

**Physical Sciences SSG Business Meeting
SCAR St Petersburg
North Hall, Park Inn Pribaltiskaya Hotel
July 6-7, 2008**

MINUTES

NOTE:

This record provides summary remarks of most reports. If further details are required, readers should contact the person who presented the report. SSG/PS executive holds copies of fuller reports and/or presentations for most items.

Sunday 6 July 2008

Meeting was opened at 9 am by Maurizio Candidi, SSG Chief Officer

1. Welcome and approval of agenda (M. Candidi)

The agenda was presented and accepted.

2. General business: 2007 SSG/PS report, medals, fellows (M. Candidi)

A brief summary of SSG/PS activities since last meeting was outlined and the 2007 report noted (on SCAR website).

3. Report from AGCS SRP (J. Turner)

The presentation gave an overview of AGCS: its goals and its themes. Five science highlights were noted as follows:

1. Improved projections of how the Antarctic climate system will evolve over the next century (Bracegirdle et al. 2008)
2. Variability of deep and bottom waters of Southern Ocean origin
3. The first assessment of Antarctic sea ice thickness (Worby et al., 2008).
4. A doubling of accumulation in the SW Antarctic Peninsula since 1850 (Thomas et al., 2008).
5. The State of the Antarctic and Southern Ocean Climate System (SASOCS) (Mayewski et al., In Press).

A major ongoing activity, the Antarctic Climate Change and the Environment (ACCE) report, is in draft form and available online at <ftp://ftp.nerc-bas.ac.uk/pub/jtu/ACCE/>. This report is a cooperative effort with SSG/LS and SSG/GS, and feedback on the draft is being sought. An executive summary went to the Treaty Meeting and the draft goes to SCAR Delegates' Meeting.

The review of SCAR science programs assessed AGCS very favourably and a further continuance will be considered at the Delegates' Meeting. Five recommendations for the program, assuming it continues are:

1. Build on activities that are unique to SCAR/AGCS, e.g. ACCE, SASOCS
2. Develop better links with the life scientists – e.g. providing future climate change scenarios
3. Rotate members of the Steering Committee
4. Better outreach – a 'popular' version of ACCE or SASOCS? Educational material?
5. Consider how we can get better involvement of the 'new' Antarctic nations and have less of a Europe/USA focus.

4. **Report from SSG/PS representative to CliC (J. Turner)**

The presentation introduced the WCRP CliC Project and its place within WCRP, together with a brief history and an overview of the CliC Project structure. Recent and upcoming meetings were noted and SCAR members referred to the CliC website. It was noted that there is a good working relationship between SCAR and CliC, with SCAR being a co-sponsor of CliC, and that CliC provide some excellent resources via their web site. There is great scope for joint SCAR/CliC workshops and initiatives, however, CliC has very limited funds available to support activities. J. Turner noted that SSG/PS will need to select a new representative to CliC, noting that A. Worby, as a member of both groups would be a suitable representative for future reporting to SSG/PS.

5. **Report from ICESTAR SRP (A. Weatherwax)**

The goal and themes of the ICESTAR SRP were described. Highlights for 2007-2008 were presented:

- ICESTAR team members published more than 100 papers in peer reviewed journals in 2007 and 2008
- ICESTAR takes a leadership role in *Heliosphere Impact on Geospace*, a core project of the fourth International Polar Year programme
- ICESTAR team leaders take key roles in data portal and virtual observatory development
- ICESTAR sponsored or co-sponsored international meetings
 - Heliosphere Impact on Geospace 2007 (Finland)
 - Greenland Space Science Symposium 2007 (Greenland)
 - Polar Gateways 2008 (Alaska, USA)
 - International Riometer Workshop 2008 (Utah, USA)
 - ICESTAR also co-sponsored scientific sessions at European and American Geophysical Union Meetings, GEM, CEDAR etc.
 - 16 invited presentations
 - 73 contributed talks and/or posters

ICESTAR and IPY connections were detailed. Virtual observatories and data management activities were noted including the GAIA (Global Auroral Imaging Access) and SuperMAG (International Ground Magnetometer Collaboration). The presentation also covered outreach activities and noted the future of ICESTAR and the cessation of the SRP. Future closer interaction/integration with PANTOS was mentioned.

6. **Other business (i) – PACT Action Group (G. Milinevsky)**

Owing to scheduling conflicts and speaker availability, other business was brought forward in the agenda. A proposal was presented for a new action group on Polar Atmospheric Chemistry at the Tropopause (PACT). This is described further in the Recommendations (Item 20).

7. **Report from Operational Meteorology Expert Group (S. Colwell)**

The focus of Operational Meteorology group activity is via their webpage (http://www.antarctica.ac.uk/met/jds/met/SCAR_oma.htm) and email. Progress against plans from 2006 was reviewed.

- Increase number of ships reporting via GTS: *Success – 18 in 2006, 27 in 2008*
- Improve reporting from existing stations: *Some improvement thanks to better monitoring see: http://www.antarctica.ac.uk/met/jds/met/ABCN_2008.pdf*

- Maintain existing stations beyond IPY: *Some closed stations have resumed meteorological observations.*
- Augment network with MOBIL stations as required: *Wisconsin AWS without a WMO number are now reporting in MOBIL code*
- Sustain deployment of drifting buoys: *No action. 12 are currently active south of 60°.*
- Reporting from aircraft: *Reports from BAS and Australian aircraft are now on the GTS*
- Challenge of introduction of Binary Universal Form for the Representation of meteorological data (BUFR) code: *No progress. The deadline is 2010.*
- Aerosols - an Antarctic Aerosol Network?: *BAS has installed a Sky Radiometer at Rothera*
- Continue to provide information via Internet: *Success – web pages updated*

Compass Data archive

- Synoptic & Upper air to BAS as part of READER
- Being acquired through GTS, some countries contributing archive data. *Archive data from Argentina and Chile still required.*
- Radiation to AARI: *No progress?*
- Ozone to WDC Canada: *Ukrainian and BAS data now available*

Some concerns were noted with the Global Climate Observing System and some station specifics detailed. This includes concern over a lack of radiosonde data from the northern Antarctic Peninsula. Many ships operating in Antarctic waters do not submit meteorological observations. Continued support is required for long term monitoring of basic meteorological parameters across Antarctica. These are essential for the determination and attribution of climate change, and form the foundation for many research programmes.

Future plans were presented:

- Introduction of BUFR code, with added reporting of real time aerosol, ozone and radiation data.
- Complete the Compass database, and continue updating READER.
- Encourage support for GUAN operation at 89055
- Encourage full reporting of CLIMAT messages from GSN stations.
- Continue to provide information via the Internet

8. IPY report (D. Carlson)

A report was received on IPY activities. The IPY “beehive” chart was shown, with overlays showing funding of projects and future legacies. Magnitude of funding, both new funds and redirected existing funds was presented. Some concerns were noted, including the necessity for timelines for some projects to spread beyond IPY due to logistic and planning constraints. The issue of long-term sustainable archives was also noted as a concern, as was that of future legacies, some of which are not funded. An impending issue the desire to keep the IPO open beyond its 2009 closure date, until the mid 2010 Oslo science conference.

9. Other business (ii) – King George Is (J. Simoes)

Some issues around KGI science and coordination were presented and discussed. The utility of defining/recommending main science questions and goals was suggested. The issue of funding of radiosondes was discussed but not resolved. It was noted that these concerns were primarily within the domain of the Action Group on KGI.

10. Report from SALE SRP (J. Priscu)

An overview of the SALE SRP was presented and the group referred to the SALE website (<http://scarsale.tamu.edu>). This presentation included key achievements and noted the excellent review of the SRP.

Scientific Achievement #1 - *Subglacial accumulations of water are common features beneath thick ice sheets.*

Scientific Achievement #2 - *Outburst discharges of subglacial water have repeatedly occurred over geologic time and are an on-going process that influences the dynamics of the overlying ice.*

Scientific Achievement #3 - *A spectrum of subglacial aquatic environments exists*

Programmatic Achievement #1 – *Building of a SALE community through workshops, meetings, and sessions at scientific meetings*

Programmatic Achievement #2 - *Identification of major scientific and technological goals for SALE research and exploration through active engagement of the community*

Programmatic Achievement #3 – *Provision of the framework for the US National Academies report on environmental stewardship of subglacial aquatic environments*

Programmatic Achievement #4 – *Regular Meetings that serve as a forum for the discussion of science and technology amongst national programs*

Programmatic Achievement #5 – *Education of the public through extensive and sustained coverage of SALE science in the lay and scientific press*

review of the SRP.

SSG/PS was asked to endorse the SALE SRP in its report to Delegates. The US NRC report *Exploration of Antarctic Subglacial Aquatic Environments*, was highlighted and discussion noted the development of a SCAR code of conduct to internationalize this issue (see recommendations).

11. JCADM report (Helen Campbell)

This presentation gave an overview of JCADM and its recent activities. It noted the two SSG/PS liaison officers: Helen Campbell and Claudio Rafanelli. The SCAR standard metadata catalogue is the Antarctic Master Directory, which has new keywords to cover expanded range of activities, and can accommodate further keyword additions. The new SCAR Data and Information Strategy was introduced and outlined.

The presentation concluded with suggested joint actions for JCADM and SSG-PS:

- Create data discovery portals for AGCS and ICESTAR through the AMD
- Build and develop databases/data portals in line with the SCAR Data and Information Strategy

Meeting adjourned until Monday 7 July

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Meeting reopened at 2.30pm by M. Candidi, Chair

12. Developments in SCAR (M. Sparrow)

On behalf of the Executive Director the new Executive Officer, Dr Mike Sparrow, gave a talk on SCAR Progress and Plans.

SCAR membership continues to grow. There have been applications from Romania and the International Astronomical Union to join SCAR as well as for Malaysia to become a full member. SCAR has also been registered as a UK company and charity, which will help us financially but does not affect our status as an international organization.

A 50th anniversary book is being produced that looks at SCAR's contributions over the past 50 years and we are in the process of completing the Antarctic Climate Change and Environment review (ACCE). This will be published as a book early in 2009, and will be a significant contribution to the IPY.

Our 5 major scientific research programmes have just had their 4-yearly external peer review - all received *excellent* ratings. We have also been reviewing the way in which we manage Antarctic scientific data and information, and this has led to the development of a draft strategy on that subject. We need the SSGs to advise the ATS, through SC-ATS, where the frontiers of science are going to be in the near future, and the implications of change for the environment.

With some 1400 registrants, this has been the largest Open Science Conference so far. One possible new development for the future is that we may hire someone to manage conference registration in-house, to cut registration fees. The next OSC will be in BA in the southern winter of 2010. That same year SCAR is also co-sponsoring the 2nd IPY conference, which will be held on June 8-12, 2010, in Oslo.

SCAR science is at the forefront of many IPY projects and we are now actively thinking about the IPY legacy through, for example, observing systems (e.g. SOOS and PAntOS) and the data and information management strategy. IPY is also about education and outreach and our main contribution is through the Fellowship programme – we continue to be able to support 3-4 research fellows per year. We are also co-sponsoring, with IASC, the Association of Polar early Career Scientists (APECS).

There will be three SCAR medals this year: We need your suggestions for medallists for 2010. We continue to build partnerships with other organisations, e.g. the World Climate Research Programme, the International Arctic Science Committee, and the newly formed International Association for Cryospheric Sciences.

This is SCAR's 50th anniversary year and has been both busy and productive, thanks largely to the work of the SCAR science groups.

13. Oceans/SOOS Report

Mike Sparrow gave an update to the SSG-PS group on the Ocean Expert Group and the Southern Ocean Observing System (SOOS). Since the meeting in Hobart in 2006 the SCAR/SCOR Oceanography Expert Group has revised its Terms of Reference and updated its membership to have a strong focus on the development of SOOS that puts into practice the Group's inter-disciplinary approach. (For full details see: <http://www.clivar.org/organization/southern/expertgroup/tor.htm>)

The reasons and possible users of a SOOS were summarized before detailing the structure and plan. The first goal of the Expert Group has been to work on a SOOS plan that demonstrates:

- why sustained observations are needed in the Southern Ocean and what science/policy questions they address,
- what mix of observations are required to address these questions,
- what is presently done and possible,
- a vision for the future

Some examples of the observing system already in place as well as key gaps were discussed. During the St Petersburg meeting the group worked on strawman plans for each component of the SOOS (physics, ecosystems, cryosphere etc.), justifications for the observations, key gaps and draft recommendations. The group agreed on the next steps and writing assignments as well as a fairly strict timeline that will hopefully result in a complete document by mid October.

14. Antarctic Astronomy & Astrophysics (AAA) Expert Group report and new SRP proposal (J. Storey)

This group was established in 2002 to coordinate efforts to:

- Explore potential for astronomy, astrophysics and cosmology from Antarctica
- Enhance existing observatories and programs in Antarctica
- Support development of new facilities

During the six years of its operation there has been vigorous activity both in site-testing and in the development of proposals for medium-scale astronomical facilities. In Europe, the FP6 Coordinating Action, ARENA (Antarctic Research: a European Network for Astronomy) has held a series of international meetings focusing particularly on Concordia Station, Dome C. At the South Pole, the 10-metre South Pole [sub-mm] Telescope has come into operation, and construction of the IceCube array is proceeding. These existing stations on the plateau, at the South Pole and Dome C, have now been joined by new stations at Dome A and Dome F. Circumpolar balloon flights continue to provide access to a unique observational space.

As the level of activity in astronomy and astrophysics in Antarctica increased, it became clear by the XXIX SCAR in Hobart that a new Scientific Research Program should be explored. The Antarctic Astronomy and Astrophysics (AAA) Scientific Programme Planning Group was approved at the meeting in 2006. A preliminary proposal for the SRP was presented to the SCAR Executive in July 2007. The full proposal was discussed by the SSG/PS at the XXX SCAR meeting in St Petersburg. Pending approval of the SRP by Delegates, the AAA Expert Group will be dissolved.

15. ICESTAR-POLENET New initiative (L. Alfonsi)

A proposal was presented for a new Action Group to develop ionospheric imaging capability in conjunction with POLENET and ICESTAR members. The initiative would provide data for space weather and weather forecasting, the latter particularly through measurements of atmospheric water vapour. This presentation included scientific detail of ionospheric tomography techniques and results. This proposal is described further in the Recommendations (Item 21).

16. Other business (iii) – Expanded opportunities for POLENET related science (T. James)

In this presentation, the additional uses of POLENET for geophysical purposes were outlined. These uses include ability to better constrain glacial isostatic adjustment (GIA) of particular interest to the ISMASS group. Geophysical uses of POLENET are also of interest to SSG/GS and cross disciplinary links were considered. The formation of a scientific planning group was proposed, as a formal SCAR activity, to develop interdisciplinary science using POLENET. This action was discussed and SSG/PS recommended that no formal action be taken, pending development of a more detailed proposal. It was suggested that this might involve building a coordinated programme which integrates with the weather and space-weather proposal (Item 15). In the meantime, the weather and space-weather group is encouraged to make links with the broader geophysical community in its use of POLENET.

17. Report from IPICS (T. van Ommen/R. Mulvaney)

A report was received from the International Partnerships in Icecore Sciences (IPICS). Following SSG/PS recommendation at SCAR XXIX, and consultation between IPICS and SCAR, IPICS will formally become an Expert Group, attached to SSG/PS.

The IPICS Steering Committee met in Vienna, Austria on 19-20 April 2008. The aim was to endorse the science and outline implementation plans for the priority projects, and to establish groups to oversee the implementation of the projects. Members of the IPICS Steering Committee, and other observers, attended the meeting. With the acceptance of Estonia, the IPICS SC now has representatives of 21 nations.

White Papers describing the IPICS projects, and the progress towards implementation were discussed over the two days. The ‘Oldest Ice’ project includes plans to drill at least one deep ice core in the Dome A region of Antarctica, and plans for airborne geophysical surveys in the forthcoming season were discussed, while other candidate sites in Antarctica are still being investigated.

The ‘NEEM’ (Greenland Eemian) drilling project is going ahead, with most of the funding in place, and drilling due to start in the summer of 2008. It was recognised that the ‘last interglacial’ was a critical period to the understanding of the current climate, and a group will investigate whether there should be a widening of the IPICS agenda to recognise this.

For the ‘40k Array’ Project, several drilling campaigns have already been completed since the initiation of IPICS, with several further projects in various stages of planning and execution, and links to other PAGES communities spanning the same age scale should be sought.

The ‘2k array’ Project has plans for a number of new cores which were discussed. There was vigorous discussion of the parameters measured on the high resolution shorter cores that form the ‘2K array’ initiative.

The underpinning technology for ice core drilling and analysis formed the main bulk of the issues discussed in the ‘Technology’ group. The next IPICS meeting is planned for July 2009, associated with the PAGES OSM in Oregon. Details of the meeting, together with the five White Papers describing the main projects can be found on the IPICS website at www.pages-igbp.org/ipics.

18. Report from ISMASS (C. van der Veen)

Recent activities and progress were reported for the ISMASS group. The major activity reported is the workshop held prior to the SCAR OSC as detailed:

Recognising the importance of ice sheets in controlling global sea level, and the inadequacies in current efforts to model observed rapid changes in ice sheets (outlined in detail in SCAR Report 30, “*A need for more realistic ice-sheet models*” by C.J. van der Veen and ISMASS), a Workshop was considered timely to develop a community strategy on how best to (i) improve the physical understanding of ice sheet processes responsible for rapid change; (ii) incorporate improved physical understanding into numerical models; (iii) assimilate appropriate data into the models for calibration and validation; and (iv) develop prognostic whole ice-sheet models that better incorporate non-linear ice-sheet response to environmental forcings (such as change in surface mass balance, loss of buttressing from floating ice shelves and ice tongues, and rising sea level). The Workshop was held July 5-7, 2008, prior to the SCAR-IASC Open Science Conference in St. Petersburg. Conveners were Cornelis van der Veen (SCAR/ISMASS), Victoria Lytle (CReSIS), Konrad Steffen (WCRP/CliC), and Andrey Glasovsky (IASC/WAG), and made possible with support from several agencies (SCAR, IASC, WCRP, CliC, ACE, ACE-CRC, CReSIS, NASA and NSF). About 45 scientists from different disciplines (ice-sheet modelling, subglacial geophysics and hydrology, oceanography and atmospheric science) participated in formulating a Science Plan, outlining a community strategy for the next 5-10 years to address current inadequacies in prognostic ice-sheet models. Realizing what can realistically be accomplished over the decade, three key questions were formulated and research strategies outlined to answer these. A draft version of the Science Plan will be submitted to the broader polar community for comments and input during the Fall of 2008, with publication of the final version anticipated by the end of this year. The next step will be a Summer School to be held in 2009, and organized by ISMASS, with support from ICSU, SCAR, WCRP, IASC, IACS, CReSIS, and CIRES. We aim to bring together scientists from various disciplines for an intensive Summer School to improve ice-sheet models used to predict sea level change, and to train young researchers. Strengthening international efforts to better constrain sea-level predictions is of direct benefit to society. The Summer School will build on the improved understanding of rapid ice-sheet changes derived from projects undertaken during the International Polar Year 2007-2008 (IPY), and will provide a legacy of the IPY by consolidating these results, training young scientists, and community building. Advances in ice-sheet modelling require international collaborations of scientists from a broad range of related disciplines.

19. Report from PANTOS (S. Palo)

The history and context of PANTOS were outlined. Its goals were presented and linkages noted with other SCAR-related activities: SOOS – Southern Ocean Observing System, Polenet, JCADM and EBA. Focus areas were identified:

- The need for Antarctic observations
- Existing observations and critical gaps
- Key variables to observe for long term observations
- Antarctic data fabric, data collection and management potential (connection with JCADM)
- Vision for the Pan-Antarctic Observations Network
- Connection to other networks

Items were flagged to consider:

- Is the current strategic plan realistic?
- What resources are needed?
- Where do we go from here?
- Phase 1 – An assessment of current and near future observing systems?
- Should we establish linkages between SCAR efforts such as SOOS, JCADM, Polenet, etc? How?

- Should we establish linkages with global efforts such as GEO and related observing networks?
How?

20. Budget

Group	2009	2010
ISMASS	7500	7500
IPICS	3000	3000
ECA	2000	2000
PAntOS	-	-
Op. Met.	3000	-
POLENET	5000	5000
Oceanography	5000	5000
Astronomy	3000	-
KGI	-	-
Cross-link (Space weather and weather)	1000	1000
ICESTAR	-	3000
Total	29500	26500

21. Recommendations

New recommendations (internal to SCAR)

1. New action group: Polar Atmospheric Chemistry at the Tropopause (PACT)

SCARXXX- SSG/PS-1

A new action group is proposed to seek better understanding of the changes in the temperature structure of the Antarctic troposphere and regional climate variations by promoting investigation of radiative and dynamical processes at the tropopause. The group will do this by making new information derived from ozonesondes available to the international scientific community for study of the polar tropopause.

Specifically, the group will add key polar tropopause region parameters to the International Global Radiosonde Archive:

- High resolution profiles of ozone mixing ratio and partial pressure in the vicinity of the tropopause.
- Height of the chemical tropopause derived using ozone measurements.
- Forward and backward analysis of air parcel history for selected parcels sampled by ozonesondes and radiosondes.

This task will involve analysis and preparation of data, development of tools and development of a database.

The proposed activities will provide the international community with new information to assist in model validation and in simulation of this important part of the polar atmosphere.

The group propose at timeline with production of data, a scientific publication and a report to SCAR to be completed by July 2010. The full proposal is available from SSG/PS.

2. New Action Group: GPS for weather and space weather forecasting

SCARXXX- SSG/PS-2

This proposed new Action Group aims to bring together researchers from the former ICESTAR SRP with the POLENET network to provide ionospheric imaging, facilitate data and technology exchange with the broader community. Using new techniques, the group will deliver greater understanding of the polar ionosphere and ionospheric processes.

Specifically, the objectives of this group has the following aims:

- Ionospheric imaging over Antarctica.
- Exchange of data and expertise for the application of tomography to other fields of interest for both the communities (e.g. 3D water vapour reconstruction).
- Exchange of technologies to install and manage remote GPS stations.
- Possibility to host instruments in the polar stations represented by the two communities.

The group will deliver the following:

- One meeting per year among the WG members
- Joint publications on peer reviewed journals
- Joint presentation at national and international conferences
- Web site realization, maintenance and updating

SSG/PS also notes interest from the wider physical sciences and geosciences community in using POLENET for new applications, including a proposal from SSG/GS for a Scientific Program Planning Group on Solid Earth Response and Cryospheric Evolution (SERCE) that will use POLENET data. SSG/PS encourages development of new linkages with the proposed “GSP for Weather and Space Weather Forecasting” action group. The full proposal is available from SSG/PS.

3. Concerning a Code of Conduct for the Exploration and Research of Subglacial Aquatic Environments. SCARXXX- SSG/PS-3

Subglacial aquatic environments are becoming an increasingly important focus for Antarctic science. A primary focus of research will involve questions about microbial life in these unusual biomes that are now known to be quite prevalent across the Antarctic landscape beneath thick ice sheets. The scientific goals of this research will require entry, sampling, and emplacement of sensors in SAE at multiple sites. These environments are potentially sensitive to disturbance during efforts to enter and sample these environments in the conduct of important ground-breaking research. Recognizing the value of these environments and the need to exercise wise environmental stewardship, it is recommended that a “Code of Conduct for the Exploration and Research of Subglacial Aquatic Environments” be developed.

The Code would be developed by an Action Group comprised of suitable representatives from the three SSGs since a wide range of disciplines are involved in research in these environments and bring differing but important perspectives on protecting these environments. The AG should be made aware of the recent US National Research Council which provides helpful information and a starting point for developing the Code.

4. Concerning SCAR seeking observer status with the Intergovernmental Panel on Climate Change. SCARXXX- SSG/PS-4

Recognising the key role Antarctica plays in the global climate system, the changes that have become evident in recent decades and the likely consequences from future changes.

Acknowledging the important role played by the IPCC in assessing climate science since its inception in 1988

Noting that Antarctica is the only region of the earth that has no representation in its own right.

Cognizant of SCAR's role and responsibility in the Antarctic Treaty System for facilitating and disseminating the results of Antarctic research

Seeking to assist the IPCC to the greatest extent possible in future planning for the consideration of Antarctic research in its assessment of the state of the earth's climate system, past, present and future,

Recommend that SCAR seek observer status through the process outlined in INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (14.III.2008)

TWENTY-EIGHTH SESSION IPCC-XXVIII/Doc.5, Corr.1

Old Recommendation internal to SCAR (from Hobart). SSG/PS wants this to stand.

Concerning the biogeochemical status of the Southern Ocean. SCARXXX- SSG/PS-5

The increasing concentration of CO₂ in the atmosphere and the consequences for the biogeochemical status of the Southern Ocean in particular the pH of the ocean are issues of concern. They may have consequences for the ecosystem of the Southern Ocean and require monitoring and research. SCAR should support research being undertaken by IMBER and SOLAS in this area. In particular, SCAR should encourage the SCAR Evolution and Biodiversity group to consider and discuss this issue. There should be particular attention given to this issue at the next Ocean Science conference, i.e. a special session

Recommendations external to SCAR

Concerning continued support of existing geospace observatories. SCARXXX- SSG/PS-6 (Originally SCAR XXVIII-6)

The Scientific Committee on Antarctic Research (SCAR) is concerned regarding planned closures of instruments and downgradings in their maintenance. The equipment under threat have provided irreplaceable data for several years, in some cases even for decades. Examples are: SuperDARN radars, VLF receivers, magnetometers, riometers, and ionosondes. SCAR recommends support by national funding agencies for continued operation of these infrastructures and for reliable archiving solutions for the data that they are providing.

Concerning Upper air and ionospheric observations along the Antarctic Peninsula SCARXXX- SSG/PS-7 (Originally SCAR XXVIII-9, plus SCAR XXIX -3 (replaced XXVIII-18) and XXIX-4)

SSG/PS

-Recognizing the importance of upper air observations for operational numerical weather prediction in the Antarctic Peninsula, a region of marked climatic change over recent decades,

-Noting that the Antarctic Peninsula is a unique topographic feature that may significantly interact with the tropospheric flow and thus may be a source of atmospheric gravity waves, which can propagate to ionospheric heights, and

-Taking into account an envisaged cooperation between the Solid Earth (POLENET) and Upper Atmosphere (UAMPY, SUPERDARN) communities that can greatly increase the value of current and future ground based and GPS observations over Antarctica, thus clearly aiming at the synergy expected from SSG-GS and SGG-PS goals,

SCAR urges that

- i. countries doing upper air observations along the Antarctic Peninsula, particularly at the tip of the peninsula, coordinate operation and optimize resources to secure continuous daily sounding till at least the end of the IPY, and preferably beyond, and that
- ii. countries that have done ionospheric sounding over the Antarctic Peninsula, consider to restart observations, and those that are currently doing them to upgrade their installations.

Concerning sea ice observations. SCARXXX- SSG/PS-8 (Originally SCAR XXIX-6)

The Antarctic Sea Ice and Climate Program has developed a protocol for making standardised and quantified observations of sea ice properties from vessels operating in the Antarctic pack ice zone. The ASPECT data archive now comprises 83 voyages of data that provide an extremely valuable resource to the climate and modelling communities. The SSG/PS recommends that COMNAP urges national programmes to contribute sea ice observations made from their icebreaking research and supply vessels. This may include training of ship officers to conduct observations.

Concerning drifting buoys. SCARXXX- SSG/PS-9 (Originally SCAR XXIX-7)

As part of the plan for increased observations in the sea ice zone for IPY, SCAR encourages delegates to commit financing for one or more data buoys to be deployed by the logistic resources which is being coordinated by the International Programme for Antarctic Buoys.

Concerning meteorological observations for weather forecasting and the IPY

SCARXXX- SSG/PS-10(Originally SCAR XXIX-8)

Real-time surface meteorological observations from both land and sea remain critical in providing accurate weather forecasts. Such observations are also vital for many science programmes and are the key data for studies of climate change. SCAR recommends that:

- a) All research and supply ships operating in Antarctic waters and traverse parties (using the MOBIL code) should contribute real-time meteorological observations to the WMO GTS.

- b) Climatic data from land stations should be submitted to GCOS via the WMO GTS shortly after the end of each month.
- c) In order to help planning of instrument deployment opportunities the group requested COMNAP to construct a web page listing intended ship movements.
- d) Aircraft operating on long distance flights in Antarctica should be encouraged to report AIREPS