

**SOOS**  
SOUTHERN OCEAN  
OBSERVING SYSTEM

The  
Southern Ocean Observing System

*2018 Annual Report*



## Summary

The Southern Ocean Observing System (SOOS) is a joint initiative of the Scientific Committee on Antarctic Research (SCAR) and the Scientific Committee on Oceanic Research (SCOR); and is endorsed by the Partnership for Observations of the Global Ocean (POGO), and the “Climate Variability and Predictability (CLIVAR)” and “Climate and Cryosphere (CliC)” projects of the World Climate Research Programme (WCRP).

SOOS was launched in 2011 with the mission to facilitate 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.

The SOOS International Project Office 2018 core sponsorship



# Content

<b>SUMMARY</b>	<b>2</b>
<b>CONTENT</b>	<b>3</b>
<b>2018 IN REVIEW</b>	<b>4</b>
<b>PERFORMANCE REPORT</b>	<b>5</b>
<b>PROGRESS REPORT AGAINST OBJECTIVES AND KEY RESULT AREAS</b>	<b>5</b>
<b>SOOS KEY PRODUCTS</b>	<b>15</b>
SOUTHERN OCEAN COMMUNITY REVIEW PUBLICATION	15
DATABASE OF UPCOMING EXPEDITIONS TO THE SOUTHERN OCEAN	16
SOOSMAP	18
<b>SOOS SPONSORSHIP</b>	<b>20</b>
<b>GOVERNANCE</b>	<b>23</b>
EXECUTIVE COMMITTEE	23
SCIENTIFIC STEERING COMMITTEE	23
ANNUAL SCIENTIFIC STEERING COMMITTEE MEETING	24
<b>SOOS IMPLEMENTATION GROUPS</b>	<b>25</b>
DATA MANAGEMENT SUB-COMMITTEE	25
TASK TEAMS	26
REGIONAL WORKING GROUPS	28
CAPABILITY WORKING GROUPS	31

## 2018 in review

2018 was a strong year for SOOS. Particularly exciting was the recognition of the impact of SOOS in the broader community; evident through strong engagement at key meetings. Measured success was also possible. Over 41k users used SOOSmap in 2018, with six new data layers added and over 300 direct downloads of data. Furthermore, DueSouth, a first point-of-access for information on upcoming Southern Ocean voyages and projects, has initiated automated data feeds to deliver an up-to-date directory.

Advocacy was also central in 2018. In collaboration with the CLIVAR-CliC-SCAR Southern Ocean Regional Panel, SOOS led a review paper to be published in *Frontiers in Marine Science* for OceanObs'19. This had broad community input and revealed eight future priorities for Southern Ocean observations. SOOS made contributions to other OceanObs'19 review papers, and also contributed the Southern Ocean chapter of the BAMS State of the Climate for 2017.

All 10 working groups were active in 2018, and the detailed achievements of these groups can be viewed in this report. Importantly, two new regional working groups were developed and first workshops organised for early 2019. This fulfils requirements to deliver a fully circumpolar observing system for the Southern Ocean. The development of cooperation with other programs was also front-and-centre in 2018, with enhanced collaboration and data sharing efforts between SOOS and CCAMLR, as well as strengthened connection to the Southern Ocean modelling community, through the SOOS Modelling workshop and the Marine Ecosystem Assessment for the Southern Ocean (MEASO).

In 2019, core efforts will focus on consolidating sustained funding for the SOOS Project Office, the first review and update of the SOOS Science Plan, and activities aimed at finalising the current 5-Year Implementation Plan and drafting of the next 5-year plan. Importantly, through SCAR, SOOS will also strengthen its engagement with the Antarctic Treaty and Committee on Environmental Protection.

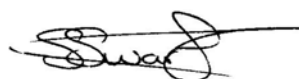
Thank you for your continued support and interest in SOOS. We encourage you to engage with our on-line platforms by submitting field plans to DueSouth and discovering data through SOOSmap, and to collaborate through our working groups. We look forward to engaging with you at upcoming events.

Signed:



Dr. Andrew Constable; Biological Sciences Co-Chair  
Australian Antarctic Division, Australia

Signed:



Dr. Sebastiaan Swart; Physical Sciences Co-Chair  
University of Gothenburg, Sweden

# Performance Report

SOOS published its 5-Year Implementation Plan in 2016, which articulated the key problems driving SOOS, and resulted in the identification of 4 Objectives and specific Key Result Areas (KRAs) that will address the causes of these challenges. The annual report for SOOS is the mechanism through which we review progress against the KRAs, to ensure the Objectives are being met.

The 5-Year Implementation Plan is available at <http://soos.aq/activities/implementation>

## Progress report against Objectives and Key Result Areas

### **Objective One: Facilitate the design of a comprehensive and multi-disciplinary observing system for the Southern Ocean**

Objective 1 will support delivery of a coordinated, integrated and efficient program that provides sustained observations Southern Ocean systems, following the Framework for Ocean Observing (FOO, 2010) and the identification of Essential Ocean Variables (EOVs). Activity towards achieving Objective 1 will be carried out by the Regional Working Groups (RWGs) and Capability Working Groups (CWGs).

There are 4 KRAs that will focus work towards achieving this objective, and all four were identified for actioning in 2018. Details of the progress are shown in the tables below.

During 2018, a concerted effort was made to address KRA 1.1 and 1.2, however there are significant discrepancies in how EOVs and their criteria are documented, and how they are used by the community. The KRAs are not necessarily priorities for the implementors of the observing system, and thus pushing for significant community effort on these is not a practical priority. Instead, SOOS will be working through CWGs, RWGs, and specific Task Teams, to identify, prioritise and document EOVS coverage and requirements (KRA 1.3), which will result in a more “organic” delivery of KRA 1.1 and 1.2.

#### ***Key Result Area 1.1: Establish Criteria for adopting EOVS and communicate them***

2018 Intended Actions	Progress Made (Y/X)	Comment
Published table of status of EOVS	Y	EOVS were published on the website: <a href="http://soos.aq/activities/system-design">http://soos.aq/activities/system-design</a>
Published, internationally defined criteria for EOVS	X	No progress was achieved in 2018, predominantly due to a lack of well-defined community to drive this initiative

**Key Result Area 1.2: Southern Ocean EOVs are identified and the manner in which they satisfy the criteria are communicated**

2018 Intended Actions	Progress Made (Y/X)	Comment
Compiled EOV descriptions and supporting documentation	Y	Concerted efforts were made to address this Action in 2018. As a result, it was identified that this Action will be a more organic outcome of the RWGs rather than a separate, focussed effort.

**Key Result Area 1.3: Spatio-temporal, system-level EOV sampling requirements are identified, documented and agreed, and strategies for implementation developed if needed**

2018 Intended Actions	Progress Made (Y/X)	Comment
Development of 5 international networks for regional coordination of SOOS implementation	Y	All 5 Regional Working Groups (RWGs) have been developed: <ul style="list-style-type: none"> <li>- West Antarctic Peninsula + Scotia Arc</li> <li>- Weddell Sea/Dronning Maud Land</li> <li>- Southern Ocean Indian Sector</li> <li>- Ross Sea</li> <li>- Amundsen/Bellingshausen Sea</li> </ul>
Reviews of current status of EOV coverage, key gaps and requirements	Y	EOV Heatmaps have been developed by the Indian Sector RWG and will be delivered by all RWGs in 2019/2020. These identify existing coverage of EOVs, gaps and requirements, as well as support discussions on standards and data management.  The Co-Chairs of all RWGs together form a <i>consortium</i> that meet semi-regularly to ensure alignment between RWGs where appropriate
International strategic plan for observing the ocean beneath Antarctic sea ice and ice shelves (OASIIS Working Group)	Y	A POGO Fact Sheet has been drafted and will be made available on the SOOS website. The strategy document is planned and will be delivered in 2020.  <b>Issues</b> – Products from this group are delayed but will be delivered by end-2020

**Key Result Area 1.4: A strategy for the uptake of EOVs within the RWGs is developed**

2018 Intended Actions	Progress Made (Y/X)	Comment
Regional Implementation Strategies developed	Y	RWG have developed an overview of observational coverage. This information will be standardised into EOV Heat-maps, and each RWG will identify strategies for implementation – to be delivered 2020.  2018 products contributing to this action include: Indian Sector Workshop <a href="#">report</a> West Antarctic Peninsula/Scotia Arc <a href="#">publication</a> Ross Sea Workshop <a href="#">Report</a>

## **Objective Two: Unify and enhance current observation efforts and leverage further resources across disciplines, and between nations and programs**

Delivering Objective 2 will ensure regional implementation of long-term, sustained observations to achieve circumpolar coverage of Southern Ocean systems, built by integrating across internationally coordinated observation programs and existing efforts by national programs.

There are 3 KRAs that will focus work towards achieving this objective, and all were identified for actioning in 2018. Progress for 2018 shown in the tables below.

In 2018, Objective 2 activities focused on consolidation and communication of key products and networks. In this process, issues with integration and alignment across regional networks were identified and structures put in place to enable better communication and connection. IPO support for Capability Working Groups is an ongoing issue, with websites, workshops and other communication efforts lagging significantly. At present, there is no clear pathway to enhancing the IPO support for these groups.

### ***Key Result Area 2.1: Working Groups and Task Teams that coordinate efforts across disciplines and programs, and between nations are developed to fill priority gaps***

2018 Intended Actions	Progress Made (Y/X)	Comment
Continuation of active Working Groups against WG-specific TORs	Y	SOOS has 10 Working Groups and all were active in 2018. For detailed WG reports, see pages 28 - 33
Development of new WGs (as required)	Y	<p>The Observing System Design Task Team was approved as a new Capability Working Group. More information on this CWG is provided on page 33</p> <p>The POLDER Task Team is a joint working group between SOOS, SCADM and the Arctic Data Committee established in 2017 and fully developed in 2018. More information on POLDER is provided on page 25.</p> <p><b>Issues</b> – inability of IPO to provide required website, communication and coordination support for existing groups. This puts into question the continued growth in WG numbers.</p>

**Key Result Area 2.2: Key products for the Southern Ocean that aid in information transfer and facilitate collaborative efforts are identified and produced**

2018 Intended Actions	Progress Made (Y/X)	Comment
Database of Upcoming Expeditions to the Southern Ocean	Y	<p>Product was consolidated and a final version almost completed; Expeditions were populated manually; Automated transfer of expedition information from JCOMMOPS; the CCAMLR Science Committee approved the inclusion of new, exploratory, and krill fishing expeditions; COMNAP provided Regional Information Exchange reports for manual entry into DueSouth; and negotiations with IAATO for tourist vessel movements were begun. Negotiations also began with Geoscience Australia to use DueSouth for Australian bathymetric survey planning.</p> <p>More details available on page 16.</p> <p><b>Issues</b> – Specific observational projects remain unpopulated; Inability to obtain user statistics; limited input of plans by community; Low level of control over timing and delivery of enhancements and modifications due to in-kind delivery of product.</p>
SOOSmap	Y	<p>Significant progress in delivering product; improvements to core functionality; new data layers added; future data layers identified; modifications to user interface initiated. More details available on page 18.</p> <p><b>Issues</b> – Low level of control over timing and delivery of enhancements and modifications to functionality due to in-kind delivery of product</p>
Community annual calendar	Y	Product was maintained and updated as required

**Key Result Area 2.3: Collaborative, multidisciplinary and multinational workshops and meetings are undertaken, resulting in the SOOS mission being achieved**

2018 Intended Actions	Progress Made (Y/X)	Comment
Capability and Regional Working Group workshops	Y	SOFLUX Workshop; CAPS Annual Workshop; Regional Working Group Consortium workshop; Data Management Sub-Committee meeting; POLDER meeting
Capacity- or Community-building workshops	Y	Southern Ocean Data Hack; Southern Ocean Modelling workshop; CCAMLR-SOOS Synergies workshop; OceanObs'19 Community White Paper preparatory workshop;
International conference sessions, town-halls, side meetings, information sessions	Y	Polar2018 Data Townhall, Polar 2018 conference session "Big data, small data, your data: What does good data management look like to you?"



**Objective Three: 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**

Achieving Objective 3 will enhance access to multidisciplinary, quality-controlled observational data from the Southern Ocean. Currently, such data is difficult and time consuming to access as there are many fragmented, mono-disciplinary or mono-platform data centres; a general lack of focused effort towards data sharing and platform interoperability; large variations in national/institutional data policies and data-sharing cultures; and a lack of general knowledge on the data that are being collected.

There are 4 KRAs that will focus work towards achieving this objective, and all were identified for actioning in 2018. Progress is shown in the tables below.

In 2018, progress towards this objective was considerable, on the back of strategic community consultation in recent years. These connections are vital to maintain in the coming years. In the past two years, as the SOOS data vision has developed, the focus of activity shifted away from a few KRAs and this is reflected by a lower intensity of effort on these fronts. In particular, KRA 3.4 “Community-developed data synthesis tools and products for the Southern Ocean are accessible through the SOOS website”, was identified as being beyond the capability of the IPO to make appropriately comprehensive and useful at this point in time.

***Key Result Area 3.1: A multidisciplinary metadata portal is developed and populated and continuously updated with records. Efforts include archiving of orphan datasets and advocating for direct links to data in metadata records***

2018 Intended Actions	Progress Made (Y/X)	Comment
Maintenance of the SOOS NASA GCMD metadata portal	Y	<p>The portal was rebuilt to maintain functionality with the GCMD’s new Common Metadata Repository. Between the two portals, there were 1720 unique visits, with 11,916 page-views. Due to differences in the portal query, it does not make sense to compare the number of records in the portal (3675) with previous years.</p> <p><b>Issue:</b> The GCMD is no longer delivering what the community requires. Development of the Federated Data Search Tool (POLDER) will shift SOOS efforts away from the GCMD</p>
SOOS mooring network	Y	<p>The original actions identified in the Implementation Plan have been modified following community consultation.</p> <p>The major activity in 2018 was to enrich the metadata for moorings published through SOOSmap, to include links to the thousands of datasets at BODC that are linked to Southern Ocean moorings. Minor additions and corrections from other nations were added as well.</p>
Chinese CTD data sharing	Y	DMSC members, Chinese researchers and data managers, and CCHDO staff have begun exploring ways

		to calibrate historic Chinese CTD observations and negotiating a path to incorporating these datasets in international aggregations of CTD data.
Southern Ocean glider network	Y	Funding was obtained to improve the management of Swedish glider data and a project to aggregate glider data from EGO, IOOS, and IMOS through the SOOSmap portal was scoped out.

**Key Result Area 3.2: Up-to-date information on key Southern Ocean data programmes, centres and repositories is provided**

2018 Intended Actions	Progress Made (Y/X)	Comment
Catalogue of Southern Ocean data providers	Y	The online catalogue was updated and maintained on the SOOS website

**Key Result Area 3.3: Web-based tools will be explored and, as needed, developed to aid data discovery and delivery; the wider community is encouraged to adopt and enhance tools that already exist**

2018 Intended Actions	Progress Made (Y/X)	Comment
Federated metadata search tool	Y	Adopted by the polar community as a high priority, on the basis of SOOS' proposal  See page 25 for more information on this effort
Brokering data discovery and interoperability	Y	Initial metadata harvest from PANGAEA into EMODnet, with discussions advanced on integrating CTD data harvests.  SOOS mooring network updated to provide full links to all BODC mooring datasets
General data management advocacy and advice	Y	Support for development of Swiss Polar Institute data management  Support for development of Antarctica New Zealand's data management  Establishment of a simple data sharing mechanism for the SCAR Plastic in Polar Environments Action Group for publishing in SOOSmap.  Delivery of Australian Research Council's Antarctic Gateway Partnership data policy, including data management advice to staff, implementation of data policy for new observing platforms (AUV), and facilitation of model output publishing guidelines and workshop

**Key Result Area 3.4: Data synthesis tools and products are made accessible**

2018 Intended Actions	Progress Made (Y/X)	Comment
Online catalogue of data products	X	This KRA involves considerable resources to develop and maintain. Following several efforts to scope a useful product that is sustainable, SOOS have put this KRA aside until more resources are found and/or higher priority is given

#### **Objective Four: Provide services to communicate, coordinate, advocate and facilitate SOOS objectives and activities**

Objective 4 provides the foundation for the work program of the International Project Office (IPO). It outlines the activities required to support the sustained implementation of SOOS, delivery of SOOS tools and products, and facilitate activities of the SOOS network.

There are 6 KRAs that will focus work towards achieving this objective, and all were scheduled for action in 2018. Progress is shown in the tables below.

Although progress was made against all the KRAs of Objective 4 in 2018, required actions were limited in depth and quality of progress due to limited capability of the IPO staff to implement all required actions, in addition to supporting the SOOS network in actions against the other objectives.

#### ***Key Result Area 4.1: The need for sustained Southern Ocean observations is strongly articulated***

2018 Intended Actions	Progress Made (Y/X)	Comment
Endorsement of observational research projects	Y	Review and endorsement of international observational research projects as requested
High-level advocacy actions	Y	Report to Antarctic Treaty Consultative Meeting Presentation to International Arctic Science Committee on SOOS data sharing activities

#### ***Key Result Area 4.2: Engagement with international stakeholders, across all disciplines and nations, is maintained***

2018 Intended Actions	Progress Made (Y/X)	Comment
Reporting	Y	<p>In 2018, annual reports were prepared for SCAR, SCOR, CCAMLR, COMNAP, ATCM-CEP, Australian Research Council's Antarctic Gateway Partnership, POGO, SCADM, and the SOOS SSC</p> <p><b>Issue:</b> Reporting requirements are a significant overhead for the IPO, particularly given the lack of consistency between required information.</p>
Development of SOOS Engagement Strategy	Y	<p>This is a significant undertaking and has been an action for the IPO for several years. In 2018, the IPO identified a way forward using AirTable and began the process of developing the strategy. It will be delivered in 2019.</p>
Community Engagement and conference presentations	Y	<p>Direct engagement included (but not limited to): IICWG, COMNAP, CCAMLR, SORP, IAATO, WDS, GEOSS, GOOS, APECS, POGO, OOPC, SCAR Programs, RDA, SCADM, ICED, IASC, IPAB, IEEE, IMBER, IMOS, IAPSO, YOPP, SCOR, Ocean Sciences 2018, OceanSITES, EGU, ADC</p> <p>All engagement/presentations were carried out directly by IPO staff or by a community member facilitated by IPO</p>
Engagement with core IPO sponsors and stakeholders	Y	<p>Regular engagement was maintained through in-person meetings and email correspondence</p> <p>Engagement included: IMAS, UTAS, AAD, ACE CRC, CSIRO, AGP, IMOS, TPN, Tas. State Government, Antarctic NZ, University of Gothenburg, SOA-China</p>

#### **Key Result Area 4.3: A SOOS community bibliography is developed**

2018 Intended Actions	Progress Made (Y/X)	Comment
Scoping of requirements and delivery of product	Y	<p>The need for this product has changed and a bibliography will no longer be developed. The IPO will continue to track all published references to SOOS using AirTable, which was initiated in 2018.</p>

#### **Key Result Area 4.4: The SOOS Communication Strategy is implemented**

2018 Intended Actions	Progress Made (Y/X)	Comment
Sourcing of new website domain host; contact management system; transfer to standardised Joomla template;	Y	<p>The IPO sought external advice on the best way forward. A plan was developed in 2018 for implementation in 2019.</p> <p><b>Issue:</b> This is a high priority but the IPO does not have the capacity to implement in appropriate timeframes</p>
Online database of presentations, posters, publications and other products	Y	<p>Key products, such as publications, were updated to the products database. Other, less important products (e.g., posters, presentations) have yet to be updated to the website</p>

		<b>Issue:</b> Lack of IPO resources to update website as required
Content of website is kept up-to-date	Y	Some aspects of the website were updated  <b>Issue:</b> Website updates were done only when immediately required, rather than when they became out-of-date or when new information was available (e.g., reactive rather than pro-active). This is due to the growth in the SOOS network and activities, and lack of growth in IPO capacity and resources
Delivery of the SOOS Newsletter	Y	One issue was produced in April 2018  <b>Issue:</b> The newsletter has historically been produced quarterly, however requires significant IPO effort, which has reduced its delivery
SOOS Publications (not including WG-specific publications)	Y	Southern Ocean OceanObs'19 community paper; Fair Data OceanObs'19 Community Paper; Southern Ocean chapter of BAMS State of the Climate in 2017
Other communication activities	Y	SOOS products were highlighted in the SCOR and SCAR newsletters and listed as SCAR Data Products
Merchandise	Y	New in-kind sponsorship by the Turkish Polar Institute and the ACE CRC supported the delivery of updated fliers and SOOS stickers
Social Media	Y	Basic-level updates to SOOS Facebook and Twitter accounts was maintained and automated where possible  <b>Issue:</b> Social media is not used strategically and is ad-hoc at best. Facebook posts are automatically delivered to Twitter irrespective of the different type of engagement that Twitter facilitates

**Key Result Area 4.5: Support for SOOS International Project Office is maintained and enhanced**

2018 Intended Actions	Progress Made (Y/X)	Comment
5-Year Business Plan and funding strategy	Y	The Business Plan was developed and provided to all stakeholders and sponsors as required
Development of future IPO hosting Partnership Agreement	Y	Significant IPO effort was directed towards this action in 2018
Maintenance of existing IPO and SOOS sponsorship	Y	Regular engagement with existing sponsors Oversight of finance and budget Development of annual sponsorship agreements and project schedules Management of in-kind services and agreements

		<p><b>Issue:</b> Most direct sponsorship is agreed on an annual basis, requiring ongoing management of agreements, increased budget risk and inability to forward-plan</p> <p>Most in-kind services are agreed verbally without the ability to develop a Service Level Agreement on delivery of product/service</p>
Actions on new sponsorship opportunities	Y	<p>Significant effort was made to formalise new sponsorship with CSIRO, Tasmanian Government DoSG</p> <p>New in-kind sponsorship was provided by the Turkish Polar Institute and the ACE CRC</p>

***Key Result Area 4.6: SOOS Administration, facilitation of Strategic Plan activities and delivery of support services is maintained***

2018 Intended Actions	Progress Made (Y/X)	Comment
Maintenance and support of SOOS Governance	Y	<p>Engagement with governing bodies SCAR and SCOR</p> <p>Management of Executive Committee (meetings, membership, activities, TORs)</p> <p>Management of Scientific Steering Committee (meetings, membership, activities, TORs)</p> <p>Management of Data Management Sub-Committee (meetings, membership, activities, TORs)</p>
Management of Implementation Plan monitoring and progress review	Y	Weekly IPO review and recording of activities against all KRAs
Administrative finance	Y	<p>Development of 2018 budget</p> <p>Management of income and expenditure</p> <p>Sponsorship of 6 international SOOS events</p>
Office administration and staff development/support	Y	<p>Management of staff Professional Development updates and strategies</p> <p>Involvement of Executive Officer on International Scientific Advisory Board of the Swedish Marine Robotics Centre</p> <p>Weekly IPO workplan meetings</p> <p>Annual review of staff performance</p> <p>Executive Officer completion of Australian Institute of Company Directors professional development course on "Company Directors"</p>

# SOOS Key Products

## Southern Ocean community review publication

In 2018, SOOS led the development of a large community review paper<sup>1</sup> as a contribution to the decadal OceanObs'19 Conference. This paper presented a community statement on the major scientific and observational progress of the last decade, since the 2009 OceanObs conference that was integral in scoping and shaping the development of SOOS. The paper also provides an assessment of key priorities for the coming decade, towards achieving the SOOS vision and delivering essential data to all end users. These issues were identified as major data bottlenecks in addressing the six SOOS Science Themes. They include:

- Observing Antarctic Bottom Water production processes
- Reducing uncertainties in air-sea and air-sea-ice fluxes of heat, momentum, freshwater and carbon
- Understanding the contribution of oceanic heat to ice-shelf basal melt
- Towards a better understanding of processes controlling Antarctic sea-ice variability and change
- Observing sea-ice thickness and volume
- Constraining the seasonal carbon cycle
- Constraining biological energy pathways
- Assessing status and trends of key Southern Ocean taxa

Additionally, the above disciplinary priorities share common needs for observation system-level priorities:

- Observations from all seasons, as well as focused Autumn/winter observational programs
- A strong relationship between implementation of new technologies and development of internationally agreed standards for the collection, QC and management of the data
- Standardisation and aggregation of similar observations
- Development and use of robust observing system design efforts that can be used to quantify observational needs of all end-users
- Incorporation of models into the observing system design and evaluation process
- Better community-wide coordinated articulation and advocacy of remote-sensing data requirements to Space Agencies

The community paper underwent review in 2018, and will be published in *Frontiers in Marine Science* in 2019.

---

<sup>1</sup>Newman L., et al., 2019 (in press): *Delivering sustained, coordinated and integrated observations of the Southern Ocean for global impact. Frontiers in Marine Science.*

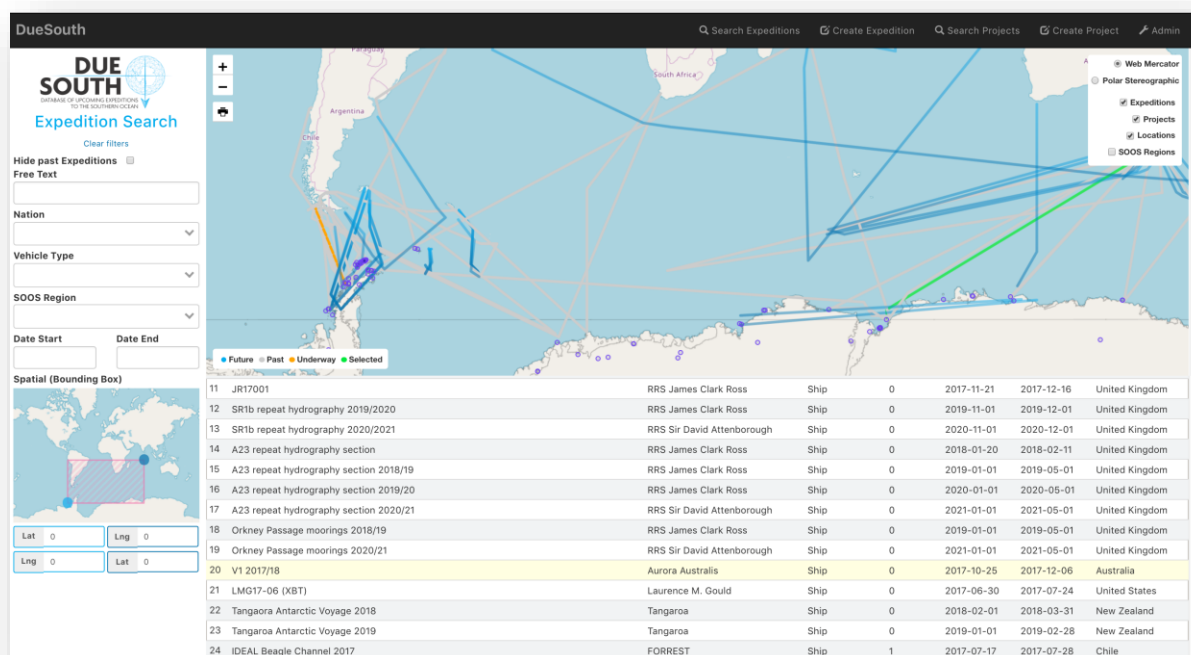
# Database of Upcoming Expeditions to the Southern Ocean



DueSouth is a community-populated database for the sharing of information on upcoming field campaigns and expeditions. It enhances opportunities for collaboration and sharing of field resources.

## Key Sponsors / People:

DueSouth coding and hosting is provided to SOOS by James Cusick of the Australian Antarctic Data Centre and DueSouth has been added to the project schedule between SOOS and AAD to provide long-term security. Antarctic Sea Ice Processes and Climate (ASPeCt) has provided funding to complete the coding.



DueSouth is available at <https://data.aad.gov.au/duesouth/>

## 2018 Milestones:

The prototype portal underwent significant redevelopment in 2018 to create a stable platform that:

- Can be easily maintained by staff at the AADC
- Allows many-to-many mappings of projects and expeditions so that multi-year projects could easily be mapped to all relevant expeditions and Antarctic research stations
- Provides a polar-projected map for better visualisation of expedition plans



- Enables automated data transfers from partner organisations,
- Enables bulk uploads from tables of planned expeditions
- Allows users to edit their contribution
- and gives the data officer greater administrative powers to edit submitted expeditions and projects

The renewed portal is not yet complete but considerable work was undertaken during this year. In 2018, the portal was largely manually populated by the SOOS data officer, with a small number of submissions from community members.

Major developments in DueSouth community collaboration in 2018 are:

- Agreement from COMNAP to share Regional Information Exchange documents with SOOS for manual upload into DueSouth
- Agreement from COMNAP to share the COMNAP ships database and research stations database with DueSouth as master lists for ships and research stations available for Southern Ocean research
- In-principle agreement from COMNAP to share outputs from their Asset Tracking System of real-time ship movements with the SOOS community, through DueSouth and/or SOOSmap
- Negotiations with the IAATO project office to develop a proposed method for sharing tourist vessel planned movements, while concealing commercially sensitive information.
- Agreement from the CCAMLR Scientific Committee to share information on planned krill, and new and exploratory toothfish fishing expeditions.
- In-principle agreement with the AAD to automatically share Australian planned research expeditions with DueSouth
- Negotiations with Geoscience Australia for them to develop a separate front-end access point to DueSouth for use by Australia's bathymetric survey community to plan upcoming surveys

## **2019 Plans:**

- Finalise the refactoring of the DueSouth code, including full administration rights for the SOOS data officer, allowing many-to-many relationships between projects and expeditions, and allowing record-authors to edit their records
- Seek approval from the CCAMLR Scientific Committee for publication of the bulk-uploaded planned expeditions from their krill and new and exploratory notification systems
- Continue negotiations with the IAATO community to allow automatic ingestion of their planned vessel movements
- Present DueSouth to the ATCM and request high-level support from National Antarctic Programs in sharing their research expedition plans in a more directly useful format
- Ask the SOOS community to comprehensively populate DueSouth with expedition plans for 2019/20 and beyond.
- Implement site analytics to enable user statistics to be collected

## SOOSmap



SOOSmap is an interactive web map that allows users to explore circumpolar datasets before downloading the data they need.

SOOSmap was developed for SOOS by coders at the European Marine Observations and Data Network (EMODnet) Physics group, using the infrastructure they have created for aggregating and sharing data from disparate European and global oceanographic programs.

### Key Sponsors/People

All development and hosting are provided by Antonio Novellino and Marco Alba at EMODnet Physics as part of their mandate to support regional ocean observing systems. The relationship between SOOS and EMODnet was negotiated by Patrick Gorringe from the EuroGOOS secretariat.

### 2018 Milestones

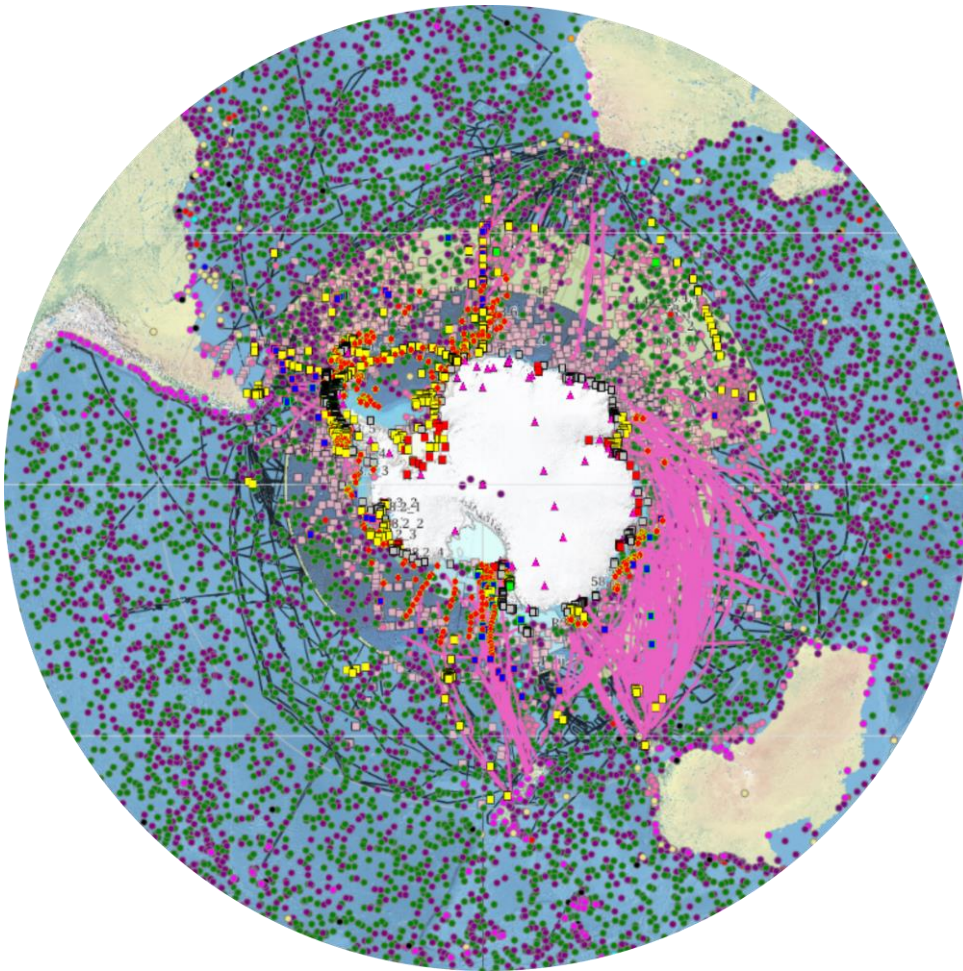
During 2018, 6 new data layers were added to SOOSmap, displaying data and metadata on CCAMLR Ecosystem Monitoring Program sites, CCAMLR Statistical Areas, CCAMLR research blocks, marine protected areas, CPR tows, micro- and macro-plastics observations, KrillBase, penguin colony count data from MAPPPD, sea-ice cores with chlorophyll observations, sea-ice concentration, sea-surface temperature, bathymetric survey effort, and high-resolution bathymetric data. Additionally, the SOOS Regional Working Group layer and the SOOS mooring network layer were updated and improved. There was considerable development on SOOSmap background components to improve processing speed, and a landing page for SOOS-specific datasets, to enable those datasets to be visualised in the web browser, was partially developed.

### 2019 Plans

In 2019, we plan to:

- Finalise a tool to allow high resolution map printing for reporting purposes
- Move SOOSmap to a new web domain that will enable the sharing of specific map views
- Finalise development of a landing page for SOOS-specific observations so that these can be plotted and explored similarly to the global data feeds that were already being served through EMODnet
- Work with PANGAEA to publish CTD data from PANGAEA in SOOSmap, as a pilot for publishing other data types from PANGAEA and other data centres with large holdings of Southern Ocean data

- Add data from the Agreement on the Conservation of Albatrosses and Petrels, MESOPP and SONA, as well as Southern Ocean frontal locations and geographic names



*All data layers available in SOOSmap as at January 2019*

# SOOS Sponsorship

## SOOS Sponsorship in 2018

In 2018, SOOS maintained its broad sponsorship base. Core sponsors remained the Australian Research Councils Antarctic Gateway Partnership (AGP), the University of Tasmania, Australia, the State Oceanic Administration of China, and the University of Gothenburg, Sweden. Operational sponsors were the Australian Antarctic Division, Antarctica New Zealand, and the AGP.

In-kind Service Providers are important and enable SOOS to achieve outputs and outcomes that would not be possible if they had to be funded directly by SOOS. The figure below shows the Service Providers for SOOS in 2018, and includes the new sponsorship by the Istanbul Technical University Polar Research Centre, which provided SOOS with support of communication products.

SOOS is grateful to all sponsors for the contribution they make to ensuring the efficient and sustained delivery of SOOS for the community.



## Sustained support for the IPO

A significant effort for the IPO in 2018, was to secure sustained hosting for the SOOS office beyond the agreed end-2019 contract with AGP. Many discussions took place with existing Australian host sponsors, as well as international institutes. The SOOS Business Plan was developed and circulated within the community. As a result, the University of Tasmania, Commonwealth Scientific and Industrial Research Organisation and the Tasmanian State Government Department of State Growth, will form a partnership to secure funding to support the IPO to remain in Hobart for 2020-2022. Additionally, the State Oceanic Administration of China will continue its support of the SOOS Project Officer in Hobart, currently agreed until mid-2020.

## Sponsorship of SOOS Activities

Sponsors of SOOS events provide a vital service in enabling the delivery of SOOS activities. In 2018, the following institutes sponsored SOOS events, and we thank them for their important support.

Event	Sponsoring Institute/Organisation
<b>SOOS-CCAMLR Synergies Workshop</b> (Hobart, Australia; April 2018) <a href="http://soos.aq/resources/reports?view=product&amp;pid=60">/soos.aq/resources/reports?view=product&amp;pid=60</a>	Australian Research Council's Antarctic Gateway Partnership, UTAS
<b>Marine Ecosystem Assessment for the Southern Ocean</b> (Hobart, Australia; April 2018)	The PEW Charitable Trusts World Wildlife Fund Antarctic Climate and Ecosystems Cooperative Research Centre, Australia Australian Antarctic Division Integrating Climate and Ecosystem Dynamics Information on other sponsors here <a href="http://www.measo2018.aq/">http://www.measo2018.aq/</a>
<b>SOOS Scientific Steering Committee Meeting</b> (Hangzhou, China; May 2018) <a href="http://soos.aq/about-us/ssc/meeting-minutes">http://soos.aq/about-us/ssc/meeting-minutes</a>	SCAR SCOR State Oceanic Administration, China State Key Laboratory of Satellite Ocean Environment Dynamics, China Second Institute of Oceanography, SOA, China College of Oceanography Hohai University, China Institute of Oceanography, Shanghai Jiao Tong University, China
<b>SOOS Data Management Sub-Committee Meeting</b> (Hangzhou, China; May 2018) <a href="http://soos.aq/data/dmsc/dmsc-minutes">http://soos.aq/data/dmsc/dmsc-minutes</a>	State Oceanic Administration, China State Key Laboratory of Satellite Ocean Environment Dynamics, China Second Institute of Oceanography, SOA, China College of Oceanography Hohai University, China Institute of Oceanography, Shanghai Jiao Tong University, China

<b>Southern Ocean Modelling Workshop</b> (Hangzhou, China; May 2018) Report: <a href="http://soos.ag/resources/reports?view=product&amp;pid=57">http://soos.ag/resources/reports?view=product&amp;pid=57</a>	State Oceanic Administration, China State Key Laboratory of Satellite Ocean Environment Dynamics, China Second Institute of Oceanography, SOA, China College of Oceanography Hohai University, China Institute of Oceanography, Shanghai Jiao Tong University, China
<b>SOOS Executive Committee Meeting</b> (Hangzhou, China; May 2018)	State Oceanic Administration, China State Key Laboratory of Satellite Ocean Environment Dynamics, China Second Institute of Oceanography, SOA, China College of Oceanography Hohai University, China Institute of Oceanography, Shanghai Jiao Tong University, China
<b>POLDER Annual Meeting</b> (Davos, Switzerland; June 2018)	SCAR SCAR Data Management Committee
<b>Data Town Hall</b> (Davos, Switzerland; June 2018)	SCAR Arctic Data Committee



# Governance

## Executive Committee

In 2018, the SOOS Executive Committee (EXCOM) held one in-person meeting, and several virtual meetings. Andrew Constable (AUS) and Sebastiaan Swart (Sweden) continued as Co-Chairs, and Mike Williams (NZ) continued as Vice Chair. After 7 years, inaugural SSC member Oscar Schofield (USA) rotated off EXCOM and the Scientific Steering Committee (SSC)—we thank Oscar for his significant contribution to SOOS in this time, and are glad that he will continue to be involved through as co-chair of the West Antarctic Peninsula/Scotia Arc RWG!

At the same time, we welcomed Eileen Hofmann (USA) to the EXCOM as Vice Chair.

## Scientific Steering Committee

Five inaugural members rotated off the SSC in 2018: Mauricio Mata (Brazil), Dan Costa (USA), Parli Bhaskar (India), Mike Meredith (UK) and Oscar Schofield (USA). We thank these members for their contribution to SOOS! At the same time, we welcomed four new members: Sarah Fawcett (S. Africa), Eileen Hofmann, Irene Schloss (Argentina) and Andrew Meijers (UK). 2018 was also the first year that RWG chairs had ex-officio status on the SSC. This was initiated to ensure strong communication between the groups and the SSC.

The composition of the SSC in 2018 is shown below:

Name	Country	Expertise	2015	2016*	Mid 2017	Mid 2018	Mid 2019	Mid 2020
SangHoon Lee	Korea	Biology	1	1	1	2	2	
Sebastiaan Swart	Sweden	Physical	2^	2^	2^	3^	3^	
Andrew Constable	Australia	Biology	1^	1^	2^	2^	2^	
Matthew Mazloff	USA	Physical	1	1	1	2	2	2
JB Sallee	France	Physical	1	1	1	2	2	2
Mike Williams	NZ	Physical	1	1	1^	2^	2^	2^
Dake Chen	China	Physical			1	1	1	
Burcu Ozsoy	Turkey	Sea ice			1	1	1	
Anya Waite	Germany	Biology			1	1	1	
Eileen Hofmann	USA	Biology				1^	1^	1^
Irene Schloss	Argentina	Biology				1	1	1
Andrew Meijers	UK	Physical				1	1	1
Sarah Fawcett	S. Africa	Biogeoch				1	1	1
DMSC Co-Chairs								
IPO Exec. Officer								

\*Note – Membership terms changed from calendar year, to mid-year rotations in alignment with SSC meeting times

^EXCOM position (2 x 3-year terms)

## Annual Scientific Steering Committee Meeting



The annual meeting for the SSC and Executive Committee took place in Hangzhou, China (May 2018), hosted by the Second Institute of Oceanography, State Oceanic Administration. These meetings took place alongside the SOOS Data Management Sub-Committee meeting, and a workshop focused on Southern Ocean Modelling.

In addition to reviewing progress, a focus of the 2018 SSC meeting was “maintaining momentum”. This was in acknowledgement of the significant advances achieved in 2017, and in support of ensuring that efforts are maintained, where required. This meeting also focused on the need to ensure an integrated, circumpolar system by drawing together the separate efforts of working groups and communities.

The minutes from the SSC meeting are available on the SOOS website. SOOS thanks the many Chinese sponsors, and our host Prof. Dake Chen for the significant organisation and financial support provided in hosting these meetings. SOOS also thanks SCOR and SCAR for their continued support of these annual meetings.



*Participants of the 2018 SOOS SSC Meeting in Hangzhou, China.*



# SOOS Implementation Groups

## Data Management Sub-Committee

The SOOS Data Management Sub-Committee (DMSC) has been engaged on a wide range of data activities, in addition to the development of DueSouth and SOOSmap (documented in other sections of this report).

### Southern Ocean data rescue efforts

In 2018, the SOOS Mooring Network grew by an additional 198 datasets, which we expect to be published in 2019. Further, SOOS Project Officer, Yuhua Pei, worked with the DMSC to substantially improve the metadata held in the Network, by developing links to the thousands of relevant datasets at BODC. Additionally, 1300 sea-ice chlorophyll measurements collected by the ASPeCt community, collated by Klaus Meiners, and aggregated by SOOS intern, David Pasquale in 2017, were published through SOOSmap.

The DMSC facilitated a collaboration between the Chinese National Arctic and Antarctic Data Centre, CLIVAR and Carbon Hydrographic Data Office, and the Ocean University China, to calibrate historic Chinese CTD data against other co-located observations. This collaboration also looked to publish these datasets alongside other international CTD observations, to improve access and use. Initial calibration trials were successful and negotiations on re-publication of the data through CCHDO or other CTD data aggregators is now underway.

### Data Management Advocacy

In 2018, the DMSC advocated for stronger data management policies and activities in the Southern Ocean. In particular, the SOOS data officer provided advice on establishing data centres to the Swiss Polar Institute and Antarctica New Zealand. Further, the SOOS data officer and DMSC established a data sharing system for the SCAR Plastics in Polar Environments Action Group, enabling micro- and macro-plastics observations in SOOSmap. To date, more than 100 observations from 13 sources have been published through SOOSmap.

### Federated Search Tool

The Polar Federated Data Search Working Group that was formed in 2017 was renamed POLDER (Polar Data Discovery Enhancement Research) and continued its work in 2018. Details of this working group are highlighted in Task Teams section below.

## Task Teams

SOOS Task Teams are developed to produce specific products, or solve a particular problem. Each Task Team is made up of a small group of experts and aims to complete its work within weeks or months.

### POLDER

Name	Institution	Affiliation
Pip Bricher	Southern Ocean Observing System	SOOS, SCADM
Taco de Bruin	NIOZ Royal Netherlands Institute for Sea Research	SOOS, SCADM, ADC
Alexander Smirnov	Arctic Portal	ADC
Anton Van de Putte	Biodiversity.aq, SCADM	SOOS, SCADM
Brendan Billingsley	Billingsley Custom Software	
Halldór Jóhannsson	Arctic Portal	ADC
Marten Tacoma	NIOZ Royal Netherlands Institute for Sea Research	SCADM, ADC
Peter Pulsifer	Nat. Snow & Ice Data Centre, Arctic Data Committee	
Stein Tronstad	Norwegian Polar Institute	SCADM, ADC
Thomas Vandenberghe	Belgian Marine Data Centre	
William Manley	Institute of Arctic and Antarctic Research	ADC
Lynn Yarmey	Research Data Alliance	
Matthew Jones	Arctic Data Centre, DataONE	ADC
Gabrielle Alix	Polar Data Catalogue	SCADM
Stefanie Schumacher	PANGAEA	SOOS, SCADM, ADC
Jenny Thomas	Swiss Polar Institute	
Kathryn Meyer	Arctic Data Centre	
Yubao Qiu	Big Earth Data for the Three Poles, GEOCRI	
Adam Leadbetter	The Marine Institute of Ireland	
Cindy Chandler	Woods Hole Oceanography Institution	

## **Mission statement**

The Polar Federated Search Working Group (POLDER) is a collaboration between the Arctic Data Committee (ADC), Standing Committee on Antarctic Data Management (SCADM) and SOOS, to develop tools and resources to support metadata aggregation, and federated search tools to improve the discoverability of polar science data.

## **Progress**

POLDER has made considerable progress and also evolved its focus during 2018. POLDER has helped organise and convene polar data management meetings in Boulder, Davos, and Geneva throughout 2018. It has led the development of a survey of metadata standards and software tools in use in the polar data community, as well as a survey of metadata harvesting relationships in this community. These results are being developed into a research paper.

The unveiling of Google's Data Search Tool in late 2018 resulted in a change of focus for POLDER. This tool searches the web for schema.org formatted header text on individual webpages to find metadata records that describe scientific datasets. While schema.org is comparatively basic compared to richer metadata standards, the presence of Google in this space is encouraging many organisations to adopt it in addition to their own metadata standards. If the schema.org standards are implemented in a uniform way across polar metadata centres, that will simplify the effort required to develop federated search by an order of magnitude. In late 2018, POLDER halted work on seeking funding and scoping the needs of a federated data search tool until it becomes apparent whether the initial interest in schema.org will translate into widespread implementation. In the meantime, it is encouraging polar data centres to adopt the recommendations of the Science on schema.org community on best practices in implementing schema.org.

POLDER members also contributed to the OceanObs Community White Paper on FAIR data principles in oceanographic data management. For further details on POLDER activities, please visit <https://polder.info>.

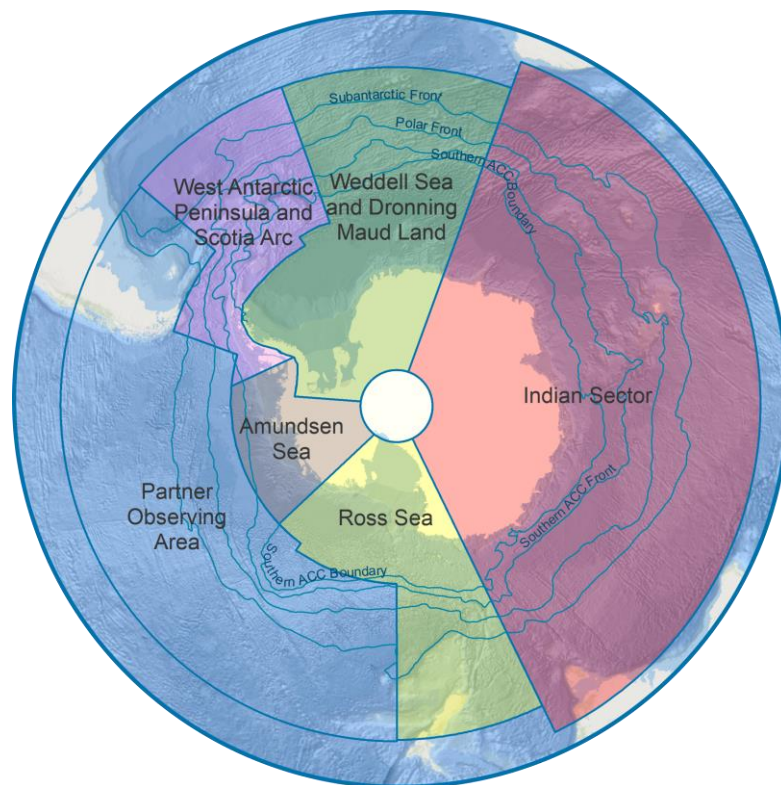
## **2019 Plans**

- To finalise and publish the research paper associated with the survey of metadata repositories
- To publish the results of the survey of metadata repositories as a dataset for the broader community
- To advocate for the adoption of the Science On Schema.org best practices by the polar data community
- To review whether schema.org will be adopted sufficiently widely in the polar community to make a basis for federated search.

## Regional Working Groups

SOOS Regional Working Groups will develop, coordinate and implement the observing system in their defined region. The regions align with the natural areas of focus of nations involved in Southern Ocean activities (although some activities will be coordinated at a circumpolar scale e.g., Argo). Given the long-term requirements for coordination and implementation, the SOOS Regional Working Groups are viewed as ongoing efforts, whilst still undergoing annual reviews by SOOS governance.

Building on the significant developments of 2017, 2018 saw the development of the final two regional groups: Weddell Sea/Dronning Maud Land (WSDML) and the Amundsen/Bellingshausen Sea (ABS) (see map below). The network now provides circumpolar coverage of the Southern Ocean.



*The above map shows the extent of the five Regional Working Groups, as well as the Partner Observing Area*

In addition to development of the final 2 groups, the SSC agreed that the approach taken by the Southern Ocean Indian Sector (SIOS) group (highlighted in their workshop report) was one that should be implemented across all groups to enable a semi-quantified understanding of regional observational coverage and key gaps. In addition to this, a number of the boundaries between groups were shifted. The Scotia Arc region was moved from the WSDML group to the West Antarctic Peninsula group—henceforth called the West Antarctic Peninsula/Scotia Arc RWG (WAPSA); and the Balleny Islands region was moved from the SIOS

to the Ross Sea group. Additionally, the Ross and ABS groups reduced their northerly boundary to 60°S, leaving the South Pacific region uncovered by the network. This large region is generally not covered by National programs, and observational efforts include predominantly Argo floats, remote sensing and decadal GO-SHIP Reference Sections (Partner Observing Area in map above). SOOS will support these international efforts where required, to ensure adequate observational coverage of the South Pacific is maintained.

With development of the network complete, communication and alignment between the groups is imperative to ensure an integrated circumpolar system, rather than 5 disparate communities. In support of this, the chairs of each group will meet regularly through a Regional Working Group “Consortium”. Sian Henley (WAPSA) and Sebastien Moreau (WSDML) will lead this consortium for 2019.

## **West Antarctic Peninsula and Scotia Arc (WAPSA) WG**

### ***Leadership:***

K. Hendry (Co-Chair, UK); O. Schofield (Co-Chair, USA); S. Henley (Co-Chair, UK); I. Schloss (Argentina); M. Mata (Brazil); J. Arata (Chile); D. Abele (Germany); In-Young Ahn (Korea); A. Buma (Netherlands); A. Meijers (UK); E. Hofmann (USA); B. Ozsoy (Turkey); J. Hofer (APECS, Chile); P. Trathan (CCAMLR, UK)

### ***2018 Milestones:***

- Special issue of the Proceedings of the Royal Society was published, titled “The marine system of the West Antarctic Peninsula: status and strategy for process in a region of rapid change”.
- A WAPSA-led scientific review and horizon scan manuscript was submitted to Progress in Oceanography (published in 2019)
- WAPSA held a small meeting at Polar2018 (Davos, Switzerland)
- A representative from the Association of Polar Early Career Scientists (APECS) was selected from an open call, and now serves in the leadership group

## **Ross Sea WG**

### ***Leadership:***

M. Williams (Co-Chair, NZ); W. Smith (Co-Chair, USA); M. Zhu (China); G. Budillon (Italy)

### ***2018 Milestones:***

- Continued oversight of field activities in the region (e.g., mooring deployments (NZ, Italy), Chinese timeseries assessments, Australian MPA cruise)

## **Indian Sector WG**

### ***Leadership:***

T. Odate (Co-Chair, Japan); A. Constable (Co-Chair; Aus); P. Koubbi (France)

### ***2018 Milestones:***

- Completion of the report from the 2017 Indian Sector workshop
- Support for other Regional Working Groups in the development of regional heatmaps for observational activities and coverage

## **Weddell Sea and Dronning Maud Land (WSDML) WG**

### ***Leadership:***

J. Gutt (Co-Chair, Germany); L. de Steur (Co-Chair; Norway); S. Moreau (Co-Chair, Norway); M. Janout (Co-Chair, Germany); JB Sallee (France); A. Meijers (UK); L. Biddle (Sweden); S. Fawcett (S. Africa); M. Wege (APECS, S. Africa); U. Nixdorf (COMNAP, Germany); OA Bergsad (Norway)

### ***2018 Milestones:***

The WSDML WG was developed in early 2018. Activities for the year focused on:

- Development of leadership group
- Development of Terms of Reference for the WG
- Overview of upcoming field campaigns to the region
- Planning and detailed organisation for 1<sup>st</sup> WSDML workshop (held Jan 2019, hosted by NPI Norway)
- Participation in the SOOS Regional Working Group consortium meeting at Polar2018 (Davos, Switzerland)
- Selection of a representative from APECS
- Identification of key national contacts (Argentina, Belgium, Brazil, France, Germany, India, Norway, Poland, S. Africa, Sweden, UK, USA)

## **Amundsen-Bellingshausen Sea (ABS) WG**

### ***Leadership:***

B. Queste (Chair, UK); A. Wåhlin (Sweden); T-W Kim (Korea); T. Yager (USA); P. Abrahamson (UK); Y. Nakayama (APECS, Japan)

### ***2018 Milestones:***

The ABS WG was developed in mid 2018. Activities for the year focused on:

- Development of leadership group
- Selection of a representative from APECS
- Planning and detailed organisation for 1<sup>st</sup> ABS workshop (held May 2019, hosted by KOPRI, Korea)

## Capability Working Groups

SOOS Capability Working Groups enhance observational capabilities for SOOS, such as:

- Developing and implementing technologies
- Improving observational design, efficiency and coverage
- Developing associated methods for managing and disseminating information.

The enhanced knowledge, technology and observing capabilities from these groups are intended to feed directly into the implementation plans of the Regional Working Groups. Capability Working Groups are, generally speaking, limited to multi-year efforts, with annual review of progress provided by SOOS governance.

## Censusing Animal Populations from Space (CAPS) WG

### ***Leadership:***

M. Hindell (Co-Chair, Aus); P. Fretwell (Co-Chair, UK); H. Lynch (USA); D. Costa (USA); K. Kovacs (Norway); A. Lowther (Norway); C. Southwell (Aus); B. de la Mare (Aus); M. LaRue (USA); C. McMahon (Aus); H. Bornemann (Germany)

### ***2018 Milestones:***

- Ground truthing field campaign (AWI, Germany)
- Launch of Tomnod crowdsourcing platform “counting seals in Antarctica”
- Initial release of SealNet framework for automating detection of pack-ice seals in imagery
- Model development and improving – manuscript in development
- Data Study Group challenge (supported by BAS and Alan Turing Institute) to automate sea-ice type classifications and link to seal distribution
- 3<sup>rd</sup> CAPS meeting (Davos, Switzerland)
- Several conference presentations
- Two new PhDs (funded by NERC)
- Honours student (funded by UTAS)
- Post-doc (funded by Uni Pretoria)

## **Acoustic Trends in Antarctic Blue and Fin whales in the Southern Ocean (ATWG) WG**

### ***Leadership:***

F. Samaran (Co-Chair, France); K. Stafford (Co-Chair, USA); S. Buchan (Chile); K. Findlay (S. Africa); D. Harris (UK); B. Miller (Aus); I. van Opzeeland (Germany); A. Sirovic (USA)

### ***2018 Milestones:***

- Granted a postdoctoral researcher to develop framework for automated detection of calls (based at University of Concepcion, Chile)
- During 2017/2018, 17 annual recording stations were serviced and data from all stations recovered in 2018 totaling ~230,000 hours of underwater recordings
- Three moored acoustic recorders were recovered and replaced by the Australian Antarctic Division and ENSTA Bretagne in collaboration with the Australian Antarctic Division at long-term recording sites in East Antarctica
- 18 Sonovault recorders were recovered the Polarstern, and 12 subsequently redeployed
- A number of autonomous recorders were deployed as a value-add and supplement to the Southern Ocean Hydrophone Network
- Širović and Stafford award an IWC-SORP Research Fund grant to join the Australian Antarctic Division ENRICH voyage as part of the passive acoustic team.

## **Southern Ocean Fluxes (SOFLUX) WG**

### ***Leadership:***

S. Gille (Co-Chair, USA); S. Swart (Co-Chair, Sweden); B. Delille (Belgium); M. Bourassa (USA); C-A. Clayson (USA); S. Josey (UK); A. Lenton (Aus); I. Smith (NZ) E. Schulz (Aus); B. Ward (UK); M. du Plessis (APECS, S. Africa)

### ***2018 Milestones:***

2018 was the 3<sup>rd</sup> year of action for SOFLUX, and included:

- Growth in membership (from 51 to 65)
- Selection of a representative from APECS
- Overview and communication of flux observational field and modelling activities in the Southern Ocean
- Support for SOOS post-doc researcher (Dr. Yanzhou Wei), funded by the State Oceanic Administration of China, and delivering a research project jointly with the Observing System Design WG, on determination of priority locations for flux moorings in the Southern Ocean
- SOFLUX side meeting at Polar2018 (Davos, Switzerland)
- Endorsement of 3 flux research proposals
- Development and submission of Southern Ocean fluxes OceanObs19 publication, and input into other flux-related manuscripts (including the SOOS OceanObs19 community paper)
- Regular communication to all members through newsletters (every 1-3 months) to update on key events, papers, field activities etc)



## **Observing and Understanding the Ocean beneath Antarctic sea ice and ice shelves (OASIIS) WG**

### ***Leadership:***

E. van Wijk (Co-Chair, Aus); R. Coleman (Co-Chair, Aus); A. Breierly (UK); L. Herraiz-Borreguero (Aus); P. Dutrieux (USA)

### ***2018 Milestones:***

This is a joint WG of SOOS and POGO. 2018 milestones include:

- A short info-sheet prepared for POGO
- Contribution to the SOOS OceanObs'19 Community White Paper

Delivery of other key outputs for this WG have been delayed due to extenuating circumstances. Efforts are being revived and the "Under-Ice Observations strategy" will be delivered by mid-2020.

## **Observing System Design (OSD) WG**

### ***Leadership:***

M. Mazloff (USA); N. Hill (Aus); A. Waite (Canada)

### ***2018 Milestones:***

This working group was proposed in mid-2018, builds on the priorities identified in the Observing System Design Task Team (2017):

- Development of leadership group
- Support for SOOS post-doc researcher (Yanzhou Wei), funded by the State Oceanic Administration of China, and delivering a research project jointly with the Observing System Design WG, on determination of priority locations for flux moorings in the Southern Ocean
- Contribution to the SOOS OceanObs'19 Community Paper
- Organisation and running of the 2018 Southern Ocean Modelling workshop (Hangzhou, China; May 2018) and production of workshop report