

SCAR/SCOR Interactions 2007/2008

Report to SCOR, October 2008

SCAR and SCOR have a strong overlap of interest in the Southern Ocean region and therefore interact through several groups with an interest in this area, for example the International Antarctic Zone Program (iAnZone, see <http://www.ldeo.columbia.edu/res/fac/physocean/ianzone/>), the International Bathymetric Chart of the Southern Ocean (IBSCO, see <http://www.ibcso.org/>) and the SCAR/SCOR Oceanography Expert Group (<http://www.clivar.org/organization/southern/expertgroup/index.htm>). Since iAnZone has reported separately to SCOR the latter two groups will be the focus of this document.

(i) The SCAR/SCOR Oceanography Expert Group:

Since the Expert Group meeting in Bremen in October 2007 (http://www.clivar.org/organization/southern/expertgroup/SOOS_interim_report.pdf) the SCAR/SCOR Oceanography Expert Group has revised its Terms of Reference (<http://www.clivar.org/organization/southern/expertgroup/tor.htm>) and updated its membership in order to have a strong focus on the development of Southern Ocean Observing System (SOOS) that puts into practice the group's inter-disciplinary approach. The co-chairs of the group are now Steve Rintoul, a physical oceanographer from Australia, and Eileen Hofmann, a biological oceanographer from the US. A concerted effort was made to choose a membership that reflected both the needs of the group as well as discipline, gender and geographic diversity (see: <http://www.clivar.org/organization/southern/expertgroup/membership.htm>).

One of the first goals 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

The last meeting of the Expert Group/SOOS was held on the 5-7th of July 2008 in St Petersburg during the SCAR Business meetings (for further information, including a full meeting report and presentations from the meeting see: http://www.clivar.org/organization/southern/expertgroup/SOOS_StPetersburg.htm). Funds to allow members and invited experts to attend the meeting were provided by SCAR, SCOR and NOAA. Holding the meeting during the SCAR Business meetings allowed a wide range of invited experts to attend the meeting.

The main aim of this meeting was to build upon progress made during the previous meeting in Bremen, to present some specific "strawman" plans for different aspects of the SOOS and to agree on some key recommendations and actions to move the process forward.

Presenters were asked to answer the question "What will SOOS look like?" with regard to each topic, i.e. to present a strawman plan for different components of the observing system.

This strawman plan would:

- include 3 time horizons: what is possible now; a target in 5-10 years; a vision for 2020 and beyond
- be specific (lines on maps; how many floats/seals/ship transects needed)
- include an indication of why the observations are needed
- indicate what other aspects of the observing system their plan depends on (e.g. changes in ocean stratification are needed to understand response of phytoplankton)
- identify key gaps
- conclude with some draft recommendations

The talks were arranged so as to leave time for discussion, with the last morning of the meeting being devoted to working on key recommendations, action items, writing assignments etc.

An outline of the SOOS plan was refined and key authors identified to draft particular sections:

1. Introduction (Rintoul)

- Need for a SOOS
- A vision for a SOOS
- Guiding principles for design of a SOOS
- Users of a SOOS
- Purpose and structure of the discussion paper

2. Scientific rationale for a SOOS

Role of the Southern Ocean in climate and global biogeochemical cycles (Rintoul, Speer, Speich, Meredith, Anson, Farbach)

- o Overturning circulation and water mass formation
- o Transport and storage of heat, freshwater, carbon, nutrients
- o Antarctic Circumpolar Current
- o Subpolar gyres, coastal current

Sea ice (Worby, Ackley)

- o Climate influence (albedo, water mass formation, air-sea exchange)
- o Contrast with Arctic
- o Role in ecosystem

Southern Ocean biology and ecology (Hall, Hofmann, Bellerby, Hosie, Costa)

- o Unique ecosystems; high nutrient – low chlorophyll
- o Link to carbon export

- Physical controls on biology
- Observations to inform management of marine resources

Southern Ocean change (Meredith, Hosie)

- Observed changes in the Southern Ocean
- Consequences of Southern Ocean change: Potential for feedbacks
- Biological/ecological changes
- Projections of future change

Key science challenges and the need for a SOOS (Rintoul and Hofmann)

- Summary of key science questions identified in above sections

3. Key variables to be measured by the SOOS

Scope of SOOS (Rintoul)

Summary of observations needed to address key science challenges (Rintoul)

- Table: key science challenges vs variables to be measured
- Table: variables to be measured vs platforms

Summary of elements/platforms contributing to an integrated observing system (Rintoul)

4. Southern Ocean observations: present status and gaps

Physics: Speer and Sparrow

Sea ice: Worby

Phytoplankton: Hall

Zooplankton: Hosie

Mammals, birds, fish: Costa, Hosie (CCAMLR, CEMP)

Ecosystem monitoring: Hofmann

Surface meteorology: Speer

5. Initial straw-man plans for a SOOS (maps, tables)

- 0-5 year plan
- 5-10 year plan
- 10+ year plan

IPY as a pilot SOOS

6. Data strategy (de Bruin)

7. Implementation

Integration of national efforts; incremental approach

Governance and relationship of SOOS to other programs (Alverson, Ryabin)

8. Summary of recommendations

References

Appendix A: Contributors list

Appendix B: Acronyms and abbreviations

The group felt it necessary to aim for a fairly strict timeline in order to keep momentum going and for the document to be available for discussion at several key meetings, for example the Partnership for Observation of the Global Oceans (POGO) meeting, Climate Variability and Predictability/Climate and Cryosphere/SCAR Southern Ocean panel meeting and OceanObs99.

The agreed timeline to produce the SOOS plan was as follows:

July 30: results of St P meeting distributed to Expert Group, with writing assignments

Aug 22: Complete writing assignments for Section 1, 2, 3, 4, 6 and 7.

Aug 29: Co-chairs compile contributions and distribute Sections 1-4, 6 and 7 to Expert Group and CLIVAR/CliC/SCAR SO Panel members for comment (2 wks for comments). Prepare draft of Section 5 (leaders to be identified) and Section 8 (co-chairs).

Sept 12: Comments received.
Draft of Sections 5 and 8 distributed to Expert Group and SO panel (2 wks for comment).

Sept 26: Comments received on Section 5 and 8.

Oct 3: Co-chairs compile complete draft and send to stakeholders for comment (e.g. carbon, CCAMLR, OOPC, individual scientists, etc). 3 wks for comment.

Oct 24: Comments received.

Nov 7: Complete draft made available for wider community to comment and sent for formal scientific review. (1 month for comment/review).

Dec 12: SOOS plan in final form.

Since the meeting the group have been working on the SOOS plan. Several sections have been drafted and it is hoped the plan can be circulated to the wider community for comments and “buy-in” as soon as possible. Key is to ensure the plan is circulated and advertised as widely as possible, something that SCOR, SCAR and the other co-sponsors of the SOOS (POGO, the Census of Antarctic Marine Life, the World Climate Research Programme and the Global Ocean Observing System) should aim to do using their own list of contacts.

(ii) The International Bathymetric Chart of the Southern Ocean Expert Group:

Both SCAR and SCOR have an interest in ensuring good quality Southern Ocean bathymetric data are collected and made available. The collection of bathymetric data is also part of the SOOS (see previous section). The aim of the IBCSO Expert Group is to collect existing bathymetric data from archives, data centers and databases from hydrographic offices and scientific institutions. The work plan in terms of data flow and data processing may be summarised in the following steps:

- conceptual design and implementation of an IBCSO database
- assembling of bathymetric, topographic, and other geoscientific data
- data preprocessing including quality control, analyses, and description
- data merging and processing including data modelling for optimized visualization
- generation of products: printed maps, web maps, database, ship

track inventories

The minutes from the last meeting held in St Petersburg on the 4-7th July are available from:

http://www.ibcso.org/index_files/IBCSCO_Minutes_AARI_2008.pdf. In summary progress with the IBCSO was discussed. It was noted that many tracks are still outstanding where data exist, for example Russian echo soundings and sonar data in the South Indian Ocean. The major data gaps are in the Weddell and Amundsen Seas and the South Indian Ocean.

A discussion was held into ways to improve the levels of data submission to IBCSO. One suggestion was to compile a list of areas in which data were required, and to also compile a list of areas where data exist but have not been submitted. This could then be submitted to the Council of Managers of National Antarctic Programmes (COMNAP).

The possible finance of the IBCSO by private companies was also discussed. The view was expressed that IBCSO should take advantage of funding opportunities from private finance, as external funding would be required to achieve a project as ambitious as IBCSO. The group discussed drawing up a list of potential donors, i.e. selling bathymetry to navigational companies. An example of a funding source could be to delineate seafloor features and value-add to the data, such as supplying it through Google Earth. The comment was made that it was important to avoid any suggestion of selling on data. Any funding idea would need to be a value-added product. It would be necessary to have a comprehensive understanding of the legal and logistical requirements of such a move and what is possible under SCAR before any decisions could be made.

The main link between SCAR and SCOR is through the Oceanography Expert Group but SCAR will continue to examine ways in which it can work more closely with SCOR in the Southern Ocean region, as this has proven to be a fruitful relationship.