



SCAR SRP / PPG

AntClim21

Paper 3

Agenda item 4

Person
Responsible:

Tom
Bracegirdle

SCAR Executive Committee Meeting 2019

Plovdiv, Bulgaria, 29-31 July 2019

Antarctic Climate Change in the 21st Century (AntClim21) 2018-19 Report

Report Author(s)

Tom Bracegirdle (UK), Nancy Bertler (New Zealand), Alia Khan (USA), Gerhard Krinner (France), Paul Mayewski (USA), Marilyn Raphael (USA), Joellen Russell (USA).

Summary

This has been an active year for AntClim21 with a number of key activities. These have all helped to increase the visibility of AntClim21 and SCAR and provide opportunities for early career researchers.

- A key activity over the last year has been to write a paper based on discussions at the Past2Projections workshop at POLAR2018 in Davos (Bracegirdle et al., 2019). The paper is on the topic of using long-term observational and paleo-proxy reconstructions to improve model projections of Antarctic and Southern Ocean climate change. The paper represents a significant collaboration with the PAIS SRP and the PAGES CLIVASH2k project.
- The link to CLIVASH2k came from co-sponsoring of a joint workshop in September 2018 on 'Climate variability in Antarctica and the Southern Hemisphere over the past 2000 years' (Thomas, 2019, <https://doi.org/10.22498/pages.27.1.30>).
- Whilst following up on the Past2Projections workshop, significant effort has also been put towards preparations for a major workshop in late June 2019. The workshop is on CMIP6 21st century projections and predictions for Antarctica and the Southern Ocean. The CMIP6 dataset is the coordinated climate modelling effort that will feed into the IPCC Sixth Assessment Report (AR6). The aim of the workshop is to help ensure that the Antarctic and Southern Ocean climate science communities make a significant contribution to AR6.
- A fourth major activity this year has been a collaboration with one of the endorsed CMIP6 projects; the Ice Sheet Model Intercomparison Project (ISMIP6). The main contribution from AntClim21 has been to provide advice on the use of climate model projections in calculating future ice sheet change (our focus being the Antarctic component of ISMIP6). AntClim21 has participated in videoconferences and an ISMIP6 workshop at the AGU Fall Meeting and ISMIP6 representatives will also attend the June 2019 workshop.

SRP updates since 2018 Delegates Meeting

What has been achieved?

Date	Activity
September 2018	Joint CLIVASH2k, AntClim21 and PAIS workshop on Climate variability in Antarctica and the Southern Hemisphere over the past 2000 years.
Spring 2019	Recommendations included in ISMIP6 climate forcing data for ice sheet projections
June 2019	Paper published from Past2Projections workshop
Whole year	Support for early career researchers to attend the June 2019 workshop and also involvement in co-authoring the Past2Projections paper.
Spring 2019	Contribution to the annual Antarctic Climate Change and the Environment (ACCE) update

What lies ahead?

Date	Activity
26-28 June 2019	Workshop on CMIP6 analysis for IPCC AR6
August 2020	Final activities at Hobart 2020

SRP planned final products (including related to OSC2020)

Date	Output/product
Spring 2020	A peer review overview paper on 21 st century Antarctic climate change
August 2020	A workshop/event to showcase our main findings and products and explain them to the SCAR community
August 2020	A session on 21st century climate change from Earth System Models at the Open Science conference

Budget

Changes to planned use of funds for 2019 and 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019	Workshop on Antarctic climate projections for IPCC AR6	20,000 (planned)	Tom Bracegirdle	tjbra@bas.ac.uk
2019	SCAR EXCOM meeting	500	Tom Bracegirdle	tjbra@bas.ac.uk
2020	SCAR OSC events	21,500 (planned)	Tom Bracegirdle	tjbra@bas.ac.uk
Total		42,000		

Membership

No changes to the leadership with the Steering Committee remaining as follows:

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chief Officer	Tom	Bracegirdle	BAS	UK	tjbra@bas.ac.uk	From Oct-2016 (SC Theme Leader 2012-2016)	2020
Theme 1 leader	Paul	Mayewski	University of Maine	USA	Paul.Mayewski@maine.edu	2012	2020
Theme 2 leader	Nancy	Bertler	Victoria University of Wellington	New Zealand	Nancy.Bertler@vuw.ac.nz	From Oct-2016 (Chair 2012-2016)	2020
Theme 3 Leader	Joellen	Russell	University of Arizona	USA	jrussell@email.arizona.edu	2012	2020
SC member	Marilyn	Raphael	University of California	USA	Raphael@geog.ucla.edu	2017	2020
SC member	Gerhard	Krinner	CNRS	France	Gerhard.krinner@cns.fr	2017	2020
*Early-career/APECS Rep.	Alia	Khan	Western Washington University	USA	khana8@wwu.edu	2012	2020

Please identify early-career researchers with * in first column

See <https://www.scar.org/science/antclim21/contact/> for a full list of all AntClim21 members

SCAR Fellowship Reviewers

Please list any people (name and email address) volunteered by the 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
Nancy	Bertler	Nancy.Bertler@vuw.ac.nz	Paleoclimate Reconstructions
Tom	Bracegirdle	tjbra@bas.ac.uk	Polar meteorology and climatology

Significant Deviations from the Implementation Plan

None

Additional information (optional)

Outreach, communication and capacity-building activities

The upcoming June workshop on climate projections for Antarctica includes support for ECRs in a number of ways:

1. Travel support for 9 ECRs to attend
2. An ECR presentation prize sponsored by Nature
3. The Workshop will also be transmitted by video-conference to promote wider accessibility.

The maintenance of an active Twitter account (<https://twitter.com/antclim21>) has helped to promote AntClim21 activities. An increasing number of followers are an indication of its expanding reach beyond the standard mailing list.

Notable Papers

1. Bracegirdle, T.J.; Colleoni, F.; Abram, N.J.; Bertler, N.A.N.; Dixon, D.A.; England, M.; Favier, V.; Fogwill, C.J.; Fyfe, J.C.; Goodwin, I.; Goosse, H.; Hobbs, W.; Jones, J.M.; Keller, E.D.; Khan, A.L.; Phipps, S.J.; Raphael, M.N.; Russell, J.; Sime, L.; Thomas, E.R.; van den Broeke, M.R.; Wainer, I. Back to the Future: Using Long-Term Observational and Paleo-Proxy Reconstructions to Improve Model Projections of Antarctic Climate. *Geosciences* 2019, 9, 255. doi: 10.3390/geosciences9060255

This paper is a product of the 2018 AntClim21 Past2Projections workshop at POLAR2018. Almost all the authors were attendees at the workshop. It addresses AntClim21 Research Themes 2 (the paleo-data component of climate model evaluation) and 3 (Antarctic climate projections).

2. Li, Camille, Michel, Clio, Graff, Lise Seland, Bethke, Ingo, Zappa, Giuseppe, Bracegirdle, Thomas J., Fischer, Erich, Harvey, Ben J., Trond, Iversen, King, Martin P., Krishnan, Harinarayan, Lierhammer, Ludwig, Mitchell, Daniel, Scinocca, John, Shiogama, Hideo, Stone, Dáithí A., Wettstein, Justin J.. (2018) Midlatitude atmospheric circulation responses under 1.5 °C and 2.0 °C warming and implications for regional impacts. *Earth System Dynamics*, 9. 359-382. 10.5194/esd-2017-107

Although not directly related to AntClim21, this paper draws on AntClim21 research on Southern Ocean wind projections (Bracegirdle et al., 2018). It addresses Theme 3 on 21st century projections.

3. Hyder, Patrick, Edwards, John M., Allan, Richard P., Hewitt, Helene T., Bracegirdle, Thomas J., Gregory, Jonathan M., Wood, Richard A., Meijers, Andrew J.S., Mulcahy, Jane, Field, Paul, Furtado, Kalli, Bodas-Salcedo, Alejandro, Williams, Keith D., Copsey, Dan, Josey, Simon A., Liu, Chunlei, Roberts, Chris D., Sanchez, Claudio, Ridley, Jeff, Thorpe, Livia, Hardiman, Steven C., Mayar, Michael, Berry, David I., Belcher, Stephen E.. (2018) Critical Southern Ocean climate model biases traced to atmospheric model cloud errors. *Nature Communications*, 9. 10.1038/s41467-018-05634-2

This work was not initiated by AntClim21, but is highly relevant and the inclusion of Tom Bracegirdle as a co-author was due in part to the track record associated with AntClim21-related research. The study relates to both Theme 2 and Theme 3.

4. Screen, James A., Bracegirdle, Thomas J., Simmonds, I.. (2018) Polar climate change as manifest in atmospheric circulation. *Current Climate Change Reports*, 4. 383-395. 10.1007/s40641-018-0111-4

This paper reviews recent progress in understanding the causes of observed changes in polar tropospheric and stratospheric circulation, and in interpreting climate model projections of their future changes. Although not primarily an AntClim21 product, it is highly relevant to the research goals associated with Themes 2 and 3.

5. Biersma, Elisabeth M., Jackson, Jennifer A., Bracegirdle, Thomas J., Griffiths, Howard, Linse, Katrin, Convey, Peter. (2018) Low genetic variation between South American and Antarctic populations of the bank-forming moss *Chorisodontium aciphyllum* (Dicranaceae). *Polar Biology*, 41. 599-610. 10.1007/s00300-017-2221-1

This paper represents a collaboration between AntClim21 the Ant-ECO SRP to which it contributes. It relates most strongly to Theme 1 on Quantification of Antarctic climate variability.

Direct support from outside organisations received for your activities

1. Natural Environment Research Council (NERC) through venue support for BAS as the host venue of the June 2019 AntClim21 CMIP6 workshop.

2. Travel expenses for the attendance of Tom Bracegirdle at POLAR2018 were provided by NERC/BAS.

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

Within SCAR

1. Scientific Research Programmes PAIS, AntERA, AntEco
2. ASPeCt
3. ACCE
4. SCATS

Outside SCAR

1. IPCC: Gerhard Krinner (AntClim21 Steering Committee member) and Nick Golledge (AntClim21 member) will be a lead authors on AR6 and Rob DeConto (member) is a lead author on the 1.5C report.
2. The Ice Sheet Model Intercomparison Project (ISMIP6) through collaboration of selection of climate models for projections data.
3. The World Climate Research Programme (WCRP) Core Project Climate and the Cryosphere (CliC) through co-sponsoring of the June 2019 CMIP6 climate predictions/projections workshop.
4. PAGES, through collaboration with the CLIVASH2k group in organising a joint workshop in September 2019.

Updates for your group's SCAR web page

We have already been supplying updates during the year, so nothing additional is required here.

Other information for publicity purposes