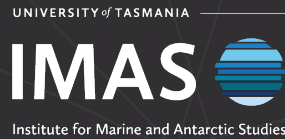


# S O O S

## SOUTHERN OCEAN OBSERVING SYSTEM



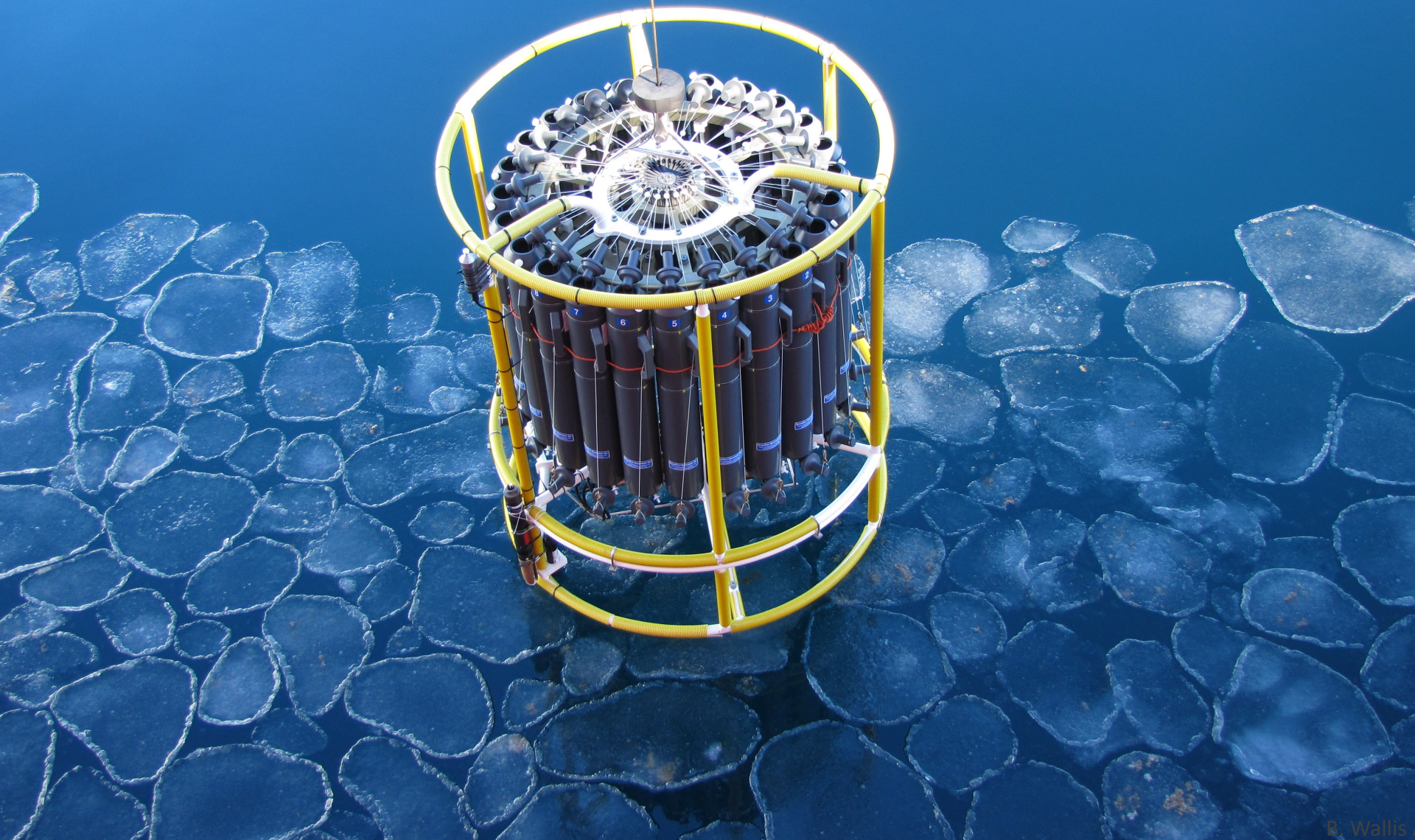
Antarctica  
New Zealand



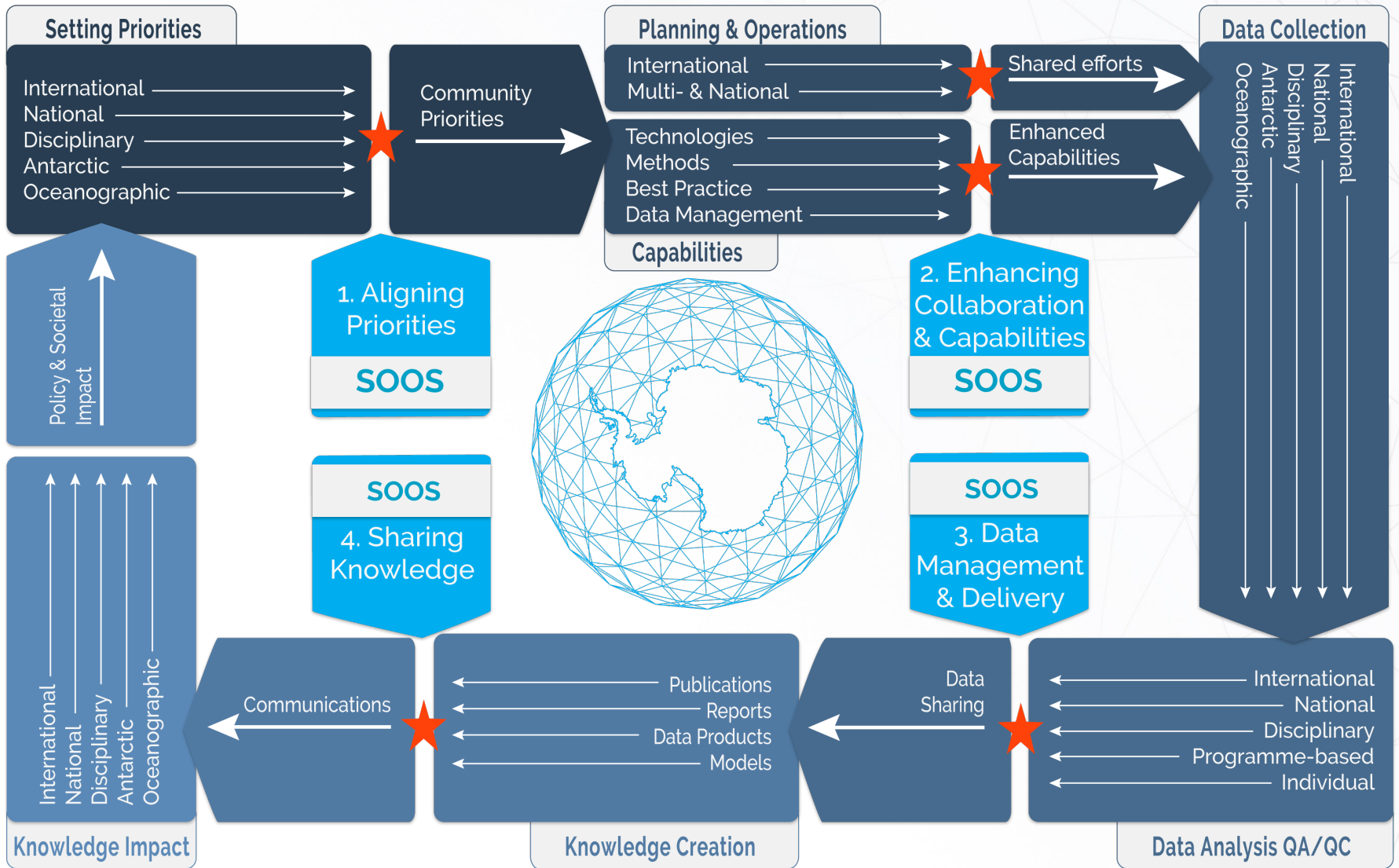
OCEAN ICE



SOOS mission is to facilitate the sustained collection and delivery of essential observations of the Southern Ocean to all stakeholders, through the design, advocacy, and implementation of cost-effective observing and data delivery systems



# Southern Ocean Science Pathway



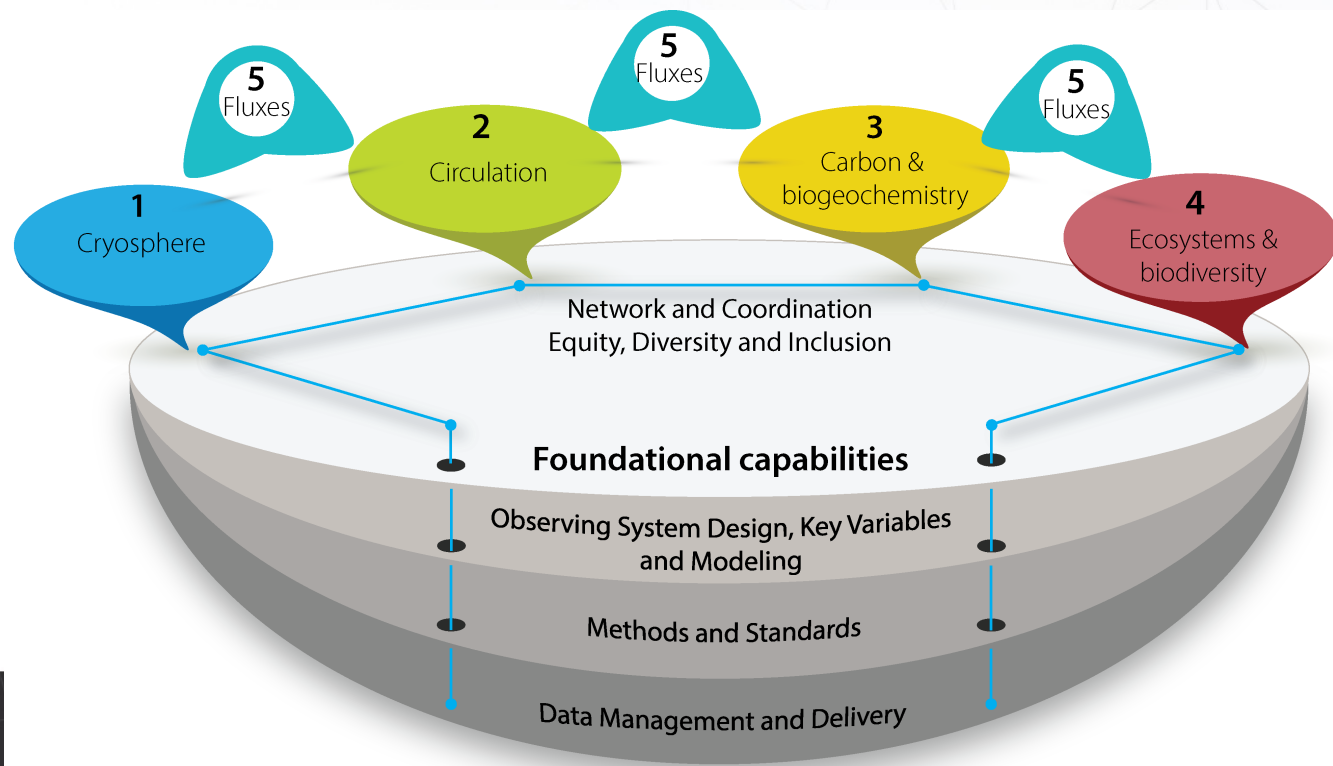
# SOOS Science and Implementation Plan 2021-2025

## Science Themes:

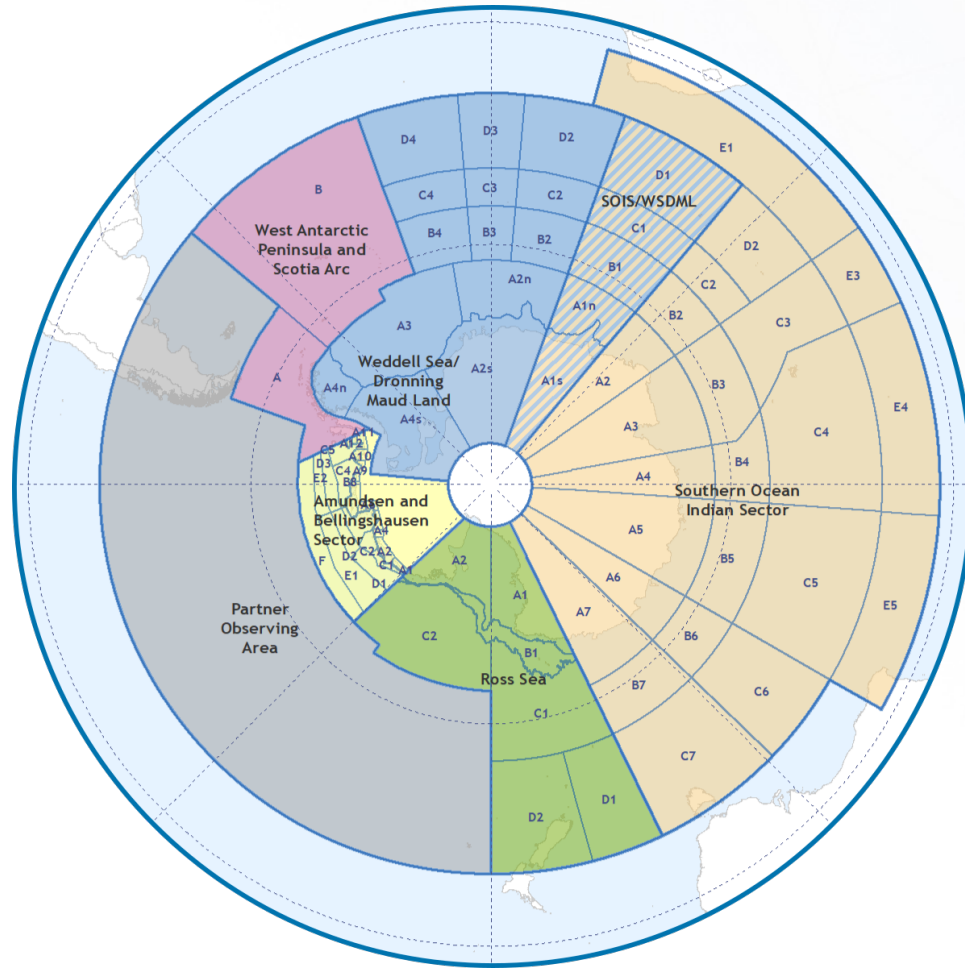
1. Cryosphere
2. Circulation
3. Carbon & Biogeochemistry
4. Ecosystems & Biodiversity
5. Southern Ocean – Sea Ice – Atmosphere Fluxes

## Foundational Capabilities:

1. Observing System Design, Key Variables and Modelling
2. Methods and Standards
3. Data Management and Delivery



# Knowledge delivery to address challenges



## Data Management Sub-Committee

### Regional Working Groups (RWGs):

Southern Ocean Indian Sector (SOIS)

Ross Sea

Weddell Sea and Dronning Maud Land (WSDML)

West Antarctic Peninsula and Scotia Arc (WAPSA)

Amundsen/Bellingshausen Sea (ABS)

### Capability Working Groups (CWGs):

Censusing Animal Populations from Space (CAPS)

Southern Ocean Flux (SOFLUX)

Observing System Design (OSD)

### Task Teams:

Ecosystem Essential Ocean Variables (eEOVs)

Polar Technology

SOOS/GOA-ON Ocean Acidification Regional Hub (in development)

### Equity, Diversity and Inclusion Group

### Partnerships and Collaborations:

UN Ocean Decade Southern Ocean Decade Collaborative Centre

Marine Ecosystem Assessment of the Southern Ocean (MEASO)

Polar Data Discovery (POLDER)

Southern Ocean Regional Panel (SORP)

Antarctic biodiversity dAta iNfrastruCture (ADVANCE)

+Future...

# SOOS 2023 at a glance

 **813** members  
- 113 new in 2023



**29** SOOS events  
- including 2 large international conferences



**3** tools  
- Southern Ocean data and metadata discovery tool  
- Southern Ocean logistics tool

 **3** scientific publications

**5** reports to policy-makers and other stakeholders



**24** SOOS presentations at other international conferences

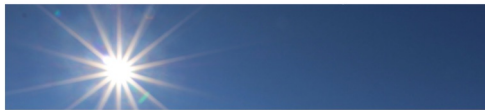
**8** SOOS endorsed project proposals



## STATE OF THE CLIMATE IN 2022

### ANTARCTICA AND THE SOUTHERN OCEAN

Kyle R. Clem and Marilyn N. Raphael, Eds.



## communications earth & environment

ARTICLE

<https://doi.org/10.1038/s43247-023-00927-x> **OPEN**

Record low 2022 Antarctic sea ice led to catastrophic breeding failure of emperor penguins

Peter T. Fretwell<sup>1</sup>, Aude Boutet<sup>2</sup> & Norman Ratcliffe<sup>1</sup>



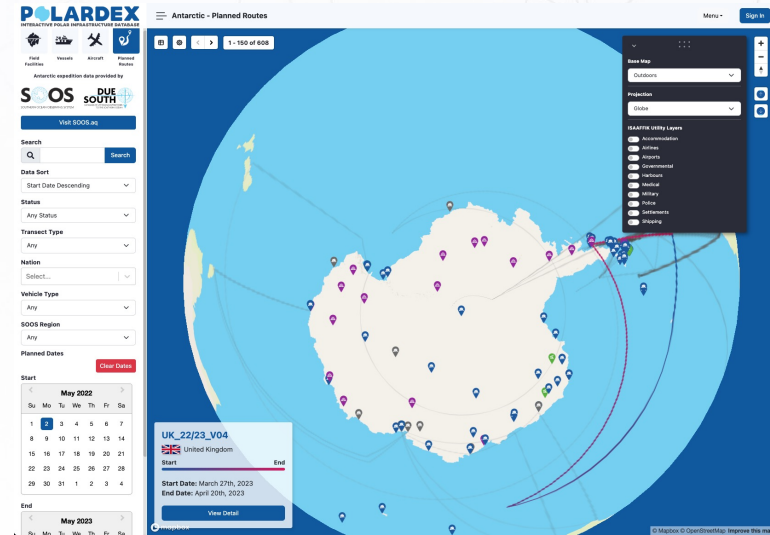
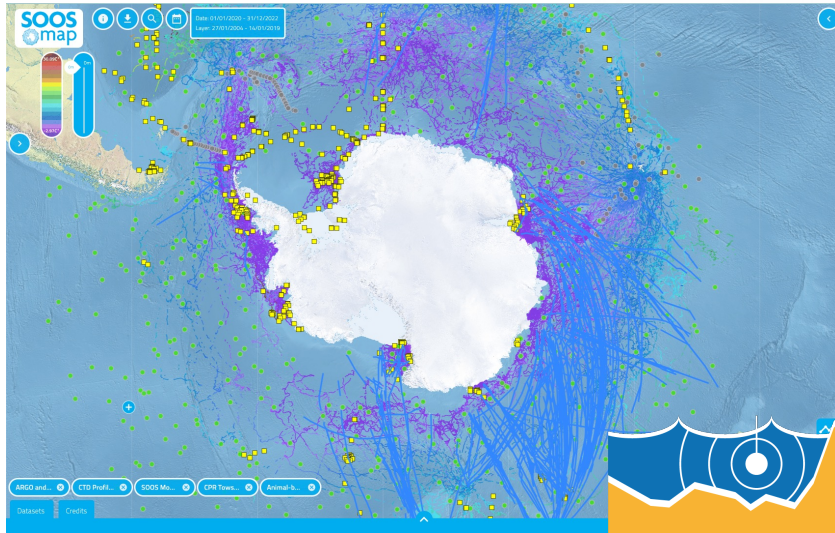
SOUTHERN OCEAN OBSERVING SYSTEM

# SOOS Data Delivery



# DUE SOUTH

DATABASE OF UPCOMING EXPEDITIONS TO THE SOUTHERN OCEAN

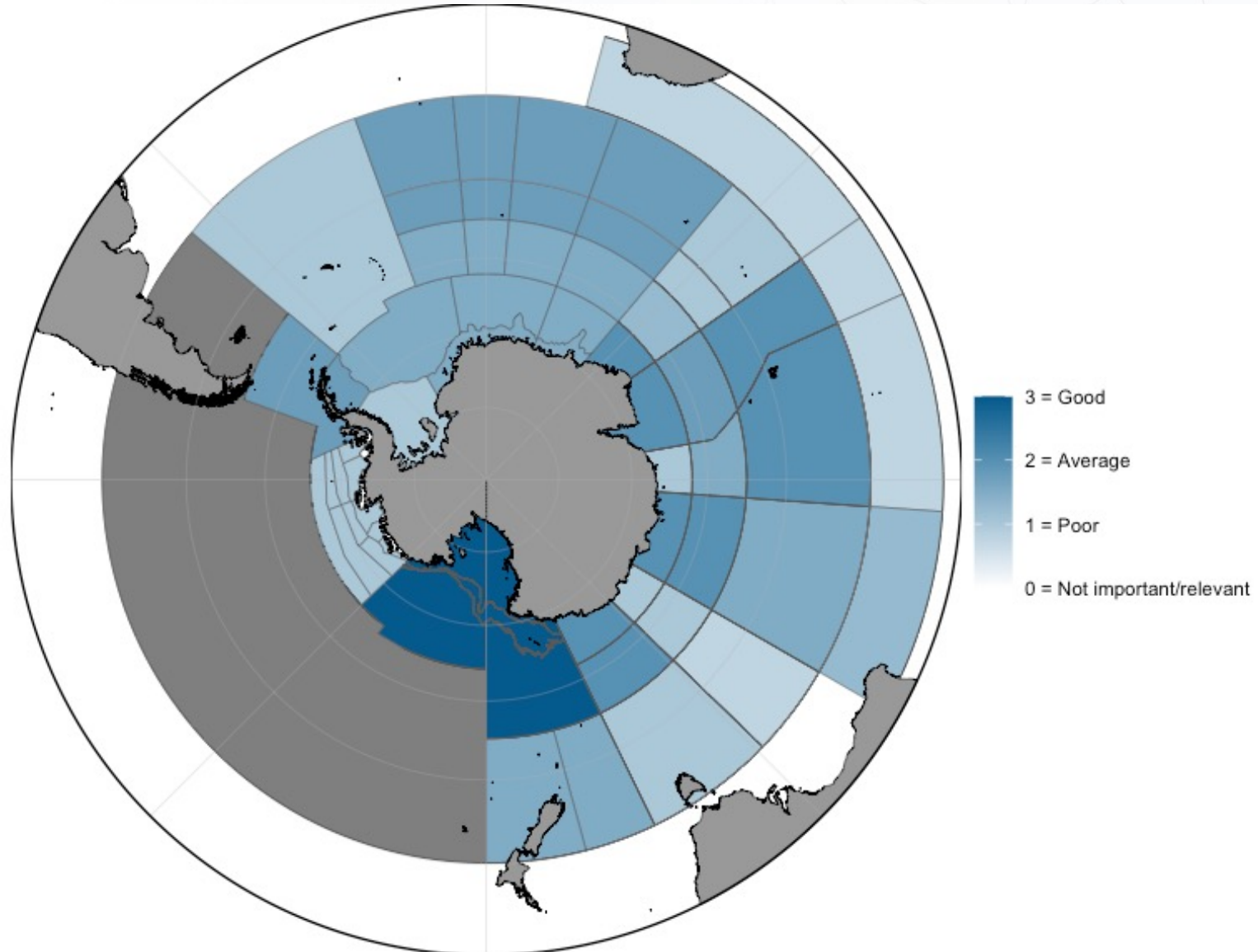


# EUROPEAN POLAR BOARD



# Observational Coverage

Understanding and quantifying the state and variability of Southern Ocean ecosystems and biodiversity





## SOOS Symposium 2023 "Southern Ocean in a Changing World"

**14 -18 August 2023 | Hobart, Tasmania**  
10-20 August 2023 with side-meetings and workshops

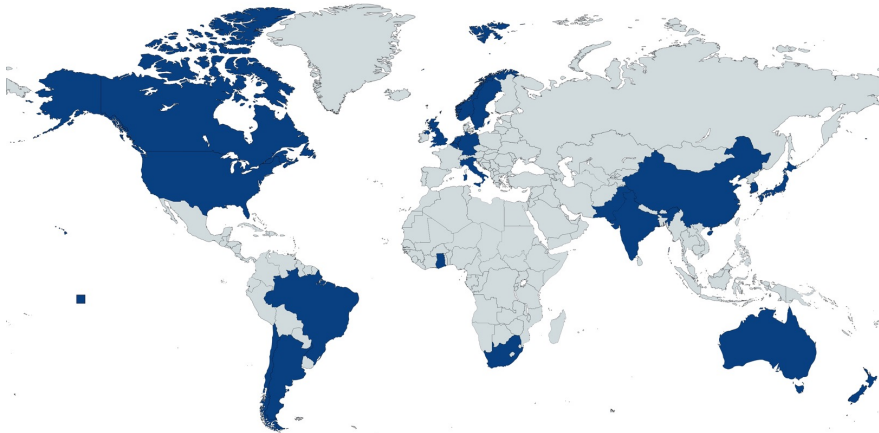


**300** attendees  
- 25 countries



**40+**

media features  
- Australia, New Zealand, Europe,  
North and South America



### Race to rescue planet

Scientists say research on Southern Ocean is critical

**Tia Ewen**  
Leading scientists across the globe are sounding the alarm as Earth's crucial oceanic system faces a troubling shift and the rapid change of the Southern Ocean and Antarctica continue to be under-researched.

More than 300 scientists from across the world travelled to Hobart to discuss the Southern Ocean at the Southern Ocean Observing System (SOOS) symposium.

Their main concern was an under-researched question of the interaction between Antarctica's ice sheet and the Southern Ocean and global warming.

"While we talk about global warming, we're really talking about ocean warming and 90 per cent of that heat is absorbed by the ocean," said Dr Andrew Majeed.

"The Southern Ocean is the planet's largest heat sink and we don't know how that's changing. It's also about 40 per cent of the global carbon sink that ends up in the water."

"The Southern Ocean also controls the rest of the planet's sea level," Dr Majeed said, "the single biggest uncertainty we have in future sea level rise."

"The problem is we really don't observe it well enough to have understood how it's changing the processes that are going into the future," he said.

"The technologies that we need to do this are not available, they're not expensive and they're hard to deploy. But for the past 50 years, SOOS has been absolutely absorbing \$460m worth of science every year and we don't know how that's changing."

"We will never have enough data from there to actually make these observations. But there has been a huge explosion in autonomous technology courtesy of the military. It's underwater or sit on the surface but they are expensive and they're difficult to deploy and retrieve."

"They're difficult to get handed because they are not the only 'we're going to put down a very exciting paper' that everyone else has their hands on."

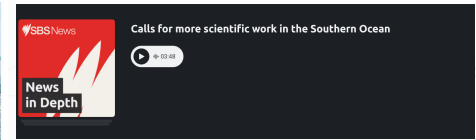
"SOOS is clear and autonomous coastal Dr. Tia Ewen has said that the Southern Ocean is the most dynamic ocean in the world during summer and the lowest hours of sea ice during winter are getting a 'toxic brew' for Southern Ocean ecosystems.

"With the massive data sets and sea ice that we're seeing in recent years, that includes all species from Antarctica's giant ice-cave species to the emperor penguin," she said.

"It's a race between the scientists and the changes that are occurring that science is not well equipped to keep up with these changes and in our hands."

"The problems have been caused by us but the solutions can also be driven by us if we can do the right decisions so that the world that lives is now."

[www.abc.net.au/news/2023-08-14/scientists-say-research-on-southern-ocean-is-critical/10311114](https://www.abc.net.au/news/2023-08-14/scientists-say-research-on-southern-ocean-is-critical/10311114)



### Scientists lament Southern Ocean 'data desert', just as climate crisis brings frightening changes

Loss of sea ice and rising temperatures in the ocean around Antarctica have a huge effect on the Earth's climate, but the ability to track them is lagging



# SOOS Symposium 2023 Community Statement

The Southern Ocean is a critical component of the global climate system.

The Southern Ocean controls to a large extent the uptake of human generated heat and carbon into the ocean. Yet, we are currently observing critical changes in the Southern Ocean that are seen in the record low levels of sea-ice extent, record high temperatures and dramatic shifts in penguin populations, among other striking changes. The chronic lack of observations for the Southern Ocean challenges our ability to detect and assess the consequences of change. As such, it is more pressing than ever to have a sustained and coordinated Southern Ocean observing system to provide an understanding of current conditions, inform predictions of future states, and support policies and regulations for the benefit of society.



***Thank You!***

[www.soos.aq](http://www.soos.aq)

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 @SOOSocean

