



THE SOUTHERN OCEAN OBSERVING SYSTEM

ANNUAL REPORT

TO THE SCOR EXECUTIVE COMMITTEE

2015

The Southern Ocean Observing System (SOOS) is a joint initiative of SCAR and SCOR, and facilitates the collection and delivery of essential observations on dynamics and change of Southern Ocean systems to all international stakeholders, through design, advocacy, and implementation of cost-effective observing and data delivery systems.

This report provides an update on activities from May 2014 to August 2015. SOOS welcomes all comments and suggestions on activities and products. A more detailed report on SOOS activities and products can be found in the SOOS 3-Year Progress Report at <http://soos.aq/resources/reports?view=product&pid=29>

SOOS Activities and Milestones from May 2014 – August 2015

1) SOOS Strategic and Implementation Activities

In 2014, SOOS clarified its mission and objectives, and developed new *Implementation Structures* to support implementation activities (e.g., Working Groups, Task Teams). This was articulated in the SOOS 5-year Strategic Plan, which is currently in internal review, and will soon be disseminated for external comments.

This plan restructured SOOS Objectives into a logical sequence of implementation. All Implementation Milestones will be reported herein against the newly defined Objectives.

Objective 1: DESIGN

Facilitate the design and implementation of a comprehensive and multi-disciplinary observing system for the Southern Ocean

Activities / Milestones

Physical Oceanographic Essential Ocean Variables Task Team

OBJECTIVE: Develop a list of candidate EOVS for Southern Ocean physical oceanography

PRODUCT: A list of candidate EOVS for the Southern Ocean

Ecosystem Essential Ocean Variables Task Team

OBJECTIVE: Organise an international workshop on identification of ecosystem Essential Ocean Variables (eEOVs)

SPONSORS: ICSU, SCOR, Rutgers University

PRODUCT: Workshop on identification of eEOVs ([report](#)); Defined process for identification of eEOVs; SCOR Working Group proposal (unsuccessful); List of candidate eEOVs for the Southern Ocean

Sea Ice EOVS Task Team

OBJECTIVE: Develop a list of candidate EOVS for Southern Ocean sea ice

PRODUCT: A list of candidate sea-ice EOVS for the Southern Ocean

Ocean-Ice EOVS Task Team

OBJECTIVE: Develop a list of candidate EOVS for Southern Ocean Ocean-Ice interface

PRODUCT: A list of candidate ocean-ice EOVS for the Southern Ocean

Objective 2: CAPABILITIES

Advocate and guide the development of new observation technologies

Activities / Milestones

- SOOS endorsed 5 successful international funding proposals that have a focus on advancing technological capabilities.
- SOOS is developing a new Endorsement Category, which will focus specifically on endorsement of ventures that support the development, testing and operation of new technologies.
- A SOOS Capability Working Group on facilitating observation technology development has been suggested and will be developed.
- Stemming directly from the 2014 SOOS SSC and FRISP meetings, Australia and Sweden will collaborate on the purchase, maintenance and use of Autonomous Underwater Vehicles (AUVs) for research under Antarctic ice shelves.

Objective 3: FACILITATING OBSERVATIONS

Compile and encourage use of existing international standards and methodologies, and facilitate the development of new standards where required

Activities / Milestones

- Support has been secured from SCOR for development of an online database of international standards and protocols.

Objective 4: REGIONAL IMPLEMENTATION

Unify and enhance current observation efforts and leverage further resources across disciplines, and between nations and programmes

Activities / Milestones

SOOS has identified 3 implementation structures required to facilitate and drive activities against all objectives: Regional Working Groups, Capability Working Groups, and Task Teams

SOOS will be implemented regionally, the natural areas of focus by nations involved in Southern Ocean activities, although some activities will be coordinated at a circumpolar scale, such as Argo. SOOS is therefore developing *Regional Working Groups* that will coordinate and implement the observing system in their defined region, including facilitating improved readiness of particularly measurements and an ability to measure them where needed. Regional Working Group membership will be open, and will have representation from all nations working in the region, and expertise across all disciplines.

Capability Working Groups will be used to develop important capabilities for SOOS generally, including (i) developing and implementing technologies, (ii) improving observational design, efficiency and coverage, and (iii) developing methods for managing and disseminating information. The existing national and international projects and programs that contribute to SOOS will be identified and recognised as contributing regionally and/or to enhancing capabilities.

Task Teams are very short-term (weeks/months) groups developed with the purpose of producing a specific product or organizing an activity. Whilst the Working Group categories have only recently been defined and are not yet active, SOOS Task Teams have been active for nearly 2 years. Recent Task Team activities are listed below:

Ross Sea Task Team

OBJECTIVE: Identify current and planned activities and key observation gaps in the Ross Sea, to ensure that activities of nations new to the Ross Sea complement the international effort.

PRODUCT: "[Observations in the Ross Sea](#)" – SOOS Report Series, Issue 1.

Air-Sea Fluxes Task Team

OBJECTIVE: Organise a workshop that will bring together the Southern Ocean flux community, identify priorities, define EOVs, and develop a strategy for enhancing observations

SPONSORS: ESRIN, WCRP, SOOS, US-CLIVAR

PRODUCT: The SOOS [Air-Sea Flux Workshop](#), 21-23 September 2015, Frascati, Italy

Joint SOOS-CLIC-SCAR Southern Ocean Satellite Data Requirements Task Team

OBJECTIVE: To develop a community report that articulates Southern Ocean satellite data requirements for inclusion in future mission planning.

SPONSORS: SOOS, CLIC, SCAR

PRODUCT: A [report](#) of community needs for Southern Ocean Satellite Data

National Capabilities Product

OBJECTIVE: Central repository of information on National Capabilities for Southern Ocean nations, including routine shipping routes and routine operational or project-based observations.

SPONSORS: SCOR

PRODUCT: In development - National webpages for all Southern Ocean nations; A web-based map of national infrastructures and activities.

Southern Ocean Field Activities Database

OBJECTIVE: Database of existing and planned field activities,

SPONSORS: ARC Antarctic Gateway Partnership, NSF-CCHDO

PRODUCT: In development - Database of information on existing and planned (funded) national and programmatic field activities, visualised in a dynamic, web-based mapping tool.

Objective 5: DATA DELIVERY

Facilitate linking of sustained long-term observations to provide a system of enhanced data discovery and delivery, utilising existing data centres and programmatic efforts combined with, as needed, purpose-built data management and storage systems.

The SOOS data effort thus far has been limited by a lack of dedicated resources. In 2014, SOOS gained support through the Australian Research Council's Special Research Initiative for Antarctic Gateway Partnership (Project ID SR140300001) and has hired a Data Officer for 2 years. This will greatly enhance DMSC activities and capabilities towards achieving Objective 5.

The SOOS Data Management Sub-Committee (DMSC)

New members on the DMSC include Alicia Aleman (NASA GCMD), James Cusick (AAD, AU), Jenny Thomas (SONA, UK) and Joana Beja (BODC, UK).

Activities / Milestones

- SOOS has hired Dr Phillippa Bricher as the inaugural SOOS Data Officer.
- 3rd Annual SOOS DMSC meeting was held in Hobart, Australia (June 2015), hosted by IMAS-UTAS. Two open data activity days and a joint DMSC-SSC session were also held.
- The SOOS metadata portal (hosted by NASA GCMD) had stagnated due to a lack of resources to dedicate to its full development. A significant overhaul of the portal was carried out during the open data activity days by the DMSC. The search term that draws in metadata records on the GCMD to this portal was reworked to explicitly draw in any datasets that spatially overlap with the Southern Ocean and which are related to any of the candidate Essential Ocean Variables, so as to better target the portal on datasets of interest to SOOS's stakeholders. The group also identified key datasets and established processes for converting metadata records from other formats into GCMD's native DIF format. The metadata portal is available through <http://gcmd.nasa.gov/portals/soos/>
- In the immediate-term, SOOS is working with the following groups:
 - OceanSITES (<http://www.oceansites.org/>) to find a home for identified orphan mooring datasets and make it discoverable through the metadata portal.
 - The Swedish Polar Research Secretariat to make Bellingshausen, Amundsen and Ross Sea data discoverable through the SOOS metadata portal.
 - The Coastal Ocean Observation Lab at Rutgers University to make US glider data discoverable through the metadata portal
 - The University of Cape Town's Marine Research Institute to house South African glider data and make it discoverable through the metadata portal.

These groups represent the initial steps of a much wider program to make Southern Ocean data public and discoverable, using existing data repositories and the metadata portal

- A data policy has been adopted and will soon be available on the SOOS website
- An interim field-project planning tool has been designed to help researchers share details of upcoming voyages and deployments. Ultimately, this will have a web interface with a live web-map, but currently consists of a web-form that feeds data to a spreadsheet that will soon be publicly available.

Objective 6: SUPPORT ACTIVITIES

Provide services to communicate, coordinate, advocate and facilitate SOOS objectives and activities

Community and Advocacy Activities / Milestones

- The importance of connecting with SOOS has been articulated in the strategic and implementation plans of 2 international programs (WMO Year of Polar Prediction, CLIVAR-CLIC-SCAR Southern Ocean Region Panel), and 1 national observing effort (Australia's Integrated Marine Observing System).
- Australia and the USA submitted a joint working paper to the Committee for Environmental Protection (CEP) at the 2015 Antarctic Treaty meeting. Titled "Shared science priorities and cooperation: systematic observations and modelling in the Southern Ocean", this report highlighted the importance of international contributions to SOOS. CEP nations agreed unanimously on the importance of SOOS and supported all recommendations from the paper.
- SOOS has 40 Affiliated Institutes, Organisations, Programmes and Field Initiatives across 16 nations.
- Since March 2014, SOOS has endorsed 18 individual research projects.

Communication Activities / Milestones

- The SOOS website (www.soos.aq) was maintained, however needs updating, which will take place in September 2015.
- Two issues of the online SOOS newsletter were produced and disseminated www.soos.aq/index.php/resources/newsletters?view=newsletters
- SOOS has developed an online Report Series for all grey literature and reports. These reports are published through the SOOS Collection on Zenodo (<https://zenodo.org/collection/user-southern-ocean-observing-system>)
- Between March 2014 – April 2015, SOOS was represented or presented at 26 international conferences, and has provided reports to the Antarctic Treaty and SCOR.
- SOOS has Twitter and Facebook accounts, providing updates to over 1000 people, across 45 countries.
- SOOS Town hall at SCAR OSM (New Zealand, August 2014) to enhance understanding and knowledge of the status of ecosystem Essential Ocean Variable activities for the Southern Ocean
- SOOS Scientific Session at SCAR OSM (New Zealand, August 2014) to support SOOS-relevant science, build community, and highlight the breadth of SOOS science.
- SOOS International Workshop "Implementation of a Southern Ocean Observing System" (11-12th June 2015, IMAS-UTas, Australia) attended by 70 international participants
- SOOS International Workshop "Assessing the State of the Climate of the Southern Ocean" (10th June 2015, IMAS-UTas, Australia) attended by 60 international participants

Publications and Reports Activities/Milestones

- Williams, M. et al., (2015). Observation Activities in the Ross Sea: Current and future national contributions to the Southern Ocean Observing System. Zenodo. [10.5281/zenodo.21169](https://zenodo.org/record/21169)
- Wåhlin, A. et al., (2015). Towards an integrated Southern Ocean Observing System. CLIVAR Exchanges, in press
- Meredith, M.P. et al., (2015). [Southern Ocean](#) [in "State of the Climate in 2014"]. Bulletin of the American Meteorological Society, 96(7).
- Newman, L., et al., (2015). Southern Ocean Community response to the Year of Polar Prediction Implementation Plan. Zenodo, [10.5281/zenodo.27261](https://zenodo.org/record/27261)
- Newman, L., et al., (2015). [SOOS 3-Year Progress Report](#). Zenodo, [10.5281/zenodo.21419](https://zenodo.org/record/21419)

- Constable, A., et al., (2015). Report on 2015 Activities of the Southern Ocean Observing System relevant to the work of CCAMLR. Zenodo, [10.5281/zenodo.28227](https://zenodo.org/record/28227)

Governance and Management Activities / Milestones

- From an international call for nominations, SOOS appointed four new members for the 2015 Scientific Steering Committee: Matthew Mazloff (SIO, USA), Mike Williams (NIWA, NZ), Jean-Baptiste Sallee (LOCEAN, FR), SangHoon Lee (KOPRI, Korea). Two SSC members rotated off the committee in 2014: Bronte Tilbrook (CSIRO, AU), Steve Rintoul (CSIRO, AU).
- Maciej Telszewski became the IOCCP ex-officio on the SOOS SSC
- Giorgio Budillon became the Italian National Representative for SOOS
- Takeshi Tamura became the Japanese National Representative for SOOS
- 4th SOOS Scientific Steering Committee Meeting (Australia, June 2015), hosted by the Institute for Marine and Antarctic Studies, University of Tasmania.

Sponsorship and Endorsement Activities / Milestones

- SCAR and SCOR both continued their support of the annual SOOS SSC meeting (2014 and 2015)
- IMAS-UTas continued to host the SOOS IPO and will do so until Aug 2016.
- The Australian Research Council's Special Research Initiative for Antarctic Gateway Partnership (Project ID SR140300001) sponsored the SOOS IPO with 100,000 AUD over 3 years towards supporting new SOOS initiatives, and a further 300,000 AUD over 3 years to support the salary of the SOOS Data Officer (2015- Aug 2016), and then the SOOS Executive Officer (Aug 2016 – Aug 2017) when the existing IMAS hosting contract finishes.
- The Australian Antarctic Division continued to provide financial support to the SOOS IPO for both the 2014-2015 and 2015-2016 financial years.
- The Australian Integrated Marine Observing System (IMOS) continued their in-kind support of the SOOS IPO in 2014 and onwards into 2015. This support was extended to include support of Finance and Administration duties for the SOOS IPO.
- New Zealand Antarctic Research Institute (NZARI) provide support for SOOS in 2015 through sponsorship of NZ SSC Member Mike Williams to attend SOOS activities.
- Antarctica New Zealand have sponsored SOOS since 2012. ANZ and SOOS are in the process of developing an official MoU to better articulate and define ANZ sponsorship and involvement in SOOS for 2015 onwards. In the meantime, Antarctica NZ have agreed to continue the sponsorship of the IPO for 2015 calendar year.
- The Tasmania Partnership for Advanced Computing (TPAC) continued their in-kind sponsorship of SOOS by providing web-programming support.
- NSF-CCHDO are new sponsors in 2014, through their in-kind support of 1-month web-programming activities per year.
- The University of Gothenburg, Sweden, are also new sponsors for 2014/2015, through their in-kind support of Anna Wåhlin's (SOOS Co-Chair) involvement in SOOS and provision of computer hardware for the IPO.

SOOS thanks all of its sponsors for their support over the last few years, and for their continued assistance into 2015.

SOOS Planned Activities for April 2015 - onwards

Implementation activities in 2015-2016 will focus on achieving the objectives and deliverables outlined in the interim SOOS 5-year Strategic Plan.

Specific activities already planned for this period are listed below:

- International review, finalisation and publishing of the SOOS 5-year Strategic Plan
- Submission of the SOOS Community Report on Satellite Data Requirements
- Air-Sea Flux Workshop (21-23 September, Frascati, Italy), sponsored by ESA, WCRP-CLIVAR and SOOS
- Development and delivery of online Southern Ocean portal of existing and planned field activities of relevance to SOOS
- Release of SOOS Metadata Portal and regular population with new records.
- Update of SOOS website
- Development of Regional and Capability Working Groups
- Solidification of long-term funding of the SOOS Executive Officer salary

5. IMPORTANCE OF SCOR SUPPORT

SCOR has continued to provide significant support for SOOS, financially and through guidance, advice and input provided by the SCOR Executive Director. SOOS would like to acknowledge and thank SCOR for this continued support. It is fundamental to our success.

SOOS also acknowledges the support provided by SCOR for the annual Scientific Steering Committee meeting, and requests that this support is continued for 2016. 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. SCAR also provides support for the annual SOOS SSC meeting and continuation of this support for 2016 is being requested at the SCAR EXCOM meeting in August 2015.

The SOOS 2016 SSC meeting will be hosted by Scripps Oceanographic Institution, USA, May 12-14, and will be held in conjunction with the annual meeting of Southern Ocean Carbon and Climate Observations and Modeling project (SOCCOM) and the SOOS Data Management Sub-Committee. The week of parallel meetings will include joint sessions and a Southern Ocean workshop. SCOR support for this meeting will ensure broad international involvement.