



SDM 17
 Agenda Item: 4.3.3
 Person D
 Responsible: Bromwich et al.

**XXXV SCAR Delegates Meeting
 Davos, Switzerland, 25-26 June 2018**

Physical Sciences Group (PSG)

Report Author(s)

David H Bromwich (USA), Adriana Gulisano (Argentina), Steven Colwell (UK)

Summary of activities and other important issues

Of the many research, meetings, and publishing activities by the 14 active groups that come under PSG selected highlights are:

- IPICS Expert Group (EG): Publication of synthesis papers on the 2000-year behavior of temperature and snow accumulation over Antarctica.
- ISMASS EG: Organized a workshop on the impact of 1.5°C global warming on the Antarctic and Greenland ice sheets and the resulting contribution to sea level rise. A review paper was prepared.
- GRAPE EG: Coordinating/leading efforts addressed to the new Scientific Research Program proposal RESOURCE (Radio Sciences Research on AntarctiC AtmospherE).
- SORP EG: Organized a joint meeting with the Year of Polar Prediction in the Southern Hemisphere (YOPP-SH) effort that lead to the continuation of the Ocean Observatories Initiative buoy (west of Drake Passage) through the YOPP-SH Special Observing Period, mid Nov. 2018-mid February 2019.
- ANTOS EG: Created a survey to identify candidates for new terrestrial and marine observing sites.
- Remote Sensing Action Group (AG): Initiated a request to the European Space Agency to extend Sentinel-2 satellite coverage to Antarctica to identify new penguin colonies.
- ACA AG: Development and submission of European Union Horizon 2020 proposal looking at clouds over the Southern Ocean that will (if funded) include a wide range of European partners but also Chile and US project partners.

Recommendations

- Disband SERAnt AG that has been dormant and its functions subsumed under GRAPE EG.
- Four new groups will likely be proposed to the Delegates at Davos. With the present limited monies for PSG, the funding for up to 18 groups in 2019-2020 is very challenging to provide worthwhile amounts.
- Encourage SCAR members to update meteorological station data for their stations in the WMO OSCAR/SURFACE system <https://oscar.wmo.int/surface//index.html#/>
- Encourage SCAR members to make meteorological data available to Steve Colwell src@bas.ac.uk for updating the SCAR READER database <https://legacy.bas.ac.uk/met/READER/>

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	12,261	47,739	28,500	28,500



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Progress and Plans

Sub-group Major Outcomes/Activities

See Attachment 1 EG and AG Reports and the front page summary.

Sub-group Outcomes Summary

The brief summaries below are in addition to the Highlights presented earlier under Summary of Activities. Expert Groups (EG) are presented first followed by Action Groups (AG).

Sub-group	Activity/Outcome/Benefit/Achievement
IPICS EG	Oldest Ice Initiative Continues.
GRAPE EG	Many international meetings sponsored.
ISMASS EG	Will continue to endorse the ice-sheet-ocean model intercomparisons by holding workshops.
SORP EG	Extensive participation in international research coordination and collaboration has occurred with several relevant programs.
ANTOS EG	Continued to develop the ANTOS database and the technical manual, as per plans originally implemented at the 2016 Kuala Lumpur ANTOS workshop.
ASPECT EG	ASPeCt updated and submitted its Terms of Reference and created a new leadership structure under which it now operates.
FRISP EG	Organized annual international FRISP workshops and co-sponsored a major International Glaciological Society Symposium on the "Interaction of Ice Sheets and Glaciers with the Ocean".
OpMet EG	The group continues to maintain webpages that are updated on a weekly basis with news, information and data monitoring on Antarctic weather https://legacy.bas.ac.uk/met/jds/met/SCAR_oma.htm
ACCE EG	Prepared a report for the 2017 Antarctic Treaty meeting on recent advances in Antarctic climate science and possible impacts on the environment.
Remote Sensing AG	Initiation and preparation of an official request of SCAR to Copernicus Program/ European Space Agency (ESA) concerning coverage of satellites. Discovered new penguin colonies.
ACA AG	The group has sponsored polar cloud sessions at EGU for the last 3 years and combined these meeting with splinter meeting of the group in the evenings.
SnowAnt AG	The main activity was the co-organization of the Snow Science Winter Schools in 2016 (Preda-Davos, Switzerland),



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	2017 (Sodankylä, Finland), 2018 (Col du Lautaret, France). A major revamp of the AG has been proposed to make it more Antarctic focused.
PACT AG	Work continues on preparation of a manuscript for publication on outcomes of the AG. One PhD student is engaged in this work.
TATE AG	A relaunch of the AG at Davos is proposed with the selection of a research active AG chair being key.
SERAnt	Has been dormant and its work subsumed under GRAPE. Recommended for termination.

Sub-group Cash Flow

All EG and AG funding for 2017-2018 will have been spent or reallocated by the end of 2018, totalling \$60K for all PSG activities.

Notable Papers

- Borowicz, A., McDowall, P., Youngflesh, C., Sayre-McCord, T., Clucas, G., Herman, R., Forrest, S., Rider, M., Schwaller, M., Hart, T., Jenouvrier, S., Polito, M.J., Singh, H., and Lynch, H.J., 2018. Multi-modal survey of Adélie penguin mega-colonies reveals the Danger Islands as a seabird hotspot. *Sci Rep*, **8**, 3926. <https://doi.org/10.1038/s41598-018-22313-w> A major hotspot of Adélie penguin abundance is identified in conjunction with Remote Sensing AG scientists in the Danger Islands off the northern tip of the Antarctic Peninsula (AP). A variety of in situ and remote sensing approaches were used.
- Nowicki, S. M. J., Payne, A., Larour, E., Seroussi, H., Goelzer, H., Lipscomb, W., Gregory, J., Abe-Ouchi, A., and Shepherd, A.: Ice Sheet Model Intercomparison Project (ISMIP6) contribution to CMIP6. *Geosci. Model Dev.*, **9**, 4521-4545, <https://doi.org/10.5194/gmd-9-4521-2016>, 2016. This work provides a comprehensive overview of development in CMIP6-ISMIP6 model intercomparisons of the Greenland and Antarctic ice sheets. From the ISMASS EG.
- Grytsai, A., Klekociuk, A., Milinevsky, G., Evtushevsky, O., and Stone, K., 2017: Evolution of the eastward shift in the quasi-stationary minimum of the Antarctic total ozone column. *Atmos. Chem. Phys.*, **17**, 1741-1758, doi:10.5194/acp-17-1741-2017. The association between the longitudinal shift of the zonal ozone minimum and changes in meteorological fields in austral spring is analyzed by PACT AG related scientists. The results suggest that long-term shifts of the zonal ozone minimum are separately contributed by changes in ozone-depleting substances and greenhouse gases.
- Hobbs, W., R. Massom, S. Stammerjohn, P. Reid, G. D. Williams, and W. N. Meier (2016): A Review of Recent Changes in Southern Ocean Sea Ice, their Drivers and Forcings. *Global and Planetary Change*, **143**, 228-250. DOI: 10.1016/j.gloplacha.2016.06.008. This work, led by ASPeCt EG scientists, summarises the research to date on observing Antarctic sea ice trends, identifying their drivers, and assessing the role of anthropogenic climate change.



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Whilst the atmosphere is thought to be the primary driver, the ocean is also essential in explaining the seasonality of the trend patterns.

- O’Shea, S.J., T. W. Choularton, M. Flynn, K. N. Bower, M. Gallagher, J. Crosier, P. Williams, I. Crawford, Z. L. Fleming, C. Listowski, A. Kirchgaessner, R. S. Ladkin, and T. Lachlan-Cope (2017): In situ measurements of cloud microphysics and aerosol over coastal Antarctica during the MAC campaign. *Atmos. Chem. Phys.*, 17, 13049-13070. During austral summer 2015, the Microphysics of Antarctic Clouds (MAC) field campaign collected unique and detailed airborne and ground-based in situ measurements of cloud and aerosol properties over coastal Antarctica and the Weddell Sea. ACA scientists were major participants.
- Stenni, B., Curran, M. A. J., Abram, N. J., Orsi, A., Goursaud, S., Masson-Delmotte, V., Neukom, R., Goosse, H., Divine, D., van Ommen, T., Steig, E. J., Dixon, D. A., Thomas, E. R., Bertler, N. A. N., Isaksson, E., Ekaykin, A., Werner, M., and Frezzotti, M., 2017: Antarctic climate variability on regional and continental scales over the last 2000 years. *Clim. Past*, 13, 1609-1634, <https://doi.org/10.5194/cp-13-1609-2017>, 2017. This paper is a core output from the 2k Array project of the IPICS EG. It provides a state of the art synthesis of Antarctic temperature change/variability in recent millennia.

Forthcoming Activities

- See EG and AG reports in Attachment 1.

Budget

Planned use of funds for 2019 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019-2020	IPICS EG	7000	Tas van Ommen	Tas.van.Ommen@aad.gov.au
2019-2020	GRAPE EG	5000	Giorgiana De Franceschi	Giorgiana.defranceschi@ingv.it
2019-2020	ISMAL EG	5000	Frank Pattyn	fpattyn@ulb.ac.be
2019-2020	SORP EG	4000	Inga Smith	inga.smith@otago.ac.nz
2019-2020	ANTOS EG	4000	Craig Cary	Caryc@waikato.ac.nz
2019-2020	ASPeCt EG	6000	Marilyn Raphael	raphael@geog.ucla.edu
2019-2020	FRISP EG	4000	Adrian Jenkins	ajen@bas.ac.uk
2019-2020	OpMet EG	4000	Steve Colwell	src@bas.ac.uk



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2019-2020	ACCE EG	0	John Turner	jtu@bas.ac.uk
2019-2020	Remote Sensing AG	2000	Hans-Ulrich Peter	bpe@uni-Jena.de
2019-2020	ACA AG	2000	T. Lachlan-Cope	tlc@bas.ac.uk
2019-2020	SnowAnt AG	2000	Martin Schneebeli	schneebeli@slf.ch
2019-2020	PACT AG	1000	A. Klekociuk	Andrew.klekociuk@aad.gov.au
2019-2020	TATE AG	2000	TBD	TBD
2019-2020	Early Career Support/Discretionary	9000	D. Bromwich	bromwich.1@osu.edu
TOTAL		57,000		

Briefly describe funds usage and desired results

Group	Use	Desired Outcome
IPICS EG	3 rd Open Science Conference in 2020, Oldest Ice Initiative (OII)	Successful OSC, Establishment of OII.
GRAPE EG	RESOURCE SRP, SCAR 2020	Resource SRP Proposal Submitted
ISMAL EG	Workshops	Contribute to IPCC 6
SORP EG	SORP-14 Workshop in 2020	Define needed Southern Ocean research directions
ANTOS EG	Technical Meetings, ANTOS Workshop at SCAR 2020	Criteria for terrestrial and marine ANTOS sites agreed by community
ASPeCt EG	Automation of ASPeCt ship-based sea ice obs., ASPeCt Workshop at SCAR 2020	Advance observations and prediction of Southern Ocean sea ice.
FRISP EG	International FRISP workshops in 2018, 2019, and 2020.	Advance understanding and prediction of Antarctic ice shelf-ocean interaction.
OpMet EG	Workshops on Antarctic Meteorology and Climate (WAMC) in 2019 and 2020	Facilitate attendance of early career and scientists from developing Antarctic programs in WAMC.
ACCE EG	ACCE Report in 2019 to SCAR and the Treaty.	A paper on recent advances in Antarctic climate science for a refereed journal in 2019.
Remote Sensing AG	Meetings and collaborations	Develop guidelines for use of drones in Antarctic biological surveys.
ACA AG	Collaborations, proposal(s)	Investigate clouds and aerosols over the Southern



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		Ocean to improve the climate models.
SnowAnt AG	Workshop on Antarctic snow	Revamp of the AG
PACT AG	Publication of results from AG activities	Publication of results, including comparison with climate models participating in the Chemistry-Climate Model Intercomparison (CCMI). This will benchmark the PACT database and fully demonstrate its use. The AG will end on the completion of this work.
TATE AG	Meetings	Revamp of the AG
Early Career Support/Discretionary	Travel of early career and developing Antarctic program scientists to meetings/capitalize on emerging opportunities.	Develop the full range of science that falls under the PSG umbrella.

Percentage of the budget to be used for support of early career researchers

2018:
 2019: Aim for 50%
 2020: Aim for 50%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018:
 2019: Aim for 50%
 2020: Aim for 50%

Linkages

Direct support from outside organisations

See EG and AG reports in Attachment 1.

Major collaborations

See EG and AG reports in Attachment 1.

Outreach and Capacity Building



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Outreach, communication and capacity building activities

See EG and AG reports in Attachment 1.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
David	Bromwich	bromwich.1@osu.edu	Polar meteorology and climatology.

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
CO	David	Bromwich	Ohio State U.	USA	bromwich.1@osu.edu	2012	2020
Deputy CO	Adriana	Gulisano	Argentine Weather Bureau	Argentina	adrianagulisano@gmail.com	2016	2020
Secretary	Steve	Colwell	BAS	UK	src@bas.ac.uk	2012	2020

**Early Career Scientists*

Other members – See PSG Member listing on SCAR website.

Requests to the Secretariat

See EG and AG Reports in Attachment 1



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Attachment 1

Physical Sciences Group Expert and Action Group Reports
(in alphabetical order, [AG] – Action Group, [EG] – Expert Group)

- Antarctic Climate Change and the Environment Advisory Group (ACCE) [EG]
- Antarctic Clouds and Aerosols (ACA) [AG]
- Antarctic Near-shore and Terrestrial Observing System (ANTOS) [EG]
- Antarctic Sea ice Processes and Climate (ASPeCt) [EG]
- Development of a satellite-based, Antarctic-wide, remote sensing approach to monitor bird and animal populations [AG]
- Forum for Research into Ice Shelf Processes (FRISP) [EG]
- GNSS Research and Application to Polar Environment (GRAPE) [EG]
- Ice Sheet Mass Balance and Sea Level The Future (ISMASS) - **see Agenda Item 4.4.8** [EG]
- International Partnership in Ice Core Sciences (IPICS) [EG]
- Operational Meteorology in the Antarctic (OpMet) [EG]
- Polar Atmospheric Chemistry at the Tropopause(PACT) [AG]
- Snow in Antarctica (SnowAnt) [AG]
- Southern Ocean Region Panel (SORP) [EG]
- Tropical Antarctic Teleconnections (TATE) [AG]



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Antarctic Clouds and Aerosols

Report Author

Tom Lachlan-Cope (UK)

Summary of activities and other important issues

The group has sponsored polar cloud sessions at EGU for the last 3 years and combined these meeting with splinter meeting of the group in the evenings. These meetings have fostered a greater understanding of the cloud and aerosol observations being made in the Antarctic and are leading to collaborative projects. During December 2017 attempts were made to make combined in-situ observations with the UK BAS Twin Otter over the ground based observations being made at the Chilean base Escudero. These meeting have also led to an EU Horizon 2020 proposal looking at clouds over the Southern Ocean that will (if funded) include a wide range of European partners but also Chile and US project partners.

Recommendations

Note the importance of investigating clouds and aerosols over the Southern Ocean to improve the climate models.

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	1500	0	1000	1000



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Progress and Plans

Sub-group Major Outcomes/Activities

Better collaboration between group members leading to collaborative projects in the Antarctic – particularly between the UK, Portugal, Holland and Chile (although other groups are involved).

A EU horizon 2020 proposal to investigate clouds over the Southern Ocean and coastal continent is being developed (Stage 1 already submitted). This involves a large number of the members of the group.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
Antarctic Clouds and Aerosols	Improved collaboration of observations of clouds and aerosols.
Antarctic Clouds and Aerosols	Development of EU grant proposal – leading to funding for collaborative research.

Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
Antarctic Clouds and Aerosols	\$1500		\$1500	

Notable Papers

Gorodetskaya et al. (2015): Cloud and precipitation properties from ground-based remote-sensing instruments in East Antarctica. *Cryosphere*, 9:285-304.
 O’Shea et al. (2017): In situ measurements of cloud microphysics and aerosol over coastal Antarctica during the MAC campaign, *Atmos. Chem. Phys.*, 17, 13049-13070
 These papers are just two that are underpinning the groups present interest and the plans for future collaboration.

Forthcoming Activities

Development of EU grant.
 Continuation of the meeting of the group at EGU – at the moment the group is rather Europe heavy and will try and encourage scientist from developing nations particularly from South America to attend.

Budget

Planned use of funds for 2018 to 2020



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Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019	Travel money for scientists for developing nations to attend our meetings.	1000	Tom Lachlan-Cope	tlc@bas.ac.uk
2020	Travel money for scientists for developing nations to attend our meetings.	1000	Tom Lachlan-Cope	tlc@bas.ac.uk

Briefly describe funds usage and desired results

Travel money for scientists for developing nations to attend our meetings – we wish to increase the attendance of scientists from smaller nations (eg South American or Asian nations) at our meetings. We will try and use this money to support early career scientists.

Percentage of the budget to be used for support of early career researchers

2018:
2019: up to 100%
2020: up to 100%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018:
2019:100%
2020:100%

Linkages

Direct support from outside organisations

None

Major collaborations

Within SCAR

None

Outside SCAR

With the International Commission on Polar Meteorology – the sponsorship of meetings.

Outreach and Capacity Building

None



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SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Tom	Lachlan-Cope	tlc@bas.ac.uk	Clouds and Aerosols

Membership

Leadership

Chair Tom Lachlan-Cope BAS UK tlc@bas.ac.uk

Other members

First Name	Last Name	Affiliation	County	Email
Annick	Terpstra	University of Bergen	Norway	annick.terpstra@uib.no
Irina	Gorodetskaya	Universidade de Aveiro	Portugal	irina.gorodetskaya@ua.pt
Nicole	Van Lipzig	Katholieke Universiteit Leuven	Belgium	nicole.vanlipzig@kuleuven.be
Greg	McFarquhar	University of Oklahoma	USA	mcfarq@ou.edu
Seb	O'Shea	University of Manchester	UK	sebastian.oshea@manchester.ac.uk
Gillian	Young	BAS	UK	giyoung@bas.ac.uk
Svitlana	Krakovska	Ukrainian Hydrometeorological Institute	Ukraine	krasvit@ua.fm
Alexis	Berne	École Polytechnique Fédérale De Lausanne	Switzerland	alexis.berne@epfl.ch
Penny	Rowe	Northwest Research Assoc.	USA	penny@nwra.com

Requests to the Secretariat

None



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Antarctic Climate Change and the Environment Advisory Group

Report Author

Prof John Turner (jtu@bas.ac.uk) UK

Summary of activities and other important issues

Preparation of an annual paper to the treaty meeting on recent advances in Antarctic climate science and possible impacts on the environment.

Updating of our book Antarctic Climate Change and the Environment via an editable wiki, which can be updated by a group of editors. The wiki can be found at [http://acce.scar.org/wiki/Antarctic Climate Change and the Environment](http://acce.scar.org/wiki/Antarctic_Climate_Change_and_the_Environment).

Updating of the SCAR READER data base, which is the definitive record of monthly mean, quality controlled meteorological data from the Antarctic stations. It is maintained by Steve Colwell (British Antarctic Survey) and updated on a monthly basis. See <https://legacy.bas.ac.uk/met/READER/>. Data from READER continue to be used in many studies and publications in the refereed literature. The Journal of Climate paper describing the READER data base has been cited 107 times, while the International Journal of Climatology paper on Antarctic climate change during the last 50 years, which was based on the READER data, has been cited 518 times.

Recommendations

None

Summary Budget 2017 to 2020

No budget request



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Progress and Plans

Sub-group	Activity/Outcome/Benefit/Achievement
ACCE	Publication of the 2017 ACCE report.
ACCE	READER data base updating

Notable Papers

The 2017 ACCE report to the Treaty meeting.

Forthcoming Activities

As no ACCE report is required in 2018 we plan to cover 2018-19 in next year's report. We also intend to produce a paper on recent advances in Antarctic climate science for a refereed journal.

The ACCE wiki will be updated.

Budget

No budget request.

Major collaborations

Within SCAR

- AntClim21

Outside SCAR

- SCOR and IASMAS

Outreach and Capacity Building

The ACCE wiki is of great public interest and provides a valuable summary of Antarctic climate science and the impact on the marine and terrestrial biota.

Membership

Jon Turner (chair), Colin Summerhayes, Paul Mayewski, Pete Convey, Guido di Prisco, Julian Gutt, Dominic Hodgson, Sabrina Speich, Tony Worby, Sun Bo and Alexander Klepikov.



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Antarctic Near-shore and Terrestrial Observing System (ANTOS)

Report Authors

Craig Cary and Vonda Cummings (NZ), co-chairs of ANTOS Expert Group

Summary of activities from 2017-18 and other important issues

We have continued to develop the ANTOS database and the technical manual, as per plans originally implemented at the 2016 Kuala Lumpur SCAR-OSC ANTOS workshop. A committee meeting at the 2017 SCAR Biology Symposium (Leuven, Belgium) reviewed progress on the technical manual and database, and refined and finalised a web-based survey (to poll the international research community about existing long-term ecological and environmental data, and other areas where such data is needed). Achievements to date, and the impending survey, were publicised at the open ANTOS meeting held at the Biology Symposium, and through SCAR distribution lists and executive newsletters. The survey was active for three months (July-September 2017).

Technical attributes for the terrestrial three-Tier systems have been configured and off the shelf designs are being developed and considered. Work is underway on development of the marine three-Tier systems. Plans were made for a closed workshop to develop a full implementation plan and to summarise the survey results (Genoa, June 11-13th), and for the ANTOS community workshop to be held prior to the Polar 2018 SCAR-OSC (June 15th). Several poster and oral presentations highlighting the aims of and plans for ANTOS have also been given by committee members in the past year.

Recommendations that EXCOM and Scientific Group Chief Officers should consider

None

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
LS	0	7000	7000	7000
GS	0	1324	2000	2000
PS	0	2000	2000	2000



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Notable Papers

- Cary, C. Cummings, V. (2017). ANTOS - Antarctic Near-shore and Terrestrial Observation System. Poster presentation at the International workshop on Antarctic permafrost, periglacial processes and soils (ANTPAS), Varese, Italy 4-5th October.
- Bergstrom, D. 2017. "ANTOS". Oral presentation to the Australian Antarctic Division. September.
- Convey, P., Cary, C., Cummings, V. 2017. Antarctic Near-shore and Terrestrial Observation System (ANTOS). Poster presented at the Past Antarctic Ice Sheet Dynamics (PAIS) meeting, Trieste Italy, 10-15th September.
- Cummings, V.J. (2017). ANTOS (Antarctic Near-shore and Terrestrial Observing System). **Oral presentation** at the Southern Ocean Observing System Ross Sea Regional Workshop. Shanghai, China. 10-13th September.
- Cummings, V.J. (2017). ANTOS - Antarctic Near-shore and Terrestrial Observation System. Poster presentation at the Southern Ocean Observing system Ross Sea workshop. Shanghai, China. 10-13th September.
- Cummings, V.J. (on behalf of ANTOS committee). (2017). Antarctic Near-shore and Terrestrial Observation System (ANTOS). Poster presented at the XIIth SCAR Biology Symposium, Leuven, Belgium. 10-14th July.
- Cummings, V.J., Cary, S.C. (2017). Antarctic Near-shore and Terrestrial Observation System (ANTOS). Poster presented at the NZ Antarctic conference, Dunedin, 26-28th June.

Forthcoming Activities

- Genoa Workshop (Committee only) - 2018
- Davos Workshop (Open) - 2018
- Database working group meeting – 2018
- Technical working group meeting – 2019
- ANTOS Workshop (open) – Hobart - 2020

Budget

Planned use of funds for 2018 to 2020

Please note that these are estimates and will be discussed and refined in consultation with the wider ANTOS committee at an upcoming workshop in Genoa (June 2018).

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	Workshop – Hobart SCAR-OSC	\$11,000	Craig Cary, Vonda Cummings	craig.cary@waikato.ac.nz Vonda.Cummings@niwa.co.nz
2019	Technical Task Group meeting	\$11,000	Charles Lee	c.lee@waikato.ac.nz



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2018 - late	Database task group meeting	\$4324	Soon Gyu Hong	polypore@gmail.com
2018 - Davos	Workshop (open)	\$3500	Craig Cary, Vonda Cummings	craig.cary@waikato.ac.nz Vonda.Cummings@niwa.co.nz
2018 - Genoa	Workshop (Committee)	\$3500	Craig Cary, Vonda Cummings	craig.cary@waikato.ac.nz Vonda.Cummings@niwa.co.nz
Total		33,324		

Briefly describe funds usage and desired results

- 2020 – Major ANTOS workshop presenting continental wide success of node installation and data management. This, we hope, will be the final meeting as an Expert Group having achieved the desired result. The rest is in the research.
- 2019 – Support is requested for 2-3 individuals from the technical team to meet and compile the final version of the technical manual and to oversee the deployment of the first Tier 3 nodes.
- 2018 – The database team will meet in Korea to finalize the database implementation and to oversee the first live streaming of data from a Tier 1 terrestrial installation.
- 2018 – Matching support being provided for 3-4 early career researchers to attend the ANTOS meeting at the Davos SCAR-OSC.
- 2018 – Funds will be used towards support for multiple committee members to travel to the ANTOS workshop in Genoa (e.g. Bergstrom, Sultan). We will also use some funds to support room and board for the 6 committee members attending this workshop.

Percentage of the budget to be used for support of early career researchers

2018:30%
2019:20%
2020:40%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018:30%
2019:10%
2020:20%

Linkages

Direct support from outside organisations

- PS-SSG - \$2000 USD
- GS-SSG - \$1324 USD



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- Substantial in kind support comes from all of the ANTOS committee home institutions that must amount to well over \$20,000USD/year
- NIWA and University of Waikato - \$7000 USD – *in-kind*

Major collaborations

Within SCAR

- PS- SSG – committee member
- GS-SSG – Committee member
- AntEco– Committee member
- Ant ERA– Committee member
- ANTPAS
- PAIS

Outside SCAR

- New Zealand Antarctic Research Institute

Outreach and Capacity Building

Outreach, communication and capacity building activities

- 2 of the ANTOS committee members are considered early career
- Charles Lee, Univ. of Waikato, Early Career brought on the lead technical effort within ANTOS
- NZ Antarctic conference poster on ANTOS – June 2017
- NZ CEP representatives have been briefed at regular intervals on ANTOS development.
- Co-chairs were invited to attend the SOOS Ross Sea Working Group Workshop in China in Sept 2017.
- ANTOS meeting is scheduled for the SCAR OSC meeting in Davos on June 15, 2018. This will consist of an open meeting in the afternoon for the entire community in the afternoon. Several committee members unable to attend the meeting will connect through video conferencing.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Craig	Cary	Caryc@waikato.ac.nz	Terrestrial ecology/ microbiology
Vonda	Cummings	vonda.Cummings@niwa.co.nz	Marine ecology



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Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-Chair	Craig	Cary	U. of Waikato	NZ	Caryc@waikato.ac.nz	8/2014	8/2020
Co Chair	Vonda	Cummings	NIWA	NZ	Vonda.Cummings@niwa.co.nz	8/2014	8/2020
Sec	*Megumu	Tsujimoto	MPR	Japan	megumutsujimoto@gmail.com	8/2014	8/2020

Other members

First Name	Last Name	Affiliation	County	Email
Byron	Adams	BYU	USA	byron_adams@byu.edu
*Charles	Lee	Waikato University	NZ	cklee@waikato.ac.nz
Dana	Bergstrom	Australian Antarctic Division	Australia	dana.bergstrom@aad.gov.au
Dolores	Deregibus		Argentina	dolidd@yahoo.com
Eli	Verleyen		Belgium	Elie.Verleyen@UGent.be
Emmanuelle	Sultan	Museum National d'Historie Meleuelle	France	esulod@locean-ipsl.upmc.fr
Marcela	Libertelli	Instituto Antártico Argentino	Argentina	mibertelli5@yahoo.com.ar
Mauro	Guglielmin	ANTPAS rep	Italy	mauro.guglielmin@uninsubria.it
Peter	Convey	BAS	UK	pcon@bas.ac.uk
Sharon	Robinson	Woolingong University	Australia	sharonr@uow.edu.au
Soon Gyu	Hong	KOPRI	Korea	polypore@gmail.com
Stefano	Schiaparelli	Unige of MNA	Italy	stefano.schiaparelli@unige.it
Steve	Colwell	PSG rep	UK	src@bas.ac.uk

Requests to the Secretariat - none



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**Antarctic Sea ice Processes and Climate
 (ASPeCt)**

Report Author

Marilyn Raphael (USA)

Summary of activities and other important issues

The period 2016 – 2018 has been a very active one for ASPeCt. Administratively - ASPeCt updated and submitted its Terms of Reference and created a new leadership structure under which it now operates. The group is now led by a Chair (Marilyn Raphael) a Vice Chair (to be nominated) an Immediate Past Chair (Steve Ackley) an Early Career Scientist position or Junior Officer (Stefanie Arndt) and a Communication and Data Executive (Petra Heil). The terms of service are arranged so that there is opportunity for the leadership to be renewed every two years. Scientifically in 2017, the PIPERS cruise into the early winter Ross Sea was successfully completed and initial reports on the outcomes will be made at the SCAR POLAR18 OSC. In 2018, ASPeCt scientists at AWI conducted a Polarstern expedition to the Weddell Sea, deploying 24 ice-tethered platforms to collect data on the seasonal variability of sea-ice and snow properties. ASPeCt underway data were collected on several cruises with contributions from a number of different countries. Additions to the ASPeCt ship observations database are being made on a continuing basis.

ASPeCt members convened sessions at regular science conferences and held a meeting at the IGS conference in New Zealand in 2017. New ideas for projects were discussed.

Recommendations

None

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	710	3000	3000	5000



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Progress and Plans

Sub-group Major Outcomes/Activities

The PIPERS cruise on N. B. Palmer into the early winter Ross Sea took place between April 11 and June 14 2017. It was the first winter research voyage into the Ross Sea in nearly 20 years. Funded by the NSF, the cruise was led by ASPeCt co-Chair Steve Ackley and included researchers from a number of different countries. The keystone project was to investigate the Atmosphere-Ice-Ocean interaction in the Terra Nova Bay and Ross Ice Shelf coastal polynyas. The cruise however involved multidisciplinary and complementary activities that were conducted in several different phases of the cruise. These activities were: ARGO and SOCCOM Float deployments north of the sea ice; marginal ice zone(MIZ) wave buoy deployments and sampling activities; along track sampling for physical oceanography, trace metals, and trace and noble gasses; ice thickness, roughness and physical property sampling at ice stations; gas fluxes(CO₂, DMS, Methane) and sea ice biogeochemistry sampling at ice stations and in polynyas; boundary layer profiling using drone aircraft and met towers at ice stations; and atmosphere, ice and ocean investigations in the coastal polynyas. Numerous presentations on the scientific outcomes of this cruise are on the programme of the SCAR POLAR18 OSC. Detail of the cruise may be found here: <http://www.utsa.edu/LRSG/PIPERS/index.htm>

ASPeCt administrative changes: ASPeCt leadership structure has been rearranged to consist of a Chair, Vice Chair, Immediate past Chair, a Junior officer (ECS) and a Communication and Data Executive. The terms of service are arranged so that there is opportunity for the leadership to be renewed every two years yet still maintain continuity. With this rearrangement Steve Ackley, who has led ASPeCt continuously and with distinction, since its origin, has stepped down from being co-Chair but remains in an advisory role as Immediate Past Chair.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
ASPeCt	PIPERS cruise into the winter Ross Sea. Analysis of the data collected will increase our understanding of the role of polynyas in climate and help understand contemporary trends in Antarctic sea ice.



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Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
ASPeCt	\$6000	-----	710	5290

Notable Papers

1. HOBBS, W., R. MASSOM, S. STAMMERJOHN, P. REID, G. D. WILLIAMS, and W. N. MEIER (2016): A Review of Recent Changes in Southern Ocean Sea Ice, their Drivers and Forcings. *Global and Planetary Change*, 143, 228-250. DOI: 10.1016/j.gloplacha.2016.06.008. This work, led by ASPeCt scientists, summarises the research to date on observing Antarctic sea ice trends, identifying their drivers, and assessing the role of anthropogenic climate change. Whilst the atmosphere is thought to be the primary driver, the ocean is also essential in explaining the seasonality of the trend patterns.
2. Meiners, K. , Arndt, S. , Bestley, S. , Krumpen, T. , Ricker, R. , Milnes, M. , Newbery, K. , Freier, U. , Jarman, S. , King, R. , Proud, R. , Kawaguchi, S. and Meyer, B. (2017): Antarctic pack ice algal distribution: Floe-scale spatial variability and predictability from physical parameters, *Geophysical Research Letters*, doi:10.1002/2017GL074346. This work, led by ASPeCt scientists provides an unprecedented view of ice algal biomass distribution, mapped (as chlorophyll a) in a 100 m by 100 m area of a Weddell Sea pack ice floe, using under-ice irradiance measurements taken with an instrumented remotely operated vehicle.
3. Wongpan, P., K.M. Meiners, P.J. Langhorne, P. Heil, I.J. Smith, G.H. Leonard, R.A. Massom, L.A. Clementson and T.G. Haskell. (2018) Estimation of Antarctic land-fast sea ice algal biomass and snow thickness from under-ice radiance spectra in two contrasting areas. *J. Geophys. Res. Oceans*, <https://doi.org/10.1002/2017JC013711> This work, led by one of ASPeCt's ECS, examines the relationships between normalized difference indices (NDI) calculated from *under-ice radiance* measurements and *sea ice algal biomass* and *snow thickness* for *Antarctic fast ice*.

Forthcoming Activities

Development of ASPeCt ship-based automated instrumentation of sea ice observation. ASPeCt's sea ice observation platform is now established, the software is working and observations are being contributed consistently by research cruises in the region. A natural next step in the evolution of sea ice observation is automation of observation and recording of such information in a way that matches the present ASPeCt protocol.



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ASPeCt will convene a session (4 separate sections) on Antarctic sea ice processes and ice shelves status at the SCAR OSC in Davos, Switzerland (June 2018) and will also hold a side-meeting on June 17th, before the OSC begins. Scientists from the PIPERS cruise will also hold a meeting during the week of the SCAR POLAR18 OSC.

ASPeCt will hold a workshop at the SCAR 2020 OSC in Hobart, Tasmania. This will be the first full-scale workshop that ASPeCt has had in six years and will highlight the group's achievements as well as establish plans for future group efforts.

Continuing work:

- Additions to the ship observations database (ASPeCt observations) are also being made on a continuing basis.
- Continuing contribution to the annual BAMS/NOAA State of the Climate assessment reports, re Antarctic sea ice extent and seasonality
<http://www.ncdc.noaa.gov/bams-state-of-the-climate/>.

Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	Fund travel and participation in an ASPeCt Workshop at SCAR 2020	\$5000	Marilyn Raphael	raphael@geog.ucla.edu
2019	Fund travel and participation in ASPeCt-related meetings.	\$3000	Marilyn Raphael	raphael@geog.ucla.edu
2018	Fund travel and participation in ASPeCt side-meeting at SCAR POLAR18	\$3000	Marilyn Raphael	raphael@geog.ucla.edu
Total		\$11000		

Briefly describe funds usage and desired results

- **2018:** The requested funds are being used to support the travel of several Early Career Scientists and the ASPeCt Chair to attend and participate in the ASPeCt side-meeting and scientific sessions at the SCAR POLAR18 OSC.
- **2019:** ASPeCt members convene sessions at regular science conferences and ASPeCt leverages members' attendance to hold sub group meetings to ensure that progress is made on ASPeCt goals. ASPeCt members also attend meetings of groups with which it would like to form closer ties. To that end ASPeCt requests \$3000 to support ASPeCt-related travel to science conferences and to



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coordinate with other groups. The requested funds will be targeted primarily to support the travel of early career scientists

- **2020:** ASPeCt plans to hold a full Workshop at the SCAR 2020 meeting in Hobart, Tasmania. This is a meeting that can be expected to draw many ASPeCt members is expected to showcase the work that ASPeCt has completed as well as discuss progress on continuing work. The requested funds will be targeted primarily to support the travel of early career scientists to attend and participate in the Workshop.

Percentage of the budget to be used for support of early career researchers

2018: Here we expect at least 50% of the budget to go towards funding ECSs.

2019: Here we expect at least 50% of the budget to go towards funding ECSs.

2020: Here we expect at least 50% of the budget to go towards funding ECSs.

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: This is not known but we expect to include ECSs from such countries.

2019: This is not known but we expect to include ECSs from such countries.

2020: This is not known but we expect to include ECSs from such countries.

Linkages

Direct support from outside organisations

ASPeCt normally receives funds from CliC each year. These funds are used mainly to support attendance of early career scientist to ASPeCt workshops. They are sometimes used to support the attendance of one of the coChairs at a CliC sponsored meeting. For example, funds from the 2016 budget were used to support travel for Stefanie Arndt, ASPeCt's new EC Junior Officer at the ASPeCt Workshop held during the IGS meeting in New Zealand in February 2017. However due to budgetary issues, ASPeCt is not directly funded by CliC in 2017-2018.

Major collaborations

Within SCAR

1. ASPeCt co-chair Marilyn Raphael is a member of the AntClim21 SSG and led the sea ice component of the Great Antarctic Climate Hack Workshop sponsored by AntClim21 in October 2017.
2. Inga Smith a member of ASPeCt, is also Co-Chair of the CLIVAR/CliC/SCAR Southern Ocean Region Panel (SORP). She coordinates activities of interest to both groups for example ASPeCt interest in working more closely with SORP on Ocean Observations Panel for Climate (OOPC). Two other ASPeCt members serve on the Panel.

Outside SCAR

1. ASPeCt was an important planner and participant in the USA's **National Academy of Science's Antarctic sea ice variability and trends workshop** held in January 2016. More than five ASPeCt members were involved.



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- Continued representation on the World Climate Research Programme (WCRP) and SPARC's Polar Climate Predictability Initiative (PCPI) via membership on the leadership (Marilyn Raphael).
- Year of Polar Prediction Southern Hemisphere (YOPP-SH) - Francois Massonnet was supported by ASPeCt to attend the most recent joint meeting in June, 2017, in Boulder, CO. There he presented the project SIPN South. SIPN South aims at collecting and analysing seasonal sea ice forecasts in the Southern Ocean for the next two years (2017-2019).
- Southern Ocean Observing System (SOOS) – ASPeCt member Burcu Ozsoy (Turkey), is a Scientific Member on the SOOS Scientific Steering Committee.

** Numerous ASPeCt scientists are also individually involved with (i.e leading) their national programs focused on the Antarctic and sea ice observation. For example, Dr. Burcu Orszoy leads the fledgling Turkish Antarctic project.

Outreach and Capacity Building

- ASPeCt supported Trond Robertsen an ice analyst with the Norwegian Ice Service to carry out ice observer training on a South African Antarctic cruise in June 2016. Trond trained students to do ice observations and interpret what they see, using ASPeCt protocols and WMO nomenclature. This effort is the first in support of the “clear [and] open interest from the South African Department of Science and Technology as well as the other major institutes” to measure and collect sea ice data during their Antarctic cruises.
- New Zealand ASPeCt members have written 4 magazine/newspaper articles, participated in several radio interviews and have had outreach activities in the Otago Museum.
- German ASPeCt members (based at AWI) participated in the outreach project “Adopt a buoy”, where all Snow Depth and Ice-Mass balance Buoys deployed during the PS111 project cruise were decorated with pictures painted by children from all over Germany. Some impressions of the project may be found (in German) at: <http://www.meereisportal.de/meereisexpedition/buntes-bojen-abenteuer/>
- ASPeCt has a mailing list of more than 50 members. This mailing list is housed at the Los Alamos Lab and administered by Elizabeth Hunke as well as the ASPeCt leadership. The mailing list is used frequently to inform the group, to foster discussion about ASPeCt activities and to collect information about the results of ASPeCt-related activities. The mailing list is quite diverse in terms of gender and nationality.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Robert	Massom	Rob.Massom@aad.gov.au	Sea ice
Sharon	Stammerjohn	sharon.stammerjohn@colorado.edu	Sea ice
Will	Hobbs	will.hobbs@utas.edu.au	Sea ice



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Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chair	Marilyn	Raphael	UCLA	USA	raphael@geog.ucla.edu	2016	
*Junior Officer (ECS)	Stefanie	Arendt	AWI	Germany	stefanie.arendt@awi.de	2016	
Immediate Past Chair	Stephen	Ackley	UTSA	USA	ackley@utsa.edu	2017	
Communication and Data Executive	Petra	Heil	AAD	AUS	Petra.heil@utas.edu.au	2010	

**Early Career Scientists*

Other members:*

Original Group Membership

S.F.Ackley (Co-Chair, USA)	Marilyn Raphael (Co-Chair, USA)
Kay Ohshima (Japan)	Elizabeth Hunke (USA)
Martin Vancoppenolle (Fr)	Marcel Nicolaus (Ger)
Petra Heil (Australia)	Klaus Meiners (Australia)
Rob Massom (Australia)	Sharon Stammerjohn (USA)
Ted Maksym (USA)	Ron Kwok (USA)
Thorsten Markus (USA)	Timo Vihma (Finland)
Pat Langhorne (NZ)	Jean Louis Tison (Be)
Hyoung Chul Shin (Ko)	

*Currently, our mailing list numbers more than 50. We can send that list in other email if necessary.

Requests to the Secretariat

None



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 Person Responsible: H-U Peter and O Mustafa

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Development of a satellite-based, Antarctic-wide, remote sensing approach to monitor bird and animal populations

Report Authors

Hans-Ulrich Peter & Osama Mustafa

Summary of activities from 2016-18 and other important

- Organizing session during SCAR Open Science Conference 2016
- Organizing Action group-meeting during SCAR Open Science Conference 2016
- Initiation and preparation of an official request of SCAR to Copernicus Program/ European Space Agency (ESA) concerning coverage of satellites
- Presentation of first results of the coverage extension at the Annual Forum for Remote Sensing and Copernicus 2017
- Organizing a workshop during SCAR Biology Symposium 2017
- Organizing an Action-Group Meeting during the Polar18-Conference in Davos
- Discovery of new penguin colonies

Recommendations

none

Summary Budget 2017 to 2020 (PS) - for LS the same

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	0	1000	1000	1000



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Progress and Plans

Sub-group Major Outcomes/Activities

- Organizing session during the SCAR OSC 2016: Session 21: Remote sensing of the Antarctic environment: Multidisciplinary Advances: 20 talks and 16 poster presentations. One young scientist got financial support.(and organizing Action group-meeting during SCAR Open Science Conference: Joint meeting of the SCAR Action Group on remote sensing of animals and the new SOOS working Group Censusing Animal Populations from Space (CAPS).
- Initiation and preparation of an official request of SCAR to European Space Agency (ESA) concerning coverage of satellites
Following a discussion at the workshop during SCAR OSC 2016 members of the Action Group initiated and prepared an official request of SCAR as representative of the Antarctic scientific community to the European Space Agency (ESA) on expanding the coverage of Sentinel-2 mission satellites. In November 2016 this request was positively answered and fully supported by ESA. The image acquisition of Sentinel-2 was extended from its former limitation to 56°S to the Antarctic continent for selected periods of the season 2016/17 and with regular coverage from 2017/18 season on.
With this, Antarctic researchers from various fields have the opportunity to use the free available and high quality imagery of this new platform.
Presentation of first results of the coverage extension at the Annual Forum for Remote Sensing and Copernicus 2017 (The analysis outlines the potential of Sentinel -2 images for monitoring bird populations in the Antarctic.
- Organizing workshop “Drones in Polar Biology” during SCAR Biology Symposium 2017 July 9.and Meeting during Polar18
This technology is used for ground truthing of satellite imagery and as a standalone survey method. To discuss the opportunities and challenges of this promising technology the SCAR Action
The use of drone technology by the following topics were discussed:
 - Monitoring of Antarctic wildlife, esp. penguins and seals (new penguin colonies where found)
 - Botanical and physiological research
 - Avoidance of disturbance of birds and seals: Recommendations for guidelines for CEP.
 - Meeting during Polar18 (June17, 2018) for discussion of new technologies (satellites and drones) and for further cooperation.



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Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
Remote Sensing	<ul style="list-style-type: none"> - Organisation of workshops and meetings, - exchange of information on new technologies and methods - Search for new penguin colonies by using new technologies - Recommendations for guidelines for CEP - Contact to ESA.

Sub-group Cash Flow

ONLY PS

Sub-group	Allocation	Amount spent		
		2016	2017	2018
Remote Sensing		1000	0	1000

Notable Papers

Bestley S., Raymond B., Gales N. J., Harcourt R. G., Hindell M. A., Jonsen I. D., Nicol S., Péron C., Sumner M. D., Weimerskirch H., Wotherspoon S. J., Cox M. J., 2017. Predicting krill swarm characteristics important for marine predators foraging off East Antarctica. *Ecography* 0. <https://doi.org/10.1111/ecog.03080>

Borowicz, A., McDowall, P., Youngflesh, C., Sayre-McCord, T., Clucas, G., Herman, R., Forrest, S., Rider, M., Schwaller, M., Hart, T., Jenouvrier, S., Polito, M.J., Singh, H., Lynch, H.J., 2018. Multi-modal survey of Adélie penguin mega-colonies reveals the Danger Islands as a seabird hotspot. *Sci Rep* 8, 3926. <https://doi.org/10.1038/s41598-018-22313-w>

Borrelle, S.B., Fletcher, A.T., 2017. Will drones reduce investigator disturbance to surface-nesting seabirds? *Marine Ornithology* 45, 89–94.

Fauchald, P., Tarroux, A., Tveraa, T., Cherel, Y., Ropert-Coudert, Y., Kato, A., Love, O.P., Varpe, Ø., Descamps, S., 2017. Spring phenology shapes the spatial foraging behavior of Antarctic petrels. 203-215. <https://doi.org/10.3354/meps12082>

Fiori, L., Doshi, A., Martinez, E., Orams, M.B., Bollard-Breen, B., 2017. The Use of Unmanned Aerial Systems in Marine Mammal Research. *Remote Sensing* 9, 543. <https://doi.org/10.3390/rs9060543>

Giordan, D., Hayakawa, Y., Nex, F., Remondino, F., Tarolli, P., 2017. Review article: The use of remotely piloted aircraft systems (RPAS) for natural hazards monitoring and management. *Natural Hazards and Earth System Sciences Discussions* 1–26. <https://doi.org/10.5194/nhess-2017-339>

Leary, D., 2017. Drones on ice: an assessment of the legal implications of the use of unmanned aerial vehicles in scientific research and by the tourist industry in Antarctica. *Polar Record* 53, 343–357. <https://doi.org/10.1017/S0032247417000262>

Malenovský Zbyněk, Lucieer Arko, King Diana H., Turnbull Johanna D., Robinson



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Sharon A., Lecomte Nicolas, 2017. Unmanned aircraft system advances health mapping of fragile polar vegetation. *Methods in Ecology and Evolution* 8, 1842–1857. <https://doi.org/10.1111/2041-210X.12833>

Pour, A.B., Park, Y., Park, T.-Y.S., Hong, J.K., Hashim, M., Woo, J., Ayoobi, I., 2018. Regional geology mapping using satellite-based remote sensing approach in Northern Victoria Land, Antarctica. *Polar Science*. <https://doi.org/10.1016/j.polar.2018.02.004>

Turner, D., Lucieer, A., Malenovsky, Z., King, D., Robinson, S.A., 2018. Assessment of Antarctic moss health from multi-sensor UAS imagery with Random Forest Modelling. *International Journal of Applied Earth Observation and Geoinformation* 68, 168–179. <https://doi.org/10.1016/j.jag.2018.01.004>

Weimerskirch, H., Prudor, A., Schull, Q., 2018. Flights of drones over sub-Antarctic seabirds show species- and status-specific behavioural and physiological responses. *Polar Biol* 41, 259–266. <https://doi.org/10.1007/s00300-017-2187-z>

Forthcoming Activities

Activities during the Polar18-Conference in Davos (Meeting of the AG on June 17), the World Ornithological Congress in Canada 2018, Meeting of the AG in 2019, SCAR OSC 2020 in Hobart etc.
 Further strong cooperation with EGBAMM, CAPS and SOOS.
 Work with colleagues from the Intersessional contact group to develop guidelines for the environmental aspects of the use of UAVs/RPAS in Antarctica within CEP.

Budget

Planned use of funds for 2018 to 2020 (only part PS !)

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2018	Polar18-participation	1000	Hans-Ulrich Peter	bpe@uni-Jena.de
2019	Meeting of the AG	1000	Hans-Ulrich Peter	bpe@uni-Jena.de
2020	OSC Hobart	1000	Hans-Ulrich Peter	bpe@uni-Jena.de
Total		3000		

Briefly describe funds usage and he desired results

The funds will be used for young people to take part on SCAR conferences (OSC and others) and workshops/meetings of the AG Remote sensing.



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Percentage of the budget to be used for support of early career researchers

2018: 100%
 2019: 100%
 2020: 100%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: 30 %
 2019: 30 %
 2020: 30 %

Linkages

Direct support from outside organisations

CEP

Major collaborations

Within SCAR

The AG is supported by LS and PS.
 There is a strong cooperation with EGBAMM , CAPS and SOOS

Outside SCAR

The results of several group members regarding the disturbance of wildlife by drones were the base for a number of conference papers submitted to ATCM/CEP giving an input for the discussion on guidelines for the use of drones near bird and seal concentrations. An Intersessional contact group to develop guidelines for the environmental aspects of the use of UAVs/RPAS in Antarctica within CEP was opened.

Outreach and Capacity Building

The results of several group members regarding the disturbance of wildlife by drones were the base for a number of conference papers submitted to ATCM/CEP giving an input for the discussion on guidelines for the use of drones near bird and seal concentrations.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Hans-Ulrich	Peter	bpe@uni-jena.de	Bird and seal ecology
Osama	Mustafa	osama.mustafa@think-jena.de	Drones, satellites and there use for birds and seals



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and O
Mustafa

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Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-chair	Osama	Mustafa	ThINK	Germany	osama.mustafa@think-jena.de	2014	?
Chair	Hans-Ulrich	Peter	FSU	Germany	bpe@uni-jena.de	2014	?

Other members

First Name	Last Name	Affiliation	Country	Email
Heather	Lynch	Stony Brook University	USA	<heather.lynch@stonybrook.edu>
Michelle	La Rue	University of Minnesota	USA	<larue010@gmail.com>
Peter	Fretwell	BAS	UK	<ptf@bas.ac.uk>
Osama	Mustafa	Think	Germany	<osama.mustafa@think-jena.de>
Ewe	Hong Tat	Universiti Tunku Rahman	Malaysia	<eweht@utar.edu.my>
Shridhar	Jawak	Nat. Centre for Antarctic and Ocean Research	India	<shridhar.jawak@gmail.com>
Rob	Massom	Australian Antarctic Division	Australia	<Rob.Massom@aad.gov.au>
Oscar	Schofield	Rutgers University	USA	<oscar@marine.rutgers.edu>
Mathew	Schwaller	NASA Goddard Space Flight Center	USA	mathew.r.schwaller@nasa.gov
Malgorzata	Korczak-Abshire	Polish Academy of Sciences	Poland	mka@ibb.waw.pl
Paul	Morin	Polar Geospatial Center	USA	lpaul@umn.edu
Marie-Charlott	Rümmeler	Jena University	Germany	marie-charlott.ruemmler@uni-jena.de
Barbara	Bollard Breen	Auckland University of Technology	New Zealand	bbreen@aut.ac.nz
Horst	Bornemann	AWI	Germany	Horst.Bornemann@awi.de



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Person Responsible:	H-U Peter and O Mustafa

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Requests to the Secretariat

None



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Person Responsible: A Jenkins

**XXXV SCAR Delegates Meeting
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Forum for Research into Ice Shelf Processes (FRISP)

Report Author

Adrian Jenkins (UK)

Summary of activities and other important issues or factors

During the reporting period FRISP organized two workshops (Kristineberg, Sweden, October 2016; Sotra, Norway, June 2017) and co-sponsored a major International Glaciological Society Symposium on the “Interaction of Ice Sheets and Glaciers with the Ocean” (La Jolla, California, July 2016). A further workshop is planned for September 2018 in Aussois, France.

Recommendations

None

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	0	4000	2000	2000



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 Person Responsible: A Jenkins

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Progress and Plans

Sub-group Major Outcomes/Activities

1) Co-sponsorship of International Glaciological Symposium on “Interaction of Ice Sheets and Glaciers with the Ocean”.

Location: Scripps Institution of Oceanography, La Jolla, California, USA.

Dates: 10th – 15th July 2016.

Participants: 152 from 14 nations.

Oral presentations: 87

Poster presentations: 59

Nature of support: Promotion and publicity.

A major international symposium organised by IGS focussed on FRISP core science questions.

2) 30th International FRISP Workshop

Location: Kristineberg Research Station, University of Gothenburg, Gullmarn Fjord, Sweden.

Dates: 3rd – 6th October 2016.

Participants: 70 from 12 nations

Oral presentations: 49

Poster presentations: 15

Side meetings: SOOS Necklace Workshop, APECS Panel Discussion

Nature of support: Organisation.

The annual international FRISP workshop for 2016, organised later than usual to avoid a clash with the IGS symposium

3) 31st International FRISP Workshop

Location: Panorama Hotell, Sotra, Bergen, Norway.

Dates: 19th – 22nd June 2017.

Participants: 100 from 12 nations

Oral presentations: 32

Poster presentations: 61

Side meetings: Filchner Ice Shelf Project meeting

Nature of support: Organisation.

The annual international FRISP workshop for 2017, organised at its traditional time near mid-summer.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
FRISP	Co-sponsorship of international symposium (2016)
FRISP	Organisation of 30 th international workshop (2016)
FRISP	Organisation of 31 st international workshop (2017)



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 Person A Jenkins
 Responsible:

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Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
FRISP	4000	0	0	0

Notable Papers

Not applicable.

Forthcoming Activities

- 32nd International FRISP Workshop, to be held in the French Alps in Aussois at the Paul Langevin centre, on 3/4/5/6 September 2018.
- 33rd International FRISP Workshop, to be held in June 2019, at a location to be decided.
- 34th International FRISP Workshop, to be held in June 2020, at a location to be decided.

Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2018	Travel support	4000		
2019	Travel support	2000		
2020	Travel support	2000		
Total		8000		

Briefly describe funds usage and desired results

Travel bursaries to provide partial support to participants in the annual International FRISP workshops (2018, 2019 and 2020), especially for early careers scientists and scientists from nations with developing Antarctica programmes. No planned expenditure associated with the Davos meeting in 2018.

Percentage of the budget to be used for support of early career researchers

Allocation depends on support applications received. Historically we expect most from early career researchers.



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Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

Allocation depends on support applications received.

Linkages

Direct support from outside organisations

The 31st International workshop received financial support from:

- 1) Aanderaa Data Instruments AS: 25 000 NOK
- 2) Nortek: 20 000 NOK
- 3) Bjerknes Centre for Climate Research: 31 327 NOK

Major collaborations

Within SCAR

1. Southern Ocean Observing System (SOOS): Necklace workshop organized in conjunction with 30th International FRISP Workshop, held in Kristineberg, Sweden.

Outside SCAR

1. Filchner Ice Shelf Consortium (FISP/FISS): One day science and data-sharing workshop organized in conjunction with 31st International FRISP Workshop, held in Sotra, Norway.
2. Nucleus for European Modelling of the Ocean Consortium (NEMO): One day workshop of modelling sub-ice-shelf processes with NEMO to be organized in conjunction with 32nd International FRISP Workshop, held in Aussois, France.

Outreach and Capacity Building

- 1) A report on the 30th International FRISP workshop was posted on the European Geosciences Union Cryosphere Division Blog (<http://blogs.equ.eu/divisions/cr/tag/frisp/>).

SCAR Fellowship Reviewers

None



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Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chair	Adrian	Jenkins	British Antarctic Survey	UK	ajen@bas.ac.uk	2016	2020
National Rep	Keith	Nicholls	British Antarctic Survey	UK	kwni@bas.ac.uk	2016	2020
National Rep	Hartmut	Hellmer	Alfred-Wegener-Institute	Germany	hartmut.hellmer@awi.de	2016	2020
National Rep	Svein	Østerhus	Bjerknes Centre for Climate Research	Norway	svein.osterhus@uib.no	2016	2020
National Rep	Anna	Wählin	University of Gothenburg	Sweden	anna.wahlin@gu.se	2016	2020
National Rep	David	Holland	New York University	USA	david.holland@nyu.edu	2016	2020
National Rep	Sang Hoon	Lee	Korean Polar Research Institute	Korea	shlee@kopri.re.kr	2016	2020
National Rep	Richard	Coleman	University of Tasmania	Australia	richard.coleman@utas.edu.au	2016	2020
National Rep	Shin	Sugiyama	Hokkaido University	Japan	sugishin@lowtemp.hokudai.ac.jp	2016	2020
ECS Rep*	Elin	Darelius	University of Bergen	Norway	elin.darelius@gfi.uib.no	2016	2020
ECS Rep*	Tore	Hattermann	Alfred-Wegener-Institute	Germany	tore.hattermann@awi.de	2016	2020
ECS Rep*	Laura	Herraiz-Borreguero	National Oceanography Centre	UK	l.herraiz-borreguero@noc.soton.ac.uk	2016	2020

*Early Career Scientists

Requests to the Secretariat

None



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Agenda Item: 4.3.3

Person Responsible: G De Franceschi & N Bergeot

**XXXV SCAR Delegates Meeting
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GNSS RESEARCH AND APPLICATION TO POLAR ENVIRONMENT (GRAPE)

Report Authors:

Giorgiana De Franceschi (Italy), Nicolas Bergeot (Belgium)

Summary of activities and other important issues

GRAPE is a joint Physical Sciences and Geosciences Group aiming to intensify the international efforts to build and coordinate a robust network of collaborations in order to answer a variety of weather and space weather related needs at high latitudes and polar regions (Arctic and Antarctica), through ad hoc data sharing and models development. The main outcome from the activities carried out relies on the increasing interest and participation of the international community and early career scientists to the scientific and business sessions focused on GRAPE topics organized within: 1) the International **Beacon Satellite Symposium 2016** (26 June- 1 July, Trieste, IT), 2) the **SCAR OSC 2016** (22-26 August, Kuala Lumpur), 3) the **URSI GASS 2017** (19-26 August, Montreal, CA), 4) the **IAGA 2017** (27 August- 1 September, Cape Town, SA) GRAPE mini symposium, 5) the **GRAPE workshop at ROB** (4 December 2017, Brussels, BE) and finally the forthcoming **POLAR2018** (15- 23 June 2018, Davos, Switzerland).

Recommendations

Please note GRAPE is coordinating/leading efforts addressed to the new SRP proposal RESOURCE (Radio Sciences Research on AntarctiC AtmospherE), that is hopefully expected to be approved and to start in 2020. In case of RESOURCE success, GRAPE will be then disbanded in 2020 because will be included in this more ambitious SRP.

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	4021	2500	2500	2500



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Progress and Plans

- **The observing infrastructures** (mainly based on GNSS receivers able to monitor ionospheric TEC and scintillations), managed and upgraded by National Projects, is growing above all over Antarctica however not yet filling the existing gap between the Northern and Southern Hemispheres. **New solutions for data exchange and management** addressed to Space Weather products development assisting communications, navigation and positioning have been tested with success.
- A new SRP proposal "**RESOURCE**" (Radio Sciences Research on AntarctiC AtmospherE) has been submitted to SCAR in May 2017 aiming to improve the current monitoring and knowledge of the Antarctic atmosphere in relation to the Arctic environment in a bipolar framework, achieved using radio sensors and supported by complementary instrumentation. In this frame, the establishment of a closer link between neutral/ionized atmosphere and **Synthetic Aperture Radar** communities in respect to the past is also in progress.
- The 2018 school "**Polar Upper Atmosphere: from Science to Operational Issues**", will be held at the International School of Space Science in L'Aquila, Italy on 17-21 September 2018 (http://www.cifs-iss.org/application_september.asp). The event is kindly highlighted on SCAR web

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
GRAPE	Infrastructures (observing systems and ICT) / new tools in progress to contribute to Weather and Space Weather / better coverage of Antarctica/ satisfactory.
GRAPE	Preparation of a new SRP proposal/ submitted/involvement of a larger community on Radio Science at polar regions/in progress
GRAPE	School organization/appreciated by international bodies (e.g. EGU)/training of students on polar atmosphere and preparation of proposals/hopefully very good

Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
GRAPE	6500 (2017-2018) 3000 (2015-2016)	3000	4021	2500



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Person Responsible: G De Franceschi & N Bergeot

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Notable Papers

- Alfonsi, L., Cilliers, P. J., Romano, V., Hunstad, I., Correia, E., Linty, N., ... & Riley, P. (2016). First observations of GNSS ionospheric scintillations from DemoGRAPE project. *Space Weather*, 14(10), 704-709, doi:10.1002/2016SW001488. This work provides the outcomes of the DemoGRAPE project concerning new solutions on Software-Hardware infrastructures tested in different Antarctic Stations in the frame of GRAPE.
- M. Negusini, B. H. Petkov, P. Sarti and C. Tomasi, (May 2016) "Ground-Based Water Vapor Retrieval in Antarctica: An Assessment," in IEEE Transactions on Geoscience and Remote Sensing, vol. 54, no. 5, pp. 2935-2948, . doi: 10.1109/TGRS.2015.2509059. This work provides a contribution to GRAPE neutral atmosphere topic and the advancement on the capability to retrieve Water Vapor.
- Correia, E., Spogli, L., Alfonsi, L., Cesaroni, C., Gulisano, A. M., Thomas, E. G., ... & Rodel, A. A. (2017, October). Ionospheric F-region response to the 26 September 2011 geomagnetic storm in the Antarctica American and Australian sectors. In *Annales Geophysicae* (Vol. 35, pp. 1113-1129), doi: 10.5194/angeo- 35-1113-2017. This work provides a detailed investigation on the ionized atmosphere reaction to a geomagnetic storm in different longitudinal sectors over Antarctica and comes from a strong collaboration among scientists of different Countries supporting GRAPE.

Forthcoming Activities

Efforts will be addressed to the improvement/refinement of the SRP proposal RESOURCE, built upon the important GRAPE legacy, firstly by enhancing interactions between the scientists who measure and utilise the entire radio spectrum, either as an auxiliary or principal observation, to study the atmosphere. This will be reached through ad hoc meetings/workshops/scientific sessions focused on these aspects. Another important goal of the GRAPE-RESOURCE community will be to strength collaborations with the SAR community to develop atmospheric (troposphere and ionosphere) mitigation tools to be used as correction of the SAR images. Efforts of GRAPE participants will focus also on the development/improvement of data archive and database in order to make experimental observations and tools available to the international community. Finally, GRAPE will continuously update the web site to share information/activities/proposals as much as possible. Just as an example, in January 2018 GRAPE has been contacted via the web site by Korean groups dealing with upper atmosphere that from now will actively participate to the GRAPE_RESOURCE initiatives.

In case RESOURCE will be approved from 2020, GRAPE will be disbanded and included in RESOURCE.



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Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	SCAR2020	2500	Giorgiana De Franceschi	Giorgiana.defranceschi@ingv.it
2019	WORKSHOP GRAPE_RESOURCE_URSI, WEB	2500	Nicolas Bergeot	nicolas.bergeot@oma.be
2018	POLAR2018 One registration fee for an early career scientist	600	Giorgiana De Franceschi	Giorgiana.defranceschi@ingv.it
2018	SCHOOL "POLAR UPPER ATMOSPHERE"	1900	Giorgiana De Franceschi	Giorgiana.defranceschi@ingv.it
Total		7500		

Briefly describe funds usage and the desired results

- 2020 SCAR2020- Funds will support registration fees and early career scientists expected to present a paper
- 2019 WORKSHOP GRAPE_RESOURCE_URSI, WEB- funds will support the organization of dedicated meetings/scientific sessions to enlarge the GRAPE RESOURCE community. Funds will also support the web maintenance and updating
- 2018 POLAR2018- Funds will support the registration fees of Elvira Musicò, early career scientists. Through the dedicated side meeting and scientific session, the challenge is the involvement of other groups in the discussion of the SRP proposal RESOURCE.
- 2018 SCHOOL "The Polar Upper Atmosphere: from science to operational issues" – this training course aims to foster excitement and encourage involvement of the next generation of space researchers in studies of the geospace environment of Polar Regions. Funds will support travel expenses of the co-director of the school (Michael Mendillo- Boston College) and one student that will be selected on the base of his/her cv as well of the Country.

Percentage of the budget to be used for support of early career researchers

2018:~50%
 2019:~30%
 2020:~30%



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Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

We cannot provide an estimation; it will depend on the adhesion to GRAPE of scientists from countries with developing Antarctic programs, which are more than welcome. Of course, they will be facilitated as much as possible.

Linkages

Direct support from outside organisation

Most of the groups participating in GRAPE are supported by their own Countries through specific projects for Antarctic sciences.

GRAPE is not directly supported by any of these projects but of course takes advantage of the existing infrastructures at Polar Regions to monitor neutral and upper atmosphere.

Major collaborations

Within SCAR

1. SCAR GS
2. SERCE SRP

Outside SCAR

1. EC and ESA initiatives focusing on GNSS services and Space Weather
2. URSI COMMISSIONS G and F
3. IAGA

Outreach and Capacity Building

GRAPE participants support locally outreach, communication activities and events (e.g. Festival of Sciences) addressed to the general public as well to pupils and students from intermediate to high schools. Special lectures are also organized for Masters, e.g.:

Spogli Luca, "Space climate and space weather from the Pole" lecture within the "Master in sustainable development, geopolitics of resources and arctic studies" organized by the Società Italiana per l'Organizzazione Internazionale (The Italian Society for International Organization), 2016 and 2017.



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SCAR Fellowship Reviewers

First Nam	Last Nam	E-mail	Principal Expertise
Nicolas	Bergeot	nicolas.bergeot@oma.be	PLASMASPHERE
Lucilla	Alfonsi	lucilla.alfonsi@ingv.it	IONOSPHERE
Monia	Negusini	negusini@ira.inaf.it	WATER VAPOR
Emilia	Correia	ecorreia@craam.mackenzie.br	Multi-instrument upper atmosphere monitoring

Membership

The complete list of membership is available at www.grape.scar.org Leadership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chief officer	Giorgiana	De Franceschi	INGV	Italy	Giorgiana.defranceschi@ingv.it	August 2012	
Deputy chief officer	Nicolas	Bergeot	OMA	Belgium	nicolas.bergeot@oma.be	August 2016	

* *Early Career Scientists*

Requests to the Secretariat

None



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 Person T van
 Responsible: Ommen
 and
 H Fischer

**XXXV SCAR Delegates Meeting
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International Partnership in Ice Core Sciences (IPICS)

Report Authors

Tas van Ommen (Australian Antarctic Division, Australia) and Hubertus Fischer (University of Bern, Switzerland)

Summary of activities and other important issues

IPICS continues to be a strong and efficient organization. Several major activities have been undertaken in the 2016-18 period. In 2016, the Second IPICS Open Science Conference in Hobart was a great success with well over 200 delegates attending. A series of resulting papers are published in a joint special issue (see references below). IPICS has adopted a new white paper on “Terminations and Seesaws”. With the completion of the 40 ka Network Project, this provides a framework for further development of related work.

The 2k Array project continues to develop synthesis products with two high profile publications on Antarctic temperature and accumulation reconstructions (see references below). New co-chairs were elected and commenced in 2017.

There has been considerable activity within the sphere of the IPICS oldest ice challenge. Several nations and groups of nations have been working at technology development and site selection toward finding and drilling a core to around 1.5 million years of age. Within Europe, the Beyond EPICA – Oldest Ice group has explored two potential source areas in the vicinity of Dome C and Dome F and has now moved to a point where it is able to seek funding for the actual drilling with a timetable.

Recommendations

none

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)		3000	4500	4500



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Person Responsible:	T van Ommen and H Fischer

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Progress and Plans

Notable Papers

1. Stenni, B., Curran, M. A. J., Abram, N. J., Orsi, A., Goursaud, S., Masson-Delmotte, V., Neukom, R., Goosse, H., Divine, D., van Ommen, T., Steig, E. J., Dixon, D. A., Thomas, E. R., Bertler, N. A. N., Isaksson, E., Ekaykin, A., Werner, M., and Frezzotti, M.: Antarctic climate variability on regional and continental scales over the last 2000 years, *Clim. Past*, 13, 1609-1634, <https://doi.org/10.5194/cp-13-1609-2017>, 2017.
2. Thomas, E. R., van Wesseem, J. M., Roberts, J., Isaksson, E., Schlosser, E., Fudge, T. J., Vallelonga, P., Medley, B., Lenaerts, J., Bertler, N., van den Broeke, M. R., Dixon, D. A., Frezzotti, M., Stenni, B., Curran, M., and Ekaykin, A. A.: Regional Antarctic snow accumulation over the past 1000 years, *Clim. Past*, 13, 1491-1513, <https://doi.org/10.5194/cp-13-1491-2017>, 2017.

Both these papers are core outputs from the 2k Array project. They provide the state of the art syntheses for Antarctic temperature and snow accumulation in recent millennia.

3. Special issue from IPICS OSC selected papers: http://www.the-cryosphere.net/special_issue12_653.html

Forthcoming Activities

Key activities for the coming two years are as follows:

- Development of a new initiative and white paper in ice coring for studying ice dynamics
- Support and development of critical initiatives for major activities, the major one being the Oldest Ice challenge. This will be discussed during the IPICS SC meeting before the POLAR2018 conference in Davos followed by a targeted Oldest Ice Workshop also to be held in Davos in June 2018.
- Establishment of a joint special issue compilation for papers dealing with the preparatory phase of oldest ice initiative. This is approved and expected to be taken to EGU-Copernicus in 2018.
- Final selection of venue/host for the IPICS Third Open Science Conference in 2020.
- Community development and engagement in the lead-up to the OSC.



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 Person Responsible: T van Ommen and H Fischer

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Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	OSC delivery/support	4500	Tas van Ommen	Tas.van.Ommen@aad.gov.au
2019	Open Science Conference preparation/support	4500	Hubertus Fischer	hubertus.fischer@climate.unibe.ch
2018	IPICS SC meeting/Oldest Ice workshop Davos	3000	Hubertus Fischer	hubertus.fischer@climate.unibe.ch
Total		12000		

Briefly describe funds will be usage and the desired results

Open Science Conference: Delivery/support and preparation/support
 As with the model for the successful Hobart OSC, IPICS plans to deploy funding to provide organisers with seed funding to secure initial preparation and to give targeted support to early career researchers (ECRs) and delegates from nations with lesser developed ice core capability. At the second OSC, this model proved very effective with a very high proportion of ECRs. This was achieved with active involvement of the Ice Core Young Scientists (ICYS) group.

Oldest Ice Davos Workshop: Existing funds are being deployed to ensure that this workshop and the IPICS Steering Committee Meetings are hosted.

Percentage of the budget to be used for support of early career researchers

2018: 10%
 2019: 20%
 2020: 60%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: 10%
 2019: 15%
 2020: 20%



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Linkages

Direct support from outside organisations

PAGES supports the IPICS web site and in the past has provided limited support for IPICS meetings.

Outreach and Capacity Building

IPICS helped originate the Ice Core Young Scientists Network (ICYS) and the IPICS chairs provide input and guidance to ICYS when needed. Furthermore, an overall goal of IPICS is to develop international collaborations in ice core science. IPICS members organize the annual Ice Core Analysis and techniques (ICAT) PhD school (<http://www.pages-igbp.org/calendar/2017/127-pages/1689-ects-icat-copenhagen-17>), which is open to all young ice core scientists on a competitive basis.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Tas	van Ommen	Tas.van.Ommen@aad.gov.au	Ice core palaeoclimate; glaciology

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-chair	Hubertus	Fischer	University of Bern	Switzerland	Hubertus.Fischer@climate.unibe.ch	8/2017	4 yr
Co-chair	Tas	van Ommen	Australian Antarctic Division	Australia	Tas.van.Ommen@aad.gov.au	8/2017	4 yr

**Early Career Scientists*

Other members

The IPICS steering committee is comprised of 37 members, with full listing here: <http://pastglobalchanges.org/ini/end-aff/ipics/steering-committee>. The committee includes national representatives from 24 nations and experts representing specific scientific or technical topics.

Requests to the Secretariat

none



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 Person Responsible: S Colwell

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**Operational Meteorology in the Antarctic (OpMet)
 Expert Group**

Report Author(s)

Steve Colwell src@bas.ac.uk United Kingdom

Summary of activities and other important issues

The group continues to maintain webpages that are updated on a weekly basis with news, information and data monitoring at https://legacy.bas.ac.uk/met/jds/met/SCAR_oma.htm

With the SSG-PS we part funding the 12th Antarctic Meteorological and Climate Workshop (June 26-28, 2017) in Boulder Colorado

In conjunction with the World Meteorological Organisation (WMO) Antarctic Task Team (ATT) we have put together an information update paper that went to the Antarctic Treaty Consultative Meeting (ATCM) on the state of operational meteorology in Antarctica.

Recommendations

1. Encourage SCAR members to update meteorological station data for their stations in the WMO OSCAR/SURFACE system
<https://oscar.wmo.int/surface/index.html#/>
2. Encourage SCAR member to make meteorological data available to Steve Colwell src@bas.ac.uk for updating the SCAR READER database
<https://legacy.bas.ac.uk/met/READER/>

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	2170	2000	2000	2000



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 Person Responsible: S Colwell

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Progress and Plans

Sub-group Major Outcomes/Activities

With the PSG part funded the 12th Antarctic Meteorological and Climate Workshop (June 26-28, 2017) in Boulder Colorado, this include a meeting of the Year Of Polar Prediction (YOPP) southern hemisphere group see:

<https://www.mmm.ucar.edu/workshop-antarctic-meteorology-climateyopp-sh-meetingsorp-meeting>

Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
OpMet	2000 per year	2000	2170	0

Notable Papers

None

Forthcoming Activities

- Working with the Antarctic community to update the station details stored in WMO OSCAR/SURFACE <https://oscar.wmo.int/surface/index.html#/>
- Looking at the contributions that can be made to the Year Of Polar Prediction (YOPP) southern hemisphere <http://polarmet.osu.edu/YOPP-SH/>
- Investigation the possibility of setting up an Antarctic Polar Regional Climate Centre (PRCC) for the WMO see http://www.wmo.int/pages/prog/wcp/wcasp/RCC-Polar_Regions.html

Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2018	WAMC meeting and Davos OSC	2000	Steve Colwell	src@bas.ac.uk
2019	WAMC meeting	2000	Steve Colwell	src@bas.ac.uk
2020	WAMC meeting and Hobart OSC	2000	Steve Colwell	src@bas.ac.uk

Briefly describe funds will be usage and the desired results



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 Person Responsible: S Colwell

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T&S for people to attend the WAMC meeting who are early career scientists or are coming from countries that have a developing Antarctic programs, this allows them to present their work and also establish links with representatives from other national Antarctic operators. Also T&S for people to attend Davos OSC meeting in 2018.

Percentage of the budget to be used for support of early career researchers

2018: 50
 2019: 50
 2020: 50

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: 50
 2019: 50
 2020: 50

Linkages

Direct support from outside organisations

None

Major collaborations

Within SCAR

1. ANTOS

Outside SCAR

1. WMO EC-PHORS
https://www.wmo.int/pages/prog/www/polar/index_en.html
2. WMO GCW <http://globalcryospherewatch.org/>

Outreach and Capacity Building

Members of the group publishing scientific papers and carrying out outreach but not specifically as OpMet.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Steve	Colwell	src@bas.ac.uk	Operational meteorology and instrumentation
Jordan	Powers	powers@ucar.edu	Atmospheric modelling



SDM **17**
Agenda Item: 4.3.3
Person Responsible: S Colwell

**XXXV SCAR Delegates Meeting
Davos, Switzerland, 25-26 June 2018**

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chair	Steve	Colwell	BAS	UK	src@bas.ac.uk	2010	NA

Requests to the Secretariat

None



SDM 17
Agenda Item: 4.3.3
Person Responsible: A
Klekociuk and G
Milinevsky

XXXV SCAR Delegates Meeting
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Polar Atmospheric Chemistry at the Tropopause (PACT)

Report Authors

Dr Andrew Klekociuk (Australia) and Dr Gennadi Milinevsky (Ukraine)

Summary of activities and other important issues

Work continues on preparation of a manuscript for publication on outcomes of the PACT Action Group. One PhD student is engaged in this work.

Recommendations

None

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	0	0	0	1000



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Agenda Item: 4.3.3
Person Responsible: A
Klekociuk and G
Milinevsky

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Progress and Plans

Sub-group Major Outcomes/Activities

Further work on finalization of PACT database of ozonesonde information relevant to polar ozone stratosphere-troposphere exchange. This will provide information that can be used to evaluate atmospheric chemistry modelling.

Analysis of data by 2 PhD students. This work forms part of each student's dissertation.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
PACT	Database for atmospheric chemistry model evaluation
PACT	Training of 2 PhD students (Mogylchak and Greenslade)

Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
PACT	0	0	0	0

Notable Papers

1. Greenslade, J. W., Alexander, S. P., Schofield, R., Fisher, J. A., and Klekociuk, A. K.: Stratospheric ozone intrusion events and their impacts on tropospheric ozone in the Southern Hemisphere, *Atmos. Chem. Phys.*, 17, 10269-10290, <https://doi.org/10.5194/acp-17-10269-2017>, 2017. This work combines ozonesonde measurements from three sites between Australia and Antarctica with the GEOS-Chem model to evaluate the seasonality of stratosphere-to-troposphere transport events and quantify the amount of ozone transported across the tropopause. This work uses methods developed for the PACT project.

2. Grytsai, A., Klekociuk, A., Milinevsky, G., Evtushevsky, O., and Stone, K.: Evolution of the eastward shift in the quasi-stationary minimum of the Antarctic total ozone column, *Atmos. Chem. Phys.*, 17, 1741-1758, doi:10.5194/acp-17-1741-2017, 2017. In the paper the association between the longitudinal shift of the zonal ozone minimum and changes in meteorological fields in austral spring is analyzed. The results suggest that long-term shifts of the zonal ozone minimum are separately contributed by changes in ozone-depleting substances and greenhouse gases. Basing on results of the paper, the analysis of the corresponded tropopause changes using PACT data will be provided.



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 Person Responsible: A
 Klekociuk and G
 Milinevsky

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Forthcoming Activities

Publication of results, including comparison with climate models participating in the Chemistry-Climate Model Intercomparison (CCMI). This will benchmark the database and fully demonstrate its use. The sub-group will come to a close with the completion of this work.

Budget

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	Analysis, results presentation at SCAR Meeting	1000	A. Klekociuk, G. Milinevsky	Andrew.klekociuk@aad.gov.au
2019	Analysis	0	G. Milinevsky	genmilinevsky@gmail.com
2018	None expected	0		
Total		0		

Briefly describe funds usage and wthe desired results

Analysis activity is covered under other project work being conducted by Klekociuk. The requested fund 1000USD in 2020 asked for partial support of attendance of SCAR Meeting in 2020 to present results of analysis.

Percentage of the budget to be used for support of early career researchers

2018: 0
 2019: 0
 2020: 0

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: 0
 2019: 0
 2020: 100%

Linkages

Direct support from outside organisations

Australian Antarctic Division - \$5k for publication costs.



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 Person A
 Responsible: Klekociuk and G Milinevsky

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

Within SCAR

Looking forward to collaborate with ACCE group

Outside SCAR

None

Outreach and Capacity Building

1. Information is provided in a web page <http://www.scar.org/pact>
2. The project has provided training to two PhD students.

SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Andrew	Klekociuk	Andrew.klekociuk@aad.gov.au	Antarctic atmospheric physics
Gennadi	Milinevsky	genmilinevsky@gmail.com	Atmosphere, aerosol

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-chair	Andrew	Klekociuk	Australian Antarctic Division	Australia	Andrew.Klekociuk@aad.gov.au		2018
Co-chair	Gennadi	Milinevsky	Taras Shevchenko National University of Kyiv	Ukraine	genmilinevsky@gmail.com		2018
*Member	Vladislav	Mogylchak	Taras Shevchenko National University of Kyiv	Ukraine	mogylchak.vlad@gmail.com		2018

**Early Career Scientists*

Requests to the Secretariat

None



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 Agenda Item: 4.3.3
 Person M
 Responsible: Schneebeli

**XXXV SCAR Delegates Meeting
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Snow in Antarctica (SnowAnt)

Report Author

Martin Schneebeli, Switzerland

Summary of activities and other important issues

The main activity of SnowAnt was the co-organization of the Snow Science Winter Schools in 2016 (Preda-Davos, Switzerland), 2017 (Sodankylä, Finland), 2018 (Col du Lautaret, France). In each of these courses, 3-4 students were also involved in projects linked to snow in Antarctica.

Otherwise only informal contacts between interested scientists in snow questions were realized, but none of the concrete goals set in the activity plan.

Recommendations

The plans for 2019 and 2020 will be discussed at the POLAR2018 meeting. As there is no direct operational necessity of the group, and the numbers of members likely to remain small, a dissolution will be discussed. The evaluation of the Snow Science Winter School were always very positive, and showed the necessity to offer a course specialized on snow measuring techniques. However, I would like to suggest that this activity alone does not necessitate of an action group, but could be more efficiently planned directly within the PS group.

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	to be checked	4000	(3000)	(3000)



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 Person M
 Responsible: Schneebeli

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Progress and Plans

Sub-group Major Outcomes/Activities

The Snow Science Winter Schools were the most significant and relevant event. It brings together early-careers snow oriented students. It is usually the first time that they hear and get informed about SCAR and its relevance. From a scientific viewpoint, SSWS is building up a very well educated base of snow scientists, which will have a long-term positive impact on snow research in Antarctica.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
SnowAnt	Snow Science Winter Schools

Sub-group Cash Flow

Sub-group	Allocation	Amount spent		
		2016	2017	2018
SSWS 2016		4000		
SSWS 2017			tbd	
SSWS 2018				0

Notable Papers

none

Forthcoming Activities

The Snow Science Winter School will continue, and the co-organizer would like to continue to receive funding from SCAR. If the group will be ceased is decided at POLAR2018.

Budget

Planned use of funds for 2018 to 2020

Depends on business meeting decision at POLAR2018

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019	SSWS	4000	Martin Schneebeli	schneebeli@slf.ch
2020	SSWS	4000	Martin Schneebeli	schneebeli@slf.ch
2020	Workshop "snow in Antarctica"	1000	tbd	tbd
Total		8000		



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Person M
Responsible: Schneebeli

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Briefly describe what the funds will be used for and what the desired results are

Depends on business meeting decision at POLAR2018

If we continue with "business as usual", 90% of the funding will be used for the Snow Science Winter School. The support of SCAR will be proportional to the total cost of SSWS (approx. 40 k USD per school), about 10% of the students are doing research in Antarctica.

Percentage of the budget to be used for support of early career researchers

2018: 80%

2019: 80%

2020: 80%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2018: 10%

2019: 10%

2020: 10%

Linkages

Direct support from outside organisations IASC (8000 USD)

1. IACS (1000 USD)
2. EGU (13000 USD)
3. ESA (10000 USD)
4. FM (11000 USD)
5. WSL (11000 USD)

Major collaborations

Within SCAR

1. none

Outside SCAR

6. IASC
7. IACS
8. EGU
9. ESA
10. FMI
11. WSL

Outreach and Capacity Building

The SSWS is educating in a highly efficient way students on snow measurements techniques. This brings students to a common high-level standard concerning snow measuring techniques. About 25% of the students are from outside the traditional cryosphere research areas (biology, remote sensing, climate science).



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 Agenda Item: 4.3.3
 Person M
 Responsible: Schneebeli

**XXXV SCAR Delegates Meeting
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Membership

Leadership

Chair, Martin Schneebeli, WSL Institute for Snow and Avalanche Research, Switzerland, schneebeli@slf.ch 2014- 2018

Other members

Katherine	Leonard	École Polytechnique Fédérale de Lausanne	Switzerland	katherine.leonard@epfl.ch
Willem Jan	van de Berg	Institute for Marine and Atmospheric research Utrecht (IMAU)	The Netherlands	w.j.vandenberg@uu.nl
Ludovic	Brucker	NASA Goddard Space Flight Center	USA	ludovic.brucker@nasa.gov
Alexey	Ekaykin	Arctic and Antarctic Research Institute	Russia	ekaykin@aari.ru
Lora	Koenig,	National Snow and Ice Data Center (NSIDC)	USA	lkoenig@nsidc.org
Marcel	Nicolaus	Alfred-Wegener-Institut	Germany	marcel.nicolaus@awi.de

**Early Career Scientists*

Requests to the Secretariat

None



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Agenda Item: 4.3.3
Person Responsible: I Smith and R Farneti

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**Southern Ocean Region Panel
CLIVAR/CLiC/SCAR**

Report Authors

Inga Smith (New Zealand) and Riccardo Farneti (Italy)

Summary of activities and other important issues

The CLIVAR/CLiC/SCAR Southern Ocean Region Panel (SORP) has been very active during 2016-2017. SORP organized a panel meeting in September 2016 (SORP-11) alongside the CLIVAR Open Science Conference in Qingdao, China and another jointly with the Year of Polar Prediction Southern Hemisphere workshop in June 2017 (SORP-12) at the National Centre for Atmospheric Research (NCAR) in Boulder, Colorado, USA. Extensive participation in international research coordination and collaboration has occurred with several relevant programmes, including the Southern Ocean Observing System (SOOS), the Ocean Observations Panel for Climate (OOCIP) and the Year of Polar Prediction Southern Hemisphere (YOPP-SH). The panel has two new members (Robin Robertson and David Bromwich) and an ex-officio representative of SOOS (Matt Mazloff).

The SORP has proposed or helped organize sessions at several international conferences including the CLIVAR Open Science Conference and Polar 2018.

Recommendations

None.

Summary Budget 2017 to 2020

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
(US\$)	0 (2000 carried over to 2018)	4000 (2000 carried over from 2017)	2000	2000



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Agenda Item: 4.3.3
Person Responsible: I Smith and R Farneti

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Progress and Plans

Sub-group Major Outcomes/Activities

The CLIVAR/CliC/SCAR Southern Ocean Region Panel (SORP) has been very active during 2016-2017. SORP organized a panel meeting in September 2016 (SORP-11) alongside the CLIVAR Open Science Conference in Qingdao, China and another jointly with the Year of Polar Prediction Southern Hemisphere workshop in June 2017 (SORP-12) at the National Centre for Atmospheric Research (NCAR) in Boulder, Colorado, USA. Extensive participation in international research coordination and collaboration has occurred with several relevant programmes, including the Southern Ocean Observing System (SOOS), the Ocean Observations Panel for Climate (OOCIP) and the Year of Polar Prediction Southern Hemisphere (YOPP-SH). The panel has two new members (Robin Robertson and David Bromwich) and an ex-officio representative of SOOS (Matt Mazloff).

The SORP has proposed or helped organize sessions at several international conferences including the CLIVAR Open Science Conference and Polar 2018.

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
SORP	Support in establishing NORP to facilitate cross-polar linkages
SORP	Regular meetings, strengthening of SCAR collaborations
SORP	New members representing SOOS and YOPP-SH

Notable Papers - Not applicable

Forthcoming Activities

The thirteen meeting of the SORP (SORP-13) will be held 14-15 June 2018 in Davos, Switzerland in conjunction with the SCAR/IASC Open Science Conference (Polar 2018). Room bookings for SORP-13 are in place for 14-15 June with afternoon of Friday 15 June set aside for a joint meeting with NORP. Although this is outside the 18 months between meetings guidelines, SORP believes Polar 2018 is a unique opportunity for SORP to interact with the new NORP and to raise the profile of Southern Ocean oceanography in particular at the SCAR OSC aligned parts of Polar 2018.

During 2019, SORP members will attend OceanObs'19 in Hawaii, USA. A representation of SORP activities will be of particular importance in order to highlight international advances in the understanding of climate variability and change in the Southern Ocean, promote internationally-coordinated Southern Ocean research and the synergetic approach involving Southern Ocean observing and modelling communities including physical oceanography, cryosphere research, atmospheric science and biogeochemical oceanography.



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In 2020, the fourteen meeting of the SORP (SORP-14) will be held in conjunction either with the SCAR Delegates' Meeting and Open Science Conference in August 2020 or with the CLIVAR Open Science Conference 2020. As in the case of SORP-11, organized during the CLIVAR OSC in 2016, meeting during the SCAR OSC or the CLIVAR OSC will provide a unique opportunity for organizing sessions and stimulating discussions with other SCAR groups or CLIVAR panels and research foci.

Budget

Planned use of funds for 2018 to 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	SORP-14 (in conjunction with SCAR OSC or CLIVAR OSC)	2000	Lei Han	lei.han@clivar.org
2019	(will be carried over to SCAR-14 – see 2020)	2000	Lei Han	lei.han@clivar.org
2018	SORP-13 (a side meeting of POLAR2018)	4000	Lei Han	lei.han@clivar.org
Total		8000		

Briefly describe funds usage for and the desired results

2018 SORP-13: a side meeting of DAVOS POLAR2018. Funding from SCAR, CliC and CLIVAR is available for travel support for SORP members to attend SORP-13 on 14-15, June 2018 in Davos, Switzerland in conjunction with the SCAR/IASC Open Science Conference (Polar 2018). SORP believes Polar 2018 is a unique opportunity for SORP to interact with the new NORP and to raise the profile of Southern Ocean oceanography in particular at the SCAR OSC aligned parts of Polar 2018.

2020 SORP-14: in conjunction with SCAR OSC or CLIVAR OSC. Funding from SCAR, CliC and CLIVAR will be used for travel support for SORP members to attend SORP-14, organized in conjunction either with the SCAR Delegates' Meeting and OSC or with the CLIVAR OSC. Meeting during the SCAR OSC or the CLIVAR OSC will provide a unique opportunity for SORP members to interact, discuss and communicate scientific advances in the understanding of climate variability and change in the Southern Ocean with other SCAR groups or CLIVAR panels and research foci.

Percentage of the budget to be used for support of early career researchers

- 2018: 100% for supporting François Massonnet
- 2019: 50% for supporting a new SORP early career member
- 2020: 50% for supporting a new SORP early career member



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Person I Smith and
Responsible: R Farneti

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Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

- 2018: 100% for supporting François Massonnet (Belgium); any residual to support Karen Assmann (Sweden)
- 2019: 50% for supporting members such as Robin Robertson (Malaysia), Karen Assmann (Sweden)
- 2020: 50% for supporting Robin Robertson (Malaysia), Karen Assmann (Sweden)

Linkages

Direct support from outside organisations

1. CLIVAR: CHF 3000
2. CIiC: CHF 2500

Major collaborations

Within SCAR

1. SOOS: providing scientific and technical input into international Southern Ocean research coordination.
2. ASPeCt: supporting and exploring co-sponsorship of conference sessions for POLAR2018 and mutual reporting.

Outside SCAR

1. CLIVAR Ocean Model Development Panel (OMDP): through the SOMIP coordinated experiment, and joint sessions organized during the CLIVAR OSC 2016.
2. CLIVAR Climate Dynamics Panel (CDP): exploring future collaborations on activities related to polar climate variability and predictability.

Outreach and Capacity Building

SOOS-SORP connections have improved the outreach into the wider Southern Ocean science community, as have the co-sponsored town hall event at CLIVAR OSC in 2016 and discussions around co-sponsored Polar2018 sessions.

Early career scientists have been recruited for National Representative roles for Belgium, Germany, New Zealand, the UK. These roles are separate to full panel membership, and provide capacity building by involving more early career scientists in SORP activities than is possible with the strict 14 member panel membership. National reports were obtained from 10 countries for 2017, which allowed SORP to see opportunities for further cooperation in the Southern Ocean.



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 Person Responsible: I Smith and R Farneti

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SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Riccardo	Farneti	rfarneti@ictp.it	Ocean modeling; Southern Ocean response to climate change; tropical-extratropical teleconnections
Inga	Smith	inga.smith@otago.ac.nz	sea-ice observations; ice-ocean interactions; super-cooling and platelet ice; isotopes

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-Chair	Inga	Smith	U. Otago	New Zealand	inga.smith@otago.ac.nz	2015 (co-chair from 2016)	2020
Co-Chair	Riccardo	Farneti	ICTP	Italy	rfarneti@ictp.it	2016 (co-chair from 2018)	2021

**Early Career Scientists*

Other members

First Name	Last Name	Affiliation	County	Email
Patrick	Heimbach	U. Texas	USA	heimbach@ices.utexas.edu
Francois*	Massonnet	UCL	Belgium	francois.massonnet@uclouvain.be
Alexander	Klepikov	Arctic and Antarctic Research Institute	Russian Federation	klep@aari.ru
Robin	Robertson	Xiamen U.	Malaysia	robin.robertson@xmu.edu.my
David	Bromwich	Ohio State U.	USA	bromwich@polarmet1.mps.ohio-state.edu
Sandra	Barreira	NHS	Argentina	barreira.sandra@gmail.com
Elisabeth	Sikes	Rutgers U.	USA	sikes@marine.rutgers.edu
Karen	Assmann	U. Gothenburg	Sweden	karen.assmann@marine.gu.se
Isabelle	Ansorge	UCT	South Africa	isabelle.ansorge@uct.ac.za
Katsuro	Katsumata	JAMSTEC	Japan	k.katsumata@jamstec.go.jp
Joellen	Russell	U. Arizona	USA	jrussell@email.arizona.edu
Jiuxin	Shi	Ocean U.	China	shijiuxin@ouc.edu.cn
Matt	Mazloff	UCSD	USA	mmazloff@ucsd.edu

**Early Career Scientists*

Requests to the Secretariat

1. To update the SCAR webpage related to SORP (<https://www.scar.org/science/sorp/>), including updates on 'Contact' and



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- 'Membership' (see above lists), and adding the latest SORP Reports (<http://www.clivar.org/clivar-panels/southern/publications>).
2. We request to be notified about and where appropriate included in present outreach and capacity building activities related to Southern Ocean and polar activities by other SCAR groups. We also request guidance and cooperation on setting up new outreach, communication and capacity building activities, perhaps through attendance of SCAR's Executive Officer at SORP in-person or teleconference sessions.



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Agenda Item: 4.3.3
Person Responsible: J Simões

**XXXV SCAR Delegates Meeting
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Tropical Antarctic Teleconnections (TATE)

Report Author

Jefferson Simões (Brazil)

Summary of activities and other important issues

Unfortunately, nothing to report about TATE for 2017/2018, we will have a first meeting during the POLAR2018 in Davos. We had a very difficult financial year in Brazil, and it was impossible to obtain any extra funding for a TATE meeting. So, the idea is to have an administrative meeting (Sunday, 17 June, 08 to 10 am, C Büro 31) plus our session in the OSC Polar 2018 this year and try to organize a workshop next year. But for this we need to get someone to lead the group, a person that is really into the tropical to pole climatology studies. Not me, I got involved just pro tempore!