindell has been contacted by Phil Trathan (British Antarctic Survey) on behalf of CCAMLR which is conducting a similar analysis to the one EGBAMM is proposing to do. CCAMLR has proposed to develop a collaboration over this project, adding thus their resources to ours. EGBAMM will be full partners in such a collaboration. Apart from CCAMLR and EGBAMM, Birdlife International will also be enlisted in the collaboration, a move that proceeds from a preliminary contact between EGBAMM and Phil Taylor from Birdlife International at the 4th Bio-Logging Symposium in Hobart (2011).

- *Penguiness Book:*

Alexandre Martin, a masters student in informatics in Strasbourg, France, was hired by the group to develop the alpha version of the EGBAMM webpage and update the version of the Penguiness Book database. The Penguiness book compiles the diving records (depth and duration) of all air-breathing vertebrates. Initially hosted at the National Institute of Polar Research in Japan, the Penguiness Book beta is now hosted at SCAR-marBIN (<http://penguinessbook.scarmarbin.be/>). Alexandre Martin and Yannick Bertho (informatician at the IPHC-DEPE, Strasbourg) will maintain these two webpages while the contents of these pages will be managed by Yan Ropert-Coudert and Akiko Kato at the IPHC-DEPE.

- *The Census of Antarctic Marine Life:*

As a result of EGBAMM's input we have now compiled 436 699 at-sea sightings data: 244 866 bird sightings; 178 480 seal sightings and 13 353 cetacean sightings!

Antarctic Biodiversity Information Facility (ANTABIF)

Funded by the Belgian Science Policy Office, ANTABIF is building an innovative Antarctic biodiversity information system, giving access to a distributed network of contributing database, according to the principles of the Global Biodiversity Information Facility. It is building a new data discovery tool using two complementary networks and will expand these by using an advanced technical architecture, capable of linking with many potential data resources.

ANTABIF integrates SCAR-MarBIN (Scientific Committee on Antarctic Research - Marine Biodiversity Information Network), with the biodiversity databases managed by the Australian Antarctic Division, bringing together data from marine and terrestrial realms.

We have now released an initial version of the ANTABIF Data Portal, which consolidates biodiversity data (taxonomy and occurrence) accessible through the SCAR-MarBIN (marine) or EBA's Antarctic Biodiversity (terrestrial and limnetic) websites.

The **ANTABIF architecture** is organized around the "biodiversity.aq" domain name, and includes a set of websites, portals and services:

www.biodiversity.aq: provides basic information on AntaBIF, as well as a dynamic links to the latest news and resources and projects developed within the network.

data.biodiversity.aq: ANTABIF's data portal. a single access point to search, visualize and download Antarctic biodiversity data. The data portal relies on a powerful search engine and machine learning.

ipt.biodiversity.aq: ANTABIF's Integrated Publishing Toolkit (IPT). Allow the users to manage, describe and share their biodiversity data. The IPT has the capacity to automatically generate a manuscript from the metadata (see i.e.: [Danis et al. 2012](#))

afg.biodiversity.aq: Antarctic Field Guides: a community-driven, online identification aid, which allows the user to create his/her own field guide to the Antarctic wildlife, in function of the region he/she is interested in, or the taxa he/she wants to focus on.

atlas.biodiversity.aq: the Biogeographic Atlas of the Southern Ocean establishes a new

synthesis of the biogeography of the Southern Ocean (patterns and processes), covering benthos, zooplankton, nekton, birds and seals, to provide a benchmark of biogeographic knowledge, and to help define the present biogeochemical and biogeographic provinces and to predict future changes under various climate change scenarios.

mars.biodiversity.aq: mARS is envisioned as an information system dedicated to facilitate the discovery, access and analysis of molecular microbial diversity (meta)data generated by Antarctic researchers. mARS will allow the discovery and integration of these microbial resources. By harboring this information directly at ANTABIF, Antarctic scientists will have the information archived and accessible through common language queries.

More projects are **in the pipeline**, including:

Interactive Identification Keys: coupled to the Antarctic Field Guides, Interactive Identification keys would ideally complement existing tools to help with the identification of Antarctic organisms. Get in touch with us if you'd like to try some available tools that we would like to test.

Gazetteer: Sharing a spatially explicit gazetteer for all the localities of the Southern Ocean and Antarctica would be a very powerful tool for generating many spatial diversity layers. We're looking for corresponding GIS shapefiles to complete the SCAR composite gazetteer.

Genomics/Proteomics: building on the experience we've gained in the framework of the CAML barcoding initiative, and on the workflows we are developing in the framework of the mARS initiative, we intend to offer an optimized access to genetic and proteomic data, with a special focus on georeferenced information. A set of analysis tools (BLAST/GEOBLAST) are also envisioned.

Expedition: an expedition database would add another layer to the geospatial capabilities of the ANTABIF tools and services. It is envisioned to couple sampling events with linked data.

Cross SSG-EG Advancing Technologies and Environmental Stewardship for Subglacial Exploration in Antarctica (ATHENA)

(Shared with PS)

1. Rationale for the Group

Antarctic subglacial aquatic environments (SAE) have been documented for some time using remote sensing geophysical techniques, but only very recently have plans been devised and implemented to sample and study these environments directly. The long lead in times for the sampling of these lakes is largely related to the technological difficulty of penetrating the overlying ice sheet, but also reflects the cautious approach warranted by the pristine nature of the environments, and their almost completely unknown capacity to sustain viable ecosystems. SCAR (e.g. via SALE) has played a fundamental role in shaping the science priorities and international partnerships in the nascent field of subglacial aquatic research, but now there is an important need for a new path forward that focuses international exchange on the appropriate technology and methodologies required to carry out the science in an environmentally responsible way. The goal of ATHENA Expert Group is to lay the foundations for future SAE exploration via the development of rate limiting Technological and Environmental infrastructure. The aims of this Expert Group are as follows:

- a. To establish the critical environmental and technological infrastructure for the future access, sampling and monitoring of Antarctic subglacial aquatic environments (SAE);
- b. To work with SCAR action groups, expert groups and research programmes to promote interdisciplinary science on Antarctic SAE;
- c. To provide an independent and international forum for the sharing of information and data during the run up to and execution of funded lake access drilling campaigns (e.g. US-WISSARD, UK-Lake Ellsworth and Russia-Lake Vostok).

2. Report on Progress

Under *Objective 1*, the environmental and technological infrastructure has begun to be established

for future SAE exploration, coordinated by this Expert Group which has maintained a presence in national campaigns via the actions of its members (e.g. Wadham on Steering Committee of the Lake Ellsworth Programme, Doran on the advisory body for the WISSARD project and Alekhina in the Vostok programme). Clean probes and lake entry technologies are being developed and there is good communication between leading groups.

The presence of the ATHENA Expert Group has undoubtedly enabled a dialogue between national groups to be continued following SALE, and has helped to maintain the exchange of ideas and information on clean technologies (e.g. during the entry into Lake Vostok, which led to a number of “reactive” type media activities by ATHENA and former SALE members), thus addressing *Objective 3*.

Cross-SSG-EG-Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED)

(Shared with PS)

Recent and forthcoming events

- In Nov 2011 a meeting was held between ICED and scientists involved in the proposed SCAR programmes AnT-ERA and Ant-ECO, to ensure coordination between the three programmes via forthcoming conferences, programme workshops, reports and planned papers, fieldwork, modelling and data synthesis and mining activities, E&O activities, the ICED website and other relevant international programmes
- ICED scientists at the British Antarctic Survey (BAS), in partnership with external ICED members, have recently been awarded a Natural Environment Research Council (NERC) International Opportunities Fund (IOF) ‘Coordinating ICED: Implementation of the ICED Programme’, Jul 2012-15
- ICED Scientists at the BAS and the Alfred Wegener Institute (AWI) have recently been awarded a EUR-OCEANS Consortium Flagship Project (entitled Flagship for Polar Ecosystem Change and Synthesis – PolEcoSyn), Nov 2011-13. The main aims of this project are to;
 - Develop a network of EU Polar Scientists (see www.iced.ac.uk)
 - Conduct detailed studies on food web structure and biogeochemical processes for the South Atlantic sector of the Southern Ocean- to inform and refine predictions of change
 - Publish a review of circumpolar food webs in the Southern Ocean (qualitative comparison, towards quantitative)- to inform and refine predictions of change
- ICED is currently developing its interactive fieldwork mapping tool on the ICED website. This tool will provide information on planned and proposed Southern Ocean fieldwork and improve coordination in the region
- ICED recently supported the Sentinel workshop :‘State of knowledge of SO food webs’, run by Andrew Constable, Aus, 7-11 May 2012
- ICED Session to be held at SCAR (Response of SO ecosystems to change), USA 16-19 Jul 2012
- ICED SSC meeting (to be held alongside SCAR)
- PolEcoSyn Workshop at AWI (autumn 2012) to unite the network of EU Polar Scientists and;
 - Develop of EU polar ecosystems science strategy
 - Link biogeochemical and ecosystems research for Polar Regions
 - Outcomes will feed into ICED-IOF Workshop (UK, 2013)

Food web Modelling

- Circumpolar food web review (under the PolEcoSyn project)

- Food web quantification and comparison – ongoing work, requires more integration
- Circumpolar food web analyses => development of generic model structure
- Agreed need to focus on coupling and scenario analysis
- ICED integrated modelling strategy/expert action group needs establishing (this will be discussed at next ICED SSC meeting)

Data syntheses and mining – building circumpolar maps of distribution

- Data Mining Action Group needs establishing (this will be discussed at next ICED SSC meeting)
- ICED scientists at BAS are currently seeking funds to develop an ICED data portal & mine *Discovery Investigations* data further

Fieldwork coordination

- BAS soon to redevelopment and launch of fieldwork map tool/links with SOOS and Sentinel Wiki
- Planning of fieldwork phase (potential for workshop)
- Forthcoming NSF funded project to undertake foodweb analysis in the Ross Sea

Workshops

- **IPY Science into Policy Conference, Apr 2012: ICED Session Convened by Jose Xavier, Eileen Hofmann and others**
 - ICED Session was a success, the 2nd most subscribed session. Andrew Constable gave a presentation on Sentinel and progress of ICED
- SCAR Open Science Conference, Jul 2012: ICED Session Mon 16th convened by Nadine Johnston and Jose Xavier, Eugene Murphy and Eileen Hofmann co-convenors
- PoIEcoSyn workshop, Oct 2012
- ICED IOF workshop: Predicting change in Southern Ocean Ecosystems, Spring 2013. Format to be decided
- Potential fieldwork planning/coordination workshop

Informing policy

- Scenario testing => inform IPCC
- Monitoring/Marine Protected Areas/Modelling => inform CCAMLR
- ICED session IPY Science into Policy Conference
- Ecosystem services and valuation
- Strategy for European polar ocean ecosystem research (PoIEcoSyn)

Education and outreach

- ICED website now has an area on the home page where people wanting to become involved in the ICED community can upload their details (contact name, institute, country, area of research, email).
- Via ICED SSC links with Association of Polar Early Career Scientists (APECS)
- Developed E&O area of the ICED website, update every 6 months

Cross SSG-AG-Ocean Acidification (OA)

(Shared with PS)

1. Rationale for the Group

The oceans provide an important service in absorbing from anthropogenic CO₂ perturbations of the natural carbon cycle and therefore lowering the warming effect of a larger atmospheric CO₂ reservoir. To date, the oceans have absorbed around 50% of anthropogenic CO₂ (defined as the excess CO₂ in the system over the natural cycle) and at present are taking up about 25%

annually. There is, however, a cost to this natural carbon mitigation. As carbon dioxide dissolves in seawater the speciation of dissolved inorganic carbon is altered - a process termed ocean acidification. There are measurable changes in marine carbonate chemistry that have been shown to change physiological and biogeochemical systems. Although there are developments towards a greater understanding of global acidification and development of observational and experimental strategies, the Southern Ocean is poorly represented. To date there has not been a group who focus specifically on coordination of Southern Ocean acidification research, hence SCAR approved the formation of the new group.

2. Report on Progress

There has been significant consultation with existing global ocean acidification efforts (e.g SOLAS/IMBER Sub Group 3, US Ocean Carbon Biogeochemistry and the SCAR ICED and the SCAR Oceanography Expert Group.)

Members of the SCAR OA Action group with expertise on ocean chemistry and plankton interactions met in Tromsø, Sept 27-29 in conjunction with the "Acidification in aquatic environments" workshop.

Plans are being made for the first group meeting for the lead authors where the first draft will be devised and other authors identified and invited to the writing team. Other international experts will be invited to this meeting. The project funds will be used to support this meeting.

3. Future Plans

OA session and AG Town hall meeting in Portland July 2012

Full author list complete by September 2012

Sketch of each chapter complete by December 2012

Sketch sent out for wider consultation January 2013

Science workshop in China/Hong Kong late summer 2013

Writing complete by December 2014

Printing completed by Spring 2014

Presentation of report SCAR meeting summer 2014

Leader authors

Richard Bellerby, Uni Research, University of Bergen, Norway (Chair)

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Nikki Lovenduski, University of Colorado, Boulder, USA

Ben McNeil, Climate Change Research Centre, University of New South Wales, Australia

Kurihara Haruko, University of the Ryukyus, Okinawa, JAPAN

Philip Tortell (University of British Columbia, Vancouver BC Canada)

Cross SSG-AG Prediction of Changes in the Physical and Biological Environments of the Antarctic (PCPBEA)

(Shared with PS)

1. Rationale for the Group

The cross-SSG Action Group on Prediction of Changes in the Physical and Biological Environments of the Antarctic was established at the SCAR Delegates' meeting in Moscow in July 2008. Its brief is to improve our ability to predict how the Antarctic environment will evolve over the next century. It is a cross-disciplinary group that brings together meteorologists, oceanographers and marine and terrestrial biologists. It has an initial 4 year lifetime.

2. Report on Progress

Progress - A major focus of the group this year has been utilizing the climate model data that are becoming available for the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), which is due to report in 2014. The world's leading climate prediction centres are running coupled atmosphere-ocean general circulation models (GCMs) as part of the *Coupled Model Intercomparison Project 5* (CMIP5). The models are being run for periods of

several hundred years with pre-industrial forcing, through the historical period since 1860 with observed forcing and out to 2100 driven by various greenhouse gas emission scenarios and predicted recovery of the ozone hole. A new method has been developed by Dr. Tom Bracegirdle (Bracegirdle and Stephenson, 2012) to combine the predictions of the various models taking into account their biases in simulating the present climate. This has the potential to give more precise surface temperature projections for the coming century. This work was presented at the WCRP workshop on CMIP5 model analysis held in Hawaii over 5-9 March 2012.

Several members of the AG have contributed to the writing and reviewing of chapters of the next IPCC Assessment Report.

Work has continued on the development of high horizontal resolution atmosphere-only climate models that can be run over regions of the Antarctic continent and Southern Ocean. A horizontal resolution of 4 km or less is needed to realistically simulate the complex orography of areas such as the Antarctic Peninsula. The current generation of models used in exercises such as IPCC have a resolution of about 200 km, so it is necessary to use statistical and dynamical downscaling techniques to produce meaningful predictions of the climate for areas such as the Peninsula. These predictions with a higher spatial resolution will be of value in studies of the terrestrial biota.

Members of the AG have developed a cross-disciplinary concept outlining how to improve habitat suitability (environmental envelop) models and apply them to Antarctic marine and terrestrial ecosystems. This concept enables spatial and temporal predictions of the distribution of species, using known occurrences as well as environmental demands of species and results of physical climate change scenarios. It includes various aspects of ecosystem dynamics as well as new biomolecular approaches (Gutt et al. in press).

Cross-disciplinary analyses that link climate change scenarios to potential ecological impacts are beginning to emerge from the Antarctic science community. For example, the team behind the IPY project, *Aliens in Antarctica*, has recently published a continent-wide risk assessment for the establishment of non-indigenous species in Antarctica including an evaluation of the situation in 2100 based on IPCC Scenario A1B (Chown et al. 2012). The ready availability of model-derived data and the continued up-dating of the ACCE synthesis are essential for supporting the wider up-take of this approach.

An example of such cross-disciplinary analysis in a marine ecosystem is the use of CMIP5 sea surface temperature projections for 2070-2100, together with an empirical model of Antarctic krill habitat suitability. These have been combined to investigate the potential impact of 21st Century climate change on krill distribution and assess the implications for land-based predator species on South Georgia.

Data - The group is developing a web-based collection of basic fields describing the physical environment of the Antarctic and the Southern Ocean. This will be of use to many scientists who have an interest in the climate of high southern latitudes. A version is online at http://www.antarctica.ac.uk/met/SCAR_ssg_ps/Atlas/index.html and the SCAR community is invited to comment on how this resource can be developed. It is planned that CMIP5 predictions will be added in due course.

Outreach - Members of the AG gave many talks over the year on Antarctic prediction to groups ranging from schools to professional bodies. The group maintains a web site at http://www.antarctica.ac.uk/met/SCAR_ssg_ps/Prediction/. This provides details of our activities, group membership and formal minutes of our meetings.

The ACCE report - Several members of the AG are involved in updating the 80 'key points' from the original ACCE report published in 2009. This is dealt with in more detail in the report of the EG on ACCE.

3. Future Plans

We propose that the AG merges with the EG on Antarctic Climate Change and the Environment (ACCE) to form a single group that is responsible for advising on Antarctic climate matters and possible impact on the environment.

References

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Cross-SSG-AG-Environmental Contamination in Antarctica (ECA)

(Shared with PS)

Prepared by: Gabriele Capodaglio

The steering committee of the group:

Dr. Susan Bengtson Nash, Griffith University, Australia, s.bengtsonnash@griffith.edu.au

Prof. Gabriele Capodaglio, University Ca' Foscari of Venice, Italy, capoda@unive.it

Prof. Paolo Cescon, University Ca' Foscari of Venice, Italy, cescon@unive.it

Prof. Roger Fuoco, University of Pisa, Italy, fuoco@dcci.unipi.it

Prof. Guibin Jiang, State Key Laboratory of Environmental Chemistry and Ecotoxicology, China, gbjiang@mail.rcees.ac.cn

Prof. Berry Lyons, Ohio State University, USA, lyons142@osu.edu.

Dr Jenny Webster-Brown, University of Canterbury, New Zealand, jenny.webster-brown@canterbury.ac.nz.

More than fifty scientists are actually involved in the group.

During the 3rd ECA meeting held at the XXXII SCAR conference in Buenos Aires was decided to extend the collaboration with other groups in order to plan common actions. A more intensive contact with scientists related to the biological aspects of Environmental contamination was established to better integrate competence from SSC-PS and from SSD-LS and, more recently, a connection was established with the Action Group on Antarctic Fuel Spills (AGAFS) to coordinate common scientific activities to study the fate and effect of organic pollutants in polar environments.

Two reviews presenting the state of the art on chemical contamination and distribution of inorganic components in marine systems and lake waters are ready to be published on scientific journals. Collected data were integrated on the ECA dedicated portal of the Antarctic Master Directory.

Results

- The ECA data base was integrated in the Antarctic Master Directory; the integration of data on Organic and trace elements was completed.
- Two reviews, focussing on the distribution of Trace elements in fresh and lacustrine waters was prepared and are ready to be submitted to scientific journal.
- One session of the XXXII SCAR and Open Science Conference that will be held in Portland at July 2012 will be dedicated to the Environmental Contamination in Antarctica.
- Future activities will be discussed and planned considering the biological implications of environmental contamination as well aspects of common interest with the AGAFS Action Group.

Cross-SSG-AG-Seeps and Vents Antarctica (SAVAnt)

(Shared with GS)

Members: Dr Phil O'Brien, Dr Jodie Smith

1. Rationale for the Group

The Seeps and Vents Action Group was established in 2008 to provide the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) with information on hydrothermal vents and cold seeps so their biota can be protected as Vulnerable Marine Ecosystems.

2. Report on Progress

The Action Group has been fairly inactive with retirement of the first coordinator and his replacement going on maternity leave, however, active vents are now being studied in the Antarctic and we have provided researchers with the CCAMLR notification forms.

3. Future Plans

Unless someone actively engaged in seeps and vent research wishes to expand the role of the group, the primary function should be monitoring activities and making sure researchers are aware of the need to notify CCAMLR of the locations of chemotrophic communities.

4. Other Business

Krill fishing in ASMA 1 was brought to the attention of CEP/ATS by CCAMLR and ASOC. Plan did not include fishing and is now being revised. There will be a workshop last week in March to discuss this issue. There was disagreement on implementation of no fishing. Thirty years of monitoring in the area, so fishing without our knowledge may have serious impact on research. Fishing should be consistent with any ASMA to protect research activities. This is being addressed by CCAMLR, but we need to have information on fishing activities.

Working group on prey – will integrate with ANtECO, ANtEra and the EG birds and mammals.

5. SCAR Meeting feedback

Business Meeting: The SSG-LS likes the split business meeting as it gives opportunity during the OSC to discuss business, expand views, develop plans and complete subsidiary reports.

Open Science Conference:

- Poster schedule needs to be modified to have chance to see other posters, especially for students
- Errors in identification of authors and notification
- Uploading to open system where anyone can download the ppt submissions is against security rules of many universities and government agencies, and people will only present published data
- But make some figures available for APECS and teachers
- Confusing because could not always get on internet to see program, so need at least a short program available
- Program should be on a memory stick in the registration bag
- People not aware of a place to print
- Two different websites made it confusing

Loss at the Brazilian Station - The SSG-LS wishes to extend its sympathy to the people of Brazil for its loss of two lives and the buildings at its Comandante Ferraz Station.

6. Budgetary Implications

SSG-LS proposed funding allocation 2013-14 (USD x 1000)

Group	Contact	Purpose	Requested Allocation	
			2013	2014
EG-HB&M	Jeff Ayton/Marc Shepanek	Website, meetings	5	5
EG-BAMM	Mark Hindell/Yan Ropert-Coudert	Annual meeting	10	10
EG-CPR	Graham Hosie	Annual standards and analyses workshops	5	5
ANTABIF	Bruno Danis	Annual workshop	5	5
Cross AG-SAVAnt	Jodie Smith and Phil O'Brien		0	0
Cross EG-ATHENA	Jemma Wadham and Peter Doran	Complete publication	1	0
Cross AG-Ocean Acidification	Richard Bellerby	meetings	5	5
Total			31	30

7. Appendices

JEG-HB&M

Annex A to Medical Group Report 2012

Medical Advisory Group to SCAR and COMNAP - JEGHBM

Terms of Reference

1. Membership of the group will comprise nominees from members of SCAR and COMNAP.
2. Individuals who have particular expertise may be invited by the Chairman of the group to participate as associate members (without voting rights).
3. The Advisory Group will report to SCAR through the SSG-LS, working to further international cooperation and collaboration in basic and applied research on and healthcare of humans in Antarctica (e.g. biomedical sciences, social and behavioral sciences, and medicine) and to promote international co-operation in these fields.
4. The Advisory Group will work with SCAR and COMNAP to further international cooperation and will work to improve healthcare in Antarctica and to facilitate human health and well being in this environment. The group will propose relevant areas of interest to SCAR and COMNAP.
5. The Advisory Group may establish subgroups to consider particular aspects of its sphere of interest.
6. The Advisory Group may apply through the SSG-LS to SCAR, and to COMNAP for funding to support the Group's activities.
7. The Advisory Group will work to encourage the development of regional networks to foster international cooperation. Networks may arrange meetings, inviting members to attend.
8. The Advisory Group will meet as required to present research findings (usually in association with SCAR OSC or COMNAP) and / or to work cooperatively on a particular task or area of interest.
9. The chair or the Group will submit an annual report to SCAR and COMNAP.

Annex B to JEGHBM group report 2012

SCAR and COMNAP JEGHBM

Provisional Membership

This list has been prepared from the latest information held by the COMNAP principal contact for Medicine and Chair of the SCAR EGHBM. Some of it is undoubtedly out of date. Some nominees are medical officers, some are contacts for an organization. SCAR and COMNAP members are asked to check the nominations and to provide up to date email and postal addresses and telephone numbers for their current nominees. Those members who have not nominated members / contacts are asked to consider doing so as soon as practicable, and to inform the group executive (jeff.ayton@aad.gov.au), and SCAR / COMNAP secretariats.

Nominees

Country	SCAR	COMNAP
Argentina	Mariano Memolli	Marcela Akerman, Roberto Bortnick
Australia	Jeff Ayton	Jeff Ayton
Belgium		
Brazil	Geny Cobra Nestor	Miranda Junior
Bulgaria		
Canada	Peter Suedfeld	
Chile		
China	Xue Chengli	Xie Peng
Ecuador		
Finland	Tiina Makinen	Viekko Kujala
France	Claude Bachelard	Claude Bachelard
Germany	Eberhard Kohlberg	Eberhard Kohlberg
India		
Italy	Sergio Pillon	Fabio Catalano
Japan	Giichiro Ohno	Giichiro Ohno, Yusei Ikeda
Netherlands		
New Zealand	Gary Steel	Paul Peterson
Norway	Holger Ursin	John Guldahl
Peru		Alejandro Venero Mortola, Luis Colque Pacheco
Poland		
Romania	Florica Toparceanu	
Russia	Gennady Gurbunov	Konstantin Levando

Korea		Yoon Kang, Kim Daison
South Africa		Brigadier L J Smith
Spain	Jeronimo Lopez	Fransisco de Diego
Sweden	Ingvar Holmer	Krister Ekblad
Switzerland	Urs Scherrer	
Ukraine	Moisejenko Yevgen	Moisejenko Yevgen
UK	Anne Hicks	Anne Hicks
USA	Marc Shepanek	Mike Montopoli
Uruguay	Roberto Lagomarsino	

Annex C to Medical group report 2012
SCAR Life Sciences Standing Scientific Group
SCAR / COMNAP Joint Expert Group on Human Biology and Medicine
Strategy for Medical and Human Biology Research in the Antarctic. July 2012

This Strategic plan covers the period 2011 – 2016, three consecutive biennial cycles. It reflects SCAR's strategic vision "for a world where the science of Antarctica is used for the benefit of all, excellence in science is valued, and scientific knowledge is effectively linked to policy making".

The Joint Expert Group on Human Biology and Medicine (JEGHB&M) is the only organization which has a full knowledge of:

- the current and recent human biology and medicine research being undertaken in the Antarctic
- areas of national expertise
- facilities and populations available, and the existing research load on limited numbers of individuals
- the capabilities and limitations of individual units, and is thus uniquely placed to assist in the coordination of research to help overcome the fragmented nature of current projects, and the problems of small numbers participating in any given project.

In the first biennial period therefore the Joint Expert Group should concentrate on becoming better known to the general scientific community and agencies which commission applied medical research. Individual members who are approached with proposals for research should encourage the proposer to involve other JEGHB&M members and resources. The JEGHB&M website should link to and from other sites involved in remote healthcare and Antarctic research. A presentation on the ways in which JEGHB&M can assist should be developed and hosted on the website.

For example, the space agencies have expressed some concern that current use of the Antarctic as a Space Analogue is not sufficiently targeted and that using the wrong stations as analogues can produce incomplete or inaccurate results which are not transferrable. This is often due to investigators being unaware of the exact nature of the stations and using current contacts. Coordination of such projects by the JEGHB&M could help ensure that the correct groups were involved to overcome these problems, and potentially aid recruitment.

Members should be encouraged to develop local networks within their geographical area to engage other doctors involved in Antarctic Research from universities and institutions not yet linked to SCAR, such as has been effectively formed in Asia.

During this period the JEGHB&M should also explore areas of cooperation with IASC, the International Union of Circumpolar Health and other organizations involved in HB&M research in the Arctic. Although there are huge differences between the two polar regions, there are also areas such as:

Telemedicine

Isolated and confined environments, group dynamics and multicultural effects

The effects of 24 hour night Genetic and physiological variation in reactions to cold, altitude and hypoxia and other variables including electromagnetic and climatic changes.

Pharmacological matters such as drug viability

Where cooperative work may be possible and beneficial.

Linkages can also be established with agencies involved in the area of Human Behavior and Performance Skills, and with Action Groups, such as the Social Action Group, or Human Impact and Alien Species working groups where appropriate. Cognizant of developing climate change, the group should also encourage disease surveillance and a mechanism for reporting of novel medical problems, particularly infectious disease.

JEGHB&M should also encourage collaborative working across species. In recent years bird biologists have assisted in the collection of ticks from seabirds to assess the risk of them being a vector for Lyme disease transmission as happens in the Northern Hemisphere. There is room to develop other linkages, again particularly in the realm of genetics and comparative physiology or zoonotic disease, vector transmission and changes in these over time, particularly with changes in climate.

Funding for HB&M research in small studies has always been difficult to obtain. Acting as a resource for those who have funded research which requires local knowledge and facilities to complete would allow JMEG members to enter partnerships and continue to further knowledge and evidence for Antarctic and global healthcare. Such projects in turn can be used to encourage doctors working in the Antarctic to engage in research, gain publications and in some cases higher degrees.

In the longer term, JEGHB&M members should collaborate with SCAR, COMNAP and individual National Programs to undertake health data collection, including a longitudinal epidemiological study of healthcare problems in the Antarctic. Many nations have considerable data about health, wellbeing and psychosocial events, past present and into the future, but there is no way of sharing this data in an anonymous form. Establishing a secure databank which can be interrogated by members with specific questions would greatly enhance the understanding of healthcare problems and needs in the Antarctic and could inform further research, policy, and logistic requirements.

EG-CPR

Appendix I. Summary of activities in relation to the Terms of Reference

1. *Provide guidance to the SCAR Southern Ocean CPR Survey in order to meet the survey objectives.*
 - a. *Map the biodiversity and distribution of plankton, including euphausiid (krill) life stages, in the Southern Ocean.*
The new Southern Ocean CPR Zooplankton Atlas has been in the 10th SCAR Biology Symposium special volume of *Polar Science*. CPR data are continuing to be used for both the Biogeographic Synthesis Atlas and CCAMLR MPA workshops. Biogeographic modelling of the most numerically abundant species and key species such as krill is continuing. A recently completed PhD thesis (University of Tasmania) on the distribution and abundance of larvacean made extensive use of CPR data.
 - b. *Use the sensitivity of plankton to environmental change as early warning indicators of the health of Southern Ocean, by studying spatial-temporal variation in plankton patterns.*
We are still monitoring apparent changes from krill to mesozooplankton dominance observed in the sea-ice zone of eastern Antarctica. Localised blooms of pelagic foraminiferans continue to be observed following the extensive blooms of 2005. The HAB dinoflagellate *Noctiluca scintillans* was found more than 200 km south of Tasmania in oceanic waters (McLeod et al., 2012). This is normally a neritic species but occurred in large numbers, in good condition and feeding on diatoms. We do not know the consequences of *Noctiluca* becoming established in the Southern Ocean. New indicators are being developed in the GACS global analyses. First analysis shows a shift to larger copepod species throughout the region south and west of Australia.
 - c. *Serve as reference on the general status of the Southern Ocean for other monitoring programs.*
The SO-CPR Survey will be a core biological component of SOOS. The SOOS Science Strategy has recommended that the SO-CPR Survey be maintained and expanded and in particular fill gaps in the Pacific and Atlantic sectors and in winter. Formal affiliation is being established between SO-CPR and SOOS and also between SOOS and GACS. CPR will also contribute to the developing Southern Ocean Sentinel project, and can contribute to the new SCAR SRPs AntEco and Ant-ERA. The CPR data are provided to CCAMLR, and a member of CCAMLR continues to serve on the EG-CPR.
2. *Develop and maintain the SO-CPR Database and to improve access for users.*
The dataset currently holds ~31,000 records at 5 nmile resolution for about 230 species and krill developmental stages plus environmental data up to the end of the 2009/10 season (March 2010). This represents approximately 70% of the Southern Ocean. Completion of sample analysis from 2010/11 and 2011/12 seasons will extend the database to ~36,000. Data are held at the AADC and accessible through SCAR-MarBIN. SO-CPR partners hold copies of the data. Data are a major contribution to the GACS global CPR database and also provided to CCAMLR.

3. *Expand and enhance the SO-CPR Survey to include more ships and repeat transects around Antarctica.*

CPR tows south of South Africa east to the Ross Sea area are well established and maintained by Australia, Japan and New Zealand. We continue to work on establishing regular tows across Drake Passage with the support of Brazil, Chile and USA. We are working with France to develop their survey in the Kerguelen region, and with Korea and Russia to enhance sampling in the Ross Sea to WAP (Pacific) sector. Our founding membership in GACS is a significant step forward in enhancing our regional and global capability, and fill in spatial gaps around Antarctica while also contributing to a global network.

4. *Provide appropriate advice on CPR methodology, data and results to SCAR and to the ATS.*

We continue to receive requests for data, from individual researchers through to CCAMLR and SCAR workshops. All requests for data and advice on methodology have been answered. Training courses have been conducted at AAD, NIPR, NIWA and SAHFOS. Several papers and a thesis have been produced, and numerous presentations made at national and international meetings in the last two years. EG-CPR and SO-CPR members have been active and lead participants in the establishment of GACS, as well as actively contributing to other programmes such as SOOS, Sentinel and CCAMLR. Through GACS we are developing our relationship with IOC-GOOS and POGO.

Appendix II. EG-CPR Membership and ToR

Terms of Reference

1. Provide guidance to the SCAR Southern Ocean CPR Survey in order to meet the survey objectives.
 - a. Map the biodiversity and distribution of plankton, including euphausiid (krill) life stages, in the Southern Ocean.
 - b. Use the sensitivity of plankton to environmental change as early warning indicators of the health of Southern Ocean, by studying spatial-temporal variation in plankton patterns.
 - c. Serve as reference on the general status of the Southern Ocean for other monitoring programs.
2. Develop and maintain the SO-CPR Database and to improve access for users.
3. Expand and enhance the SO-CPR Survey to include more ships and repeat transects around Antarctica.
4. Provide appropriate advice on CPR methodology, data and results to SCAR and to the ATS.

Membership, July 2012

*Dr Graham Hosie (Co-Chair, AAD Australia)
 *Prof. Mitsuo Fukuchi (Co-Chair, NIPR Japan)
 Dr Kunio Takahashi (NIPR Japan)
 Prof. Dr Uli Bathmann (AWI Germany)
 *Dr Julie Hall (NIWA New Zealand)
 Dr Peter Ward (BAS United Kingdom)
 Dr Brian Hunt (UBC Canada)
 *Prof. Erik Muxagata (FURG Brazil)
 *Prof. Peter Burkill (ex-Director SAHFOS)
 Dr Andrew Constable (CCAMLR)
 Dr Bruno Danis (SCAR-MarBIN)

Dr Stevens has left NIWA and has been replaced by Dr Julie Hall (NIWA, New Zealand). Similarly, Dr Bassoi is no longer conducting CPR work and has been replaced by Prof. Muxagata (Federal University of Rio Grande) as the principal South American representative.

*Indicate members of the GACS Board of Governance.

Meetings

EG-CPR primarily meets electronically, specifically by email correspondence. During the last two years the co-chairs have met on a regular basis in Australia and Japan to discuss developments in the SO-CPR Survey. Both are founding members of GACS. Dr Hosie has also met with most other members, at least once in the last two years. Travel has been supported by the AAD, NIPR, SAHFOS and GACS. Dr Hosie is Chair of the GACS Board of Governance, and continues to be a trustee of the Sir Alister Hardy Foundation for Ocean Science (SAHFOS) Council.

Appendix III. SO-CPR Publications and Presentations since SCAR Buenos Aires report Peer Review

- Hosie, G.W., Koubbi, P., Riddle, M., Ozouf-Costaz, C., Moteki, M., Fukuchi, M., Ameziane, N., Ishimaru, T., Goffart, A. (2011) CEAMARC, the Collaborative East Antarctic Marine Census for the Census of Antarctic Marine Life (IPY # 53) : an overview. *Polar Science* 5 (2), 75-87 - doi:10.1016/j.polar.2011.04.009
- McLeod, D.J., Hallegraeff, G.M., Hosie, G.W., and Richardson, A.J. (2012) Climate-driven range expansion of the red-tide dinoflagellate *Noctiluca scintillans* into the Southern Ocean. *Journal of Plankton Research*. 34, 332-337
- Reid, P.C., Bathmann, U., Batten, S.D., Brainard, R.E., Burkill, P.H., Carlotti, F., Chiba, S., Conversi, A., Dickson, R.R., Dooley, H., Edwards, M., Flinkman, J., Fukuchi, M., Goes, J., Goni, G., Greene, C.H., Hare, J.A., Hays, G.C., Head, E., Hood, R.R., Hosie, G.W., Hunt, B.P.V., John, A.W., Jonas, T.D., Jossi, J.W., Karlson, B., Kim, K., Kirby, R.R., Kitchener, J., Kobayashi, D., Lakkis, S., Llope, M., Lopes, R.M., MacDiarmid, A., McQuatters-Gollop, A., Malone, T., Matondkar, P., Muxagata, E., Pershing, A., Richardson, A.J., Robertson, D., Robinson, K., Sartimbul, A., Stenseth, N.C., Sugisaki, H., Stevens, D., Vanden Berghe, E., Verheye, H., Vezzulli, L., Ward, P. (2010) A Global Continuous Plankton Recorder Programme. In *Proceedings of OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 2)*, Venice, Italy, 21-25 September 2009, Hall, J., Harrison, D.E. & Stammer, D., Eds., ESA Publication WPP-306. Doi: 10.5270/OceanObs09.cwp.73
- Takahashi, K.T., Hosie, G.W., Kitchener, J.A., McLeod, D.J., Stevens, C., Robinson, K., Jonas, T. and Fukuchi, M. (2012) Report on "Southern Ocean CPR Standards Workshop -SCAR Expert Group on CPR Research". *Nankyoku Shiryou (Antarctic Record)* 55 (3), 277-284
- Takahashi, K.T., Hosie, G.W., Kitchener, J.A., McLeod, D.J., Stevens, C., Robinson, K., Jonas, T. and Fukuchi, M. (2012) Report on "Southern Ocean CPR Standards Workshop -SCAR Expert Group on CPR Research". *Nankyoku Shiryou (Antarctic Record)* 55 (3), 277-284
- Takahashi, K.T., Hosie, G.W., McLeod, D.J., Kitchener, J.A. (2011) Surface zooplankton distribution patterns during austral summer in the Indian sector of the Southern Ocean, south of Australia. *Polar Science* 5(2). 134-145
- Takahashi, K.T., Hosie, G.W., McLeod, D.J., Kitchener, J.A. (2011) Surface zooplankton distribution patterns during austral summer in the Indian sector of the Southern Ocean, south of Australia. *Polar Science* 5 (2), 134-145 - doi:10.1016/j.polar.2011.04.003

Thesis

- Lindsay, M.C.M. (2012) Distribution and abundance of larvaceans in the Southern Ocean. *Ph.D. Thesis, University of Tasmania*. 350 pp.

Conference Abstracts

- Hosie, G., Batten, S., Chiba, S., Edwards, M., Fukuchi, M., Hall, J., Melrose, C., Muxagata, E., Owen, N., Richardson, A., Sun, S., Verheye, V., Burkill, P. (2012) Global Alliance of Continuous Plankton Recorder Surveys (GACS): placing local/regional monitoring in a global context. *Marine Extremes and Everything in Between - Abstracts of the 2012 Australian Marine Sciences Association and New Zealand Marine Sciences Society Joint Conference*. p 122
- Hosie, G., Constable, A., Raymond, B., Wright, S., Kawaguchi, S. (2011) Australia's current and future Southern Ocean routine marine observations. *Abstracts of XXXIII Symposium on Polar Biology, National Institute of Polar Research, 17-18 November 2011*.
- Hosie, G.W. (2011) Changes in Antarctic plankton and krill: consequences for the future. *Plankton 2011: Biodiversity & Global Change 22-23 September 2011*.
- Hosie, G.W., Hall, J., Mormede, S., Raymond, B., Pinkerton, M., Kitchener, J., Robinson, K., McLeod, D. (2011) Predicting biogeographic patterns of Southern Ocean and Antarctic zooplankton using Continuous Plankton Recorder data. *New Zealand-Australia Symposium in Ocean Observing and Data Management. University of Tasmania, 5-6 December 2011*.
- Hosie, G.W., Mormede, S., Raymond, B., Pinkerton, M., Field, I. (2011) Predicting biogeographic patterns of Southern Ocean and Antarctic zooplankton using Continuous Plankton Recorder data. *The 2011 Annual Conference of The Australian Marine Sciences Association. Fremantle, Western Australia 3-7 July 2011*, p 72.
- McLeod, D., Hallegraeff, G., Hosie, G., Richardson, A. (2011) Climate-driven range expansion of *Noctiluca scintillans* into the Southern Ocean. *Plankton 2011: Biodiversity & Global Change 22-23 September 2011*.

- McLeod, D., Hallegraef, G., Hosie, G., Richardson, A. (2012) Climate-driven range expansion of *Noctiluca scintillans* into the Southern Ocean. *Marine Extremes and Everything in Between - Abstracts of the 2012 Australian Marine Sciences Association and New Zealand Marine Sciences Society Joint Conference*. p 143
- Takahashi, K.T., Hosie, G.W., Fukuchi, M. (2011) The variability of zooplankton distribution patterns between nine seasons along the 110°E and 150°E in the Southern Ocean. *Plankton 2011: Biodiversity & Global Change 22-23 September 2011*.

Articles

- Harris, N. (2011) Southern Ocean plankton is changing. *Australian Antarctic Magazine*, Issue 20, 13
- Hosie, G. (2012) Recording plankton in the Southern Ocean. *Marine Scientist*. No. 39 May 2012

EG-BAMM

Example of the contribution of EGBAMM on four species of top predators: the emperor and king penguins (Author: Barbara Wienecke), the southern elephant seal (Author: Iain Field), the Antarctic fur seal (Author: Ian Staniland). Although the guide is still under development stage as can be seen on the pdf attached to this report, the contributions already submitted by EGBAMM authors are complete. In annex is the list of the species that will be produced together with the authors who accepted to be in charge of a given species, and their progress. One output that we have in mind for this guide is the production of a hardcover book based on the output of EGBAMM contribution to the Antarctic Field Guide and illustrated with high resolution photos of the different species.

BIRDS		Common Name	Scientific Name	Contributor	Text sent	ONLINE	
	ALBATROSSES	Wandering Albatross	Diomedea exulans	Jean-Baptiste Thiebot			
		Antipodean Albatross	Diomedea (exulans) antipodensis				
		Amsterdam Albatross	Diomedea (exulans) amsterdamensis				
		Tristan Albatross	Diomedea (exulans) dabbenena				
		Black-browed Albatross	Thalassarche melanophris				
		Salvin's Albatross	Thalassarche (cauta) salvini				
		Grey-headed Albatross	Thalassarche chrysostoma				
		Atlantic Yellow-nosed Albatross	Thalassarche chlororhynchos				
		Indian Yellow-nosed Albatross	Thalassarche (chlororhynchos) carteri				
		Sooty Albatross	Phoebastria fusca				
		Light-mantled Albatross	Phoebastria palpebrata				
		PETRELS	Southern Giant Petrel	Macronectes giganteus			
			Northern Giant Petrel	Macronectes halli			
			Southern Fulmar	Fulmarus glacialis	Jeroen Creuwels		
	Antarctic Petrel		Thalassoica antarctica	Jeroen Creuwels			
	Cape Petrel		Daption capense	Peter Hodum			
	Snow Petrel		Pagodroma nivea	Peter Hodum			
	Blue Petrel		Halobaena caerulea				
	Fairy Prion		Pachyptila turtur	Alain De Broyer			
	Slender-billed Prion		Pachyptila belcheri	Alain De Broyer			
	Fulmar Prion		Pachyptila crassirostris	Alain De Broyer			
	Broad-billed Prion		Pachyptila vittata	Alain De Broyer			
	Antarctic Prion		Pachyptila desolata	Alain De Broyer			
	Savin's Prion		Pachyptila salvini	Alain De Broyer			
	Grey Petrel		Procellaria cinerea	Henri Robert			
	White-chinned Petrel		Procellaria aequinoctialis	Henri Robert			
	Spectacled Petrel		Procellaria consocillata	Henri Robert			
	Little Shearwater		Puffinus assimilis				
	Flesh-footed Shearwater		Puffinus carneipes				
	Great Shearwater		Puffinus gravis				
	Kerguelen Petrel		Lugensa brevirostris	Henri Robert			
	Soft-plumaged Petrel		Pterodroma mollis	Henri Robert			
	Atlantic Petrel		Pterodroma incerta	Henri Robert			
	White-headed Petrel		Pterodroma lessonii	Henri Robert			
	Great-winged Petrel		Pterodroma macroptera	Henri Robert			
	STORM PETRELS		Wilson's Storm-petrel	Oceanites oceanicus			
			Grey-backed Storm-petrel	Garrodia nereis			
			Black-bellied Storm-petrel	Fregetta tropica			
			White-bellied Storm-petrel	Fregetta grallaria			
	DIVING PETRELS	South Georgia Diving-petrel	Pelecanoides georgicus				
		Common Diving-petrel	Pelecanoides urinatrix				
	PENGUINS	King Penguin	Aptenodytes patagonicus	Barbara Wienecke	DONE	ONLINE	
		Emperor Penguin	Aptenodytes forsteri	Barbara Wienecke	DONE	ONLINE	
		Adélie Penguin	Pygoscelis adeliae	Phil Trathan			
		Chinstrap Penguin	Pygoscelis antarctica	Andres Barbosa			
		Gentoo Penguin	Pygoscelis papua	Barbara Wienecke			
		Western Rockhopper Penguin	Eudyptes chrysocome				
		Eastern Rockhopper Penguin	Eudyptes filholi				
		Northern Rockhopper Penguin	Eudyptes moseleyi				
		Royal Penguin	Eudyptes schlegeli				
		Macaroni Penguin	Eudyptes chrysolophus	Phil Trathan			
		CORMORANTS	Rock Shag	Phalacrocorax magellanicus			
	Imperial Shag		Phalacrocorax atriceps				
	Antarctic Shag		Phalacrocorax transfieldensis				
	South Georgia Shag		Phalacrocorax georgianus				
	Heard Shag		Phalacrocorax nivalis				
	Crozet Shag		Phalacrocorax melanogenis				
	Kerguelen Shag		Phalacrocorax verrucosus				
	Macquarie Shag		Phalacrocorax purpurascens				
	Red-footed Shag		Phalacrocorax gaimardi				
	TERNES		Trudeau's Tern	Sterna trudeaui			
		South American Tern	Sterna hirundinacea				
		Antarctic Tern	Sterna vittata				
		Kerguelen Tern	Sterna virgata				
		Arctic Tern	Sterna paradisaea				
	SKUAS	South Polar Skua	Stercorarius maccormicki	Hans-Ulrich Peter			
		Brown Skua	Stercorarius antarctica				
MARINE MAMMALS	FUR SEALS	Antarctic Fur Seal	Arctocephalus gazella	Iain Staniland	DONE	ONLINE	
		Subantarctic Fur Seal	Arctocephalus tropicalis				
	MONACHINAE	Southern Elephant Seal	Mirounga leonina	Iain Field	DONE	ONLINE	
		Ross Seal	Ommatophoca rossi				
		Crabeater Seal	Lobodon carcinophagus	Mark Hindell			
		Leopard Seal	Hydrurga leptonyx	Tracey Rogers	DONE	ONLINE	
		Weddell Seal	Leptonychotes weddellii	Kathryn Wheatley	IN PROGRESS		
	DOLPHINS	Commerson's Dolphin	Cephalorhynchus commersonii				
		Southern Right Whale Dolphin	Lissodelphis peronii				
		Long-finned Pilot Whale	Globicephala melas				
		Orca	Orcinus orca	Christophe Guinet			
		Black-chinned Dolphin	Lagenorhynchus australis				
	PORPOISES	Hourglass Dolphin	Lagenorhynchus cruciger				
		Spectacled Porpoise	Phocoena dioptrica				
	SPERM WHALE	Sperm Whale	Physeter macrocephalus				
		Arnoux's Beaked Whale	Berardius amuxii				
	BEAKED WHALES	Southern Bottlenose Whale	Hyperoodon planifrons				
		Hector's Beaked Whale	Mesoplodon hectori				
		Gray's Beaked Whale	Mesoplodon grayi				
		Layard's Beaked Whale	Mesoplodon layardii				
		BALEEN WHALES	Southern Right Whale	Eubalaena australis	Ari Friedlaender	IN PROGRESS	
	Fin Whale		Balaenoptera physalus	Ari Friedlaender	IN PROGRESS		
	Sei Whale		Balaenoptera borealis	Ari Friedlaender	IN PROGRESS		
	Blue Whale		Balaenoptera musculus	Ari Friedlaender	IN PROGRESS		
	Common Minke Whale		Balaenoptera acutorostrata				
	Antarctic Minke Whale		Balaenoptera bonaerensis				
	Humpback Whale		Megaptera novaeangliae	Ari Friedlaender	IN PROGRESS		
	Pygmy Right Whale	Caperea marginata					

New Expert Group on Antarctic Biodiversity Informatics (EG-ABI)

The Terms of Reference of the group are to:

- Coordinate biodiversity informatics activities across SCAR for research, management, conservation and monitoring purposes;
- Promote free and open access to primary Antarctic biodiversity data, source code, and relevant resources;
- Promote community-driven biodiversity data projects;
- Provide advice to SCAR groups which require access to biodiversity data and advise on strategies to embrace future data streams;
- Advise SCAR groups on best practices in biodiversity data management, standardization, interoperability and biodiversity information networks designs;
- Advise on the involvement of SCAR with bodies such as the Global Biodiversity Information Facility (GBIF) or the Ocean Biogeographic Information System (IODE-OBIS) on matters relevant to Antarctica and the Southern Ocean;
- Contribute to the establishment of a dynamic, data-driven benchmark of the state of Antarctic ecosystems;

Composition:

Bruno Danis (CO) - Belgium

Ben Raymond (Secretary) - Australia (to be confirmed)

AG- Ocean Acidification

<http://www.scar.org/researchgroups/physicalscience/soacid/>

Detailed ToRs for Ocean Acidification:

- define our present understanding of the contemporary rates and future scenarios of Southern Ocean acidification;
- document ecosystem and organism responses from experimental perturbations and geological records;
- identify present and planned observational and experimental strategies;
- identify gaps in our understanding of the rates and regionality of ocean acidification;
- define strategies for future Southern ocean acidification research.