



POLAR SCIENCE
FOR PLANET EARTH

AntarcticClimate²¹

Summary and current status

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Background

The overarching question of this proposal is: How will the Antarctic environment change over the 21st Century? This is a very important issue both within Antarctica and globally. Global impacts could occur through the effects of Antarctic climate change on sea level, global ocean circulation, ocean carbon uptake and ecosystems.

***AntarcticClimate*²¹** builds on AGCS, but with a tighter focus on new opportunities to improve future predictions.



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Current status

- A draft proposal has been produced following a meeting in July 2011 in Melbourne attended by 19 prominent scientists from a range of backgrounds.
- All required aspects of the proposal have been considered.
- Work to finalise the proposal will take place once key contributors have returned from the field.



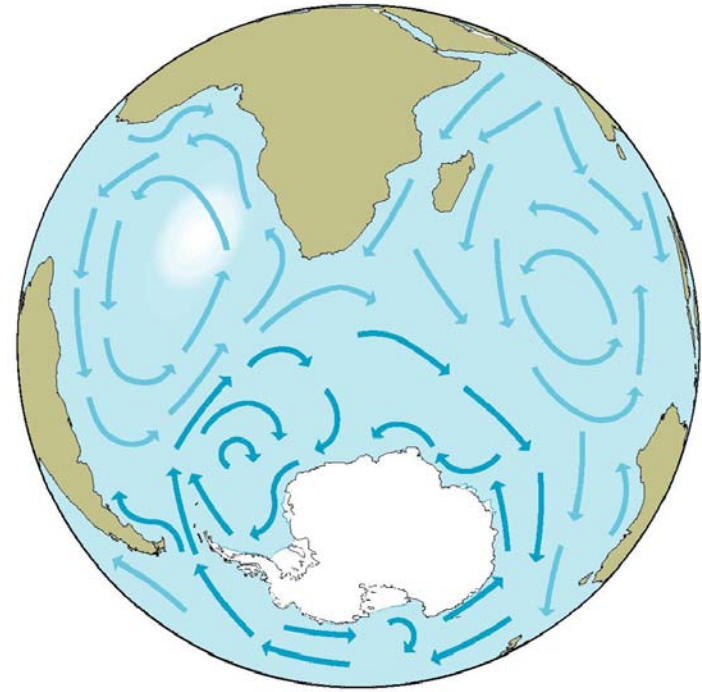
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Objectives

- Theme 1. Quantification of Antarctic climate variability.
- Theme 2. Climate model verification for the Antarctic region.
- Theme 3. Antarctic climate prediction to 2100.
- Theme 4. The impact of physical changes on the Antarctic environment and the biosphere.



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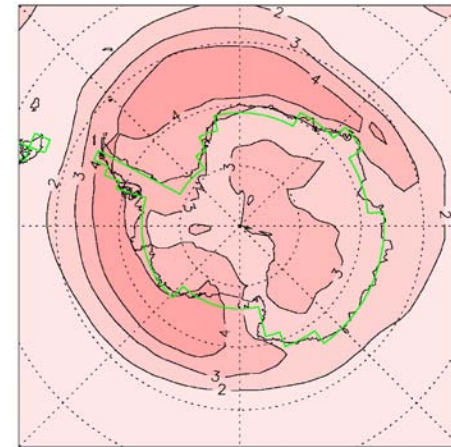
Rationale and justification

It is envisaged that this proposed programme will strengthen SCAR's position as the *leading* authority on Antarctic climate change its local and global impacts.

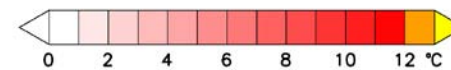
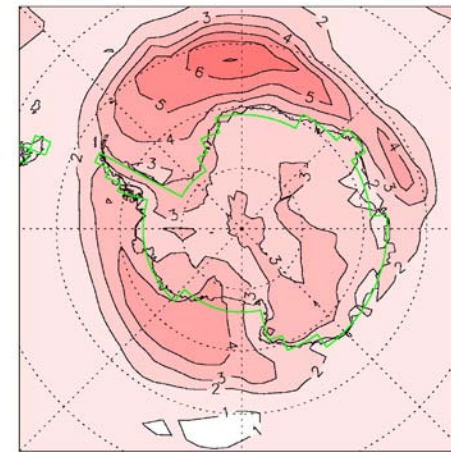
Antarctica does not have a high enough profile in IPCC and SCAR is well placed to provide the detailed assessment that is required by policymakers and the broader scientific community.



IPCC AR4 method



Recent method including model skill (same models as above)



Bracegirdle and Stephenson (2012 - in review)



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Now is a good time to launch *AntarcticClimate*²¹ since the climate model data have just been released in preparation for the upcoming IPCC AR5 report. In particular:

- There are exciting new opportunities provided by the inclusion of paleoclimate model runs in AR5.
- More realistic stratospheric ozone (ozone hole) in AR5 models.
- Climate change is becoming an ever more urgent issue as mitigation to reduce emissions of greenhouse gases appears to be having little impact.

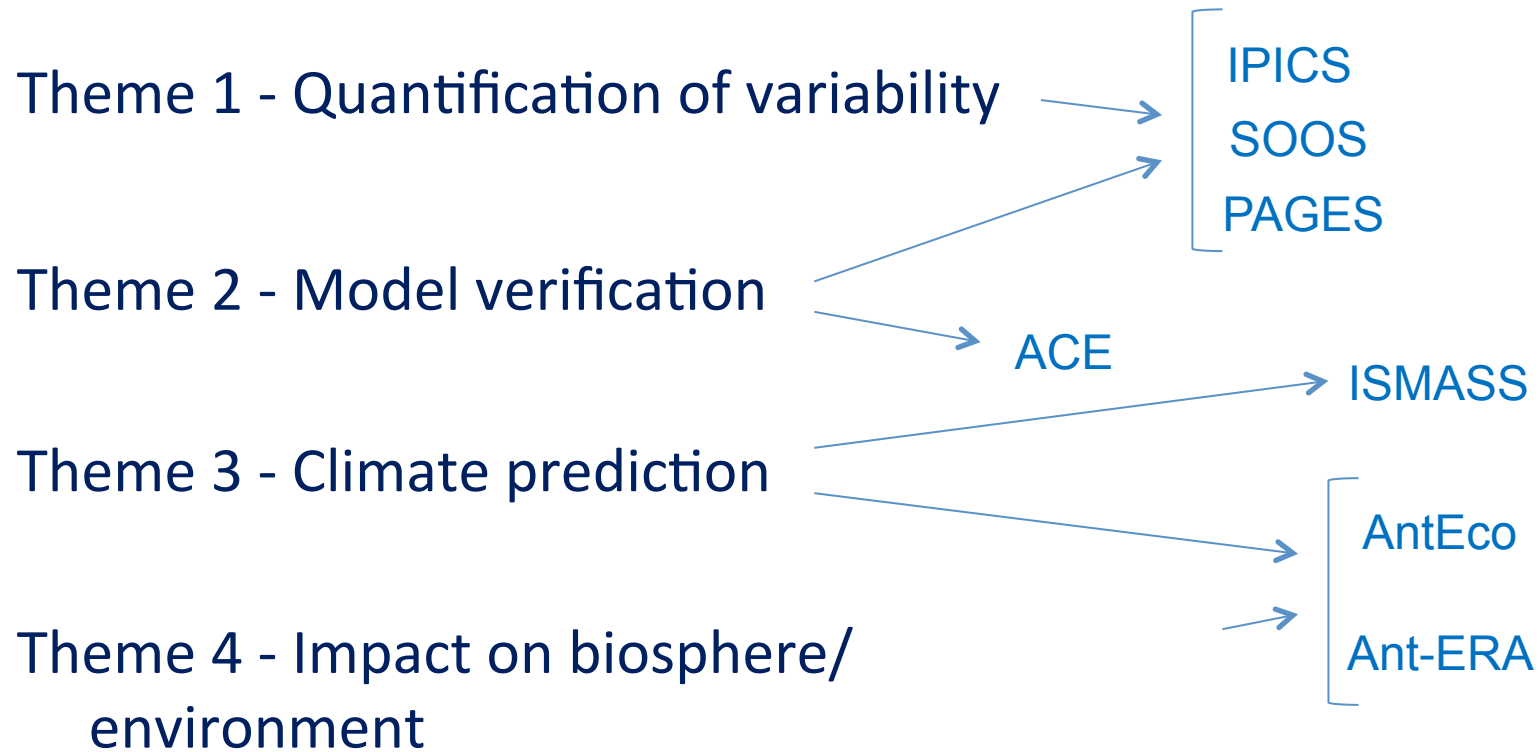


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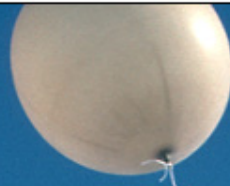
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Inter- and extra-programme Interactions



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Outputs

The fundamental outcome of *AntarcticClimate*²¹ will be improved predictions of the future role and response of Antarctica to global change. The findings will be communicated as follows:

- Scientific papers in peer-reviewed journals.
- Presentations at scientific conferences.
- Interim reports on each theme for the broader community.
- A final synthesis report for policymakers and the broader community.



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The role of SCAR

- There is a requirement across the SCAR community of quantitative data on how the Antarctic environment will evolve over the next century.
- The problem of producing reliable projections and assessments of environmental impacts requires coordination across a number of disciplines. The challenges are significant and require the support of a SCAR programme.
- The assessment of climate model skill from paleoclimate to present day climate requires the shared expertise of meteorologists, oceanographers and ice-core scientists. The impacts studies additionally require the involvement of ice sheet modellers and biologists.
- In addition to coordination across groups, there are significant scientific challenges that must be overcome and would benefit from focussed SCAR workshops:
 - Comparisons between climate models and ice core proxies
 - Downscaling of large-scale climate model data
 - Improve methods for bias correction in climate models.



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Milestones

2012

- Appoint **AntarcticClimate**²¹ Steering Committee
- Appoint Expert Advisory Panel relevant for the four reports
- Formalise the collaboration with ISMASS, SOOS, IPICS, PAGES, ACE, Ant-ERA, AntEco
- Source AR5 model output
- Acceptance of **AntarcticaClimate**²¹ as a SCAR programme in July 2012

2013

- Workshop 1 'Quantification of Antarctic climate variability'
- Workshop with AntEco/Ant-ERA – perhaps with SCAR-Bio Conf.
- Synthesis on existing climate model output for the Antarctic
- Conduct modelling studies in preparation of workshop

2014

- Publication of Quantification of Antarctic climate variability' Report.
- Workshop 2 Climate model verification for the Antarctic region'
- Conduct modelling studies as identified during workshop 2
- SCAR Open Science Conference – Session on 1) Antarctica 2100 AD

2015

- Publication of Climate model verification for the Antarctic region' Report.
- Workshop 3 Antarctic climate prediction to 2100 AD'

2016

- Publication of Antarctic climate prediction to 2100 AD Report.
- Workshop 4 The impact of physical changes on the Antarctic environment and the biosphere in conjunction with workshop with AntEco/Ant-ERA
- SCAR Open Science Conference

2017

- Publication of The impact of physical changes on the Antarctic environment and the biosphere Report.
- Bi-annual workshop with AntEco/Ant-ERA

2018 -

- Publication of **AntarcticClimate**²¹ Report.
- Succession planning – what are the next urgent, important science questions?



Management and governance



- Steering Committee Chair (1), who oversees overall progress
- Lead Authors (4), who take responsibility each for one of the four Science Reports
- Secretary (1), organisation of the four workshops and assists with editing the reports
- APECS Representative (1), provide the linkage and access to the next generation of Antarctic researchers.
- Expert Advisors (8; 2 for each report), assist the Lead Authors to identify key contributors and leading scientists essential to the research question, will assist in liaising with collaborating SCAR programmes and initiatives (Ant-ERA, AntEco, ACE, ISMASS, ITASE, SOOS, IPICS). We propose that the expert advisors are active contributors to the programmes listed above.
- All newly collected data and newly synthesised existing data sets will be made available through the READER data bases and the Antarctic Master Directory



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Education and Outreach

- Workshop: “Antarctic Change – Results relevant to adaptation and mitigation responses”. Planned as a two-day workshop focused on briefing policymakers on conclusions of the ***AntarcticClimate*²¹** report.
- Linkages with APECS to involve next generation of polar scientists
- ***AntarcticClimate*²¹** Webpage. To include updates on research, reports and a comparison of predicted versus observed climate changes. Also disseminate data to scientific community and for public use.



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