



**WP 18**

Agenda Item: 4.4.3

Person Responsible: Louise Newman

**XXXIII SCAR Delegates Meeting**

**Auckland, New Zealand, 1-3<sup>rd</sup> September 2014**

# **The Southern Ocean Observing System**



## Executive Summary

**Title:** The Southern Ocean Observing System (SOOS)

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**Introduction/ Background:** The Southern Ocean influences climate, sea level, biogeochemical cycles and biological productivity on a global scale. Many of the most difficult and pressing issues faced by society—how to mitigate and adapt to climate change and sea-level rise, how to manage the effects of ocean acidification, and how best to conserve marine resources and biodiversity—cannot be addressed effectively without improved understanding of Southern Ocean processes and feedbacks and their sensitivity to change. The most urgent research challenges in the Southern Ocean often span traditionally separate scientific disciplines. The Southern Ocean Observing System (SOOS) provides the sustained, integrated, multi-disciplinary observations required to meet these challenges.

### Important Issues or Factors:

- 1) In 2014, SOOS elected a new Co-Chair (Anna Wåhlin, Sweden) to replace Mike Meredith (UK), and also elected two Vice-Chairs (Sebastiaan Swart (S. Africa), Andrew Constable (Australia).
- 2) The governance and structure of SOOS, and role of the Scientific Steering Committee (SSC) will be modified to support greater implementation capabilities
- 3) The International Project Office (hosted by the Institute for Marine and Antarctic Studies, University of Tasmania, (IMAS UTas) Australia) only has funding secured for another 2 years. Discussions are taking place to ensure continuation of this support. Currently, only New Zealand and Australia provide support for the IPO. SOOS will need to secure greater international support for the IPO to justify continuation of hosting.
- 4) The 2015 SSC meeting will take place in Hobart, Australia, hosted by IMAS UTas. Date and level of host support TBA.
- 5) SOOS will be holding its inaugural Open Science Conference (OSC) alongside the SSC meeting in Hobart in 2015. It is intended that this event will be fully international and will highlight past, current and planned SOOS-related activities (strategic and field). Funding for this conference will be sought through a number of avenues.

### Recommendations/Actions and Justification:

- 1) SCAR provides financial support for the annual SSC meeting. This support is imperative to ensure participation of all of the international SSC members. SOOS greatly appreciates the support provided by SCAR, and requests that this support is continued for 2015.
- 2) Although planning is at the early stages, SCAR will be invited to sponsor the planned SOOS OSC. SOOS requests that the delegates consider the merit of such sponsorship.

### Expected Benefits/Outcomes:

- 1) Continuation of the support for the SSC meeting will ensure participation by all SSC members, which is imperative for planning and implementation of SOOS objectives.
- 2) SCAR sponsorship of the SOOS OSC is likely to either be used to provide travel support for participants, or will be used to reduce the running cost of the conference so that registration fees can be kept to a minimum.

### Partners:

- 1) SCOR provides 10,000 USD towards the annual SOOS SSC meeting. Discussions will be had with the 2015 SSC meeting host, IMAS, regarding a level of host support for this meeting.
- 2) Additional sponsorship and support for the SOOS OSC will be sought over the coming year.

### Budget Implications:

- 1) 10,000 USD are requested to support the 2014 SSC meeting.
- 2) SOOS cannot suggest a level of sponsorship for the SOOS OSC at this time. The decision to hold an OSC was made only 1 week ago and time is required to develop a budget for the conference. It is expected that the SOOS Executive Officer will communicate with the SCAR Secretariat on this matter in the coming months.

# The Southern Ocean Observing System

## **1. Progress on SOOS Implementation from mid-2013 – mid-2014**

### **1.1 Southern Ocean Air-Sea Fluxes Initiative**

At the 2013 SSC meeting in China, the SSC identified air-sea fluxes (across all disciplines and systems) as a priority gap in Southern Ocean observations. SOOS has, therefore, identified an international Working Group to help organise a workshop to bring together the air-sea flux community. This workshop will likely take place in Europe in Spring 2015. All information on this initiative, including a link to download the workshop prospectus, is available from the SOOS website ([www.soos.aq/index.php/science/air-sea-fluxes](http://www.soos.aq/index.php/science/air-sea-fluxes)).

### **1.2 Satellite Data Initiative**

Satellite data products are an integral component of SOOS and our requirements for data are only going to increase through time. SOOS has instigated a Southern Ocean Satellite Data Initiative to address a number of key issues. In addition to this, SOOS has joined with CliC and WMO PSTG in developing a survey on Southern Ocean Satellite Data Requirements. This survey will provide an avenue for users to articulate their requirements (across all disciplines and spatial/temporal scales) and will be compiled into a Community Report that will be submitted to WMO PSTG as the consensus view on our data requirements. For more information on this initiative, and for a link to the survey, visit the SOOS website ([www.soos.aq/index.php/science/satellite-data](http://www.soos.aq/index.php/science/satellite-data)).

### **1.3 Identification of ecosystem Essential Ocean Variables**

A key objective of SOOS is the design of a multidisciplinary and sustainable observing system. Towards this objective, we need to select the Essential Ocean Variables (EOVs) that will provide us with the information needed to detect, track and attribute (either directly or using models) change in the physical, biogeochemical and biological systems of the Southern Ocean. EOVS activities of the last year have focussed predominantly on identification of ecosystem Essential Ocean Variables (eEOVs). An ICSU-funded workshop was hosted by Rutgers University in March 2014. Nearly 30 international scientists attended, and invitations were extended to representatives of GOOS, GOOS Deep Ocean Observing System (DOOS), US Integrated Ocean Observing System, IOCCP, IOCCG, GEO BON, IndiSeas, SCOR, SCAR, CCAMLR, Palmer LTER, US AMLR, IMBER and APECS, although not all could attend. SCAR provided support for this workshop, although in the end it was not required.

Key outcomes of the workshop are highlighted in the official report to ICSU (see [www.soos.aq/index.php/science/ecosystem-variables](http://www.soos.aq/index.php/science/ecosystem-variables)) and will be presented at a SOOS Town Hall alongside the SCAR OSM on 27<sup>th</sup> August.

### **1.4 National Activities and Capabilities Initiative**

A key issue highlighted by the SSC during the 2013 SSC meeting is that we do not have a good understanding of the observations that are being taken routinely by all nations (at sea and from bases) making it difficult to identify gaps. We also do not have a clear picture of the funding structure and process across all Southern Ocean nations, the research infrastructure and capabilities of nations, the key data repositories and policies, the dominant shipping tracks, and the strategic science plans for their Southern Ocean research. In addition, many nations have fishing fleets that regularly fish the Southern Ocean, providing potential opportunistic observation platforms.

This initiative will compile information on national capabilities and activities produced as a user-friendly, web-based product that will enable all users to search and identify national efforts. It will utilise existing communities (e.g., CCAMLR, COMNAP, POGO, SCAR, SCOR) to gather the information. It is hoped that such information can be used by researchers in the forward planning of research proposals, and will enable greater cross-utilisation of national infrastructure and capabilities. SCOR has provided funds to enable SOOS

to produce this product. More information will be available on this initiative on the SOOS website under “Activities” once it has officially started.

### **1.5 Under Ice Initiative**

A workshop was held on this initiative in 2012. The resulting Under Ice Strategy was presented to the SOOS SSC at the June 2014 SSC meeting and will be made available at [www.soos.aq/index.php/science/under-ice](http://www.soos.aq/index.php/science/under-ice) following a short review process.

### **1.6 Standardised Methods and Protocols Initiative**

There are multiple methods that can be used when measuring or monitoring ocean variables and parameters. Not all methods produce observations that are equal in quality and precision, and variability in methods can lead to significant comparability issues. For measurement of many variables, international standards and protocols exist, however this information can be difficult to access and is widely distributed across many websites. This initiative will compile all internationally agreed standards and make the information easily accessible. Any observations that do not have a consensus standard methodology will be identified, and the requirements for developing one will be assessed. Funds have been secured by SCOR to produce this product, which will be started late in 2014 (following the production of the National Capabilities product).

### **1.7 Priority Observations Task Group**

The Priority Observations Task Group (PO-TAG) is being coordinated by Tosca Ballerini, the APECS representative on the SOOS SSC. The objective of PO-TAG is to identify the observations that are critically lacking in the Southern Ocean, and highlight those that could be made quickly/cheaply underway on ships (and hence could in theory be done from tourist ships, resupply ships as well as research ships), or from, for example, small inflatable boats deployed from coastal Antarctic stations. This information will be useful to nations seeking to leverage more effort from their existing operations and make more significant contributions to SOOS without necessarily having to increase infrastructure.

### **1.8 Data Management Sub-Committee**

Dr Kim Finney (AAD, Australia) was the DMSC chair from 2012 until March 2014, when she rotated off due to new work commitments. Steve Diggs (CCHDO, USA) has been a member of the DMSC since 2012, and was elected in early 2014 by the SOOS EXCOM to replace Kim Finney on the SSC and DMSC Chair. ([www.soos.aq/index.php/data/dmsc](http://www.soos.aq/index.php/data/dmsc)). Over the last year, NASA GCMD developed the SOOS Metadata Portal, currently in beta testing phase. A metadata cookbook is being developed to support this portal.

The SOOS data web pages will be updated to include a more dynamic supply of links and information on Southern Ocean data repositories. We are in the final stages of securing an agreement with NSF (funders of CCHDO) for in-kind support of IT and programming help to develop and maintain data components of the SOOS website and advance other areas where possible.

The 2<sup>nd</sup> DMSC meeting will be held alongside SCAR in Auckland, from the 29-30<sup>th</sup> August 2014, hosted by the National Institute for Water and Atmospheric Research (NIWA).

### **1.9 Other Collaborative Activities**

There are many international organisations and programmes of relevance to SOOS Objectives and where possible SOOS works with these communities in the organisation of activities and delivery of products.

#### ***COMNAP***

At the invitation of COMNAP, SOOS held a joint COMNAP/SOOS workshop alongside their annual meeting (July 2013, Korea). The objectives of this workshop were to identify collaborative projects that SOOS and COMNAP could work together on. Following a successful workshop, SOOS and several COMNAP members put forward a proposal for support of a number of activities to COMNAP EXCOM, though none of the proposed activities were approved.

Following this, COMNAP developed a Task Group comprising national representatives who are interested in working further with SOOS. This Task Group is being led by Rob Wooding (AAD, Aus). SOOS will continue to communicate activities and requirements to COMNAP and the Task Group.

### ***POGO***

In 2013, SOOS held a workshop alongside the POGO Annual Meeting in Hobart, Australia (Jan 2014). A number of proposed Action Items were approved and are outlined below:

- A) 2.1.1. Sustain Action Item 7 from POGO-14 and support the growth of the SOOS Metadata Portal. Action: POGO members.
- B) 2.1.2. Work with SOOS, ODIP, COMNAP, JCOMMOPS to coordinate the various ship schedule databases; support population of the ODIP shipping database with information on Southern Ocean activities. Action: Secretariat and Executive Committee.
- C) 2.1.3. Provide POGO endorsement for the Southern Ocean Carbon and Climate Observations and Modelling (SOCOM) project. POGO Members encouraged to take part in the project by deploying additional floats with biogeochemical sensors in the Southern Ocean. Currently only USA, UK, Australia, Argentina, Brazil, South Africa and Switzerland participate. Action: Chair to write letter of support. Members to investigate potential participation in the project.

SOOS is in the process of following up these Action Items with POGO and the relevant communities.

### ***CCAMLR***

SOOS has a strong connection to CCAMLR. Andrew Constable (SOOS Vice Chair) is an Australian representative to CCAMLR, and the Executive Officer regularly meets with Keith Reid (CCAMLR Science Officer) to discuss collaborative activities. In 2013, CCAMLR was involved in the development of candidate eEOVs and supported Keith Reid to attend the SOOS eEOV workshop in the USA.

### ***IAATO***

The use of tourist vessels as platforms for collecting observational data has great potential. In 2014, SOOS SSC member Dan Costa initiated discussions with IAATO members, specifically on identifying tourist activities in the Peninsula region.

### ***GOOS, DOOS, OOPC***

A number of international initiatives are starting to address the issue of identifying EOVs. SOOS is working with these communities where possible to avoid duplication.

### ***ODIP***

The Ocean Data Interoperability Program (ODIP) is an international initiative to contribute to the removal of barriers hindering the effective sharing of data across scientific domains and international boundaries. SOOS has plans to work with ODIP to develop a Southern Ocean component to the ODIP Cruise portal.

## **2. Other Activities**

### **2.1 Communication Activities**

#### ***Website***

The SOOS website ([www.soos.aq](http://www.soos.aq)) was developed in early 2012 and since this time the direction and focus of SOOS has been clarified, activities have developed and thus the website structure and content is outdated. The SOOS Executive Officer is in the process of an update, in order to provide better information on activities and products and details on how the community can be involved. SOOS invites feedback on the website to ensure it stays up-to-date and relevant.

### *Newsletter*

In 2013 SOOS developed a new digital newsletter (see Resources on SOOS website), which updates the SOOS community on all SOOS activities and products. We also source short articles from endorsed projects, and other relevant international programmes to keep our community informed of broader activities. The newsletter is generally produced quarterly. Three issues have been produced since the last report to SCAR.

### *Publications*

Two SOOS publications have recently been published, as key outcomes of the 2013 SOOS Asian Workshop:

- 1) Swart, S. et al., in press - *Advances in Polar Science: The SOOS Asian Workshop: Exploring possibilities for collaboration.*
- 2) Liu, J. et al., in press - *Advances in Polar Science: The SOOS Asian Workshop on Southern Ocean research and observations.*

### *Meetings*

SOOS was represented/presented at the following meetings by the Executive Officer and SSC members:

- Strategic Science in Antarctica (June 2013, Australia)
- COMNAP/SOOS Workshop (July 2013, Korea)
- SCAR Biology (July 2013, Spain)
- Theo Murphy Science Meeting (July 2013, UK)
- CAS-TWAS-WMO (Sept 2013, Brazil)
- Latin American Congress for Antarctic Science (Sept 2013, Chile)
- Polar Data Symposium (October 2013, Japan)
- ICED Symposium (Nov 2013, UK)
- SCOR EXCOM Meeting (Nov 2013, NZ)
- POGO Annual Meeting (Jan 2014, Australia)
- POGO Communications Workshop (Jan 2014, Australia)
- Australian Meteorological and Oceanographic Society Conference (Feb 2014, Australia)
- Ocean Sciences Meeting (Feb 2014, USA)
- Sea Ice Symposium (Feb 2014, USA)
- IMOS Annual Planning meeting (Feb 2014, Australia)
- International Programme of Antarctic Buoys (IPAB; Mar 2014, Australia)
- FRISP meeting (June 2014, Germany)
- IMBER Future Oceans (June 2014, Norway)
- SCAR Open Science Conference (August 2014, NZ)
- SCAR Delegates Meeting (August 2014, NZ)

SOOS also held a number of meetings over the last year:

- SOOS Asian Workshop (May 2013, China)
- SOOS DMSC Meeting (May 2013, China)
- SOOS/POGO Workshop (Jan 2014, Australia)
- SOOS eEOV Workshop (Mar 2014, USA)
- SOOS SSC meeting (Norway, June 2014)
- SOOS DMSC meeting (NZ, 29-30 August 2014).

- SOOS Town Hall at SCAR OSM (NZ, 27 August 2014)

## 2.2 Endorsed Projects

SOOS provides endorsement for individual research projects, large national and international research projects, national and international collaborative and coordination programmes, and data management initiatives. SOOS has endorsed a number of projects over the last year. More details are available from the SOOS website at [www.soos.aq/index.php/science/endorsed-programmes](http://www.soos.aq/index.php/science/endorsed-programmes)).

## 2.3 Sponsorship Prospectus

SOOS is in the process of developing a sponsorship prospectus, which will clearly articulate the need for SOOS and outline ways for institutes and/or nations to directly contribute to activities and products. It will identify avenues for both direct funding of the IPO and also in-kind support (e.g., of personnel and experience), and short-term funding of activities (e.g., workshops) or products. It will also provide a mechanism by which SOOS can acknowledge institutes, organisations or programmes who are contributing with in-field efforts that they themselves identify as direct contributions to SOOS.

## 3. Management, Governance and Funding

### 3.1 IPO Support and Sponsorship

The International Project Office (IPO) is hosted by IMAS UTas. This hosting includes Executive Officer salary and office on-site costs. The IPO relies on annual sponsorship to provide the financial support for all office costs and IPO activities. In 2013-2014, the following organisations sponsored the IPO: the Australian Antarctic Division (AAD), Antarctica NZ/NZ Antarctic Research Institute, and IMAS UTas.

SOOS also receives in-kind support for various activities/services.

- The Australian Integrated Marine Observing System (IMOS) has provided in-kind office support (e.g., printing, fax, general office supplies) since 2011, and has recently agreed to provide in-kind Finance Officer support to take care of all finance administration duties for the IPO.
- Tasmanian Partnership for Advanced Computing (TPAC) provides 1.5 wks/year website support
- Department of Economic Development, Tourism and the Arts, Tasmanian Government provided 3 months administration/workshop organisation support (Dec 2013 – Mar 2014)
- The University of Gothenburg is providing support for 5% of Anna Wählin's time to be dedicated to SOOS for the duration of her appointment as Co-Chair.
- NSF has recently agreed to provide up to 1-months programming and IT support for the SOOS website and other activities, coordinated through Steve Diggs (SOOS SSC member) at the CLIVAR and Carbon Hydrographic Data Office (CCHDO, USA)

Although in-kind support is very useful to the IPO, it is imperative that we have continuation and growth in the existing levels of direct financial support. To this end, the IPO is developing the Sponsorship Prospectus (as outlined above in Other Activities).

IMAS hosting of the IPO beyond mid-2016 is not secure. It is imperative that the national sponsorship base of the IPO is expanded over the next year, in order to clearly show the importance of and support for SOOS by the international community. SCOR will be initiating a discussion at their upcoming EXCOM meeting about increasing annual membership fees for those nations interested in having some of the fees re-directed as SOOS sponsorship. This may provide a mechanism for countries that have difficulties directing funds to organisations based in other nations, to become sponsors of SOOS. SCOR may also wish to consider this.

SOOS will also be identifying options for long-term, large-scale funding of the IPO through philanthropic and national funding schemes.

All information on sponsorship is available at [www.soos.aq/index.php/about-us/sponsors](http://www.soos.aq/index.php/about-us/sponsors).



### 3.2 Scientific Steering Committee Membership

In Jan 2014, physical science co-chair Mike Meredith (BAS, UK) stepped down from the co-chair position due to new work commitments (he remains an SSC member). Anna Wåhlin (Gothenburg University, Sweden) was elected by the SSC (and approved by SCAR and SCOR) as the new physical sciences co-chair. During this process it became apparent that we needed greater continuity in leadership. It was agreed that a Physical Sciences Vice Chair and Biological Sciences Vice Chair would also be elected. The Vice Chairs would also be represented on the Executive Committee and would automatically become the next Co-Chairs. Sebastiaan Swart (CSIR, South Africa) and Andrew Constable (AAD, Australia) were voted in as the Physical and Biological Vice Chairs, respectively. Their appointment was approved by SCAR and SCOR.

In early 2014, SOOS announced a call for nominations for new SSC members. We received 16 nominations from 9 countries. SCAR/SCOR approved the elected members below:

Matthew Mazloff (Scripps, USA)  
 Jean-Baptiste Sallee (CNRS, France)  
 Mike Williams (NIWA, NZ)  
 SangHoon Lee (KOPRI, Korea)

## 4. Planned Future Activities

[NOTE: SOOS annual activities are defined at the annual SSC meeting, which took place only a week before submission of this report. Therefore, many of the activities outlined in this section are proposed in concept form only, and may be modified in the future following further clarification and discussion with the relevant communities]

### 4.1 Changes to SOOS Governance structure

From 2012 - 2014 SOOS has moved through a developmental phase that focused on the development of policies, governance, communication strategies, and clarification of the vision. SOOS now recognises the need to change focus towards achieving its 5 key objectives (observing system design and implementation; facilitating new technologies; enhancing existing observation efforts; integrating and communicating between disciplines and programmes; facilitating access to data and data products). This re-focus will also require a change in the governance structure for SOOS. Presently, the SSC are both the governing and implementing bodies, and this is unsustainable (even at existing level of activity). At the 2014 SSC meeting (June 2014, Norway) the SSC agreed to the development of SOOS Working Groups (WGs), designed to drive the implementation activities of SOOS. These WGs will include coordination of field activities (through development of Regional WGs, e.g., West Antarctic Peninsula, Weddell Sea, etc), development of strategic initiatives (e.g., air-sea flux initiative, EOY initiatives etc), or purely coordination activities (e.g., SOOS Ships of Opportunity activities with IAATO). WGs can be proposed by the SSC or the Southern Ocean community. All WGs proposals will be reviewed to ensure international involvement, alignment with SOOS objectives and to prevent duplication of effort with other existing initiatives.

All WGs will be led by one or more Project Leaders. These Leaders will all be part of a (relatively informal) SOOS Implementation Board (IB), which will form a communication pathway from the WGs to the SSC. The IB will not have annual meetings, however it is proposed that every 3-4 years, SOOS will hold an Open Science Conference to bring the IB and SSC together and to update all on the activities across all WGs. The first OSC is being planned for early-mid 2015 in Hobart, Australia. It is proposed that the breadth of expertise and nationality of the IB will enable SOOS to reduce the size of the SSC down to approximately 12 members over the next decade (through natural off-rotation of existing members).

The Terms of Reference for WGs and a full list of SSC-proposed WGs are being developed and all information will be made available on the SOOS website as soon as possible.

### 4.2 Upcoming Meetings

- SOOS Air-Sea Fluxes Workshop (early 2015, location/date TBA)

- SOOS 2<sup>nd</sup> ecosystem Essential Ocean Variables Workshop, (Nov 2015, location/date TBA)
- SOOS 4<sup>th</sup> SSC Meeting (early-mid 2015, Hobart, Australia)
- SOOS 3<sup>rd</sup> DMSC Meeting (early-mid 2015, Hobart Australia)
- SOOS Open Science Conference (early-mid 2015, Hobart Australia)

#### **4.3 Communication Activities/Products**

A number of new products and activities are planned for the upcoming year, including:

- Complete overhaul of SOOS website content, update to data pages
- SOOS “webcam” (metadatabase of planned field activities)
- Mid-term report to sponsors and stakeholders, highlighting achievements and plans