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SCAR Group

SOOS

Person
Responsible:

Alyce Hancock

XXXVII SCAR Delegates Meeting

India, September 2022

Southern Ocean Observing System (SOOS)

2020-22 Report

Summary

Report Author(s)

Alyce Hancock (SOOS Executive Officer, Australia)

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Summary of activities from 2020-22

In August 2021 SOOS celebrated its 10-year anniversary of the establishment of the International Project Office in Hobart, Australia. During this first decade, SOOS facilitated major changes in data collection coordination and in finding and accessing existing observations of the Southern Ocean. These changes provided a foundation for the development of a new [SOOS 2021-2025 Science and Implementation Plan](#), which, after extensive review, was approved by our sponsors, SCOR and SCAR, in June 2022.

The International Project Office staff has undergone changes during the past year. Dr. Louise Newman departed in late 2021, after 10 years as the SOOS Executive Officer, for a new position. Dr. Alyce Hancock took on the role of Executive Officer after serving as the SOOS Science and Communication Officer. Dr. Julia Bach joined SOOS in late 2021 as the new Science and Communication Officer. Dr. Pip Bricher, SOOS Data Officer for 7 years, left in March 2022 for a new position. Dr. Imogen Jones joined SOOS as the new Data Officer in May 2022.

SOOS continues to partner with polar organisations to make data more findable and accessible. Our data portal, [SOOSmap](#), has been undergoing continued development and version 2 will be released in the August 2022. [DueSouth](#), which SOOS developed to help researchers find future logistical opportunities, has been further developed in partnership with the European Polar Board and is now part of [Polardex](#) which was launched in April 2022.

SOOS took a lead role in the organisation of a side-event, "[Antarctic Marine Ecosystems Under Pressure](#)", at the 26th United Nations Climate Change conference (COP26) in Glasgow, UK in October 2021. SOOS also participated in workshop and webinar related to development of the [United Nations Ocean Decade Southern Ocean Action Plan](#). In 2022, SOOS was represented at the UN Ocean Conference and co-convened a virtual side event "[From the Southern Ocean to the Arctic – a call to action via the UN Ocean Decade](#)".

Southern Ocean Observing System (SOOS): 2020-22 Report, cont.

The impacts of COVID on international travel prevented in-person meetings in 2021. However, SOOS maintained an active schedule of virtual meetings that included six Scientific Steering Committee (SSC) meetings (two in 2021 and quarterly through 2022), four Data Management Sub-Committee (DMSC) meetings (two each year), the [SOOS 10-year celebration](#), the [2nd Southern Ocean UN Ocean Decade Regional Workshop](#), [Polar Data Forum IV](#), ten [polar to global online data hacks](#), two AUV Task Team meeting (one each year) and a UN Ocean Decade Satellite Session “More Seats at the Table – Increasing Representation in the Marine Sciences”. Two of SOOS’s working groups commenced webinar series, the Southern Ocean Fluxes (SOFLUX) Capability Working Group and the Amundsen and Bellingshausen Sector (ABS) Regional Working Group. In addition, the SOOS Equity, Diversity and Inclusion (EDI) group meet and continued to guide SOOS in ensuring inclusivity for all representations within SOOS and the community.

Technology is changing and SOOS has recognised this in the formation of a Polar Technologies Task Team. This task team aims to develop a polar technologies group focused on addressing challenges and exploiting synergies in technology targeted at Southern Ocean and Antarctic marine research.

SOOS continued active publication of science papers and reports in 2021 and 2022. This included seven publications, three reports and a new [SOOS Data Policy](#). SOOS endorsed 10 international projects, was represented at over 50 international meetings, workshops and conferences, submitted several proposals for funding in collaboration with other international partners and had a growth in international sponsorship with additional sponsorship support gained from the University of Cape Town’s Marine Biogeochemistry Lab (2021-2022), South Africa and the Scientific and Technological Research Council of Turkey Marmara Research Centre Polar Research Institute (2021), Turkey. The local sponsoring partnership continued between the Institute for Marine and Antarctic Studies - University of Tasmania, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Tasmanian Government (2020-2022). International sponsorship continued from the Swedish Polar Research Secretariat (for 2020-2022), Antarctica New Zealand (agreed annually since 2012), and the agreement with the State Oceanic Administration, China, was completed in 2021.

Specific challenges for SOOS previously focused on a lack of capacity for the International Project Office to properly support the activities of the working groups and committees, as well as engagement with other communities. The growth in sponsorship, and importantly the multi-year sponsorship agreements have enabled SOOS to be more strategic in the use of funding. Also, hiring a Science and Communications Officer in 2019 (currently working 60%) has fundamentally changed SOOS’s ability to deliver the Implementation Plan.

2021 and 2022 has come with a set of unique challenges due to the lack of in-person engagement and the over-subscription of replacement zoom. Whilst SOOS has continued regular virtual meetings, engagement with the Southern Ocean community and opportunity to recruit new members to the SOOS community has been limited. The SOOS Symposium planned for 2023, is one way in which SOOS is aiming to recover from this limited engagement and outreach.

Summary Budget 2021 to 2024

	2021	2022	2023	2024
	Spent	Allocated	Request	Request
(US\$)	\$10,000	\$10,000	\$10,000	\$10,000

Progress and Plans

Outcomes/Activities Summary

- SOOS 10-Year Anniversary (August 2021): SOOS celebrated a decade since its inception with an online event including a series of presentation on SOOS' achievements over the last decade and plans for the coming decade (recordings available via the [SOOS YouTube Channel](#)).
- Development of the [SOOS 2021-2025 Science and Implementation Plan](#). This plan developed by the broader Southern Ocean community, underwent an independent, international review and was approved by SCAR and SCOR in June 2022.
- Development of a new version of the SOOS data portal, [SOOSmap](#), due to launch in August 2022.
- Development of a new interface for SOOS's database of upcoming expeditions to the Southern Ocean, [DueSouth](#), and incorporation of this into the European Polar Board [Polardex](#) database.
- Formation of a [SOOS Polar Technologies Task Team](#).
- Organised/co-organised 37 events include:
 - o Co-coordination of a side-event, "[Antarctic Marine Ecosystems Under Pressure](#)", at the 26th United Nations Climate Change conference (COP26) in Glasgow, UK in October 2021.
 - o Co-convened a virtual side event "[From the Southern Ocean to the Arctic – a call to action via the UN Ocean Decade](#)", at the UN Ocean Decade Conference, June 2022.
 - o Co-organised the [2nd Southern Ocean UN Ocean Decade Regional Workshop](#) and [Polar Data Forum IV](#), both online in September 2021.
 - o Convened a UN Ocean Decade Satellite Session "More Seats at the Table – Increasing Representation in the Marine Sciences" (SOOS Equity, Diversity and Inclusion Group).
 - o Co-organised ten [polar to global online data hacks](#) across 2021 and 2022.
 - o SOOS AUV Task Team meeting in 2021 (recordings available via the [SOOS YouTube Channel](#)) and 2022.
 - o Commencement of SOOS working group webinar series, [Southern Ocean Fluxes \(SOFLUX\) Capability Working Group](#) and the [Amundsen and Bellingshausen Sector \(ABS\) Regional Working Group](#).
- 8 publications: a paper highlighting the need for more timely and accurate information for decision making ([Van de Putte et al., 2021](#)), the annual *Bulletin of the American Meteorological Society* State of the Climate Report - Southern Ocean chapter ([Tamsitt et al., 2021](#)), four publications from the Censusing Animal Populations from Space (CAPS) Capability Working Group ([Labrousse et al., 2021](#); [LaRue et al., 2021](#); [Wege et al., 2021](#); [LaRue et al., 2022](#)), and a publication from the Acoustic Trends Capability Working Group ([Miller et al., 2021](#)).
- Led or significantly contributed to 3 reports: the [alignment of polar data policies and recommended principles](#); the [United Nations Ocean Decade Southern Ocean Action Plan](#); and a Ross Sea report providing an update of current and future national observational activities ([Smith et al., 2021](#)).
- Developed and published a new [SOOS Data Policy](#).
- Endorsed 14 international projects.

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- SOOS representation at over 50 international meetings, workshops and conferences.
- Submitted several funding proposals in collaboration with other international partners.
- Additional international sponsorship gained from the University of Cape Town's Marine Biogeochemistry Lab (2021-2022) and the Scientific and Technological Research Council of Turkey Marmara Research Centre Polar Research Institute (2021).

For full details on SOOS activities across 2020 and 2021, please see the SOOS Annual Reports available [here](#).

Future Plans for 2022 to 2024

SOOS is the process of planning and convening of an inaugural SOOS Symposium scheduled for 14-18 August 2023 in Hobart, Australia. The Symposium will improve linkages across the community including enhancing coordination and collaboration between nations and Southern Ocean regions, international and national observing initiatives, disciplines, and key stakeholders across all steps in the observational pathway (e.g., technological, logistical, scientific, data management and policy stakeholders). The Symposium is planning to gather about 300 leading researchers and data managers to discuss the current observing system, the status of this system, its gaps, and the next steps and opportunities needed for addressing these gaps. The mixture of plenary presentations, panel discussions, parallel sessions and workshops planned for the Symposium, with a hybrid format, is intended to further the SOOS mission to create a comprehensive, integrated and cohesive observing system that is readily accessible. This observing system will provide a foundation for enabling the international scientific community to advance our understanding of the Southern Ocean and for policy and decision makers to address critical societal challenges. More information on the Symposium will be made available [here](#).

Sub-group	Planned activity
SOOS	SOOS Symposium (August 2023)
SOOS	SOOS 5-Year Progress Report (2015 – 2020)
SOOS	Maintaining and developing new SOOS sponsorships
SOOS	Secure new SOOS sponsoring partnership (beyond 2022)
SOOS	Development of a strategic and realistic engagement and communications strategy (2022)
SOOS	UN Decade of Ocean Science Southern Ocean contribution
SOOS	Deliver outcomes/outputs as defined in the 2021-2025 Science and Implementation Plan

Budget

Planned use of funds for 2022 to 2024

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2024	SOOS SSC Meeting – travel support for SSC	10,000	Alyce Hancock	hancock@soos.aq
2023	SOOS SSC Meeting – travel support for SSC and EXCOM Meeting, to be run both virtually and in-person. Hosted by the University of Tasmania, Australia.	10,000	Alyce Hancock	hancock@soos.aq
2022	Publication of an article on the SOOS Science and Implementation Plan; and design and printing of updated communications tools (i.e., flyers) on SOOS	10,000	Alyce Hancock	hancock@soos.aq
TOTAL		30,000		

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Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Ending
EXCOM Co-Chair	Eileen	Hofmann	Old Dominion University	USA	hofmann@ccpo.odu.edu	2018	2023
EXCOM Co-Chair	Mike	Williams	National Institute of Water and Atmospheric Research (NIWA)	New Zealand	mike.williams@niwa.co.nz	2021	2022
EXCOM Vice Chair	Sian	Henley	University of Edinburgh	UK	s.f.henley@ed.ac.uk	2020	2024
EXCOM Vice Chair	Sebastien	Moreau	Norwegian Polar Institute	Norway	sebastien.moreau@npolar.no	2021	2025
Executive Officer (IPO)	Louise	Newman	SOOS International Project Office	Australia		2011	2021
*Executive Officer (IPO)	Alyce	Hancock	SOOS International Project Office	Australia	hancock@soos.aq	2021	-
SSC	Andrew	Meijers	British Antarctic Survey	UK		2018	2024
SSC	Burcu	Ozsoy	Istanbul Technical University	Turkey		2017	2023
SSC	Dake	Chen	State Oceanic Administration	China		2017	2023
SSC	Delphine	Lannuzel	University of Tasmania	Australia		2020	2026
SSC	Irene	Schloss	Instituto Antártico Argentino	Argentina		2018	2024
SSC	Jean-Baptiste	Sallée	National Centre for Scientific Research (CNRS), Institute Pierre Simon Laplace (IPSL)	France		2015	2021
*SSC	Jilda	Caccavo	Alfred Wegener Institute (AWI), Berlin Centre for Genomics in Biodiversity Research, Leibniz Institute for Zoo and Wildlife Research, Institute Pierre Simon Laplace (IPSL)	Germany, France		2020	2026
SSC	Luciano	Pezzi	Instituto Nacional de Pesquisas Espaciais (INPE)	Brazil		2020	2026
SSC	Matthew	Mazloff	Scripps Institution of Oceanography	USA		2015	2021
SSC	Sarah	Fawcett	University of Cape Town	South Africa		2018	2024
SSC	Wolfgang	Rack	University of Canterbury	New Zealand		2021	2027

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Data Officer (IPO)	Pip	Bricher	SOOS International Project Office	Australia		2015	2022
*Data Officer (IPO)	Imogen	Jones	SOOS International Project Office	Australia		2022	2022
*Science and Communications Officer (IPO)	Alyce	Hancock	SOOS International Project Office	Australia	hancock@soos.ag	2019	2021
Science and Communications Officer (IPO)	Julia	Bach	SOOS International Project Office	Australia	bach@soos.ag	2021	-

(Early-career researchers identified with * in first column)

Other members

The table below lists the Leadership Members of each SOOS working group. In addition to these names, SOOS has a broader community subscription base of 650 people.

First Name	Last Name	Affiliation	Country
Benjamin	Pfeil	University of Bergen	Norway
Petra	ten Hoopen	British Antarctic Survey	UK
Pierre	Dutrieux	British Antarctic Survey	UK
Patricia	Yager	University of Georgia	USA
Pierre	Dutrieux	British Antarctic Survey	UK
Elizabeth	Shadwick	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Sarat	Tripathy	National Centre for Polar and Ocean Research	India
*Juan	Höfer	Dynamics of High Latitude Marine Ecosystems (IDEAL), Pontificia Universidad Catolica de Valpariso (PUCV)	Chile
Oscar	Schofield	Rutgers University	USA
Markus	Janout	Alfred Wegener Institute (AWI)	Germany
Stefanie	Ardnt	Alfred Wegener Institute (AWI)	Germany
Walker	Smith	Virginia Institute of Marine Science, Shanghai Jiao Tong University	US, China
Paola	Rivaro	University of Genova	Italy
Mark	Hindell	University of Tasmania	Australia
Peter	Fretwell	British Antarctic Survey	UK
*Marcel	du Plessis	University of Gothenburg	Sweden
Thomas	Dahlgren	University of Gothenburg	Sweden
Sebastiaan	Swart	University of Gothenburg	Sweden
Sarah	Gille	Scripps	USA

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Andres	Marouchos	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Guy	Williams	University of Tasmania	Australia
Anna	Wählin	University of Gothenburg	Sweden
Karen	Heywood	University of East Anglia	UK
Won Sang	Lee	Korean Polar Research Institute	South Korea
Andrew	Constable	University of Tasmania	Australia
Luc	Lenain	Scripps Institution of Oceanography	USA
Dan	Jones	British Antarctic Survey	UK
Povl	Abrahamsen	British Antarctic Survey	UK
Alex	Kozyr	National Centres for Environmental Information, NOAA	USA
Anton	Van de Putte	Royal Belgium Institute of National Sciences, ODIS, GCMD, biodiversity.aq	Belgium
Antonio	Novellino	ETT Solutions	Italy
Mike	Meredyth-Young	Antarctica New Zealand	New Zealand
Becky	Macneil	Antarctica New Zealand	New Zealand
Benedicte	Pasquer	Integrated Marine Observing System	Australia
Florence	Fetterer	National Snow and Ice Data Centre	USA
Janine	Felder	Alfred Wegener Institute (AWI)	Germany
Joana	Beja de Almeida e Silva	Flanders Marine Institute, OBIS, EMODnet	Belgium
Johnathan	Kool	Australian Antarctic System	Australia
Kenneth	Casey	National Centres for Environmental Information	USA
Lizong	Wu	Polar Research Institute of China	China
Marco	Alba	ETT Solutions	Italy
Mathieu	Belbéoch	World Meteorological Organization	France
Matt	Donnelly	National Oceanographic Centre	UK
Melissa	Zweng	National Centres for Environmental Information	USA
Michael	Morahan	NASA	USA
Patrick	Gorringe	Swedish Meteorological and Hydrological Institute	Sweden
Scott	Ritz	NASA	USA
Sebastien	Mancini	Integrated Marine Observing System, Australian Ocean Data Network	Australia
Simona	Longo	Consiglio Nazionale delle Ricerche	Italy
Stefanie	Stumacher	Alfred Wegener Institute (AWI)	Germany
Steve	Diggs	Scripps Institution of Oceanography	USA
Taco	De Bruin	Royal Netherlands Institute for Sea Research, OBIS, GCMD, EMODnet	Netherlands
*Chantelle	Verhey	International Technology Office	Canada
Daphnis	De Pooter	CCAMLR	Australia
Richard	Coleman	University of Tasmania	Australia

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Esmee	van Wijk	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Laura	Herraiz Borreguero	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Kate	Stafford	University of Washington	USA
Flore	Samaran	ENSTA Bretagne	France
Alexander	Brearley	Integrated Marine Observing System	UK
Azwianewi	Makhado	Dept of Environment, Forestry and Fisheries	South Africa
Cédric	Cotté	Institute Pierre Simon Laplace (IPSL)	France
Clive	McMahon	Sydney Institute of Marine Sciences	Australia
Craig	Stevens	National Institute of Water and Atmospheric Research (NIWA)	New Zealand
Eric	Schulz	Bureau of Meteorology	Australia
Jenson	George	National Centre for Polar and Ocean Research	India
Jianfeng	He	Polar Research Institute of China	China
Jisoo	Park	Korean Polar Research Institute	South Korea
Jiuxin	Shi	Oceans University China	China
Pierpaolo	Falco	Marche Polytechnic University	Italy
*Mia	Wege	University of Pretoria	South Africa
*Michelle	LaRue	University of Minnesota, University of Canterbury	US, New Zealand
*Minkyung	Kim	Kyungpook National University	South Korea
*Svenja	Halfter	University of Tasmania, National Institute of Water and Atmospheric Research (NIWA)	Australia, New Zealand
Tae-Wan	Kim	Korean Polar Research Institute	South Korea
*Alessandro	Silvano	University of Southampton	UK
Andrew	Thompson	California Institute of Technology	USA
Toru	Hirawake	National Institute of Polar Research	Japan
Takeshi	Tamura	National Institute of Polar Research	Japan
Tsuneo	Odate	Research Organization of Information and Systems	Japan
Will	Hobbs	University of Tasmania	Australia
*Yoshihiro	Nakayama	Hokkaido University	Japan
*Tiago	Segabinazzi Dotto	University of East Anglia	UK
Zhaomin	Wang	Hohai University	China
Uwe	Nixdorf	Alfred Wegener Institute (AWI)	Germany
Rodrigo	Kerr	Federal University of Rio Grande	Brazil
*Ethan	Campbell	University of Washington	USA
Theoni	Photopoulou	University of St Andrews	UK
Sandy	Thomalla	Council for Scientific and Industrial Research	South Africa
Julian	Gutt	Alfred Wegener Institute (AWI)	Germany

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Louise	Biddle	University of Gothenburg	Sweden
Laura	De Steur	Norwegian Polar Institute	Norway
Katharine	Hendry	University of Bristol	UK
Philip	Trathan	British Antarctic Survey	UK
Doris	Abele	Alfred Wegener Institute (AWI)	Germany
In-Young	Ahn	Korean Polar Research Institute	South Korea
Javier	Arata	Association of Responsible Krill Harvesting Companies (ARC)	Canada
*Elisa	Seyboth	Federal University of Rio Grande	Brazil
Carlos Rafael	Mendes	Federal University of Rio Grande	Brazil
Andrés	Barbosa	Spanish National Research Council	Spain
*Iole	Orselli	Federal University of Rio Grande	Brazil
Carol Anne	Clayson	Woods Hole Oceanographic Institution	USA
Bruno	Danis	Universite Libre de Bruxelles	Belgium
*Veronica	Tamsitt	University of South Florida	United States
Simon	Josey	National Oceanography Centre	UK
Andrew	Lenton	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
*Yosr	Ammar		Sweden
*Kimberlee	Baldry	University of Tasmania	Australia
Ruth	Eriksen	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Brian	Ward	National University of Ireland, Galway	Ireland
Horst	Bornermann	Alfred Wegener Institute (AWI)	Germany
Heather	Lynch	Stony Brook University	USA
Daniel	Costa	University of California	USA
Andy	Lowther	Norwegian Polar Institute	Norway
Robyn	Verrinder	University of Cape Town	South Africa
Alberto	Naviera Garabato	University of Southampton	UK
Bruno	Delille	Universite de Liege	Belgium
Giorgio	Budillon	University of Naples Parthenope	Italy
Mauricio	Mata	Federal University of Rio Grande	Brazil
Parli	Bhaskar	National Centre for Polar and Ocean Research	India
Piotr	Kukliński	Polish Academy of Sciences	Poland

(Early-career researchers identified with * in first column)

Additional information (*optional*)

Notable Papers

1. Van de Putte, A.P., Griffiths, H.J., Brooks, C., et al. 2021. From data to marine ecosystem assessment of the Southern Ocean: achievements, challenges and lessons for the future. *Frontiers in Marine Science* **8**: 637063. DOI: <https://doi.org/10.3389/fmars.2021.637063>

This publication presents an overview of the components of an integrated marine biological observing and informatics system in place for the Southern Ocean, the existing gaps and framework for a way forward. It is published as part of the “Marine Ecosystem Assessment for the Southern Ocean: Meeting the Challenge for Conserving Earth Ecosystems in the Long Term” special issue.

2. Tamsitt, V., Bushinsky, Z., Li, M., et al. 2021. Southern Ocean [in “State of the Climate in 2020”]. *Bulletin of the American Meteorological Society* **102** (8), S341-S345. DOI: <https://doi.org/10.1175/2021BAMSStateoftheClimate.1>

Bulletin of the American Meteorological Society “State of the Climate in 2020” report including an overview of the State of Climate of the Southern Ocean 2020 written by the SOOS community, included as a sub-section of the Antarctic chapter.

3. Miller, B.S., The IWC-SORP/SOOS Acoustic Trends Working Group, Balcazar, N., et al. 2021. An open access dataset for developing automated detectors of Antarctic baleen whale sounds and performance evaluation of two commonly used detectors. *Scientific Reports* **11**, 806. DOI: <https://doi.org/10.1038/s41598-020-78995-8>

This publication is a contribution from the SOOS Acoustic Trends Capability Working Group and International Whaling Commission Southern Ocean Research Partnership (IWC-SORP). It presents a library of annotated recordings for the purpose of training and evaluating automated detectors of Antarctic blue and fin whale calls.

4. LaRue, M. Salas, L., Nur, N. et al. 2021. Insights from the first global population estimate of Weddell seals in Antarctica. *Science Advances* **7**, eabh3674. DOI: <https://doi.org/10.1126/sciadv.abh3674>

This publication is a contribution from the SOOS Censusing Animal Populations from Space (CAPS) Capability Working Group. It uses a combination of high-resolution satellite imagery from 2011, crowd-sourcing and habitat modelling to report the first global population estimate for Weddell seals and environmental factors influencing their distribution.

5. Wege, M., Salas, L., and LaRue, M. 2020. Ice matters: life-history strategies of two Antarctic seals dictate climate change eventualities in the Weddell Sea. *Global Change Biology* **27**, 6252-6262. DOI: <https://doi.org/10.1111/gcb.15828>

This publication is a contribution from the SOOS Censusing Animal Populations from Space (CAPS) Capability Working Group. Using presence-absence data and a suite of remotely sensed environmental variables to build habitat models, it shows that broad-brush, basin-scale approaches cannot be used to understand

species-specific responses to climate change and that regional models are needed.

6. Labrousse, S., Iles, D., Viollat, L. et al. 2021. Quantifying the causes and consequences of variation in satellite-derived population indices: a case study of emperor penguins. *Remote Sensing in Ecology and Conservation* **8** (2), 151-165. DOI: <https://doi.org/10.1002/rse2.233>.

This publication is a contribution from the SOOS Censusing Animal Populations from Space (CAPS) Capability Working Group. This shows that very high-resolution satellite imagery can be used to provide robust population trends of emperor penguins.

7. LaRue, M., Brooks, C., Wege, M., et al. 2022. High-resolution satellite imagery meets the challenge of monitoring remote marine protected areas in the Antarctic and beyond. *Conservation Letters* **e12884**. DOI: <https://doi.org/10.1111/con1.12884>

This publication is a contribution from the SOOS Censusing Animal Populations from Space (CAPS) Capability Working Group. It demonstrates that very high-resolution satellite imagery offers a cost-effective and easily accessible method for collecting previously unobtainable data to inform the designation and implementation of Southern Ocean marine protected areas (MPAs).

Direct support from outside organisations received for your activities

(Numbered list with values indicated if direct cash support. Please restrict in-kind support to substantive in-kind support only)

Sponsor	Activity	Amount/Type
SCAR	2020: purchasing of video conference equipment, facilitate DueSouth help forum development, publication and printing cost of the SOOS Science and Implementation Plan, and 5-Year Progress Report (to be completed 2022) 2021: Sponsorship support received in 2021 to add new data layers into SOOSmap (to be completed in 2022)	Due to COVID pandemic and related travel restrictions, no in-person SOOS Scientific Steering Committee meetings were held in 2020, 2021 and 2022. SCAR kindly allowed the usual travel support funds to be used for other SOOS deliverables.
University of Tasmania	International Project Office Core Sponsor (2020-2022)	Hosting of the office, salaries and operational funds
CSIRO	International Project Office Core Sponsor (2020-2022)	Salaries and operational funds
Tasmanian State Government	International Project Office Core Sponsor (2020-2022)	Salaries and operational funds
Antarctica New Zealand	Core Sponsor (2012-2022)	Core SOOS Operational Sponsorship
Swedish Polar Research Secretariat	SOOS-SPRS Collaborative Partnership for development of Swedish Southern Ocean network (2020-2022)	Collaborative partnership
Scientific and Technological Research Council of Turkey Marmara Research Centre	Core Sponsor (2021)	Core SOOS Operational Sponsorship

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(TUBITAK) Polar Research Institute		
University of Cape Town, Marine Biogeochemistry Lab	Core Sponsor (2021-2022)	Core SOOS Operational Sponsorship
State Oceanic Administration, China	Office support person (2018-2021)	In-kind
EMODnet	Development, maintenance and hosting of SOOSmap product for SOOS	In-kind
European Polar Board	Development and hosting of DueSouth (2020 onwards)	In-kind
Australian Antarctic Division Data Centre	Development and hosting of DueSouth (2017 - 2020)	In-kind
Tasmanian Partnership for Advanced Commuting (TPAC)	SOOS Website Support	In-kind
COMNAP	Delivery of information for DueSouth Expeditions	In-kind
IAATO	Delivery of information for DueSouth Expeditions	In-kind
Old Dominion University	SOOS EXCOM Host Institute	In-kind support for SOOS EXCOM member
National Institute of Water and Atmospheric Research (NIWA)	SOOS EXCOM Host Institute	In-kind support for SOOS EXCOM member
University of Edinburgh	SOOS EXCOM Host Institute	In-kind support for SOOS EXCOM member
Norwegian Polar Institute	SOOS EXCOM Host Institute	In-kind support for SOOS EXCOM member
BELSPO (Belgium)	2 nd Southern Ocean Decade Regional Workshop and Polar Data Forum IV (co-hosted by Royal Belgian Institute of Natural Sciences and the European Polar Board, co-organised by SOOS, SCAR Standing Committee on Antarctic Data Management, the World Data System, EuroGOOS and other polar data management organisations)	Direct funding for meeting

Major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR

Within SCAR

1. SCADM – collaborations on efforts of mutual interest; collaboration on SOOSmap, DueSouth and development of the Federated Data Search Tool and related working group POLDER; SOOS Data Officer is a member of SCADM
2. Southern Ocean Regional Panel (SORP) – joint membership; representation at respective meetings; one SORP member in SOOS SSC and working group leadership; input into SOOS Science Plan; SOOS SSC and working group leadership co-editors on a SORP CLIVAR Exchanges Special Issue (due for release 2023)

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3. BEPSII – jointly supported effort for delivery of sea-ice chlorophyll data into SOOSmap; 3 members from BEPSII in SOOS EXCOM and SSC; input into SOOS Science Plan
4. ICED – co-involvement in MEASO; 4 ICED members in SOOS EXCOM, SSC and working group leadership; input into SOOS Science Plan
5. ASPeCt – SOOS SSC member as co-representative and another ASPeCt member on SOOS SSC and working group leadership; collaboration on DueSouth; input into SOOS Science Plan
6. FRISP – endorsement and significant data management support of key FRISP program “NECKLACE”; 3 FRISP members in SOOS working group leadership
7. Ant-ICON – SOOS representative joined Ant-ICON advisory group in 2022; 3 members from Ant-ICON in SOOS SSC and working group leadership; input into SOOS Science Plan; strong partnership to develop between Ant-ICON and SOOS in late 2022 onwards
8. SO-CPR – support for delivery of CPR data through SOOSmap
9. PLASTIC-AG - support for delivery of SCAR plastic data through SOOSmap; 2 members from PLASTIC-AG in SOOS working group leadership
10. Quantarctica - engagement in development of tools
11. EGBAMM – 1 member from EGBAMM in working group leadership and strong collaboration between SOOS Censusing Animal Populations in Space (CAPS) Capability Working Group
12. EG-ABI –2 EG-ABI member in SOOS working group leadership
13. IBCSO –1 member from IBCSO in SOOS working group leadership
14. INSTANT – 4 members from INSTANT in SOOS SSC and working group leadership; input into SOOS Science Plan
15. Ant-CLIMnow – 3 Ant-CLIMnow members in SOOS working group leadership; input into SOOS Science Plan
16. RINGS – 1 member from RINGS in SOOS working group leadership
17. SKAG - 1 member from SKAG in SOOS working group leadership
18. BEDMAP3 – 1 member from BEDMAP3 in SOOS working group leadership

Outside SCAR

1. Scientific Committee of Oceanic Research (SCOR) - governing body; represented at SOOS annual SSC meetings; official annual report; regular email reporting/engagement
 - a. SCOR Working Group, Developing an Observing Air-Sea Interactions Strategy (OASIS) – strong collaboration and overlap between SCOR OASIS working group and SOOS SOFLUX working group including co-membership across both groups; SOOS SOFLUX Capability Working Group endorsed as a UN Ocean Decade action under OASIS; joint SOOS SOFLUX Capability Working Group and OASIS webinars; input into SOOS Science Plan
 - b. SCOR Working Group, analysing ocean turbulence observations to quantify mixing (ATOMIX) – two SOOS working group leadership member in ATOMIX; input into SOOS Science Plan
 - c. SCOR Working Group, Measuring Essential Climate Variables in Sea Ice (ECV-Ice) – one SOOS SSC member in ECV-Ice; input into SOOS Science Plan

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- d. SCOR Working Group, Active chlorophyll fluorescence for autonomous measurements of global marine primary productivity – one SOOS working group leadership member; input into SOOS Science Plan
 - e. SCOR Working Group, Eastern boundary upwelling systems (EBUS): diversity, coupled dynamics and sensitivity to climate change – one SOOS SSC member in EBUS; input into SOOS Science Plan
 - f. SCOR Working Group, Integration of plankton-observing sensor systems to existing global sampling programs (P-OBS) – one SOOS working group leadership member in P-OBS
 - g. SCOR Working Group, Translation of optical measurements into particle content, aggregation and transfer (TOMCAT) – one SOOS working group leadership member in TOMCAT
 - h. SCOR Large-Scale Ocean Research Project, Surface Ocean Lower Atmosphere Study (SOLAS) – input into SOOS Science Plan
2. CCAMLR - involvement in SC-CAMLR; annual report; contribution to CCAMLR MPA; regular meetings with CCAMLR Secretariat; CCAMLR representative on the SOOS Symposium 2023 International Program Committee
 3. Partnership for Observation of the Global Oceans (POGO) - joint OASIS working group (now complete); providing funding for the SOOS Symposium 2023
 19. Global Ocean Observing System - attendance at GOOS Regional Alliances meetings; contribution to GOOS reporting on stakeholders
 20. COMNAP - support for development and entries into DueSouth; connection with COMNAP secretariat
 21. IAATO –MoU for IAATO contribution to DueSouth
 22. European Polar Board – service level agreement for hosting of DueSouth (2020 onwards); collaboration for 2021 UN Ocean Decade Workshop and Polar Data Forum IV workshop; joint support for EU-funded, SOOS-endorsed SO-CHIC program
 4. IMOS - support for IPO; involvement in annual meetings
 5. WMO-IOC OceanOPS (formerly Joint Technical Commission for Oceanography and Marine Meteorology in-situ Observing Programmes Support Centre (JCOMMOPS)) - regular engagement with JCOMMOPS team for delivery of DueSouth and SOOSmap
 6. Southern Ocean Carbon and Climate Observation and Modelling (SOCCOM) - updates to community; collaboration on SOOSmap data layers
 7. European Marine Observation and Data Network (EMODnet) - collaboration on delivery, maintenance and growth of SOOSmap
 8. Arctic Data Committee - joint development of Federated Data Search Tool working group POLDER (with SCADM)
 9. Association of Polar Early Career Scientists (APECS) – appointment of ECR/APECS Representative positions in each SOOS working group
 10. Swedish Polar Research Secretariat (SPRS) – three-year sponsoring partnership; Swedish-SOOS Southern Ocean Network
 11. Ocean Best Practice (OBP): strong SOOS involvement and engagement in OBP annual meeting and working groups
 12. Global Ocean Acidification-Observing Network (GOA-ON): discussion and planning for Southern Ocean Regional Hub in GOA-ON

Southern Ocean Observing System (SOOS): 2020-22 Report, cont.

13. Animal Borne Ocean Sensor Network (AniBOS): strong SOOS involvement and membership between AniBOS and SOOS working group leadership teams
14. Marine Ecosystem Assessment for the Southern Ocean (MEASO): strong collaboration; SOOS ecosystem Essential Ocean Variable (eEOV) Task Team as contribution to MEASO; management of PEW Charitable Trusts grants and finances for MEASO product delivery; joint side-events at COP26 and UN Ocean Decade Conference
15. UN Ocean Decade: key partner in the Southern Ocean Task Force for the UN Ocean Decade including 3 SOOS EXCOM members on the Task Force steering committee; co-convening of the 2nd Southern Ocean Regional Workshop for the UN Ocean Decade; co-authorship on the UN Ocean Decade Action Plan; co-convening of a UN Ocean Conference side-event
16. OceanSITES: engagement in annual meetings
17. COP26: co-coordinated the Polar Ocean Days at the Cryosphere Pavilion including co-convening the “Polar Oceans: Acidification and Freshening” day at the Cryosphere Pavilion as well as strong involvement in other events run as part of the Polar Ocean Days Cryosphere Pavilion events
18. NASA Earth Data (formerly GCMD): maintenance of SOOS metadata portal; development of new portal and testing of new search functionalities
19. Chinese National Arctic and Antarctic Data Center: collaborative effort to ensure international access to Chinese CTD data
20. CCHDO: collaborative efforts in ensuring access to Chinese CTD data
21. PANGAEA: collaborative effort to deliver all PANGAEA CTD data holdings through EMODnet and into SOOSmap
22. IASC: engaged in data management discussions
23. EuroGOOS: collaborative efforts in data management
24. GLODAP: discussions for delivery of GLODAP data through SOOSmap
25. SOCAT: discussions for delivery of SOCAT data through SOOSmap
26. Southern Ocean Argo: joint project on Southern Ocean Argo data and publication
27. Intergovernmental Oceanographic Commission (IOC): UN Decade discussions; feedback on 2022 IOC Data Policy and Terms of Use
28. International Oceanographic and Information Data Exchange (IODE): UN Decade planning discussions
29. Biodiversity.aq: UN Decade planning and discussions
30. Tasmanian Polar Network: SOOS membership and involvement in meetings
31. South West Pacific Hydrographic Commission Marine Spatial Data Infrastructure Working Group: SOOS membership and involvement in meetings
32. EU-PolarNet: presentation and involvement in EU-PolarNet workshop in 2022
33. Affiliated Institutes - maintained the SOOS network of Affiliated Institutes (currently 48) – which is a network that acknowledges the role that institutes play in supporting the collection, management and delivery of observations and scientific knowledge of importance to the SOOS mission

Outreach, communication and capacity-building activities

SOOS has undertaken many communication, outreach and capacity building activities over the last two years. Details are available in our annual reports (<http://soos.ag/about-us/annual-reports>). Briefly listed below are some of the key mechanisms we have used to achieve these:

1. SOOS Update – SOOS community newsletter (over 650 subscribers)
2. Representation at community conferences and meetings
3. Publications, presentations, posters and reports (see [resources](#) database on website)
4. Engagement with APECS to ensure ECR involvement in all SOOS working group activities
5. Establishment of a SOOS Equity, Diversity and Inclusion Group

Contributions to equality, diversity, and inclusion (EDI)

In 2020, SOOS established a SOOS Equity, Diversity and Inclusion (EDI) Group to ensure inclusivity for all representations within SOOS and the Southern Ocean community. Across 2021 and 2022, the EDI group meet and continued to guide SOOS in EDI issues. The group also convened a UN Ocean Decade Satellite Session “More Seats at the Table – Increasing Representation in the Marine Sciences” and appointed two early-career APECS representatives to join the leadership team of the group.

SCAR Fellowship Reviewers

First Name	Last Name	Email	Principal Expertise
Jilda	Caccavo	ergo@jildacaccavo.com	Genomics, population ecology, fisheries management
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Sarat Chandra	Tripathy	sarat@ncpor.res.in	Phytoplankton, bio-optics, biogeochemistry