International Science & Infrastructure for Synchronous Observation (Antarctica InSync)

Update IP91

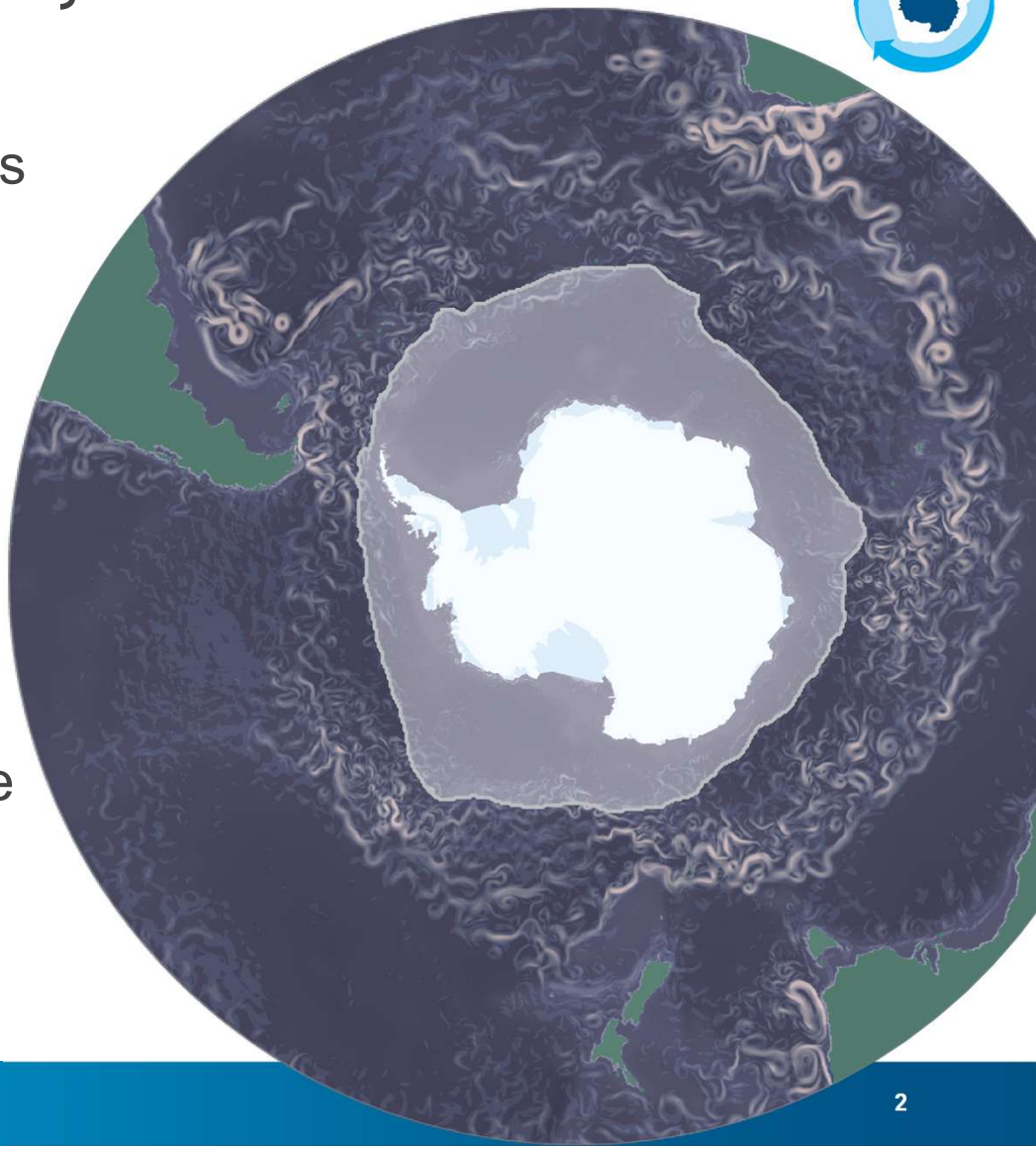
Antje Boetius
Alfred Wegener Institute Helmholtz Center for Polar and Marine research

ATCM 23 May 2024

ANTARCTICA INSYNC

A vision for a mission: PanAntarctic Synchronous Science

- Southern Ocean and Antarctica heat, freshwater, carbon and other element budgets and their response to climate change
- Rapid sea ice decline and its causes and consequences
- Melting ice shelves and ice sheets and their connections to coastal ocean and continental margin zones
- Improving knowledge and protection of the unique Antarctic life from land and ice into the deep-sea
- Detecting and abating anthropogenic footprints in atmosphere, ice, ocean and land



ATCM 2023: Proposing UN Decade Program Antarctica InSync (preparation 2024-2026; field phase 2027-30)

- Method: Coordinated, synchronous observations
  Support: ATCM & COMNAP
- 2024-2026 Preparation phase
- 2027-2030 Field and analysis phase

- Establishment of coordination office at AWI
  International cooperation unit
- E-Mail info@antarctica-insync.org
- Representation at ocean and polar conferences

- Next steps
- Website
- Scientific working groups for the elaboration of the program

Scientific Committee on Antarctic Research

SOOS
SOUTHERN OCEAN OBSERVING SYSTEM

One Planet-Polar Summit: Paris Forum for Peace - November 8-10

Participants:

Broad spectrum of stakeholders (scientific experts, indigenous peoples, NGOs, local communities, researchers, decision-makers and world leaders)

UNESCO general secretary

Audrey Azoulay announced AntarcticaInsync as key contribution to the Decade

Handover of the declaration to 30 heads of state

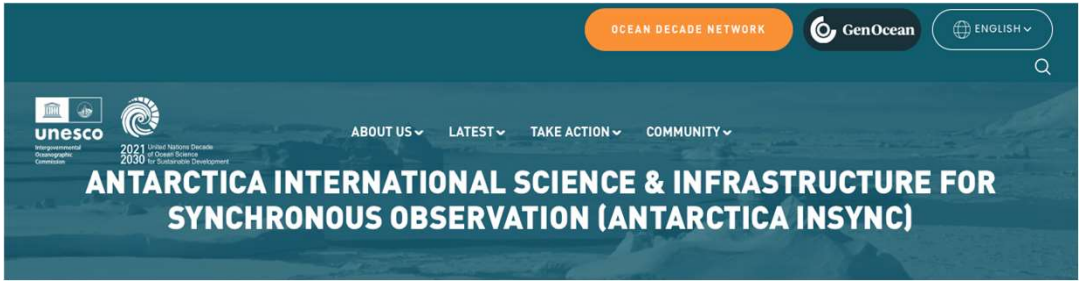
https://oneplanetsummit.fr/en/events-16/one-planet-polar-summit-284

Decade Action page - Ocean Decade Network

SCAR Decade Collaborative Center

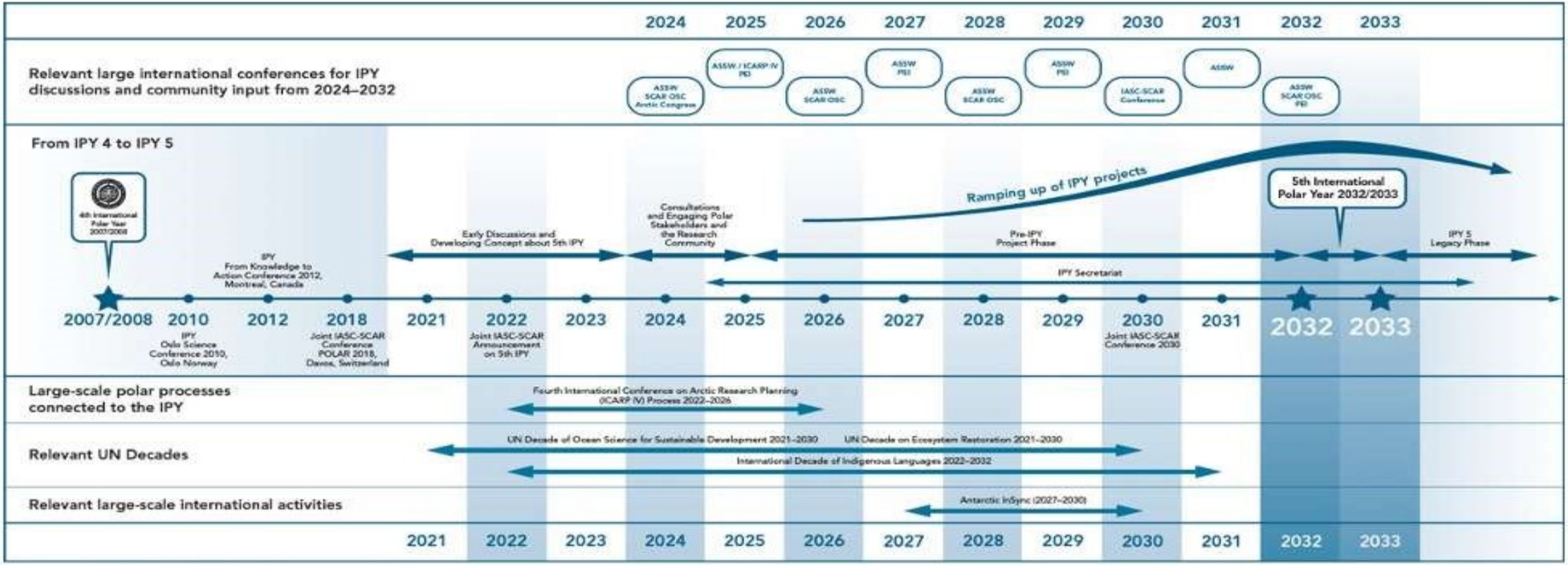
November 2023 –
Endorsement of Decade Action

December 2023 –
Decade Action page:
https://oceandecade.org/actions/antarctica-insync/



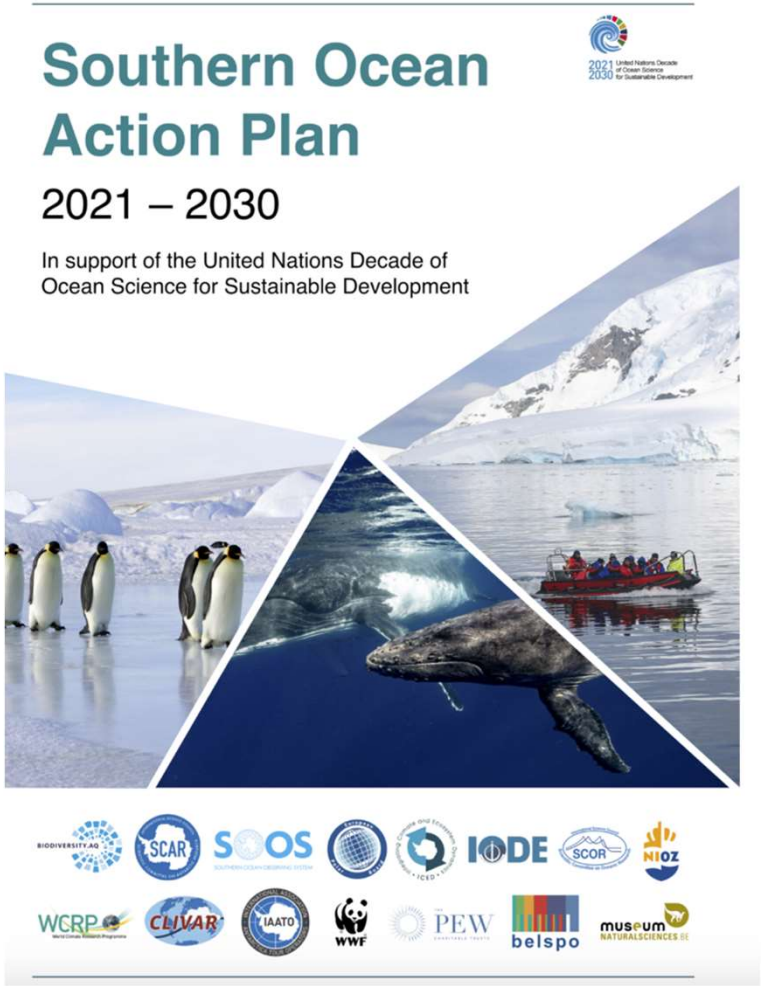
April 2024 UN Ocean Decade Conference

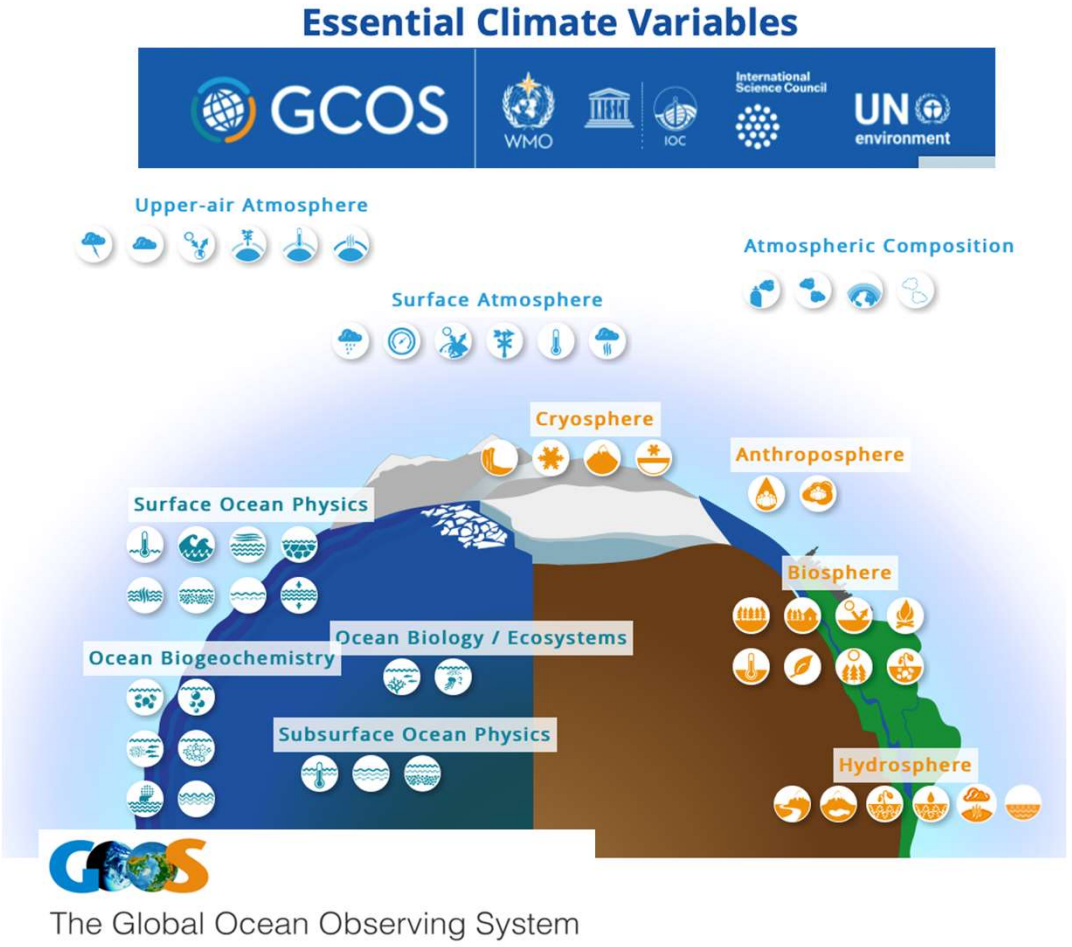
5th International Polar Year 2032-33




ANTARCTICA
INSYNC
International Partnership

Combining international activities – “better together”



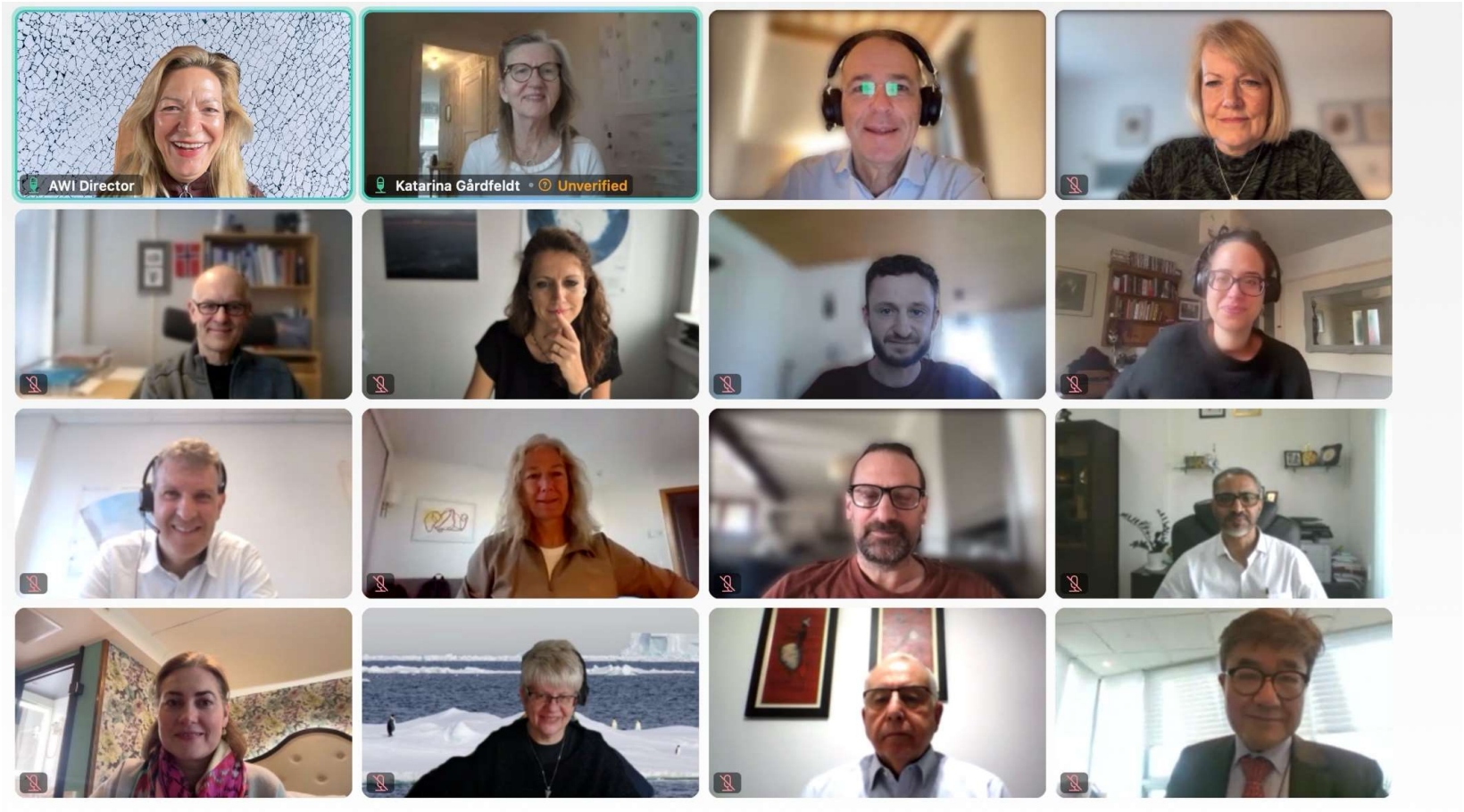


Partners

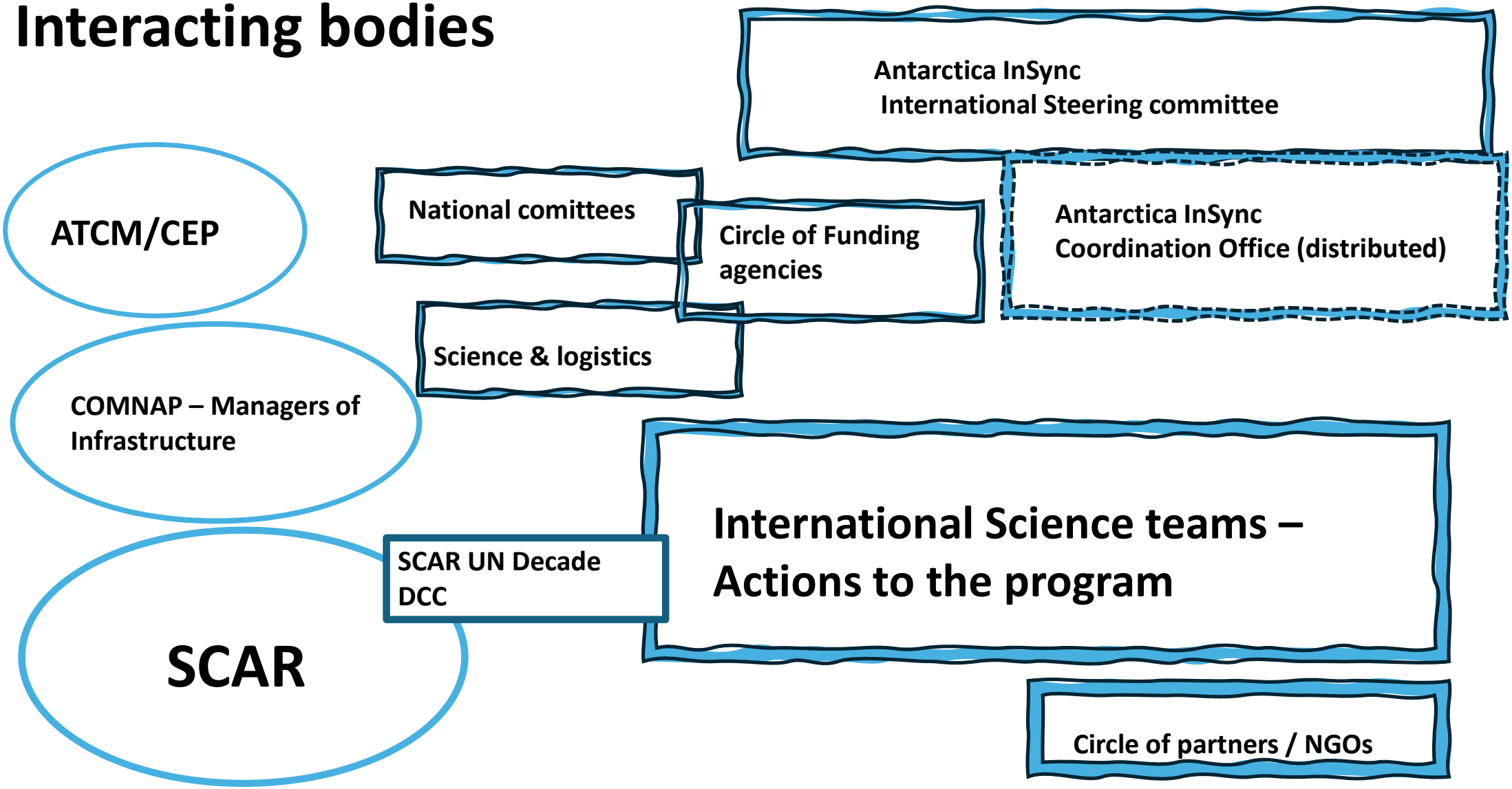
AAD david.souter@aad.gov.au
AntarcticaNZ J.Hendrikx@antarcticanz.govt.nz
AWI antje.boetius@awi.de
BAS janefr@bas.ac.uk
C. Pol. Espanol antonio.quesada@ciencia.gob.es
CPC jefferson.simoes@ufrgs.br
Czech Ant. Res. Prog. Daniel.Nyvlt@sci.muni.cz
INACH alopez@inach.cl
IPEV Yan.Ropert-Coudert@ipev.fr
ISP barbante@unive.it
KOPRI hcshin@kopri.re.kr
NCPOR meloth@ncpor.res.in
NPI camilla.brekke@npolar.no
NSF jcallen@nsf.gov
PFS Katarina.gardfeldt@polar.se
SPI daniele.rod@swisspolar.ch
SAEON jc.hermes@saeon.nrf.ac.za
UAI/PNA gerardo.prato@mrree.gub.uy

Current conversations: Portugal, Japan, Bulgaria, Turkey

Forming an international steering committee from Antarctica & Southern Ocean Science Programs & institutions
12.04.2024



Interacting bodies



National support&coordination teams
(all partner institutions are asked to establish them)

National polar committee of Gemany :

l.sanguineti@uni-bremen.de
https://scar-iasc.de/en/home-english/

Current coordination team @ AWI:

Antje Boetius, director

Nicole Biebow, international office

Daniela Sampaio, coordination

Uwe Nixdorf, logistics & COMNAP link

Stefan Hain, ATCM&CCAMLR link

Roland Koch: Science communication

Science contact into working groups:

Alex Haumann - Ocean

Stefanie Arndt - Sea Ice

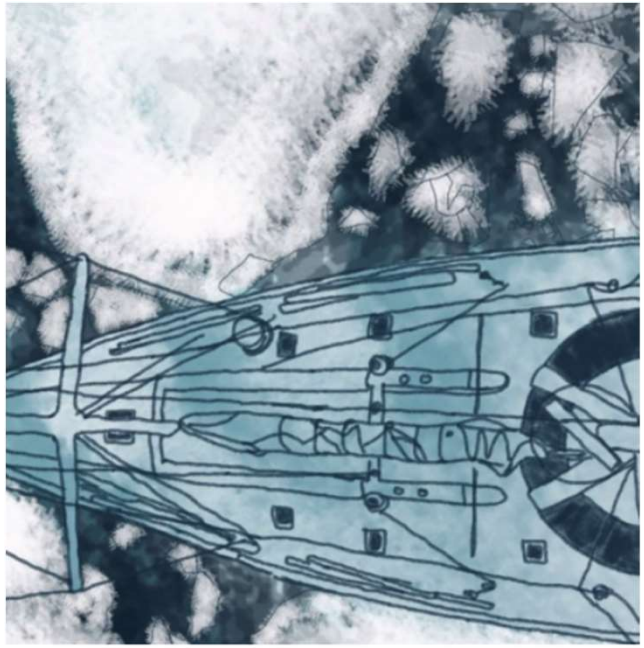
Bettina Mayer- Biology

Markus Rex - Atmosphere

Olaf Eisen- Ice Sheet

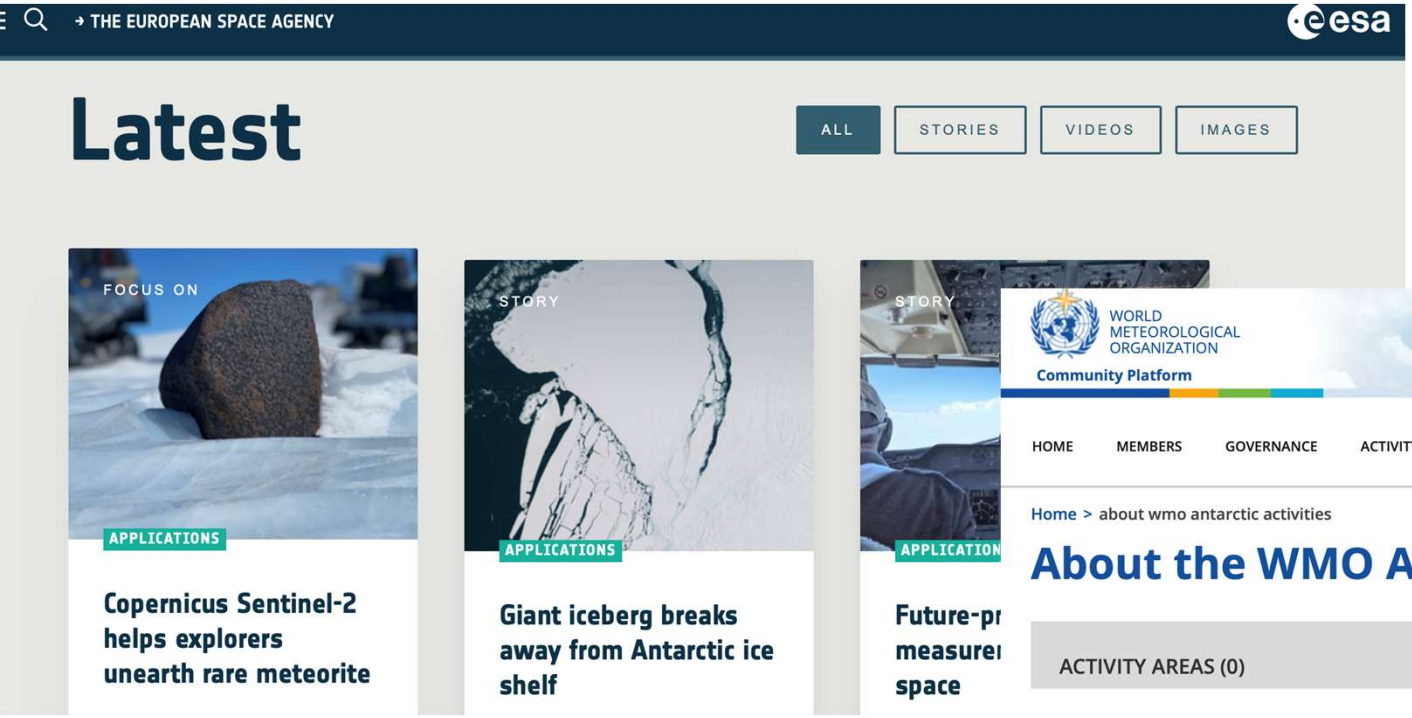
Other Partners –Platforms
sailing & space science &philanthropy

- Tara Foundation
- Le Forel
- Team Malizia
- Vendee globe
- Ocean race
- Ocean REV
- ---



- Discussions with IAATO about science partnership

Current action: Building a partnership with ESA and WMO



About the WMO Antarctic Activities

Purpose and scope

The WMO Antarctic Activities (WMOAA) Programme coordinates meteorological activities in Antarctica carried out by nations and groups of nations. Within the framework of the Antarctic Treaty, it focuses on the interfaces between these activities and relevant WMO Programmes, in particular the WWW, and aims at meeting the requirements for meteorological services as well as for environmental monitoring and climate research.


ANTARCTICA
INSYNC
International Scientific Working Groups

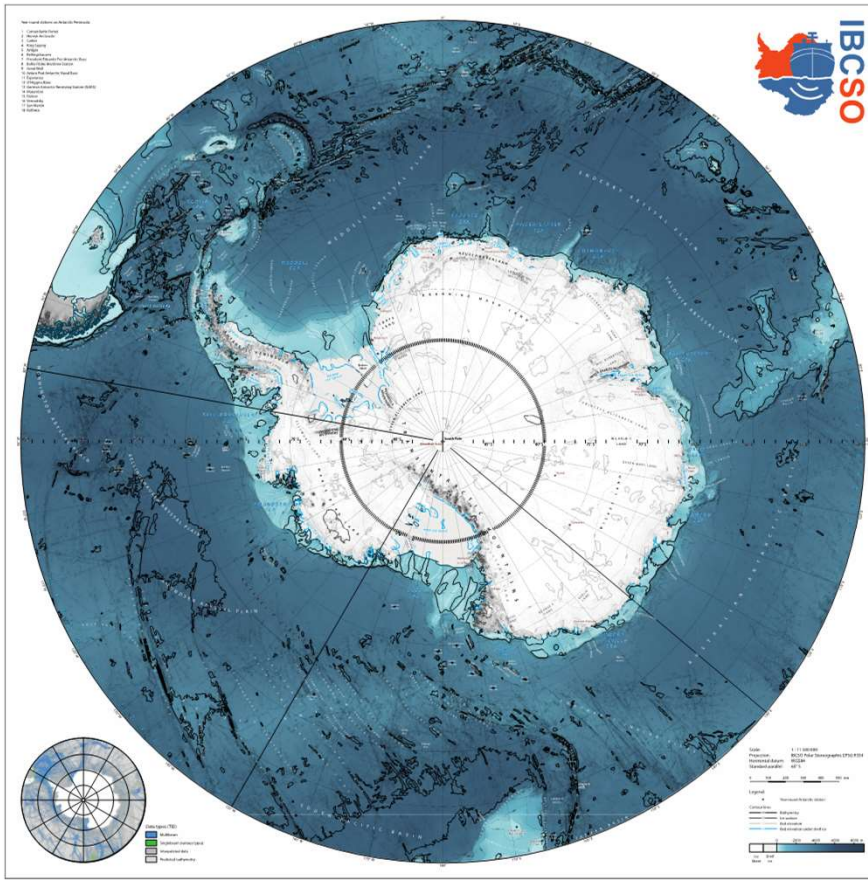
Standing working groups

The Antarctic Treaty, CEP and CCAMLR member states are at the core of Antarctica InSync's science

- Antarctic scientific research institutions & agencies
- National Antarctic Programmes

They provide the main support and infrastructures for Antarctica InSync

Examples: Involving international scientific working groups to plan INSYNC actions



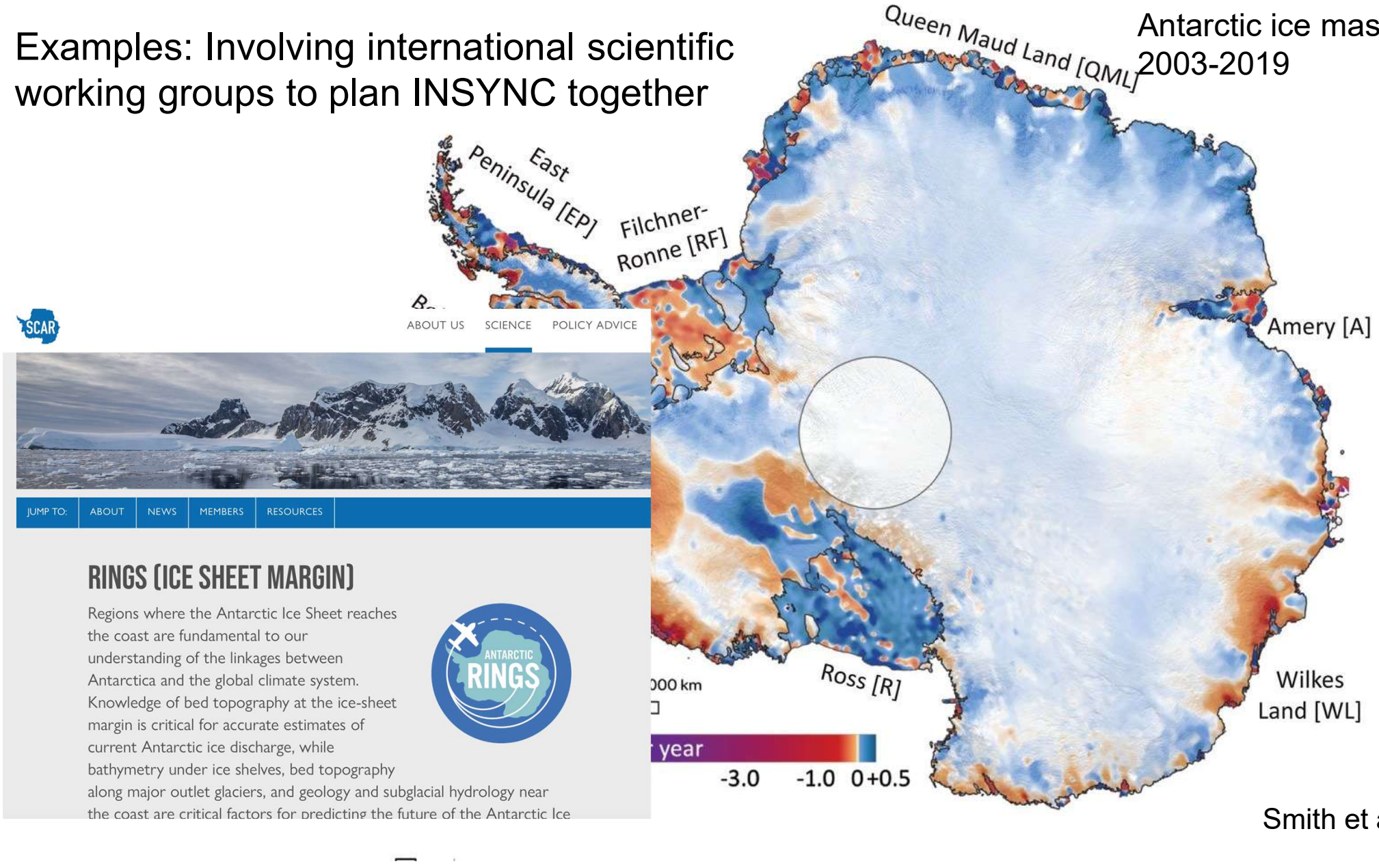
Home » Data & Products » Gridded Bathymetry Data - Southern Ocean (IBCSO)

International Bathymetric Chart of the Southern Ocean (IBCSO)

Jump to

> Seabed 2030

Examples: Involving international scientific working groups to plan INSYNC together



SCAR

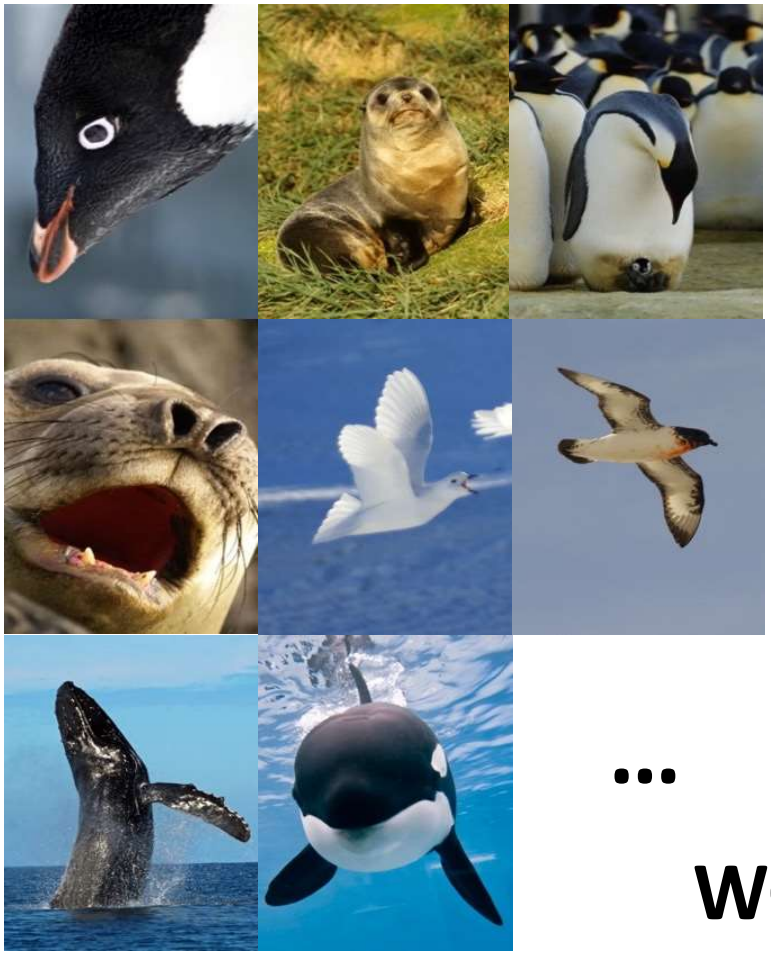
ABOUT US SCIENCE POLICY ADVICE

JUMP TO: ABOUT NEWS MEMBERS RESOURCES

RINGS (ICE SHEET MARGIN)

Regions where the Antarctic Ice Sheet reaches the coast are fundamental to our understanding of the linkages between Antarctica and the global climate system. Knowledge of bed topography at the ice-sheet margin is critical for accurate estimates of current Antarctic ice discharge, while bathymetry under ice shelves, bed topography along major outlet glaciers, and geology and subglacial hydrology near the coast are critical factors for predicting the future of the Antarctic Ice

Examples: Involving international scientific working groups to plan INSYNC together



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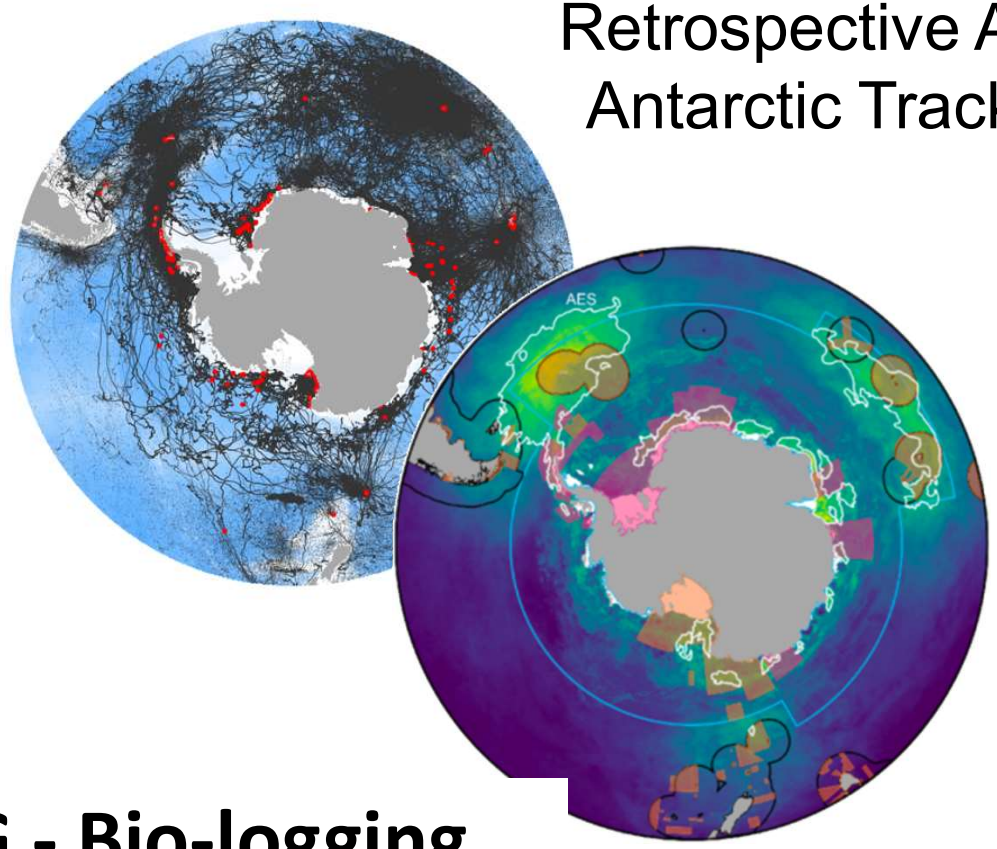
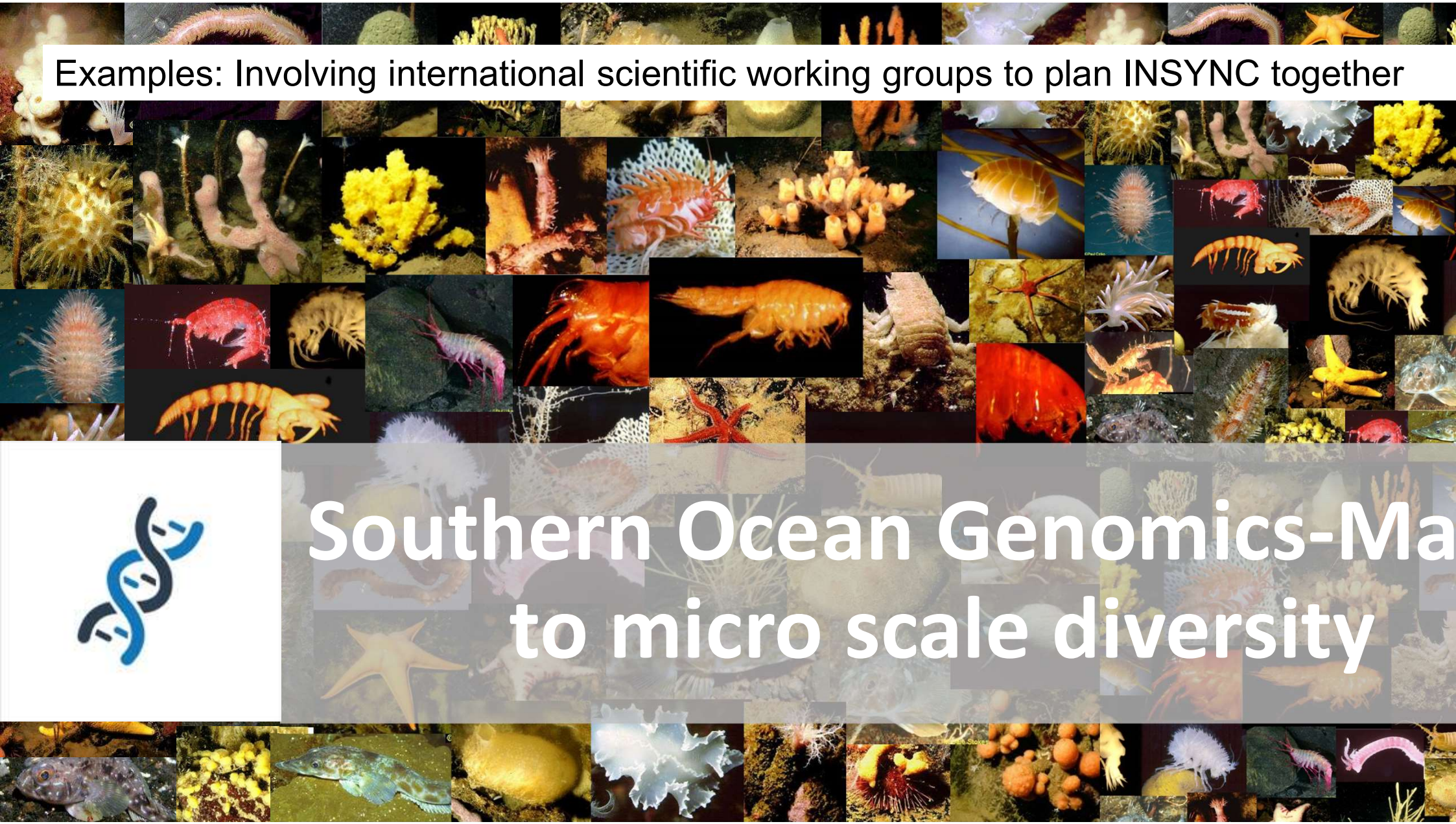
WG - Bio-logging

Retrospective Analysis of Antarctic Tracking Data



Hindell et al. 2020 Nature

Examples: Involving international scientific working groups to plan INSYNC together



Southern Ocean Genomics-Ma
to micro scale diversity

How to build dedicated international science teams for action : Scientists who inform standing groups (list growing)

- A Haumann et al informs CLIVAR/CliC/SCAR Southern Ocean Region Panel (SORP)
- S Arndt, Petra Heil informs SCAR/CliC Antarctic Sea Ice Processes & Climate (ASPeCt)
- B Mayer et a informs SCAR Krill group
- Marcel Du Plessis, Sarah Gille, Seb Swart informs Southern Ocean Fluxes (SOFLUX) Capability Working Group
- Klaus Meiners informs SCAR Biogeochemical Exchange Processes at Sea-Ice Interfaces (BEPSII)
  Felicity McCormack informs IUGG Joint Commission on Ice-Ocean Interactions (JCIOI)
- Clive McMahon informs GOOS Animal Borne Ocean Sensors (ANIBOS)
- Lynne Talley et al informs GO-SHIP /WOCE
- Boris Dorschel et al. informs Nippon GEBCO 2030 Southern Ocean bathymetry
- Kenighi Matsuoka, Olaf Eisen informs RINGS

Important actors to contact
Argo GO-BGC / SOCCOM

How to build dedicated international science teams : Scientists who build panAntarctic activities

Pan Antarctic microbiome and eDNA Survey
(e.g. via Chris Bowler Tara, CNRS; Nicole Webster IMAS)

Southern Ocean climate archives. – post IODP/ECORD
(e.g. via Eduard Bard, Gerald Haug and others)

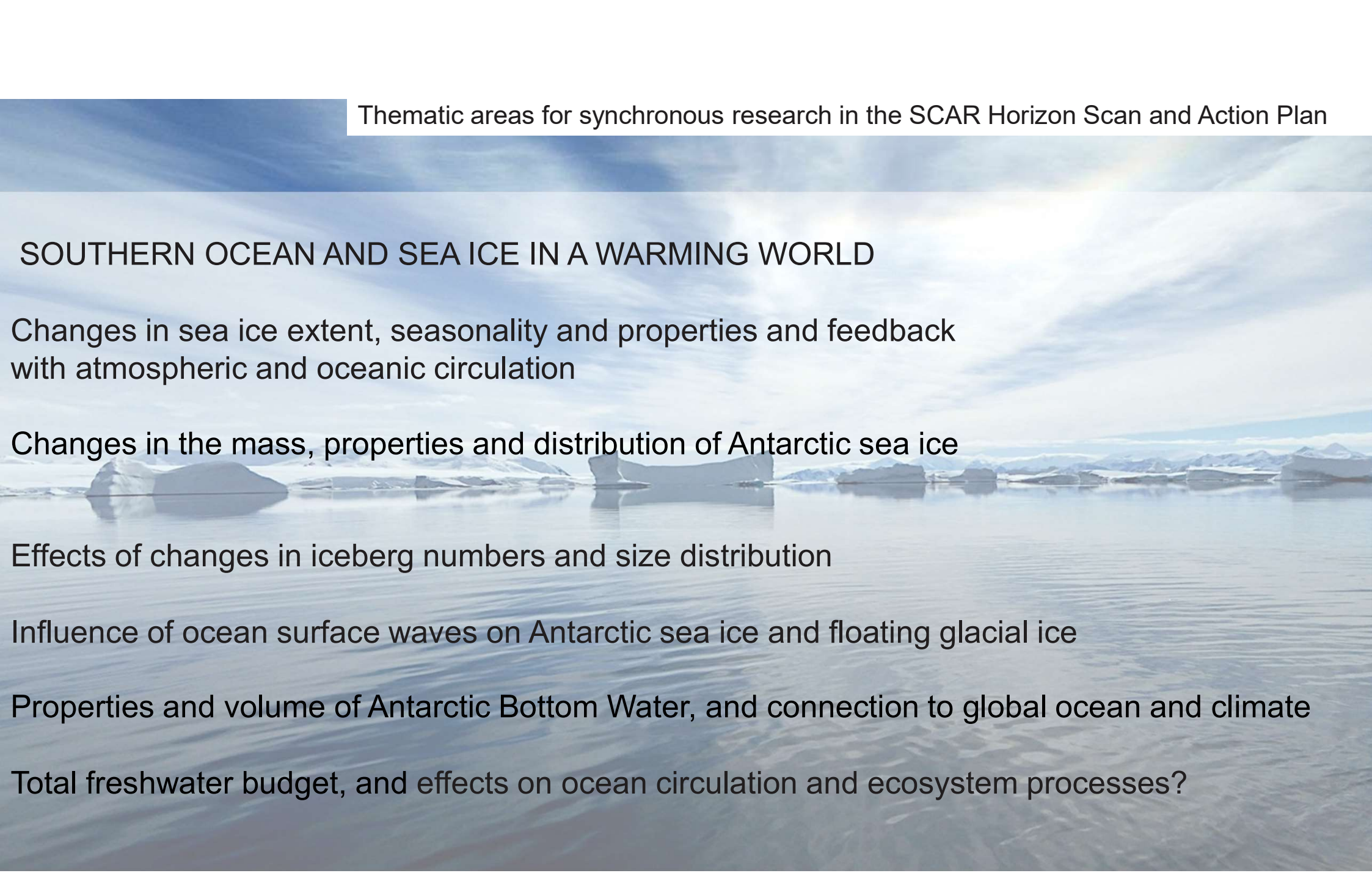
Pan Antarctic flora - NN

Pan Antarctic margin and deep sea benthos. - Angelika Brandt et al.

Pan Antarctic Data center association

Pan Antarctic modeling group

Pan Antarctic policy group



SOUTHERN OCEAN AND SEA ICE IN A WARMING WORLD

Changes in sea ice extent, seasonality and properties and feedback with atmospheric and oceanic circulation

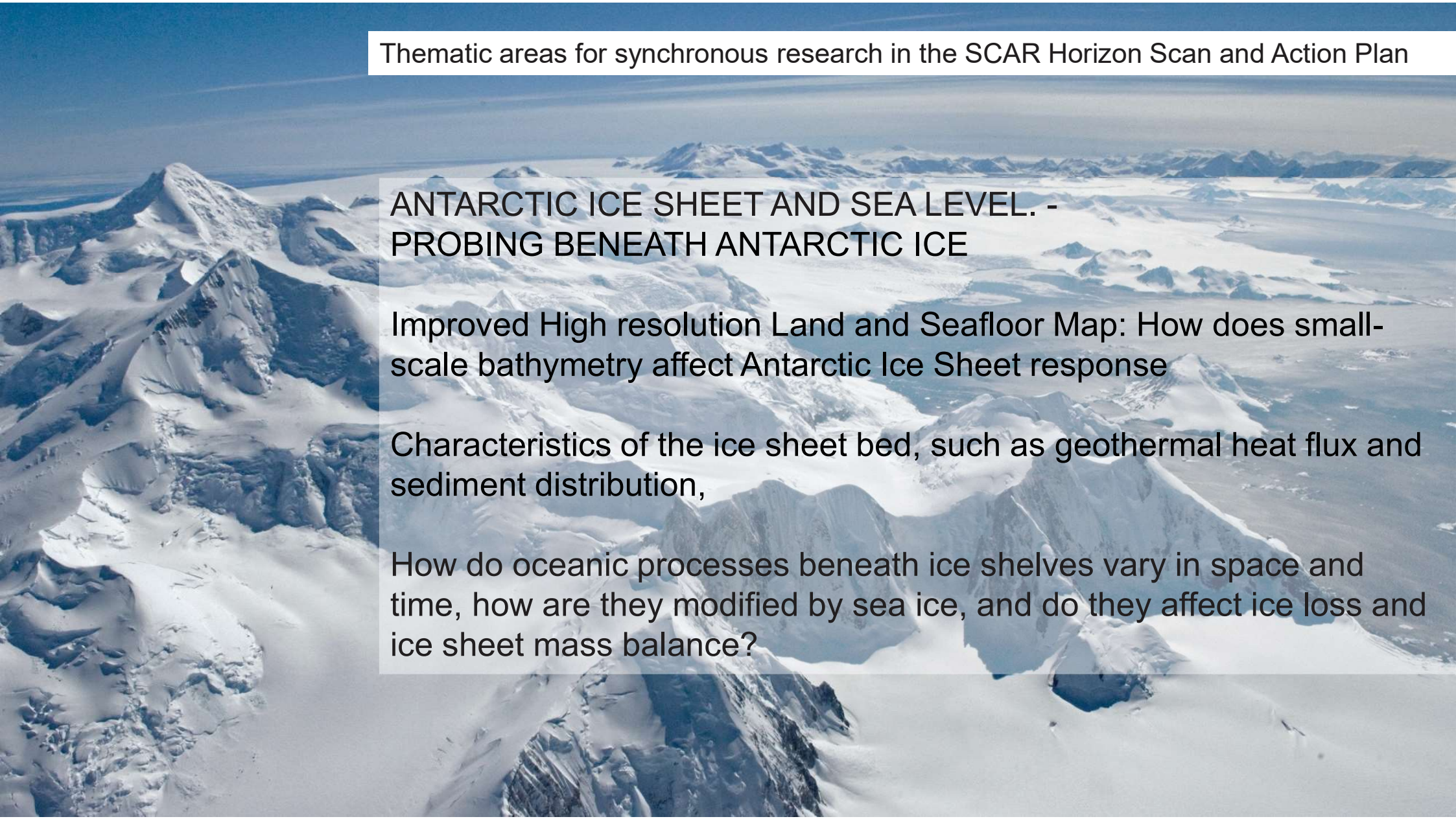
Changes in the mass, properties and distribution of Antarctic sea ice

Effects of changes in iceberg numbers and size distribution

Influence of ocean surface waves on Antarctic sea ice and floating glacial ice

Properties and volume of Antarctic Bottom Water, and connection to global ocean and climate

Total freshwater budget, and effects on ocean circulation and ecosystem processes?

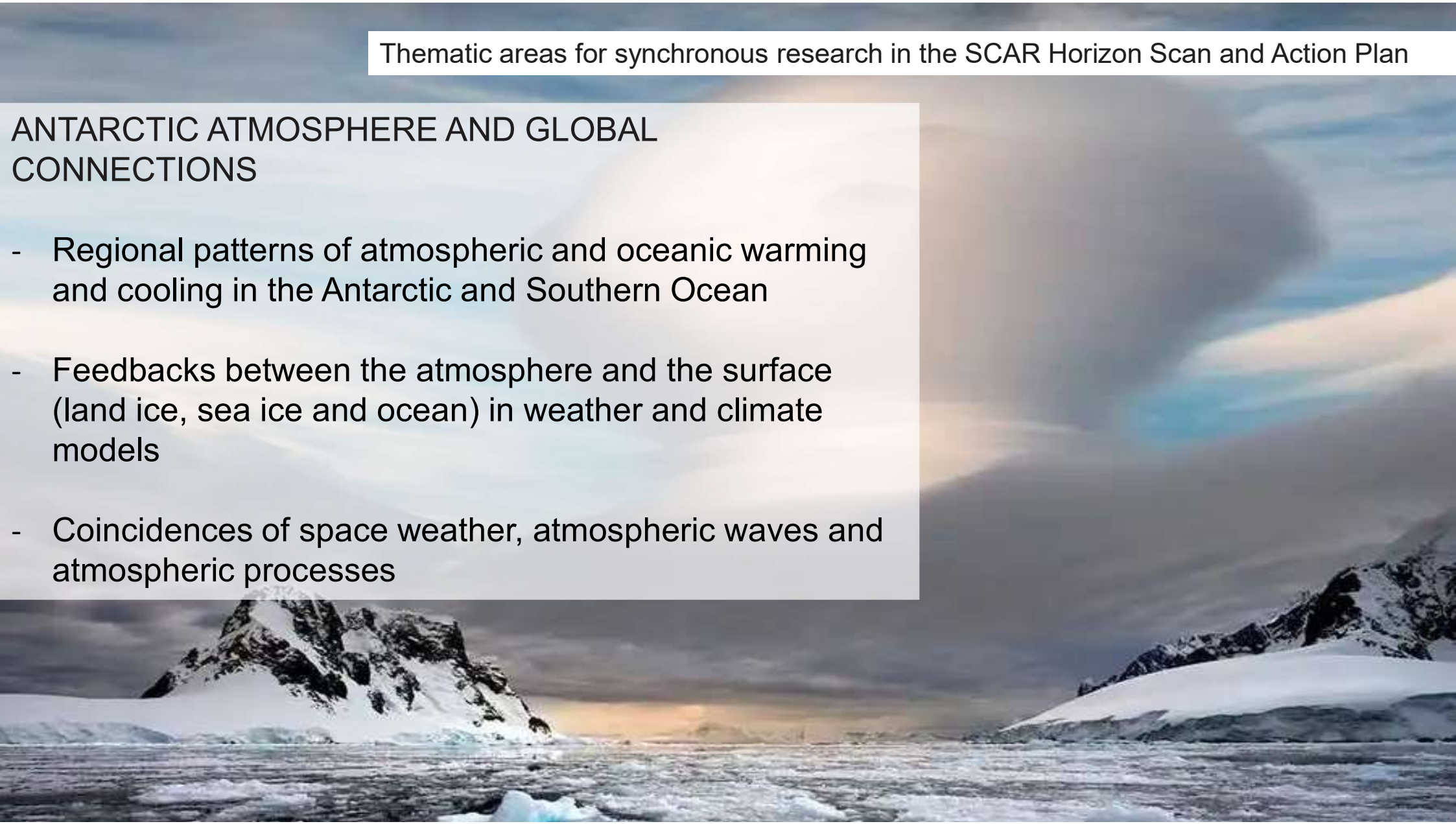


ANTARCTIC ICE SHEET AND SEA LEVEL. - PROBING BENEATH ANTARCTIC ICE

Improved High resolution Land and Seafloor Map: How does small-scale bathymetry affect Antarctic Ice Sheet response

Characteristics of the ice sheet bed, such as geothermal heat flux and sediment distribution,

How do oceanic processes beneath ice shelves vary in space and time, how are they modified by sea ice, and do they affect ice loss and ice sheet mass balance?



ANTARCTIC ATMOSPHERE AND GLOBAL CONNECTIONS

- Regional patterns of atmospheric and oceanic warming and cooling in the Antarctic and Southern Ocean

- Feedbacks between the atmosphere and the surface (land ice, sea ice and ocean) in weather and climate models

- Coincidences of space weather, atmospheric waves and atmospheric processes

Thematic areas for synchronous research in the SCAR Horizon Scan and Action Plan

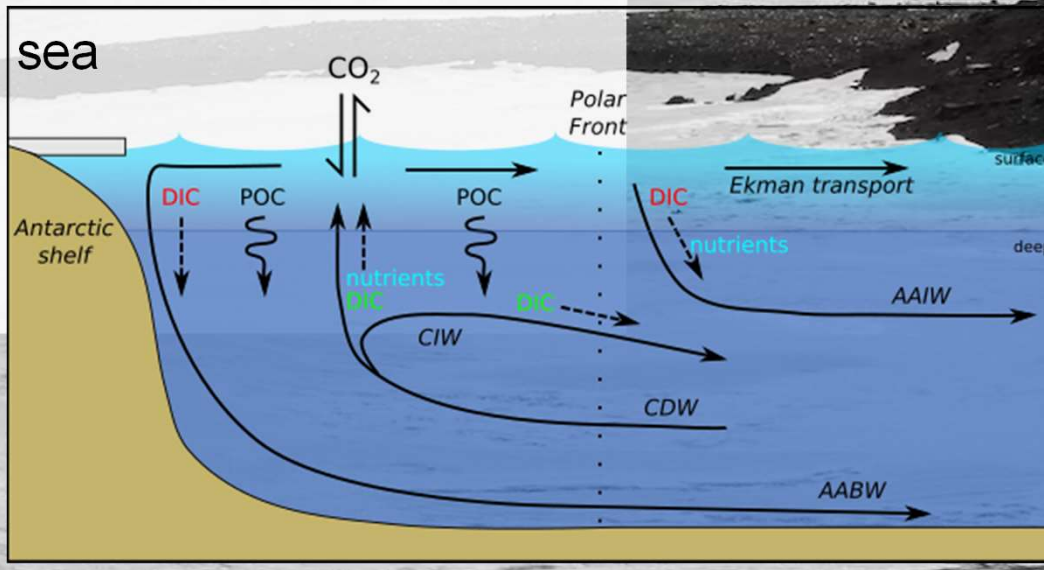
Ecosystem functions and Biogeochemistry

Total release and sink of greenhouse gases

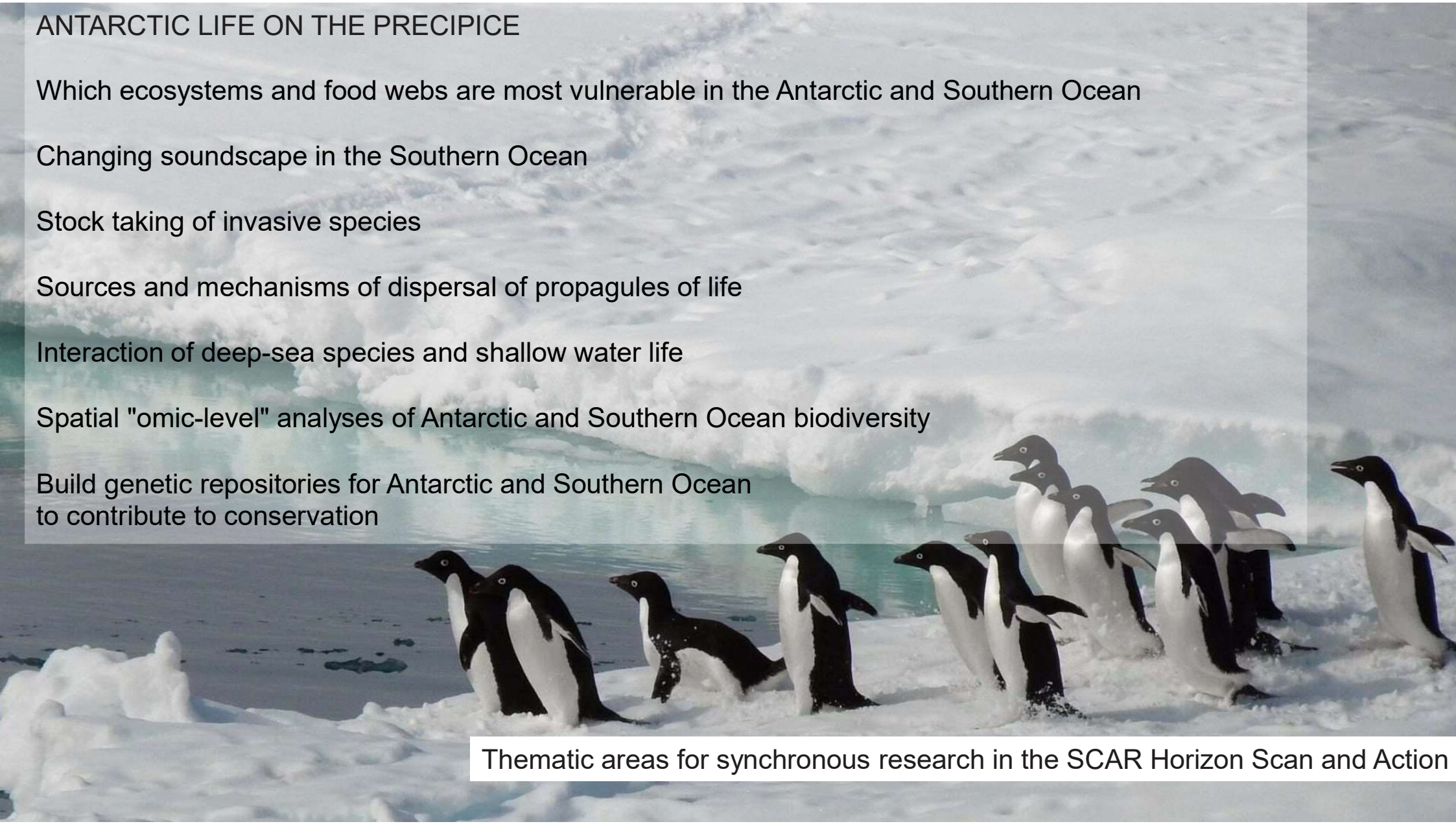
Next-generation contaminants affecting Antarctic and Southern Ocean biota and ecosystems

Fluxes of material and energy between land and sea

How will permafrost, the active layer and soil moisture change



Examples: Involving international scientific working groups to plan INSYNC together; global carbon



ANTARCTIC LIFE ON THE PRECIPICE

Which ecosystems and food webs are most vulnerable in the Antarctic and Southern Ocean

Changing soundscape in the Southern Ocean

Stock taking of invasive species

Sources and mechanisms of dispersal of propagules of life

Interaction of deep-sea species and shallow water life

Spatial "omic-level" analyses of Antarctic and Southern Ocean biodiversity

Build genetic repositories for Antarctic and Southern Ocean
to contribute to conservation

Thematic areas for synchronous research in the SCAR Horizon Scan and Action

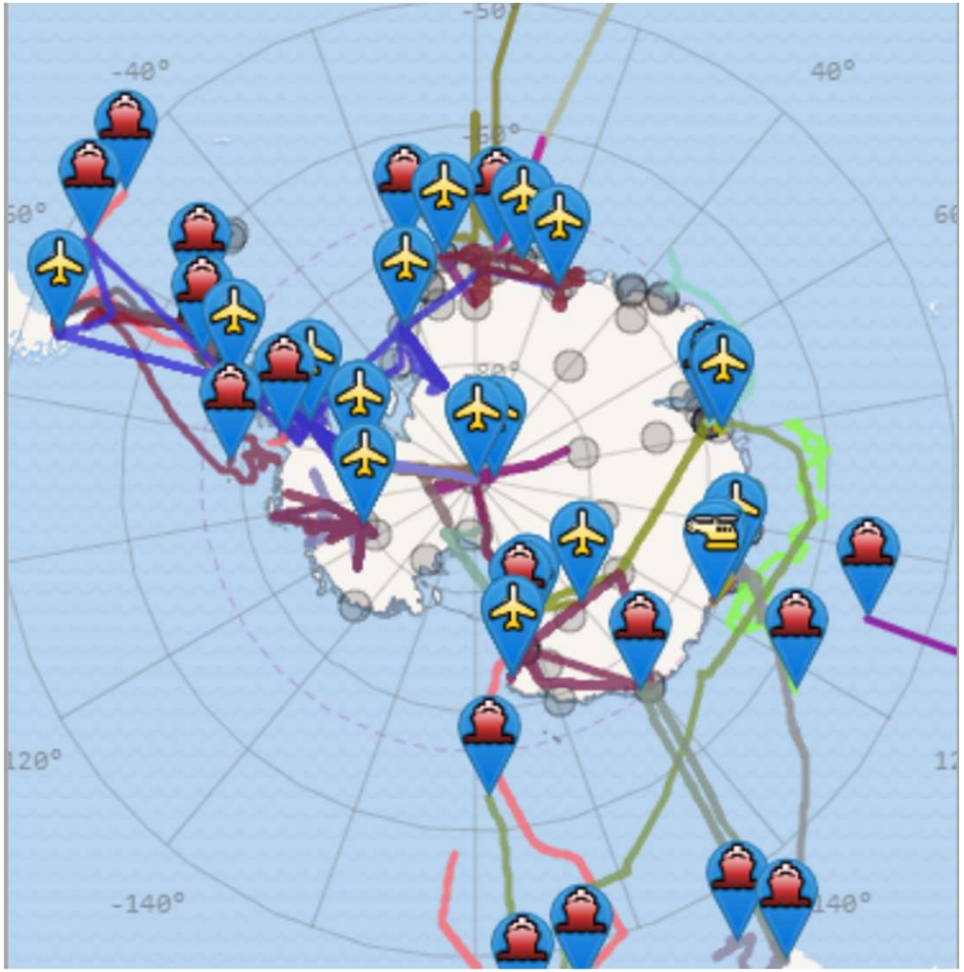
HUMAN PRESENCE IN ANTARCTICA

How will regulatory mechanisms evolve to keep pace with Antarctic tourism

What is the current and potential value of Antarctic ecosystem services

How will we do better science together

Key Task : Scheduling of platforms via COMNAP



Ships
Planes / helicopters
Traverse
Stations
Autonomous deployments
Remote sensing missions

Other partner platforms

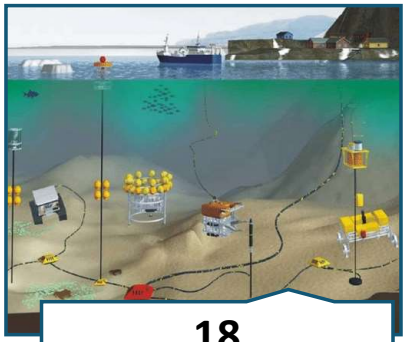
Council of Managers of National Antarctic Programs (**COMNAP**) Assets app

New: POLARIN:
POLAr Research Infrastucture Network

Access integration to **64** research infrastructures and their services in **both poles.**

38
Research stations

12
Polar vessels



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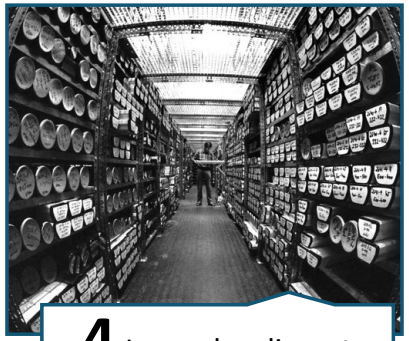
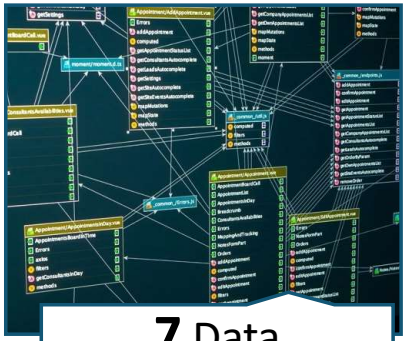
Observatories



4 Ice and sediment core repositories



7 Data infrastructures

Consortium
16 European countries
6 non-European countries
50 consortium members

Coordinator
ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Duration
01.03.2024 – 30.02.2029

Funding
€14,588,114

Grant Agreement No.
101130949

Project coordinator
Nicole Biebow (AWI)

www.-------

To Do's


& Infrastructure for Synchronous Observation
Contact
PRESENTATION
INITIATIVES
NEWS & EVENTS
RESOURCES & FAQ
LOGIN
REGISTER
ANTARCTICA INSYNC
Antarctica International Science &
Infrastructure for Synchronous Observation
unesco
Intergovernmental Oceanographic Commission
2021 2030 United Nations Decade of Ocean Science for Sustainable Development
COMNAP
SCAR

To Do's: define impact beyond "data"

- Many countries and funding agencies need to know the bigger impact of science beyond "more data"
- We will develop a short paper on impacts expected, but for now:

-Answering to the UN decade challenges
https://oceandecade.org/challenges/

- Sharing infrastructures and access to Antarctica sustainably
- Developing autonomous observation skills to predict rapid change and risks (e.g. weather, sea ice, ice loss, marine mammal mobility, endangered species, pollution, heatwaves etc)
- Building the next generation of Antarctic scientists and their collaborative network
- Dialogue with stakeholders, to provide the best available knowledge for the protection of the Southern Ocean / Antarctic region and its role in climate & sea level & biodiversity

Fact sheet – first draft

ANTARCTICA INSYNC

What is Antarctica InSync?

Antarctica InSync is an UNESCO endorsed Ocean Decade programme for large, synchronous and collaborative scientific observations in Antarctica and the Southern Ocean to generate data and knowledge to better understand, protect and sustainably manage the Southern Ocean and Antarctica.

Why do we need Antarctica InSync?

Remoteness and extreme climate conditions remain a challenge to international research and especially coordinated synergistic observation in Antarctica and the surrounding Southern Ocean. Solving these challenges is beyond the skills and infrastructure of any single science programme or nation.

Who can join?

Antarctica InSync is open to everyone willing to contribute, including countries without Antarctic infrastructure, foundations, NGOs and industry associations.

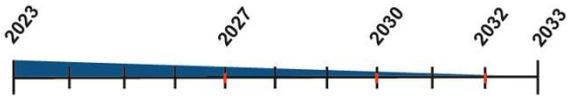
What does Antarctica InSync aim?

- Accelerate the generation and use of knowledge and understanding of Antarctica and the Southern Ocean;
- Strengthen existing and create new partnerships across nations and between all Antarctica and Southern Ocean actors;
- Be co-designed and/or co-delivered by all partners and stakeholders in order to facilitate the uptake of Antarctica and Southern Ocean science and knowledge for policy, decision-making and sustainable management;
- Contribute to achieving Ocean Decade objectives; and
- Ensure that all Antarctica InSync data and resulting knowledge are provided in an open access, shared, and discoverable manner (FAIR principles).

Overarching themes

- I - Southern Ocean and Antarctica heat, freshwater, carbon and other element budgets and their response to climate change
- II - Rapid sea ice decline and its causes and consequences
- III - Melting ice shelves and ice sheets and their connections to coastal ocean and continental margin zones
- IV - Improving knowledge and protection of the unique Antarctic life from land and ice into the deep-sea
- V - Detecting and abating anthropogenic footprints in atmosphere, ice, ocean and land

Antarctica InSync timeline



2024-2026 Preparatory phase

2027-2030 Synchronous scientific observation

2030-2032 Synthesis and reporting

2032-2033 International Polar Year

For more information on Antarctica InSync, please contact: antarctica-insync@awi.de

Antarctica INSYNC time plan

2022	**EOI submission to UN Decade program and SCAR**
2023	**Presentations at ATCM, COMNAP, SCAR, SOOS etc**
2024-2026	**Preparatory Phase**
2027-2029	**Implementation Phase / Fieldwork**
2029-2030	**Completion and Reporting Phase**

10 YEARS.
10 CHALLENGES.
1 OCEAN.

A Science Mission for Antarctica and the Southern Ocean in 2027-2030 as a contribution to the UN Ocean Decade

2024-2026 preparatory phase >>> 2027-2030 field phase

Antarctica InSync proposes a joint, multidisciplinary science program in Antarctica and the Southern Ocean, inspired by the success of initiatives like the MOSAiC Expedition. This program aims to unite national Antarctic programs in synchronous observation, addressing key knowledge gaps and contributing to the goals of the UN Ocean Decade.

LEARN MORE

Understand and beat marine pollution

Protect and restore ecosystems and biodiversity

Unlock ocean-based solutions to climate change

Expand the Global Ocean Observing System

Create a digital representation of the ocean

Change humanity's relationship with the ocean

JOIN US IN THIS JOURNEY

We invite leaders of Antarctic research institutions, international science frameworks, policy stakeholders, NGOs, foundations, and industry partners to join us in this endeavor. Together, we can leverage our collective expertise and resources to advance understanding and stewardship of Antarctica and the Southern Ocean.

BROWSE OUR THEMATICS

Southern Ocean heat, freshwater, and carbon budgets and their response to climate change

ICE SOIL WATER

Rapid sea ice decline and its interdisciplinary consequences

ICE WATER BIOLOGY

Melting ice shelves and coastal impacts

WATER SOIL ICE

Improving knowledge and protection of the unique Antarctic life from land into the deep sea

BIOLOGY

Anthropogenic signatures in Antarctica: the race against pollution and other pressures

ICE SOIL WATER

SCAR will host Southern Ocean UN Decade Collaborative Centre !

Scientific Committee on Antarctic Research

INSYNC is a regional / thematic programme !

ATCM, COMNAP, SCAR … - representation of Antarctica InSync

Ocean Sciences Meeting	New Orleans	18.-23.02.
Polar Symposium	Monaco	21.-23.02
UN Decade of Ocean Science Meeting	Barcelona	10.-12.04.
POLARIN GA	Bremerhaven	17.-19.04
EGU	Vienna	14.-19.04
ATCM	Kochi, India	20.05-30.05.
FRISP	Bremerhaven	19.-21.06.
IAPSO best practic WG (focus on InSync)	TBD	TBD
CCAMLR WG EMM	Leeuwarden, The Netherlands	01.-12.07.
ICTP Workshop	Trieste, Italy	29.-31.07.
COMNAP	Buenos Aires, Argentina	12.-16.08.
SCAR OSC	Pucon, Chile	19.-23.08.
European Polar Science Week	Copenhagen	03.-06.09
CCAMLR	Hobart	14.-25.10
AGU Fall Meeting	Washington	09.-13.12