ICED
Integrating Climate and Ecosystem Dynamics in the Southern Ocean

ANTARCTICA INSYNC

Antarctica InSync: Improving knowledge and protection of Antarctic life



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

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EU Polar Week 2024

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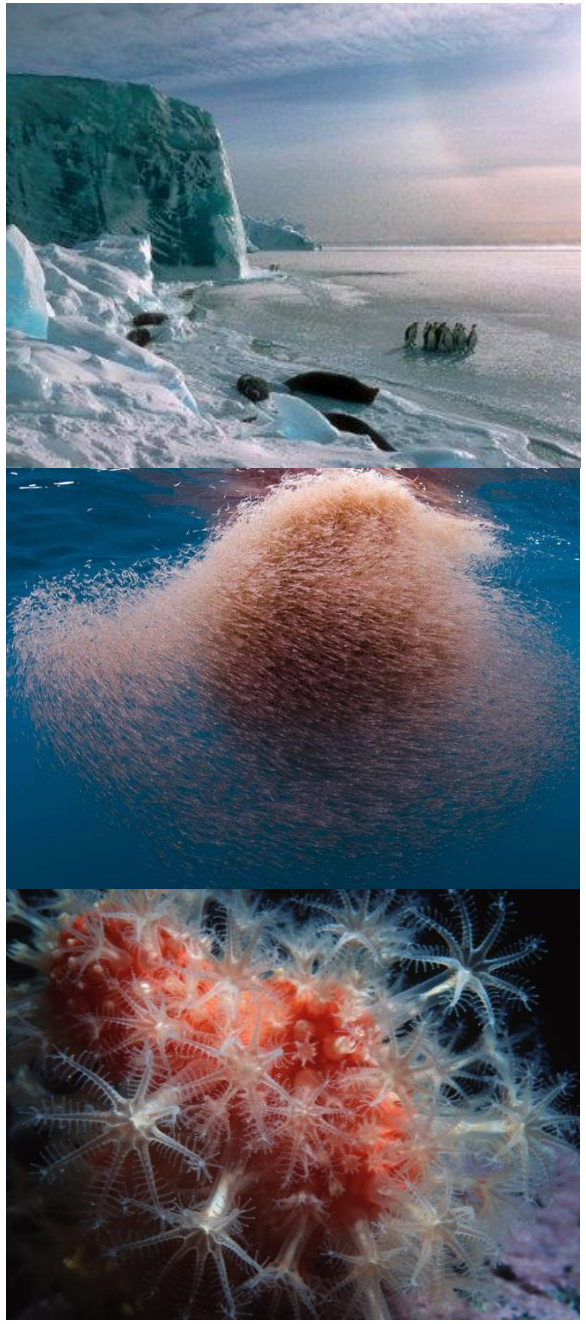
IMBeR futureearth research for global sustainability

International Council for Science SCOR Scientific Committee on Oceanic Research

THE INTERNATIONAL COUNCIL FOR SCIENCE SCAR SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Credit: Ali Massey & BAS

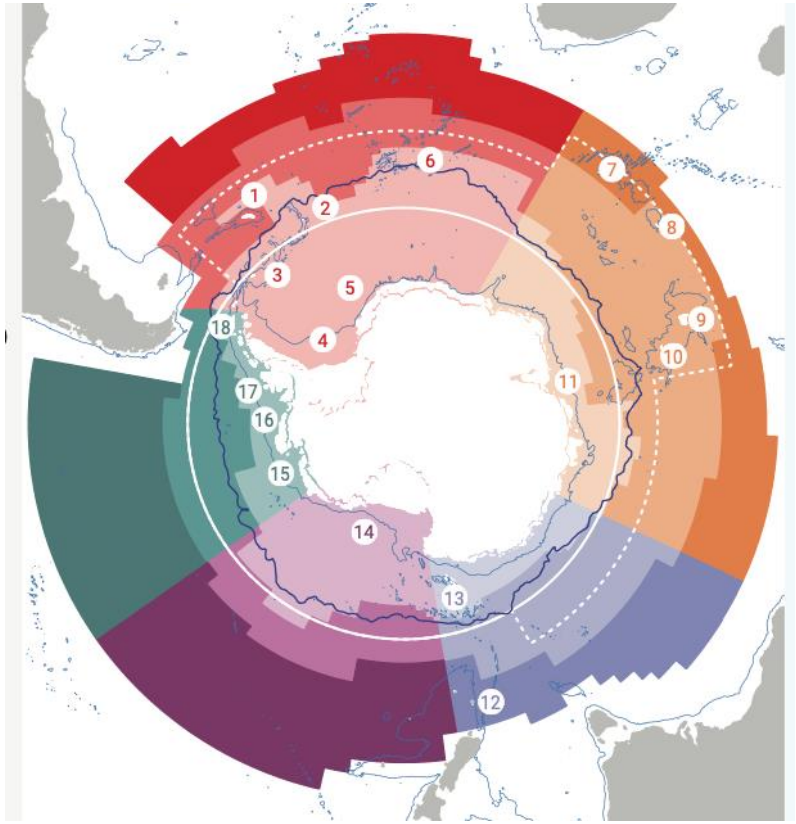
Southern Ocean ecosystems

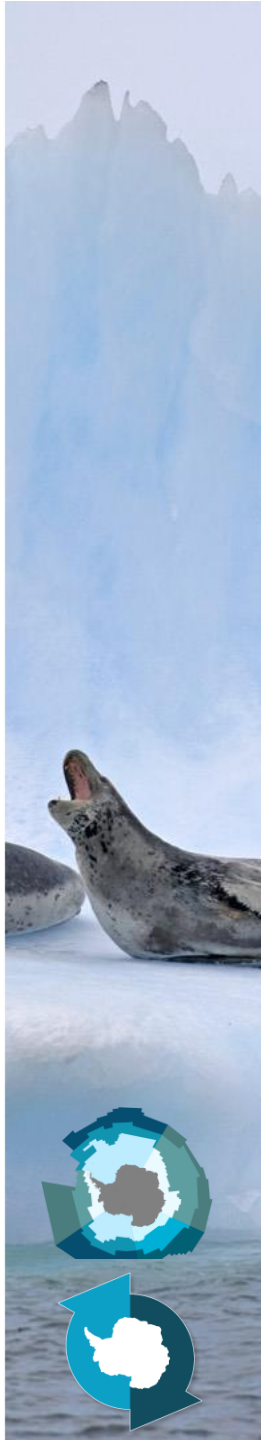
- **Unique** and **highly productive**
- **Resident** and **migrant** species
- **Adapted** to cool thermally stable environment
- **Occupy** a range of habitats from the coast to the deep ocean
- **Under threat and need our protection**

MEASO | MARINE ECOSYSTEM ASSESSMENT FOR THE SOUTHERN OCEAN

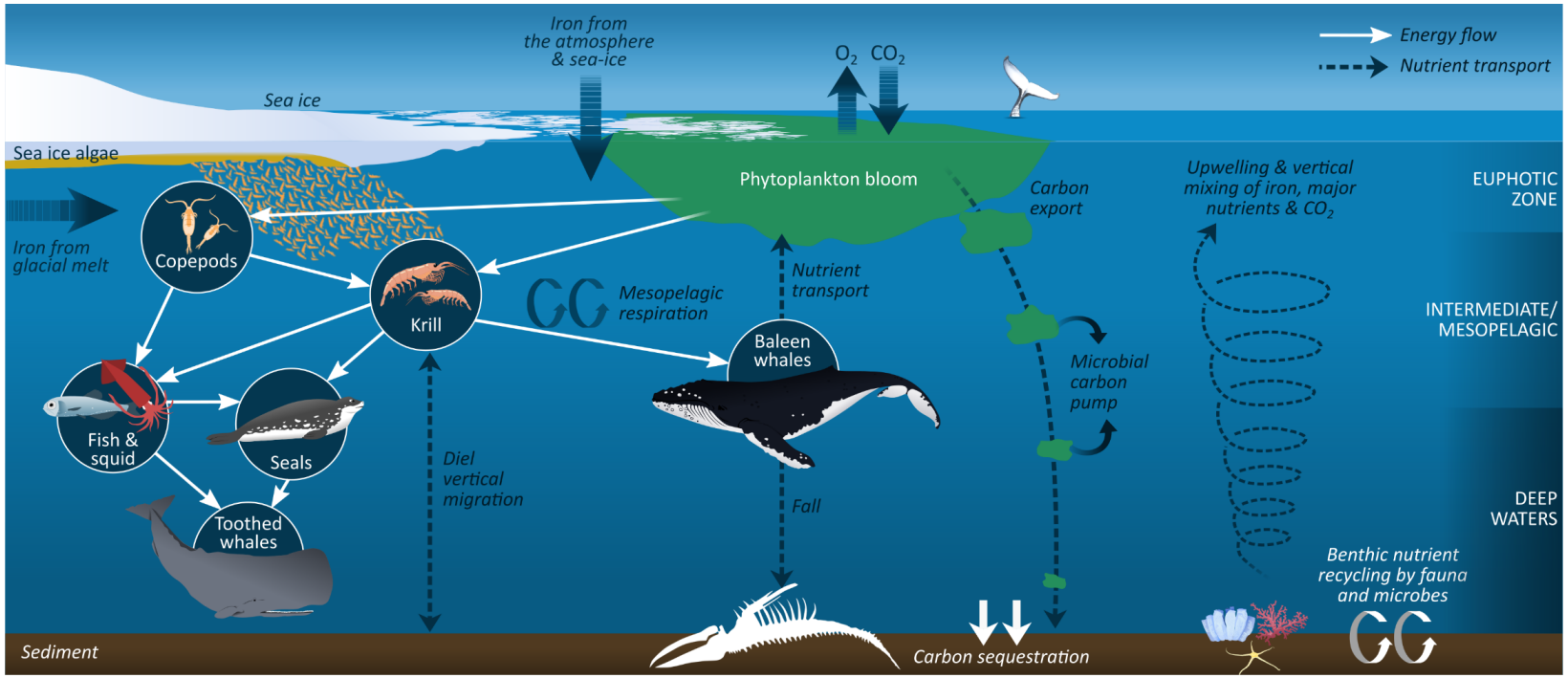
ICED
Integrating Climate and Ecosystem Dynamics in the Southern Ocean

- >200 researchers, >19 countries
- Completed a systematic **assessment of the status and change** of Southern Ocean ecosystems to **inform global and local policy decisions**
- Captured **full spectrum of the ecosystem**
- Assessed a range of **local and global drivers**
- **Published and disseminated** results widely
- **5 key messages**





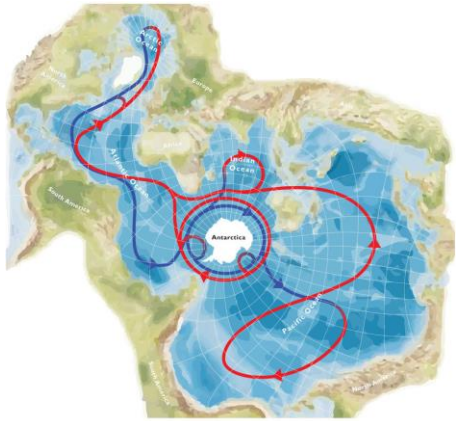
MEASO Key messages



Henley et al. 2020, Credit: Dr Stacey McCormack @VisualKnow

Southern Ocean ecosystems are:

1. **Globally** connected and provide important ecosystem services (biodiversity, fisheries, tourism, climate regulation, C and nutrient cycling)
2. **Threatened** by a range of global and local drivers
3. **Already changing**
4. **Continued changes** will have **global consequences**

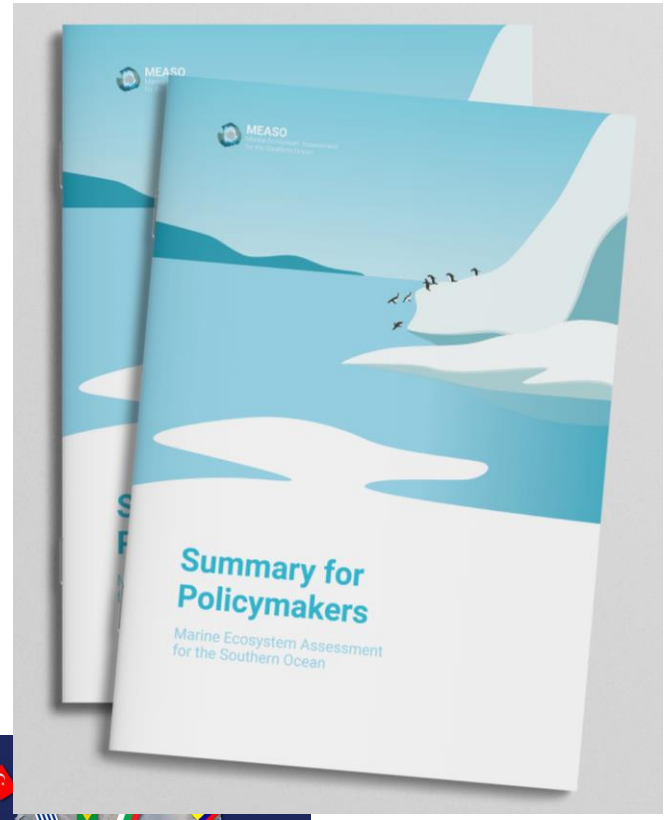


Credit: Meredith et al. BAS

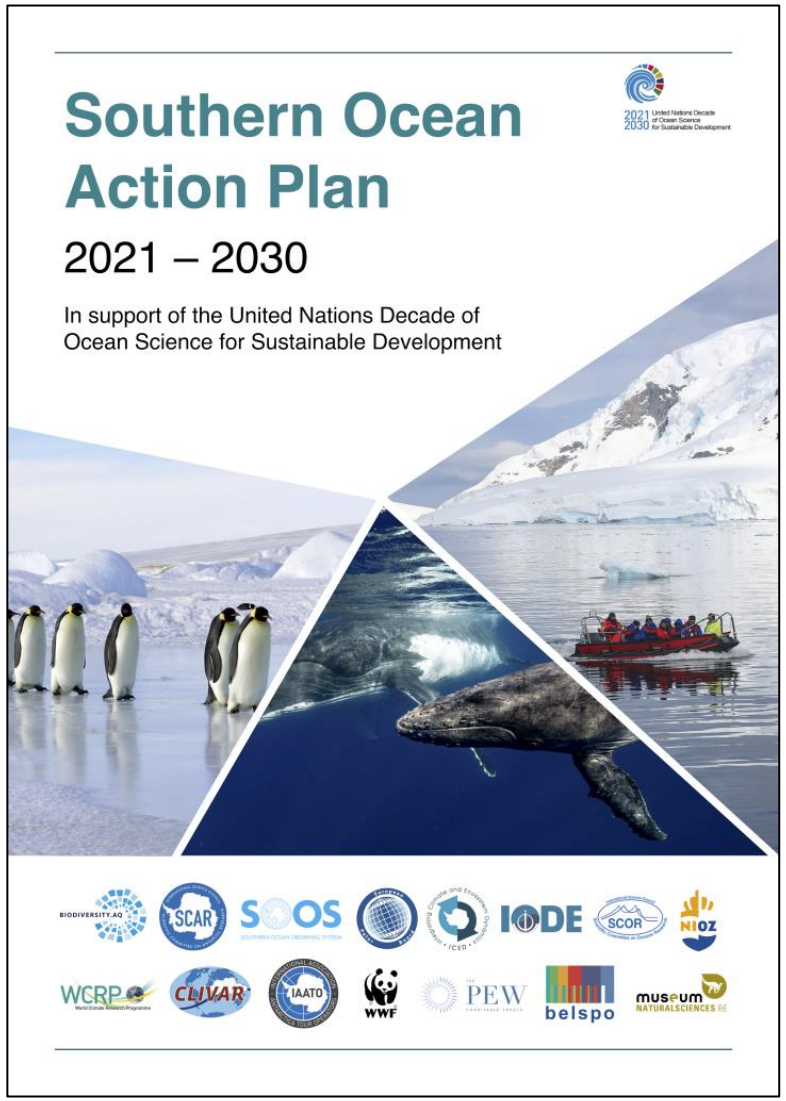
5. Action is needed to protect Southern Ocean ecosystems

- Effective local and regional **management and conservation policies** that can account for change and foster ecosystem resilience
- **Systematic long-term measurements of the state of habitats and biota** in the MEASO regions to underpin assessments of change
- Robust future projections of change
- **Global action** to curb climate change and ocean acidification

- ***Requires international collaboration and coordination***



Scan me!



2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Scan me!

ANTARCTICA
INSYNC

7 Working Groups

each identified 4 key questions and research challenges to be addressed

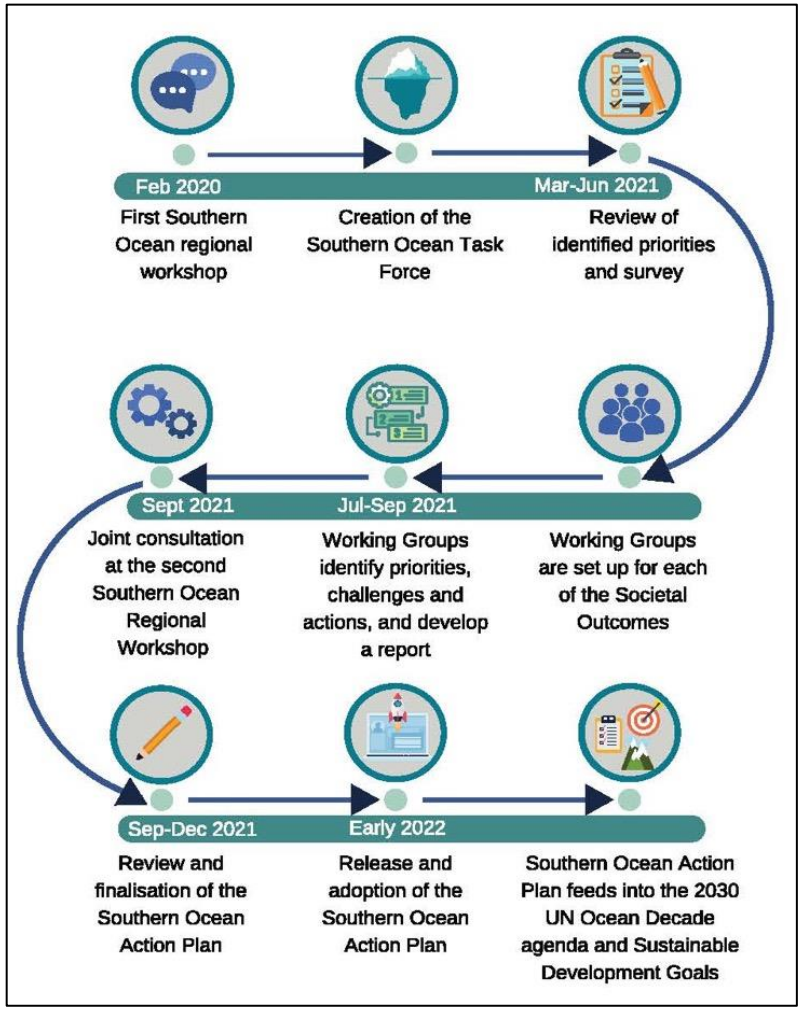
1.	2.	3.	4.	5.	6.	7.
A clean ocean where sources of pollution are identified and removed	A healthy and resilient ocean where marine ecosystems are mapped and protected	A sustainably harvested ocean ensuring the provision of food supply	A predictable ocean where society has the capacity to understand current and future ocean conditions	A safe ocean where people are protected from ocean hazards	A transparent and accessible ocean with open access to data, information, and technologies	An inspiring and engaging ocean where society understands and values the ocean

5 Bridges

- Funding
- Crossing boundaries
- Identifying and connecting stakeholders
- Data, observations and modelling
- Capacity building, inclusion, diversity

See Southern Ocean action plan for details

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

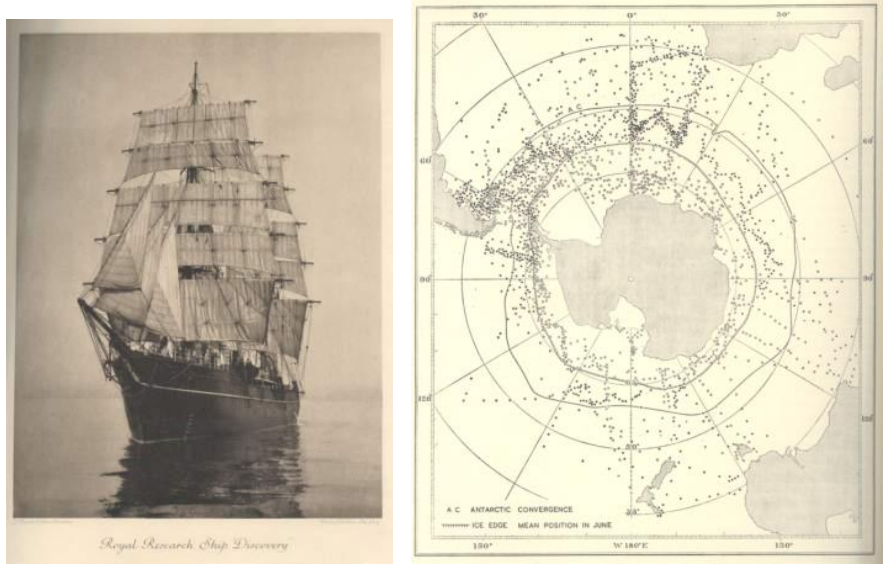


How can Antarctica InSync contribute?

- Establish a **network** of systematic long-term measurements of the state of habitats (sea ice, coastal areas, deep ocean) and biota (phytoplankton, zooplankton, benthos) to assess change
- Identify **mechanisms** involved and **resilience**
- **Quantify** the role of biology in carbon and nutrient cycles
- Develop robust quantitative **future projections** of ecosystems and implications for ecosystem services
- **Standardise protocols** for observations

Particularly

- In the sea ice environment
- During seasonal transitions
- During winter



Discovery Investigations 1925-52

Natural Environment Research Council

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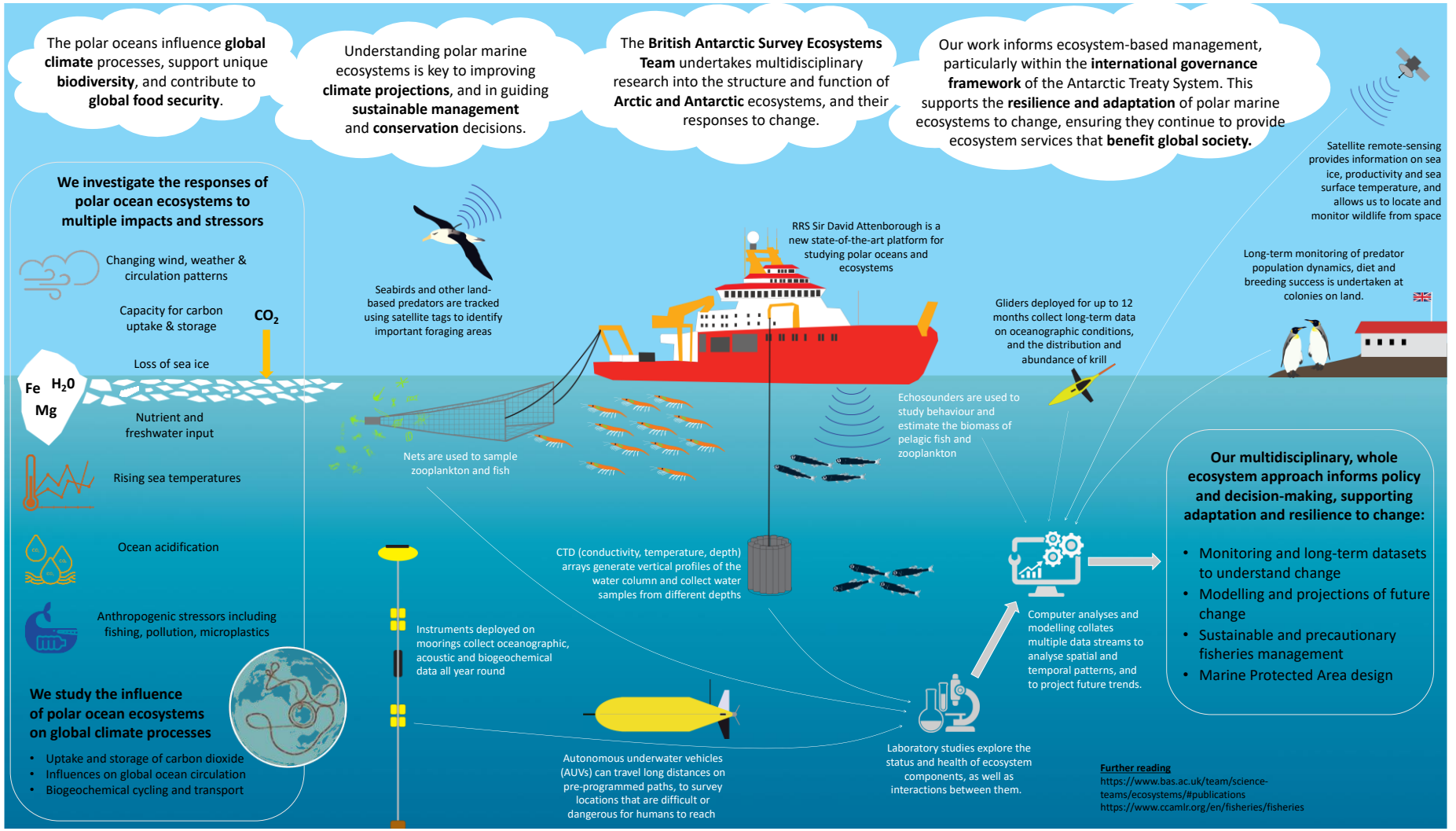

Credit: Grant *et al.* BAS

Next steps

- Southern Ocean ecosystem community strategy
- Engage physical scientists and other stakeholders
- Develop standardised protocols
- Make use of existing data
- Attract funding
- *Ensure all processes are inclusive*

Thank you!

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IMBeR

futureearth
research for global sustainability

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PolarRES
Exploring future polar climates

MEASO | MARINE ECOSYSTEM ASSESSMENT FOR THE SOUTHERN OCEAN

POLAR ECOSYSTEMS
BIOPOLE
GLOBAL IMPACTS

SOOS
SOUTHERN OCEAN OBSERVING SYSTEM

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Additional slides…

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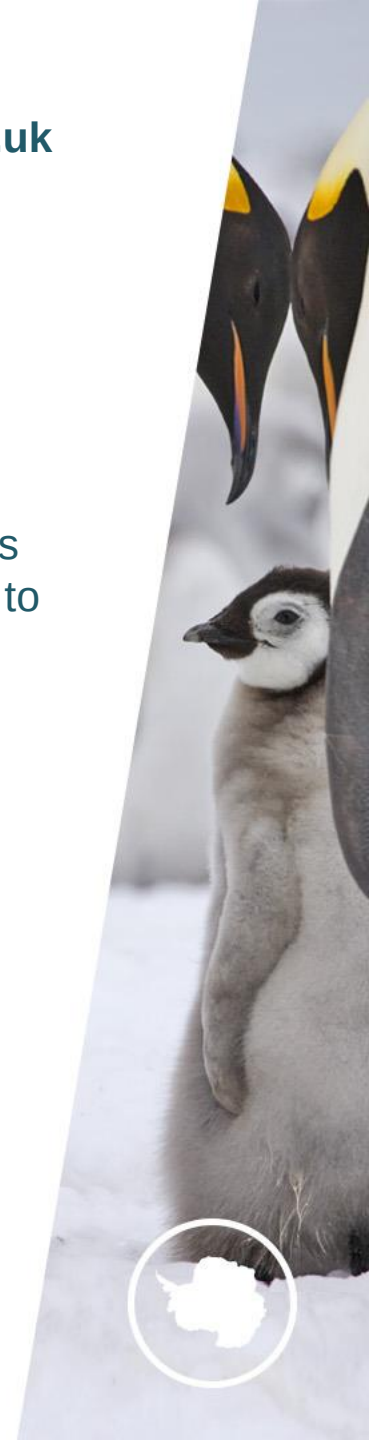
Vision

- To understand interactions between climate and ecosystem dynamics and generate scenarios and projections of future ecosystem change to support sustainable governance

Research Challenges

1. Understand and quantify the **state and variability** of Southern Ocean ecosystems
2. Improve **scenarios and projections** of future Southern Ocean ecosystems at multiple scales
3. Inform **conservation and sustainable management**

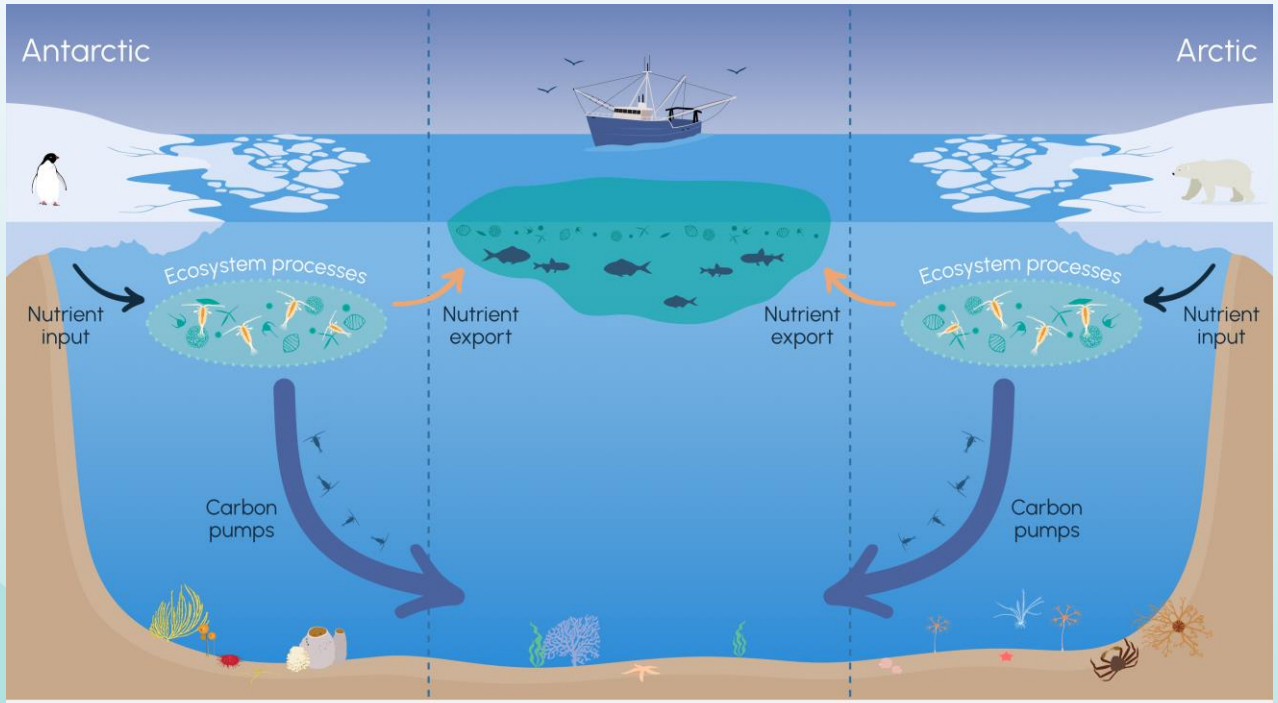
- *We promote and address these challenges by identifying and undertaking high-priority research, delivering workshops, conference sessions, and stakeholder-engagement activities*



2021 2030 United Nations Decade of Ocean Science for Sustainable Development

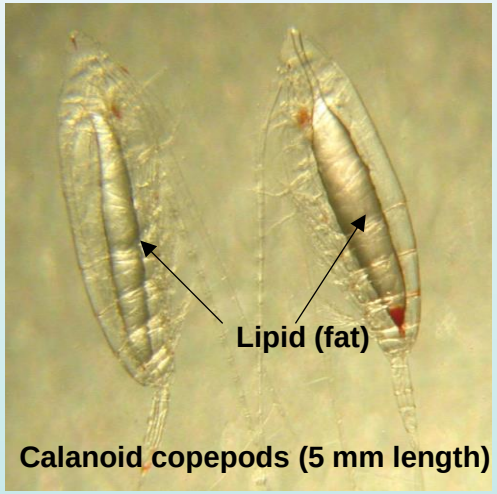
£8.5M NERC Long-term Multi-centre Programme (2022-7)

Goal: To address a fundamental aspect of the Earth System – how nutrients in polar waters drive global primary productivity, fisheries and the carbon cycle



BIOPOLE is answering three key questions

- Q1. What are the key inputs that contribute to nutrient balance in the polar oceans?
- Q2. How do polar marine ecosystems regulate this balance and sequester carbon?
- Q3. What are the global impacts?



Calanoid copepods (5 mm length)

British Antarctic Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS British Geological Survey

cpom Centre for Polar Observation and Modelling Natural Environment Research Council

National Oceanography Centre

UK Centre for Ecology & Hydrology

BIOPOLE SCIENCE PARTNERS STRATEGIC PARTNERS

UKRI Natural Environment Research Council