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SCAR SRP SCAR SRP AntClimNow  
Person Responsible: Person Responsible: Tom Bracegirdle

## XXXVII SCAR Delegates Meeting India, September 2022

# Near-term Prediction and Variability of the Antarctic Climate System (AntClimNow) 2020-22 Report

## Summary

The Antarctic climate system exhibits large variability on annual to multi-decadal timescales, which makes predicting near-term (1-30 years) conditions particularly challenging. The AntClimNow SRP is focussed on quantifying and understanding the recent, current and future near-term state of the Antarctic climate system and impacts and interactions across physical and biological components.



Over the first year and a half the main activities of AntClimNow have been establishing a diverse community of members, planning workshops (taking place mid-late 2022), and refining and implementing core ongoing products/activities. During the first year (2020) a key ECR activity was logo competition which generated a large number of applications and helped to foster early awareness of AntClimNow. To promote scientific discussion an online talk series was established and slowly expanded from an initial Steering Committee focus to become a more open community-wide initiative. A launch and planning event in June 2021 set the stage for a wide range of activities that are taking place in 2022. These include:

- Continuation of the AntClimNow science talk series.
- Two scientific workshops
- Support of an Antarctic-focussed session at an international conference
- An Antarctic data stewardship and development scheme.
- Formulation and initial drafting of core ongoing AntClimNow products/activities, for example the annual science update and Antarctic Climate Indicators.

Details of which are provided in this report.

Spending was low during 2021 both due to Covid-19 impacts and lead time for event planning. In 2022 this has balanced out with the majority of the 2021 and 2022 allocated budget gratefully used for the above-listed activities.

The AntClimNow Steering Committee would like to thank SCAR for the excellent support provided and the opportunity to develop and implement such an exciting international research programme.

## Report Author(s)

Tom Bracegirdle, British Antarctic Survey, UK;  
Ilana Wainer, University of São Paulo, Brazil.

## **Summary of activities from 2020-22**

As mentioned in the overall summary, after being approved at the start of 2021, there are a number of AntClimNow activities now in progress which are listed here in a little more detail:

1. Monthly science talks are a successful activity for engaging membership and the wider community. See attached schedule of speakers for the first two years.
2. This year (2022) AntClimNow is sponsoring two international workshops and co-sponsoring a session at a conference.
  - a. The AntClimNow-funded Firn Workshop is taking place currently (end of June 2022), see <https://www.colorado.edu/lab/icesheetclimate/firn-workshop>.
  - b. A workshop on improving the use of observational data in modelling of the Antarctic climate system will take place at BAS in September 2022.
  - c. AntClimNow are co-sponsoring a polar session at the atmospheric rivers conference in Chile in October 2022, see [https://cw3e.ucsd.edu/iarc2022\\_ars\\_and\\_polar\\_meteorology\\_and\\_climate/](https://cw3e.ucsd.edu/iarc2022_ars_and_polar_meteorology_and_climate/)
3. The membership is continuing to grow. There are approximately 80 members based in 21 different countries, illustrating the strong international dimension.
4. Three data stewardship and development grants have been awarded. The aim of this is to improve accessibility and coordination of climate related data.
5. Current initiatives in development include:
  - a. A project to compile a list of Antarctic Climate Indicators, to provide an easily-accessible snapshot of the current state of the Antarctic Climate System.
  - b. Develop an annual update of science relevant to AntClimNow. In this first year the initial aim is an internal document, but with scope to expand to a more widely-disseminated document accessible by a range of disciplines.

## **Key challenges**

The lack of in person meetings during the first year has made it challenging to initiate scientific collaborations. It is difficult to discuss ideas for papers and/or grants and to develop new links in an online-only situation. This is particularly challenging in a cross-SRP sense. However, the in-person workshops during 2022 will be a great help and a cross-SRP component to the INSTANT 2023 conference is being discussed.

## **Summary Budget 2021 to 2024**

	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
	Spent	Allocated	Request	Request
(US\$)	5k (awarded in 2021 although final spend will be in 2022)	51k	34k (4k carry over from 2022 for planned events in 2023)	30k
Total	\$5,000	\$51,000	\$34,000	\$30,000

## Progress and Plans

### Main Activities

#### 1. Kick-off and launch meeting, June 2021.

One of the first activities of AntClimNow was to organise and hold a kick off meeting that combined a focussed members' workshop and a wider community launch. The aims of these two components were to refine the aims of the planned science-related activities and expand awareness, and membership, across the Antarctic science community. Both aspects achieved their aims. Initiatives identified at the workshop include:

- An annual update of the science relevant to AntClimNow, accessible by non-specialists from a range of backgrounds.
- Expansion of monthly SSC talk series to the wider AntClimNow membership (with the recorded presentations publicly available online).
- The development of a product to provide a snapshot of the recent and current state of the Antarctic climate system, Antarctic Climate Indicators.
- The development and/or identification of outreach materials, such as infographics, to help communication with non-scientists.

Key outcomes from the community launch were:

- A significantly expanded membership, with ~120 registered attendees leading to an approximately 50% increase in core membership.
- Involvement of leading representatives from relevant groups, in particular SOOS, YOPP-SH, WCRP and other SCAR SRPs (Ant-ICON and INSTANT).

#### 2. Scientific Workshops

During 2022 two scientific workshops and one conference science session are being organised and supported by AntClimNow. These international workshops are central to the aims of facilitating scientific progress in AntClimNow. It is from these meetings that scientific papers will be generated, new ideas for research funding will be identified and collaborative networks will be established and/or developed. The three activities and their specific aims are as follows:

- a. The International Firn Workshop took place during May and June 2022, see <https://www.colorado.edu/lab/icesheetclimate/firn-workshop>. It brought together approximately 150 participants from across the world. The main aims of the meeting were to: (i) provide an accessible-for-all framework for presenting, sharing, and discussing new research on firn processes; (ii) discuss and synthesize the current state of knowledge and open questions regarding the general theme of firn on land ice; and (iii) enhance collaboration between data-focused (observational) and modeling-focused communities, and entrain expertise from neighbouring disciplines such as seasonal snow and ice sheet dynamics. Major outcomes were will be reported during summer 2022.
- b. A workshop on 'Connecting Models and Observations of the Antarctic Climate System Across Timescales' will be held at the British Antarctic Survey on 28<sup>th</sup>-30<sup>th</sup> September 2022. This workshop will provide an opportunity to share and discuss advances in the combined use of climate models, observations, and reconstructions across timescales from short-term extreme events to longer-term climatological means. In addition to the physical atmosphere-ocean-ice components of the Antarctic climate system, the scope will extend to considering climate interactions with biological systems. It is important to hold this workshop

now to help initiate an early dialogue in AntClimNow between scientists working on observations and those focussed on modelling and to make use of current developments in both areas.

- c. Moreover, AntClimNow is supporting keynote speaker and young scientist participation in a special session on the “Atmospheric rivers and Polar meteorology and climate” as part of the 4<sup>th</sup> International Conference on Atmospheric Rivers, to be held in Santiago, Chile, during 10-14 October 2022. The aim of this session is to bring together the AR and the Polar meteorology and climate communities for an exchange of recent research and ideas with a goal to improve our understanding of the poleward heat and moisture transport, polar amplification, and the role of atmospheric rivers, their interaction with the weather, climate and surface mass and energy balance in the Polar Regions. The session has received 27 abstracts, including at least 9 early-career researchers as first author presenters.

### **3. monthly meetings / talks**

One of the early activities of the AntClimNow Steering Committee (SC) was to run a series of monthly talks given by each SC member in turn. Although initially designed to help improve interactions and collaboration within the SC, it was decided these should be opened up to the wider SCAR community (indeed any scientists interested in attending). The speakers range from experienced senior scientists to ECR researchers. A relatively short format pitched at a general Antarctic science audience is encouraged to help facilitate broad discussions. A list of the talks given so far is attached to this report and many of the recordings of the talks can be viewed on the AntClimNow Youtube channel: <https://www.youtube.com/channel/UC6BpH646EHI-WbV62rzceWg>.

Going forward, it is intended that these talks will continue. A new committee position of talk organizer has been created. Nominations are being sought with the aim of providing an ECR some experience of being a member of the committee and hopefully new networking opportunities with leading Antarctic scientists.

## **Major Outcomes**

### **1. Improving access and coordination of observations of the Antarctic climate system**

The major activity in this regard is the AntClimNow Dataset Development and Stewardship Scheme. The aim of the scheme is to develop improved access and coordination of climate-related data for Antarctica that will ultimately help to improve knowledge of the trends and variability of the Antarctic climate system. A wide range of activities are considered for funding, for example:

- bringing together disparate Antarctic climate data records to a single repository / access point;
- developing and maintaining websites to provide improved access to existing datasets;
- maintaining and/or expanding an existing Antarctic climate dataset; or
- linking environmental and climate data records.

The scheme runs annually with up to \$5,000 USD available. In 2021 two awards of \$2,500 USD were made and in 2022 one award of \$5,000 USD was made. Six-

month interim reports of the 2021 recipients (awarded in November 2021) report good progress with AntClimNow funds being used to:

- help add new snow density data to a major international dataset, the Surface Mass Balance and Snow on Sea Ice Working Group (SUMup) dataset;
- develop a website (content, standardised processing methods, and coordination of collaborators) to provide functionality to international researchers planning to contribute to the NECKLACE basal melt dataset, which will be accessible via the SCAR/SCOR supported SOOSMAP project.

Looking ahead, it is anticipated that the AntClimNow workshop on connecting observational and model data and the Antarctic Climate Indicators project will both contribute to improving the use of and access to observations of the Antarctic climate system.

## **2. Building and supporting a diverse community of Antarctic scientists.**

The first milestone of the AntClimNow Science and Implementation Plan is:

“AntClimNow will bring together scientists from a range of backgrounds to develop a community focussed on near-term Antarctic climate prediction. The extensive and diverse PPG membership as a starting point in this. Success in this regard will be measured in terms of the numbers, diversity and level of participation of the AntClimNow membership.”

Good progress has been made in meeting this milestone. Since launching AntClimNow in 2021 a large community has been brought together. In terms of numbers:

- Approximately 150 mailing list members from 31 different countries.
- Approximately 80 full members from 21 different countries.
- An online platform for online collaboration between members using Slack.
- 136 participants at the June 2022 AntClimNow sponsored Firm Workshop.
- 60 following AntClimNow on Instagram and 76 following on Twitter.
- Regular diverse attendees at the monthly science talks.

## **3. Facilitating scientific collaborations**

Over the first one and a half years of AntClimNow many new scientific connections have been made. This large network of scientists working on related topics of near-term variability of the Antarctic climate system have provided a platform for sharing new science advances and identifying opportunities for working together. For example posting new science results/papers for discussion on the AntClimNow Slack workspace. Specific active support is provided by:

- ECR travel grants for attendance at the AntClimNow 2022 autumn workshop on connecting models and observations.
- Writing of the annual report on science advances.
- Collaboration in delivering the Antarctic Climate Indicators project.
- Cross-disciplinary involvement in AntClimNow activities and participation in discussion events including the SCAR Ant-ICON / SCATS mini-Symposium at SCAR 2022.

## Future Plans

Building on the progress so far, plans for the first four years (up to the start of 2025) are broadly to move beyond the initial phase of building a community and initiating projects to a phase including scientific progress and new collaborative initiatives (e.g. proposals, collaborations). The following activities are planned to make these next steps:

- 2024: AntClimNow workshop at SCAR 2024
- 2024: Data Stewardship and Development Scheme
- 2024: Publications and outreach from 2023 activities
- 2023: Antarctic climate system conference
- 2023: Data Stewardship and Development Scheme
- 2023: Publications and outreach from 2022 activities
- 2023: Data stewardship and development scheme (US\$)
- 2022: (October): Atmospheric rivers conference polar session
- 2022: (September) Model-observations workshop
- 2022: (June): Firn workshop (took place in June 2022).

## Budget

### Planned use of funds for 2022 to 2024

(Start with 2024 and work back to 2022 down the table)

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2024	AntClimNow workshop at SCAR 2024	20k	Tom Bracegirdle	tjbra@bas.ac.uk
2024	Dataset development and stewardship scheme (US\$)	5k	Tom Bracegirdle	tjbra@bas.ac.uk
2024	Publications and outreach	5k	Ilana Wainer	wainer@usp.br
2023	Antarctic climate system conference	20k	Ilana Wainer	wainer@usp.br
2023	Dataset development and stewardship scheme (US\$)	5k	Tom Bracegirdle	tjbra@bas.ac.uk
2023	Publications and outreach	5k	Tom Bracegirdle	tjbra@bas.ac.uk
2022	Dataset development and stewardship scheme	10k (including 5k carried over from 2021)	Tom Bracegirdle	tjbra@bas.ac.uk
2022	Firn workshop	11k	Jan Lenaerts	Jan.Lenaerts@colorado.edu
2022	Atmospheric rivers conference polar session	5k	Irina Gorodetskaya	irina.gorodetskaya@ua.pt

2022	Model-observations workshop	25k	Tom Bracegirdle	tjbra@bas.ac.uk
2022	ECR Travel grants to attend major conferences	5k	Tom Bracegirdle	tjbra@bas.ac.uk

### **Additional detail on funds usage and desired results/outcomes**

Details on outcomes and results of workshops and the Dataset Development and Stewardship Scheme are included above in the 'Main Activities' and 'Major Outcomes' sections.

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

**2022:** Approximately 50%, see below table (approximate numbers).

Item	ECR spend	Total spend
Model observations workshop	7.5k	25k
Firn workshop	7.5k	11k
Antarctic session at Atmospheric rivers conference	2.5k	5k
Dataset Development and Stewardship grants	5k	10k
ECR travel support	5k	5k

**2023:** We estimate approximately 50%, based on a similar profile of activities as for 2022.

**2024:** Approximately 50% as above.

### **Percentage of the budget to be used for support of researchers from countries with developing Antarctic programmes**

2022:

2023:

2024:

## Membership

### Leadership

Role	First Name	Last Name	Affiliation	Country	Primary Language	Email	Date Started
Theme 1	*Erik	Behrens		NZ		<a href="mailto:erik.behrens@niwa.co.nz">erik.behrens@niwa.co.nz</a>	2021
Joint Chief Officer and Theme 3	Tom	Bracegirdle		UK		<a href="mailto:tjbra@bas.ac.uk">tjbra@bas.ac.uk</a>	2021
Theme 5	Rachel	Cavanagh		UK		<a href="mailto:rcav@bas.ac.uk">rcav@bas.ac.uk</a>	2021
Theme 1	*Sheeba	Chenoli		Malaysia		<a href="mailto:sheeba@um.edu.my">sheeba@um.edu.my</a>	2021
Theme 2	Matt	England		Australia		<a href="mailto:m.england@unsw.edu.au">m.england@unsw.edu.au</a>	2021
Theme 1	Ryan	Fogt		USA		<a href="mailto:fogt@ohio.edu">fogt@ohio.edu</a>	2021
Theme 2	Irina	Gorodetskaya		Portugal		<a href="mailto:irina.gorodetskaya@ua.pt">irina.gorodetskaya@ua.pt</a>	2021
Theme 4	*Alia	Khan		USA		<a href="mailto:khana8@wwu.edu">khana8@wwu.edu</a>	2021
Theme 1	Seong-Joong	Kim		Republic of Korea		<a href="mailto:seongjkim@kopri.re.kr">seongjkim@kopri.re.kr</a>	2021
Theme 2	* <sup>1</sup> Jan	Lenaerts		USA		<a href="mailto:Jan.Lenaerts@colorado.edu">Jan.Lenaerts@colorado.edu</a>	2021
Theme 4	Shelley	MacDonell		Chile		<a href="mailto:shelley.macdonell@ceaza.cl">shelley.macdonell@ceaza.cl</a>	2021
Theme 2	Waliur	Rahaman		India		<a href="mailto:waliur1981@gmail.com">waliur1981@gmail.com</a>	2021
Theme 4	Craig	Stevens		NZ		<a href="mailto:Craig.Stevens@niwa.co.nz">Craig.Stevens@niwa.co.nz</a>	2021
Theme 5	Liz	Thomas		UK		<a href="mailto:lith@bas.ac.uk">lith@bas.ac.uk</a>	2021
Joint Chief Officer and Theme 4	Ilana	Wainer		Brazil		<a href="mailto:wainer@usp.br">wainer@usp.br</a>	2021
Theme 3	Zhaomin	Wang		China		<a href="mailto:zhaomin.wang@hhu.edu.cn">zhaomin.wang@hhu.edu.cn</a>	2021
	*Erik	Behrens		NZ		<a href="mailto:erik.behrens@niwa.co.nz">erik.behrens@niwa.co.nz</a>	2021

<sup>1</sup>Early-career researchers

<sup>1</sup>Jan Lenaerts is leaving in September 2022 due to a change in job.

### Other members

An up-to-date list of members is shown at <https://www.scar.org/science/antclimnow/members/>

## Additional information (optional)

### Notable Papers

As AntClimNow is still in early stages, papers are still being planned and/or prepared. Therefore plans for papers are noted here rather than final publications.

1. Bracegirdle et al. (2022). Quantifying the role of internal variability in near term Antarctic climate projections. In preparation

This work will present a broad overview of estimates of near-term Antarctic and Southern Ocean climate change incorporating information about internal variability. It will be developed in collaboration with AntClimNow colleagues.
2. The AntClimNow community (2022). Annual update of scientific progress relevant to estimating future near-term conditions in the Antarctic climate system. In preparation.

This work will present an annual review of the latest scientific findings relevant to the aims of AntClimNow. It is being written by members of the AntClimNow community.

### Direct support from outside organisations received for your activities

- The British Antarctic Survey and the Natural Environment Research Council are thanked for their part in providing support for hosting the September 2022 AntClimNow workshop at BAS in Cambridge.

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

#### Within SCAR

1. The SRPs Ant-ICON and INSTANT will be key focal points for collaboration within SCAR. Discussions are ongoing with both in terms of the use of near-term climate information in helping to achieve their scientific aims. Mutual cross-SRP attendance at future workshops and meetings will help to facilitate progress.
2. The Southern Ocean Observing System (SOOS). Discussions with SOOS will be included at future workshops to identify opportunities for working together. An example from the recent period is the AntClimNow Dataset Development and Stewardship Scheme, which has included a link to SOOSmap.
3. Sea ice is a major focus of research in research into near-term climate change. Therefore links with the Expert Group on Antarctic Sea-ice Processes and Climate (ASPeCt) will be maintained going forward. Chair of ASPeCt, Marilyn Raphael, is a member of AntClimNow.

#### Outside SCAR

- 1.

### **Outreach, communication and capacity building activities**

1. Online presentation coaching for ECRs as part of the 2022 Firn Workshop.
2. Promotional material for the 2022 Firn Workshop (stickers and re-usable bags).
3. Active Twitter account. See [twitter.com/antclimnow](https://twitter.com/antclimnow).
4. Active and popular Instagram account with 330 posts and 421 followers at time of writing. See <https://www.instagram.com/antclimnow/>.

### **Contributions to equality, diversity, and inclusion (EDI)**

*(Any specific actions the group has undertaken to advance EDI within the group and/or within SCAR)*

## **SCAR Fellowship Reviewers**

*(As part of SCAR's Capacity Building efforts, such as the Fellowships and Visiting Professor Awards, we are looking for people from all the SCAR groups including SRPs to form a 'review panel', so if applications in your field are submitted we have people to contact to help assess relevant applications. Please list one or more people (name and email address) from your SRP who would be willing to serve as reviewers for the next few years, along with 1-3 keywords on their principal expertise).*

First Name	Last Name	E-mail	Principal Expertise
Tom	Bracegirdle	tjbra@bas.ac.uk	Antarctic meteorology, climate dynamics and change