



SOUTHERN OCEAN OBSERVING SYSTEM

ANNUAL REPORT 2025

BREAKING THE ICE

www.SOOS.aq

WELCOME FROM THE CO-CHAIRS

Welcome to SOOS' Annual Report for 2025! This report showcases SOOS' key achievements and progress in 2025, a busy and productive year across all of SOOS.

In 2025, SOOS and the Horizon Europe project, OCEAN ICE convened a joint workshop on the harmonisation and future priorities for ice-ocean observations. The findings from the workshop are presented in a white paper, "Future priorities for observation of the ice-covered Southern Ocean and harmonisation of observing systems" and will be included in the white paper collection providing the scientific priorities for the UN Decade Action, Antarctica InSync.

Seven SOOS-led papers were published in 2025, including additions to SOOS' Special Feature in *Elementa*; a review of the status of ocean observations in the Indian Sector of the Southern Ocean, the characterisation of observing system requirements for measuring high-frequency air-sea fluxes in the Southern Ocean, and a paper presenting the Version 2 release of SOOSmap. The SOOS and Global Ocean Acidification Observing Network (GOA-ON) published a policy-orientated paper on the current state of ocean acidification in the Southern Ocean, as well as the key challenges and priorities for the future. SOOS continued its annual contribution to the BAMS State of the Climate Report, highlighting the continued rapid changes occurring in the Southern Ocean including substantial warming, continued low sea-ice extent and biogeochemical changes. All these substantial and continued changes will impact the critical role of the Southern Ocean in regulating global climate.

SOOS was also very active in policy forums during 2025. At the *UN Ocean Conference*, *One Ocean Science Congress* and the *33rd UNESCO-Intergovernmental Oceanographic Commission (IOC) Assembly*, SOOS raised importance of the Southern Ocean in the global climate system and called for urgent action to strengthen Southern Ocean observations. This call for action continued through SOOS' observer status at the 2025 meetings of the *Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)* along with the presentation of SOOS tools that facilitate enhanced coordination of the observing system in Southern Ocean.

Looking ahead to 2026, SOOS will be releasing a 2026-2030 Science and Implementation Plan and starting two new projects. One project will develop interactive maps of observational status (funded by the Fondation Prince Albert II de Monaco), and the other will establish a synchronized Southern Ocean observatory with SOOS as a partner (a newly approved EU Horizon project). SOOS will continue its efforts in linking Southern Ocean science to global and regional policy, including a strong presence at the 2026 Antarctic Treaty Consultative Meeting, the IOC Assembly, CCAMLR and COP31. It will remain actively involved in Antarctica InSync and planning for the 2032-33 International Polar Year. SOOS looks forward to an exciting 2026 and the start of a new era for SOOS.



Irene Schloss
SOOS Co-Chair



Wolfgang Rack
SOOS Co-Chair



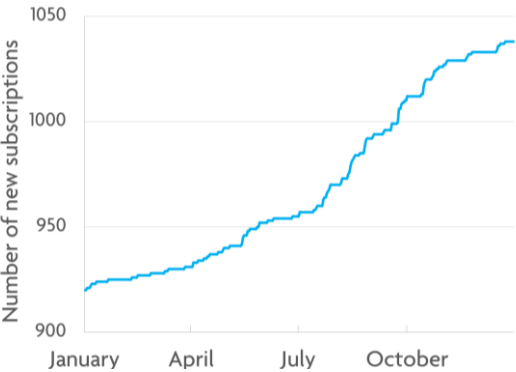
SOUTHERN OCEAN OBSERVING SYSTEM

FACTS AND STATS OF 2025

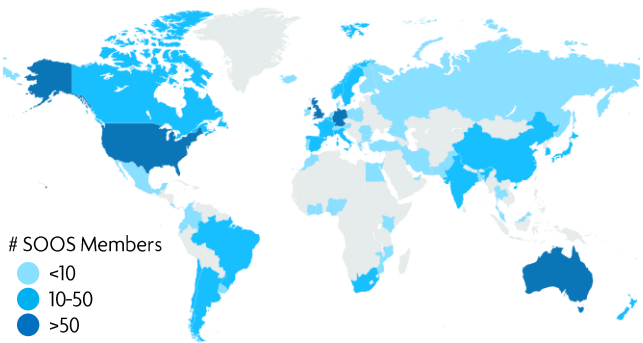
SOOS Community Engagement



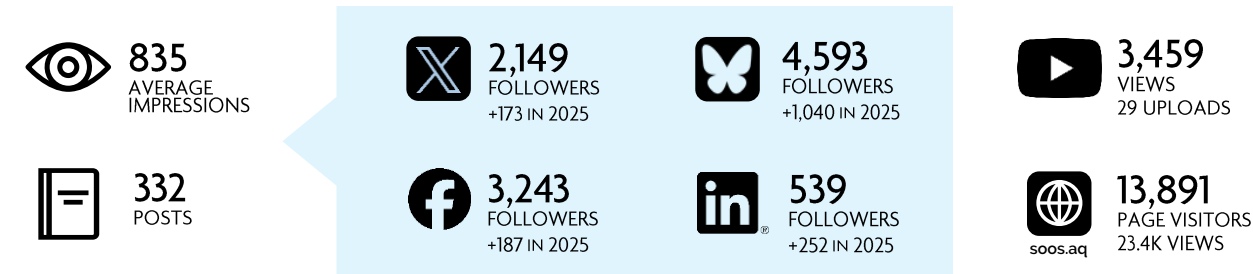
SOOS Membership Growth



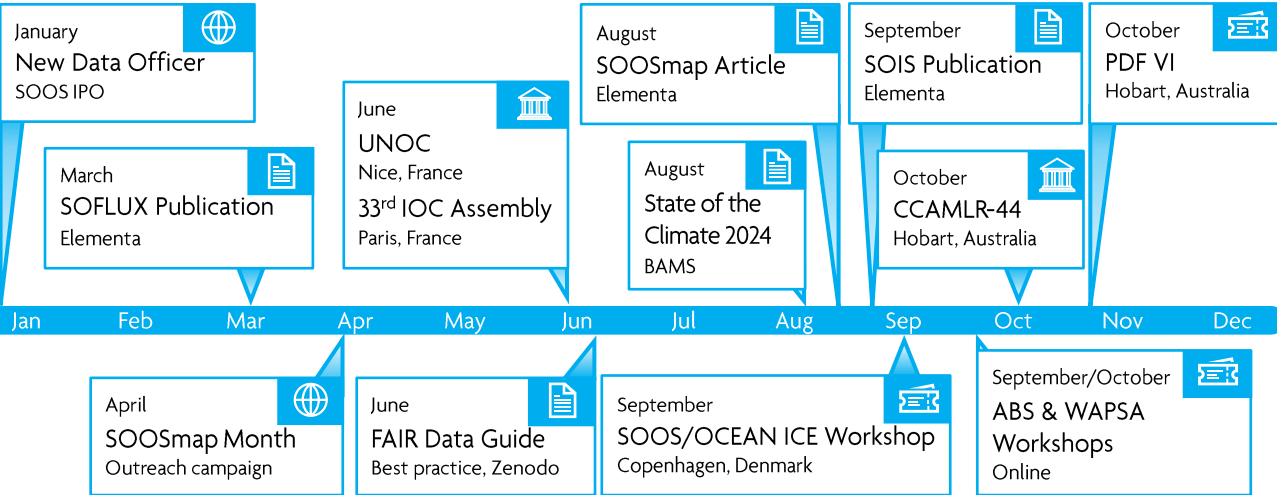
Membership Map



SOOS Outreach



Timeline of Major SOOS Outputs



BROKERING DATA



92 Million
OBSERVATIONS



>29,400
KRILLBASE SAMPLES



42 Million
SURFACE CARBON DIOXIDE
MEASUREMENTS



1.6 Million
DNA BARCODES



1.1 Million
DRIFTING BUOY
MEASUREMENTS



>4,700
PENGUIN
OCCURRENCE RECORDS



6.8 Million
MARINE MAMMAL
OBSERVATIONS



>883,700
ARGO MEASUREMENTS



58
DATA LAYERS



7.3 Million
MOORING
OBSERVATIONS



>26,600
SCAR ICEBERG
OBSERVATIONS



114
SCAR PLASTICS
SAMPLINGS

SOOSmap (soosmap.aq) unites globally curated datasets from decades of Southern Ocean observing.

Highlights in 2025 included:

- Improved SOOSmap functionality & user interface, e.g. gridded data overlays and integrated tutorials
- New admin tools, e.g. a public dataset submission form, FAIR guidelines, & automated dataset checks
- Expanded dataset accessibility via GeoNetwork metadata records & additional OCEAN:ICE datasets
- Established the future technical architecture for SOOSmap to guide next-phase development.

Developed, maintained and hosted by:



31 Nations Represented in

732 Ship Expeditions



62
SCIENCE/NAP



91
FISHERIES



579
TOURIST

26 Other Expeditions



25
FLIGHTS



1
TRAVERSE

DueSouth (polar dex.org/due-south) enables sharing of plans for upcoming cruises, expeditions and more.

DueSouth is hosted on the European Polar Board's Polardex platform. Key 2025 achievements include:

- Easier voyage uploads through updated CSV uploads, and streamlined workflow for data entry
- Testing AI tools to extract voyage information
- Dedicated source filter allows easy identification of Antarctica InSync activities

Maintained and hosted by: As part of:



**EUROPEAN
POLAR BOARD**

POLARDEX

SOOS Metadata Portal

731 page views, 609 visitors, 9,093 datasets

- Improved usability & more targeted data access seen by a substantial increase in users alongside fewer page views per user
- Draft Metadata Management Tool (DMMT) replaced by NASA's Earthdata Metadata Management Tool (MMT), improving metadata management but requiring user authentication.

Developed, maintained and hosted by:

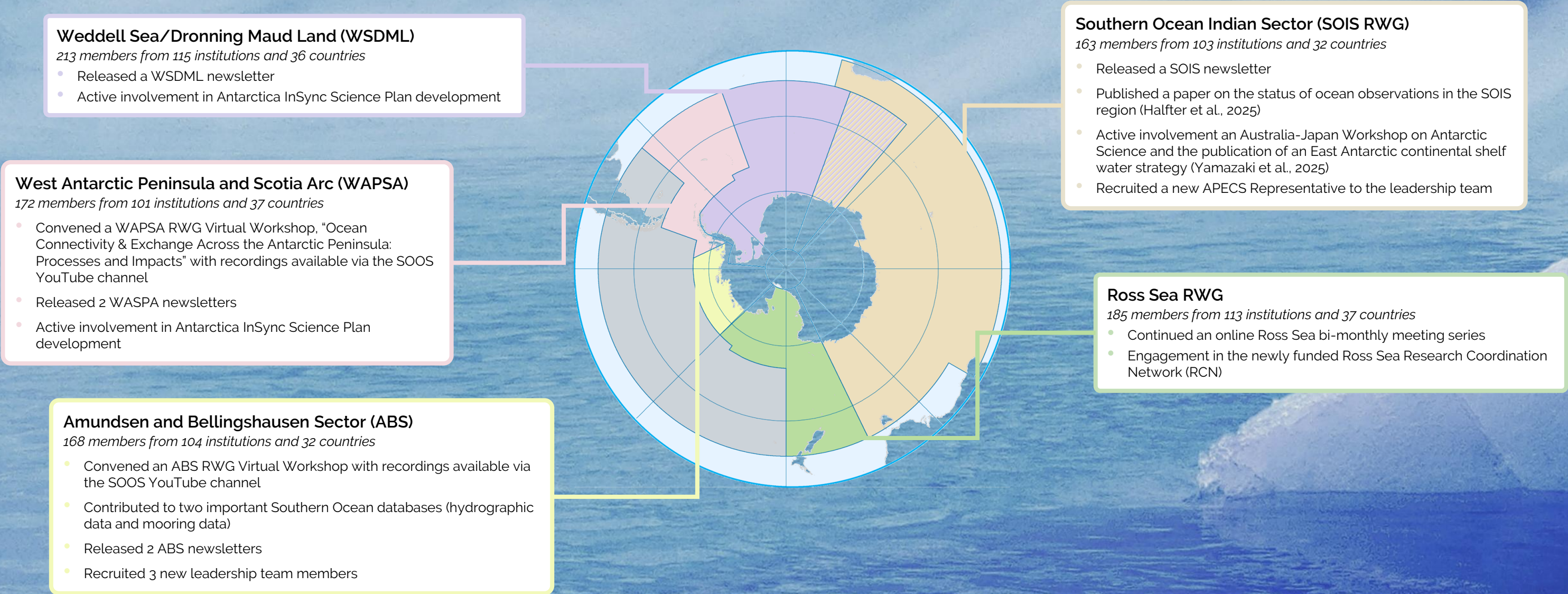


Data Management Sub-Committee

22 members from 20 institutions and 12 countries

- Key role in major polar data initiatives, such as Antarctica InSync, the 5th International Polar Year, and co-organising the Polar Data Forum
- Publication of a peer-reviewed SOOSmap paper in Elementa & a cross-polar guide to publishing FAIR data for the polar research community
- Implementation of new governance structure and Terms of Reference in 2025, clarifying roles and establishing an additional leadership layer to strengthen coordination

REGIONAL WORKING GROUPS (RWG)



CAPABILITY WORKING GROUPS (CWG)

Censusing Animal Pop. from Space (CAPS)
64 members from 42 institutions and 25 countries

- 2 scientific publications (Fretwell et al., 2025; Bamford et al., 2025)
- Engagement in the newly funded Ross Sea Research Coordination Network (RCN)
- Working to coordinate Antarctica InSync projects including a newly developed ESA Antarctica InSync Remote Sensing Group

Southern Ocean Fluxes (SOFLUX)
224 members from 117 institutions and 38 countries
Endorsed UN Ocean Decade Action

- Convened 4 SOFLUX webinars with recordings available via the SOOS YouTube channel
- Published a paper on observing system requirements of air-sea fluxes in the SO (Prend et al., 2025) and a paper on uncrewed surface vehicles in the global ocean observing system (Patterson et al., 2025)
- Active involvement in Antarctica InSync Science Plan development and development of an Antarctica InSync Hotspots Working Group to outline flux measurements, standardisation and best practices
- Recruited a new Co-Chair, new APECS Representative and two new leadership team members

Southern Ocean – Ocean Acidification Regional Hub (SO-OA)
54 members from 41 institutions and 26 countries
Joint hub between SOOS and the GOA-ON

- Convened a virtual workshop held as part of the OA Week 2025
- Published a summary to policy-makers in the SCAR Antarctic Environments Portal on the current state and future challenges for ocean acidification in the Southern Ocean (Nissen et al., 2025)

Observing System Design (OSD)
174 members from 111 institutions and 41 countries

- Published a paper on uncrewed surface vehicles in the global ocean observing system (Patterson et al., 2025)

OTHER SOOS GROUPS

Polar Technology Task Team
42 members from 27 institutions and 17 countries

- Published a paper on uncrewed surface vehicles in the global ocean observing system (Patterson et al., 2025)

SOOS PARTNERSHIPS & COLLABORATIONS



Antarctic bioDiVersity dAtA iNfrastruCture (ADVANCE) project continued its work in 2025 including the publication on developing Essential Biodiversity Variables for the Southern Ocean (Plasman et al., 2026).



UN Decade Collaborative Centre for the Southern Ocean Region (DCC-SOR) was represented by SOOS and partners at the United Nations Ocean Conference 2025 and other Ocean Decade activities. Progress also included advancing community White Papers and establishing a dedicated SCAR Action Group for **Antarctica InSync**.



International Polar Year (IPY) 5 progressed its planning phase with new global calls for bids to host the International Coordination Office, develop National Committees, and endorsed projects.

SORP

CLIVAR/CLIC/SCAR Southern Ocean Regional Panel (SORP) (SSC *ex-officio* position by SOOS) coordinated the SOFIA Initiative to improve representation of Antarctic meltwater in climate models, now recognised as an official international climate modelling project.



Polar Data Discovery and Enhancement Research Working Group (POLDER) modernised the backend of the Polar Data Search tool, boosting performance and sustainability. Maintained by the Canadian Polar Data Consortium (Uni Calgary), the system added three new repositories.

HIGHLIGHT OF THE YEAR

From Workshop to White Paper: The Future of Ice-Covered Ocean Observations

Rapid change in the ice-covered Southern Ocean demands coordinated observations.. The joint OCEAN ICE/SOOS workshop gathered **~30 international experts in Copenhagen, Denmark**, to define future priorities for ice-ocean monitoring. Through presentations and breakout discussions, participants **identified key variables, regional priorities, and barriers to effective observation**.



A parallel **community survey (~100 respondents)** expanded this effort, capturing system-wide priorities and reinforcing alignment between observational and modelling communities. [EGUsphere \[preprint\], doi.org/10.5194/egusphere-2026-213](https://egusphere.lpreprint.org/doi.org/10.5194/egusphere-2026-213)

Outcomes

Shared priorities → Consensus on critical measurements to ensure consistency across initiatives.

Including year-round observations under sea ice, improved monitoring of ice shelf–ocean interactions, and better coverage of continental shelves to support climate predictions.

Exposed data gaps → Clear targets for new measurements and more harmonised approaches

Such as under-ice data, air–sea heat and CO₂ fluxes, and biogeochemical observations—through expanded use of autonomous platforms, coordinated field campaigns, and better data standardisation.

White Paper

Future priorities for observations of the ice-covered Southern Ocean and the harmonisation of observing systems

A community-driven roadmap for future Southern Ocean observations—strengthening international coordination and informing major initiatives such as Antarctic InSync and IPY-5.

[Part of SCAR Antarctica InSync White Papers](#)

ABOUT | 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). SOOS was launched in 2011 with the mission to facilitate the sustained collection and delivery of essential observations of Southern Ocean systems to all international stakeholders, through design, advocacy, and implementation of cost-effective observing and data delivery systems.

SOOS Governing Bodies



SOOS International Project Office (IPO) Sponsorship Collaboration in 2025



SOOS IPO host



SOOS International Sponsorship in 2025



Service Providers in 2025



SOOS Executive Committee (EXCOM) in 2025



From left to right:
Irene Schloss (Co-Chair), CADIC-CONICET, UNTDF, Argentina
Wolfgang Rack (Co-Chair), University of Canterbury, NZ
Andrew Meijers (Vice Chair), BAS, UK
Sarat Chandra Tripathy (Vice Chair), NCPOR, India

SOOS IPO Team



From left to right:
Alyce Hancock (Executive Officer)
Julia Bach (Science & Comms Officer),
Michaela Miller (Data Officer)