

Leadership and Revised Structure of the SCAR INSTANT (Instabilities and Thresholds in Antarctica) Programme

Introduction & Background

INSTANT is a new SCAR strategic research programme (SRP) that addresses - *the question of Antarctica's uncertain contribution to sea-level change*. It utilises a multidisciplinary Earth systems approach combining geoscience, physical sciences, biological and social sciences to improve understanding of the interactions between the ocean, atmosphere, solid Earth and the Antarctic Ice Sheet (AIS) and aims at ensuring effective communication on this topic with stakeholders.

The goal of INSTANT

“Quantify the Antarctic ice sheet contribution to past and future global & regional sea-level change, from improved understanding of atmosphere, ocean and solid Earth interactions and feedbacks with the ice sheet, so that key stakeholders can better anticipate and assess the risk in order to manage and adapt to sea-level change and evaluate mitigation pathways”.

To achieve this, INSTANT and its partners (e.g. WCRP) will focus on the poorly understood processes and feedbacks that influenced ice-sheets in the past, are influencing observed ice sheet changes, and will influence Antarctica's contribution to future global sea-level change. The key outcomes will be reconstructions of past and projections of future ice mass changes, with reduced uncertainties due to an improved knowledge of rate-determining instabilities and irreversible thresholds, which will be shared with various stakeholder groups. The ice sheet projections will be integrated into probabilistic sea-level projection frameworks for Intergovernmental Panel on Climate Change (IPCC) representative concentration pathways (RCPs) and shared socioeconomic pathways (SSPs)

INSTANT will foster the implementation of research in each Theme (see below) using a proven integrated data-model approach that involves:

1. Recent observations and paleo-reconstructions of the ice-atmosphere-ocean-Earth system, identifying forcings, feedbacks, and rates of change.
2. Process understanding at all time scales.
3. Modelling at all time scales (reconstructions and projections).
4. Engagement with representative stakeholders throughout the SRP.

Key contributions of INSTANT are at the interface of science and policy, and will involve engagement between earth system scientists, social scientists, practitioners, decision-makers, planners and publics. Stakeholder engagement and science communication will play an important role in this SRP. INSTANT will provide scientific evidence to assess the effectiveness of, and risks associated with, climate change mitigation pathways (e.g., UNFCCC¹ Paris Agreement). This evidence will also guide adaptation approaches required to

¹ UNFCCC = United Nations Framework Convention on Climate Change

avoid the worst impacts, such as coastal flooding and erosion, groundwater inundation and salination, habitat loss and large-scale human migration. The impacts of sea-level and ice sheet change around Antarctica are also of critical interest to CCAMLR², COMNAP³ and Antarctic Treaty System parties, as they will have profound implications for key Antarctic stakeholder groups including national programme operations, tourism and fisheries.

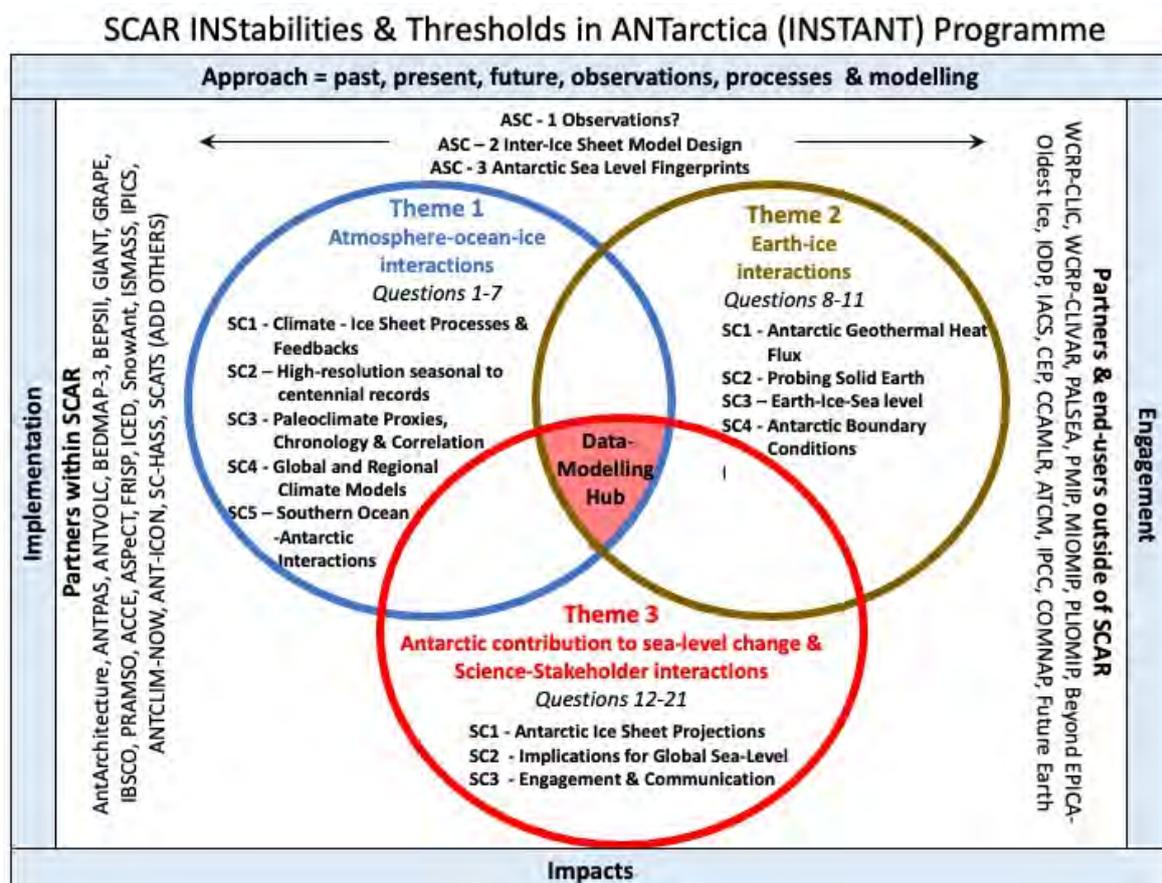


Figure 1: INSTANT approach and structure. Themes includes some sub-committees (SC) and Across-theme sub-committees (ASC).

Themes

The revised programme structure includes 3 Themes (Fig. 1):

1. **Theme 1: Atmosphere-Ocean-Ice Interactions:** Improved understanding of atmospheric and ocean forcing processes on ice sheet dynamics.
2. **Theme 2: Earth-Ice Interactions:** Improved understanding of solid Earth processes and feedbacks on ice sheet dynamics and regional to global non uniform sea-level variations.
3. **Theme 3: Antarctica's Contribution to Global Sea-Level - Science-Stakeholder Interactions:** Here the aim is to integrate the science outputs of Themes 1-2 and improve our ability to reconstruct and predict the Antarctic ice sheet contribution to sea-level change and reduce uncertainties. We will provide greater understanding

² CCAMLR = Commission for the Conservation of Antarctic Marine Living Resource

³ COMNAP = Council of Managers of National Antarctic Programs

to policy-makers, practitioners/operators, and publics of the importance of improved projections of the Antarctic contribution to global sea-level change, as well as their impacts, risks and implications.

Themes are as large as previous SRPs (e.g. PAIS or SERCE). They are sub-programmes where integrated data-model systems science approach is used to address priority questions outlined in the INSTANT science and implementation plan (SIP) (*Questions 1-21*).

Role of Theme leaders:

- Theme leaders are listed in Table 1.
- They should develop a high-level work plan based on the INSTANT SIP.
- Theme Leaders ensure that progress is being made towards addressing the strategic priority questions, identify gaps and opportunities for collaboration, funding, capacity development and engagement, propose workshops and products (e.g. thematic publications).
- Theme Leaders will have representation on the Steering Committee and will help in annual reporting to SCAR EXCOM.
- Balancing diversity for genders, nationalities and career stage within the leaderships is a strong focus of INSTANT. The Steering committee will seek to build capacity in leadership over the course of the SRP to achieve balance in gender, nationality and career stage within the leadership of INSTANT.
- Rotation of the leadership needs to be considered at least once in the duration of the programme and can also be suggested by the Steering Committee.

Subcommittees (Within Themes) (SCs)

Subcommittees within themes focus on key research tools/capabilities and/or problems needed to address the theme questions. Theme leaders can also be subcommittee leaders. Balancing diversity for genders, nationalities and career stage within the leaderships is strongly encouraged. INSTANT Steering committee may help identify sub-committee co-leaders to preserve gender, nationality and career stage balance within the leadership of the SCs. Rotations of the leadership needs to be considered by the SCs leadership team at least once in the entire duration of the programme and may also be guided by the Steering Committee. The aim is help develop tomorrows leaders.

Role of Theme leaders:

- Initial leaders of subcommittees are listed in Table 1.
- Subcommittees are where the research community engage to facilitate the work plan.
- Subcommittees need to identify their team and develop a science and implementation plan that addresses.
 - The key questions and rationale
 - Potential partners and collaborators (within and outside of SCAR).

- How the work will be implemented (meetings, research consortia, workshops etc.)
 - Products
 - Impacts
 - Engagement and communication
 - Capacity development.
- The first step for INSTANT is to get the Subcommittees up and running.

Across Theme Subcommittees (ASCs)

Across Theme Subcommittees have been developed to ensure interaction and collaboration between the Themes and focus on shared research capability required by all themes. The ASCs are key to ensuring that data, observations and modelling communities are operating and interacting effectively to achieve the goals of INSTANT. Across Theme Subcommittees and Promoters or Leaders are listed in Table 1. These Subcommittees may work with existing projects/programmes/communities to ensure INSTANT is utilising the best observations and models to address its questions and goals.

Data-Modelling Integration Hub

The Data-Modelling Integration Hub is hosted by Theme 3 and the Inter-ice sheet model design across theme subcommittee, but will be contributed to by all Themes. It is virtual and will take the form of workshops that bring together key groups and scientists from all Themes to provide a data-modeling vision of Antarctic's ice sheet evolution capable of reducing the uncertainties in past and future projections of AIS mass loss. The Data-Modelling Integration Hub will be a place where collaboration and coordination between INSTANT and its partners will occur (e.g. ISMASS and ISMIP).

Steering Committee

Membership of the Steering Committee is listed in Table 1 (below). The Steering Committee will meet once a year in person and 2 times per year online. The Steering Committee has oversight of the INSTANT Programme and Budget, and will approve all activities and requests for funding. It will also organise and annual reports to SCAR Executive Committee. Rotation of the members of the Steering Committee may be considered at least once in the entire duration of the programme, including INSTANT co-chiefs.

Budget and Leveraging

The budget (\$50K annually) will be held centrally and managed by the Steering Committee. All subcommittees will provide updated annual workplans to their Theme leaders with indicative budgets/costs for planned activities. Applications will be made by Theme leaders to the SC for budgeted line items as required.

SCAR INSTANT provides a powerful brand and funding for its activities should leverage other sources, sponsors and organisations. Previous SCAR SRPs have been very successful in

leveraging significant funds for workshops, meeting, publications, summer schools and engagement. Preference will be given to using INSTANT funds for those activities that leverage significant co-funding and promote inter-communities and disciplinary discussions.

Table 1. SCAR INSTANT Leadership

Chief Officers				
Naish	Tim	New Zealand		Tim.naish@vuw.ac.nz
Colleoni	Florence	Italy		fcolleoni@inogs.it

Steering Committee				
Goelzer	Heiko	Norway	ISMASS/ISMIP	heig@norceresearch.no
Alessio	Rovere	Germany	PALSEA	arovere@marum.de
Abe-Ouchi	Ayako	Japan	PMIP	abeouchi@aori.u-tokyo.ac.jp
Van de Wal	Roderik	Netherlands	WCRP/CLIVAR	r.s.w.vandewal@uu.nl
Seroussi	Helene	USA	WCRP/CLIC	helene.seroussi@jpl.nasa.gov
Morlighem	Mathieu	USA	ISMIP	mathieu.morlighem@uci.edu
Bracegirdle	Thomas	UK	ANTCLIM-Now	tjbra@bas.ac.uk
Santos	Mecha	Chile	ANT- Icon	msantos@apn.gob.ar
Vaughan	David	UK	ThwaitesNSF_NERC	dgv@bas.ac.uk
Perez	Lara	Denmark	APECS	larrez@bas.ac.uk
Escutia	Carlota	Spain	PRAMSO	cescutia@ugr.es
Liggett	Daniela	New Zealand	SC-HASS	daniela.liggett@canterbury.ac.nz

Theme 1 Atmosphere-ocean-ice interactions - Leaders				
Goodwin	Ian	Australia		ian.goodwin@mq.edu.au
Thomas*	Liz	UK		lith@bas.ac.uk
Golledge	Nick	New Zealand		Nicholas.golledge@vuw.ac.nz
Silvano#	Alessandro	UK		a.silvano@soton.ac.uk
Theme 2 Solid Earth-Ice interactions - Leaders				
Lloyd	Andrew	USA		andrewl@ldeo.columbia.edu
Simms#	Alex	USA		asimms@geol.ucsb.edu
Stocchi*	Paolo	Netherlands		Paolo.Stocchi@nioz.nl
Theme 3 Projections & Implications - Leaders				
Levy*	Richard	New Zealand		r.levy@gns.cri.nz
Kopp	Bob	USA		robert.kopp@rutgers.edu
Nowicki#	Sophie	USA		sophien@buffalo.edu
DeConto	Rob	USA		deconto@geo.umass.edu
Priestley	Rebecca	New Zealand		Rebecca.priestley@vuw.ac.nz

*Represent Theme on SC, #Alternate representative on SC

ASC - 1 Earth Observations				
Howarth	Martin	Germany		martin.horwath@tu-dresden.de
ASC – 2 Inter-Ice Sheet Model Design - Leaders				
Ritz	Catherine	France		catherine.ritz@univ-grenoble-alpes.fr
Goelzer	Heiko	Norway		heig@norceresearch.no
ASC - 3 – Antarctic Sea Level Fingerprint - Leaders				
Rovere	Alessio	Germany		arovere@marum.de
Barlow	Tasha	UK		N.L.M.Barlow@leeds.ac.uk

Theme 1 – SC1 – Climate-Ice Sheet Processes and Feedbacks – Leaders				
Silvano	Alessandro	UK		a.silvano@soton.ac.uk
?				
Theme 1 – SC2 – High-Resolution Seasonal to Decadal Records				
Thomas	Liz	UK		lith@bas.ac.uk
Goosse	Hugues?	Belgium		
Vance	Tessa	Australia		Tessa.Vance@utas.edu.au
Theme 1 – SC3 – Paleoclimate Proxies, Chronology, Cyclostratigraphy & Correlation - Leaders				
DeSantis	Laura	Italy		ldesantis@inogs.it
Grant	Georgia	New Zealand		g.grant@gns.cri.nz
Theme 1 – SC4 – Global & Regional Paleoclimate Models – Leaders				
Abe-Ouchi	Ayako	Japan		abeouchi@aori.u-tokyo.ac.jp
Colleoni	Florence	Italy		fcolleoni@inogs.it
Theme 1 – SC5 – Southern Ocean Antarctic Interactions - Leaders				
Weber	Mike	Germany		mike.weber@uni-bonn.de
Lamy	Frank	Germany		frank.lamy@awi.de

Theme 2 – SC1 – Antarctic Geothermal Heat Flux - Leaders				
Staal	Tobias	Australia		tobias.staal@utas.edu.au
?				
Theme 2 – SC2 – Probing Solid Earth and its Implications – Leaders				
Schienert	Mirko	Germany		mirko.scheinert@tu-dresden.de
Kenichi	Matsuoka	Norway		kenichi.matsuoka@npolar.no
Theme 2 – SC3 – GIA & Near-Field Sea-Level - Leaders				
Klemann	Volker	Germany		volkerk@gfz-potsdam.de
Caron	Lamber	USA		lambert.caron@jpl.nasa.gov;
Maryam	Yousefi	Canada		maryam.yousefi@mcgill.ca
Theme 2 – SC4 – Antarctic Geological Boundary Conditions - Leaders				
Jamieson	Stewart	UK		stewart.jamieson@durham.ac.uk

Theme 3 – SC1 – Modelling Integration Hub - Leaders				
Golledge	Nick	New Zealand		Nicholas.golledge@vuw.ac.nz
Stocchi	Paolo	Netherlands		Paolo.Stocchi@nioz.nl
Ritz	Cat	France		catherine.ritz@univ-grenoble-alpes.fr
Theme 3 – SC2 – Antarctic Ice Sheet Projections - Leaders				
Norwicki	Sophie	USA		sophie.nowicki@nasa.gov
DeConto	Rob	USA		deconto@geo.umass.edu
Theme 3 – SC3 – Implications for Global Sea-Level - Leaders				
Levy	Richard	NZ		r.levy@gns.cri.nz
Van de wal	Roderick	Netherlands		r.s.w.vandewal@uu.nl
Kopp	Bob	USA		robert.kopp@rutgers.edu
Theme 3 – SC4 – Engagement & Communication - Leaders				
Priestley	Rebecca	NZ		Rebecca.priestley@vuw.ac.nz
?				