ACCESS
Australian Earth System Simulator
National Research Infrastructure

Strategic plan for ACCESS-NRI (2022-2027)

Acknowledgement

We acknowledge the Traditional Owners of the land on which our research infrastructure and community operate across Australia and pay our respects to Elders past and present. We recognise the thousands of years of accumulated knowledge and deep connection they have with all the Earth systems we simulate.

ACCESS-NRI is enabled by the Australian Government through the National Collaborative Research Infrastructure Strategy (NCRIS), a program managed by the Department of Education.

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

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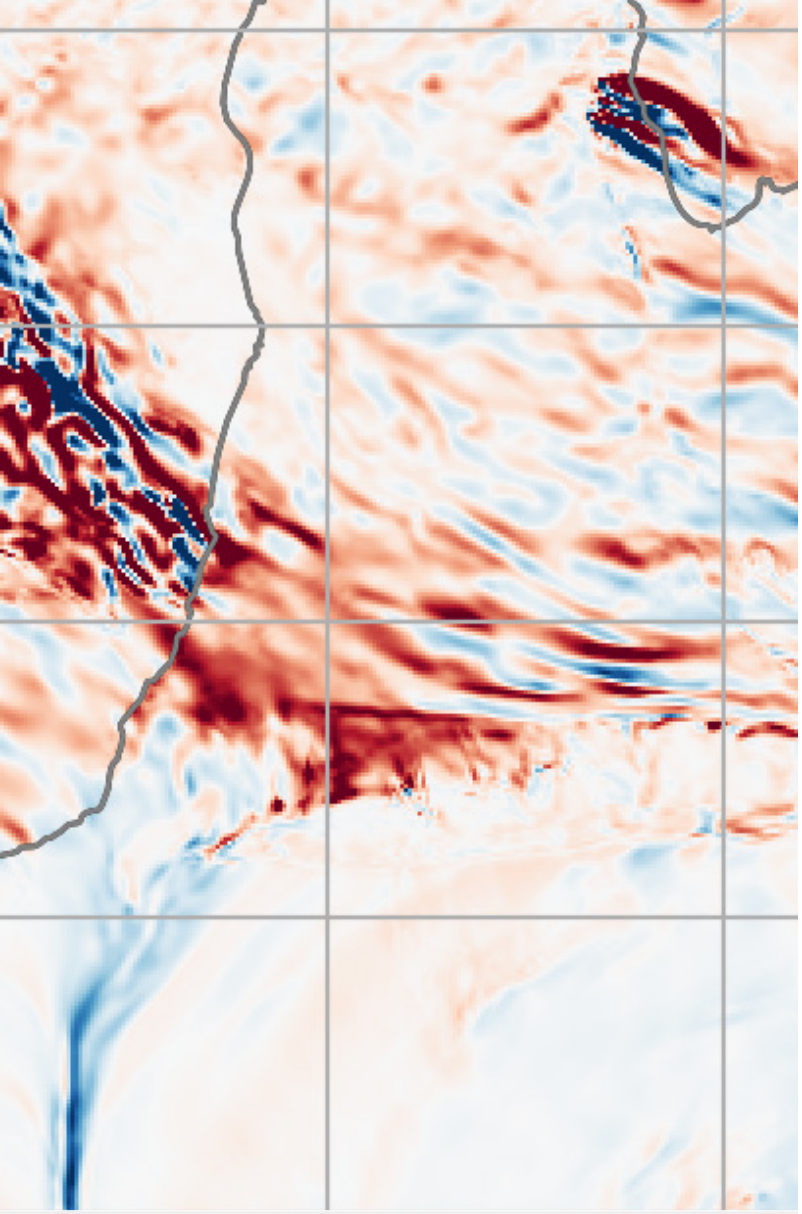
Our Vision

A world class Earth system modelling research infrastructure to predict Australia's weather and climate.

Our Mission

Our mission is to build a collaborative national Earth system modelling infrastructure to support research and decision making in Australia by:

1. Fostering a collaborative, diverse, interdisciplinary and inclusive research community
2. Building, releasing and supporting cutting-edge modelling systems, software tools and data frameworks
3. Transforming the quality, scale, significance, efficiency and relevance of Australia's weather, climate and Earth system science research



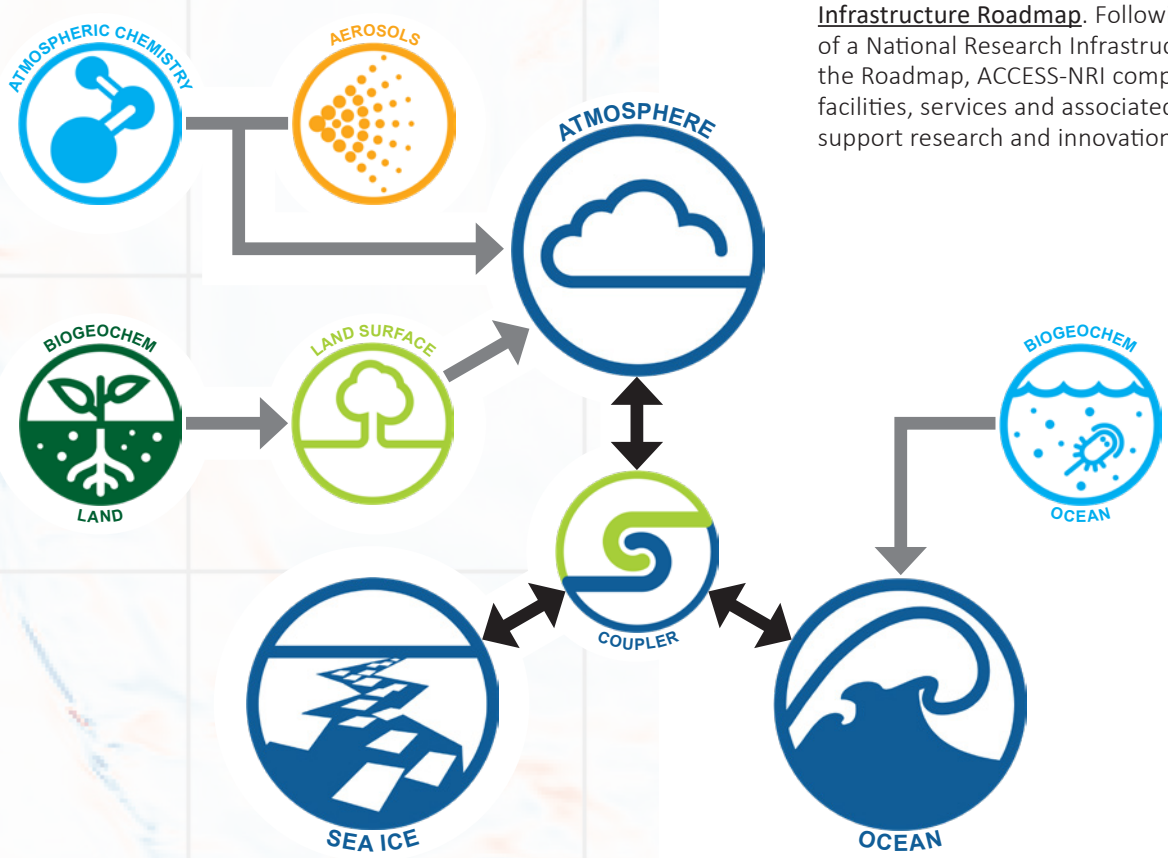
What is ACCESS?

The Australian Community Climate and Earth System Simulator, or ACCESS, is a **framework** for modelling the weather, climate and Earth system. This framework comprises individual **component** models – such as the land surface, the ocean or the atmosphere. Each of these components can be run in isolation, or they can be joined together to create coupled model **configurations**. These configurations can then be used for scientific research, weather prediction and future climate projections.

ACCESS has been developed over the last 15 years to serve the Australian community in areas such as weather forecasting, seasonal prediction, climate projections and paleoclimate.

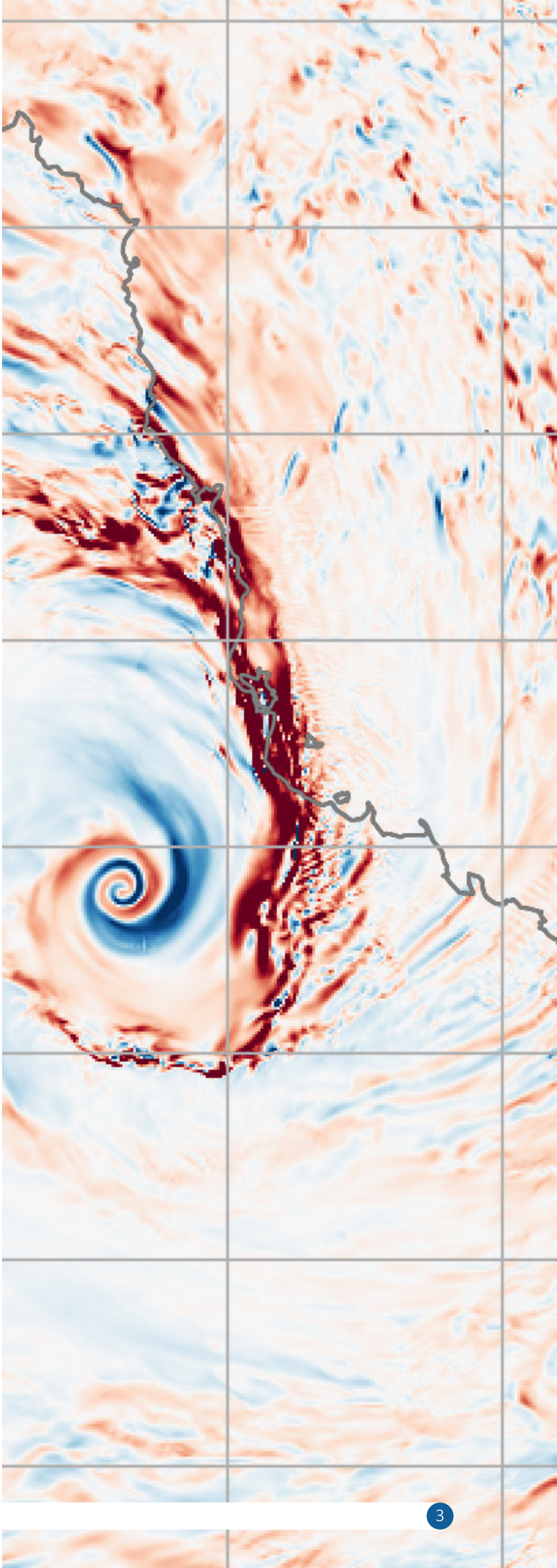
In 2021, ACCESS became part of Australia's National Collaborative Research Infrastructure Strategy (NCRIS). The Australian Earth System Simulator, also known as ACCESS-NRI, will build on the long-term development of ACCESS to enhance the capability of Australia's weather, climate and Earth system modelling and prediction framework.

Our strategy follows the strategic direction and principles set by the 2021 National Research Infrastructure Roadmap. Following the definition of a National Research Infrastructure (NRI) in the Roadmap, ACCESS-NRI comprises the assets, facilities, services and associated expertise to support research and innovation.

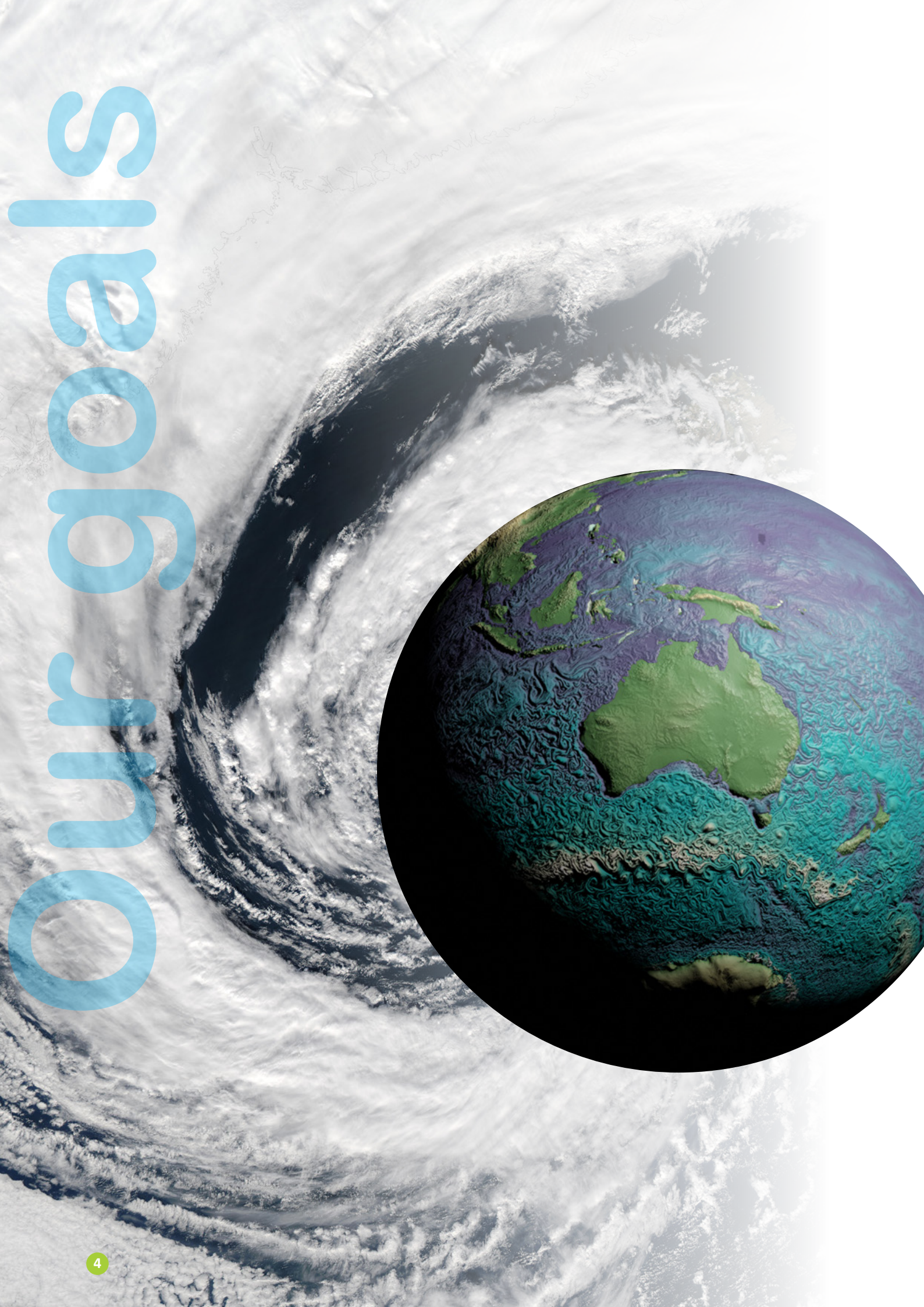


Our Guiding Principles and Values

- Our priorities are determined by the National interest and the needs of the ACCESS community
- The tools that we develop are designed to enhance national capacity (and strengthen international collaboration)
- We use an open development environment with clear and coherent software standards
- Our data framework is based on Findable, Accessible, Interoperable and Reusable (FAIR) principles
- We are a collaborative, multidisciplinary and equitable organisation
- We invest in the skills and capability of our workforce and wider community
- We manage our infrastructure to deliver maximum impact in National priority areas



Our goals



Our Goals

1 Creating an ACCESS model framework which is easier for researchers to develop and use

STRATEGIES

- An open development framework
- Well-documented code
- Community feedback via open issues
- Clear and transparent release processes
- Provide computational resources via a Merit Allocation Scheme

OUTCOMES

- Uptake of ACCESS by new users, by new communities, and for new use cases
- Enhanced research output from the Australian community
- ACCESS becomes a tool that unites the Australian research community and serves to drive collaboration
- Community input to drive the model development cycle

2 Improve the quality and performance of ACCESS model configurations

STRATEGIES

- Develop an evaluation & diagnostics toolbox
- Rigorous automated testing framework
- Optimisation of ACCESS configurations
- Deliver new configurations based on the needs of our research community

OUTCOMES

- Rigorous and reproducible model simulations
- Faster, more efficient, model configurations
- Improved model representation of the Earth system
- Easier for researchers to contribute code for community use

Our goals

Our goals

3 Make ACCESS output and input data transparent, open and accessible

STRATEGIES

- FAIR and open output data pipeline
- Documented processes for creating model inputs
- Community shared input files for standard model configurations
- Develop & maintain model output data processing workflows

OUTCOMES

- A community repository of nationally important reference simulation output
- Datasets that are well-described and easy to find and adopt
- Model reproducibility

4 Australian science for Australian model infrastructure

STRATEGIES

- Identify science needs for the Australian Earth system modelling community
- Incorporating Australian innovations into modelling framework
- Optimising model code on Tier 1 national computing facilities

OUTCOMES

- A modelling infrastructure designed for Australian needs
- Improved model performance in areas critical for Australia
- Model uptake by local users
- Accelerating Australian Earth system science

5 Be an organisation where people and partnerships thrive

STRATEGIES

- Investment in staff development
- Clear plan/policies to ensure an inclusive, diverse and respectful workplace
- Commitment to the Reconciliation Action Plan (RAP) as part of our activities

OUTCOMES

- Staff retention and continuity.
- Long-term development of critical skills
- A diverse workforce
- A rewarding and enriching workplace
- Foster innovation and creativity

6 Preparing for future challenges

STRATEGIES

- Become a thought-leader in national and international modelling community
- Developing national skill base
- Exascale and other High Performance Computing (HPC) challenges
- Engaging new communities and developing new techniques to broaden our partners and collaborators

OUTCOMES

- ACCESS NRI well integrated in national and international science fabric
- A systematic plan for future developments, with community buy-in
- Preparedness for disruptors
- Contribute to development of cross-sector modelling capability
- Forge links with national and international Research infrastructures

7 Build a connected community across academia, government, science, industry and society

STRATEGIES

- Clear Communications and engagement strategy
- Collaborate with other NCRIS organisations to leverage our efforts
- Raise awareness of our aims, services and values as an organisation
- Build up our national and international impact

OUTCOMES

- Foster new partnerships and users and maintain existing ones
- People understand and value what we do and why and the importance of our services
- Through our partners, provide information about the risks associated with climate change and how to mitigate these risks

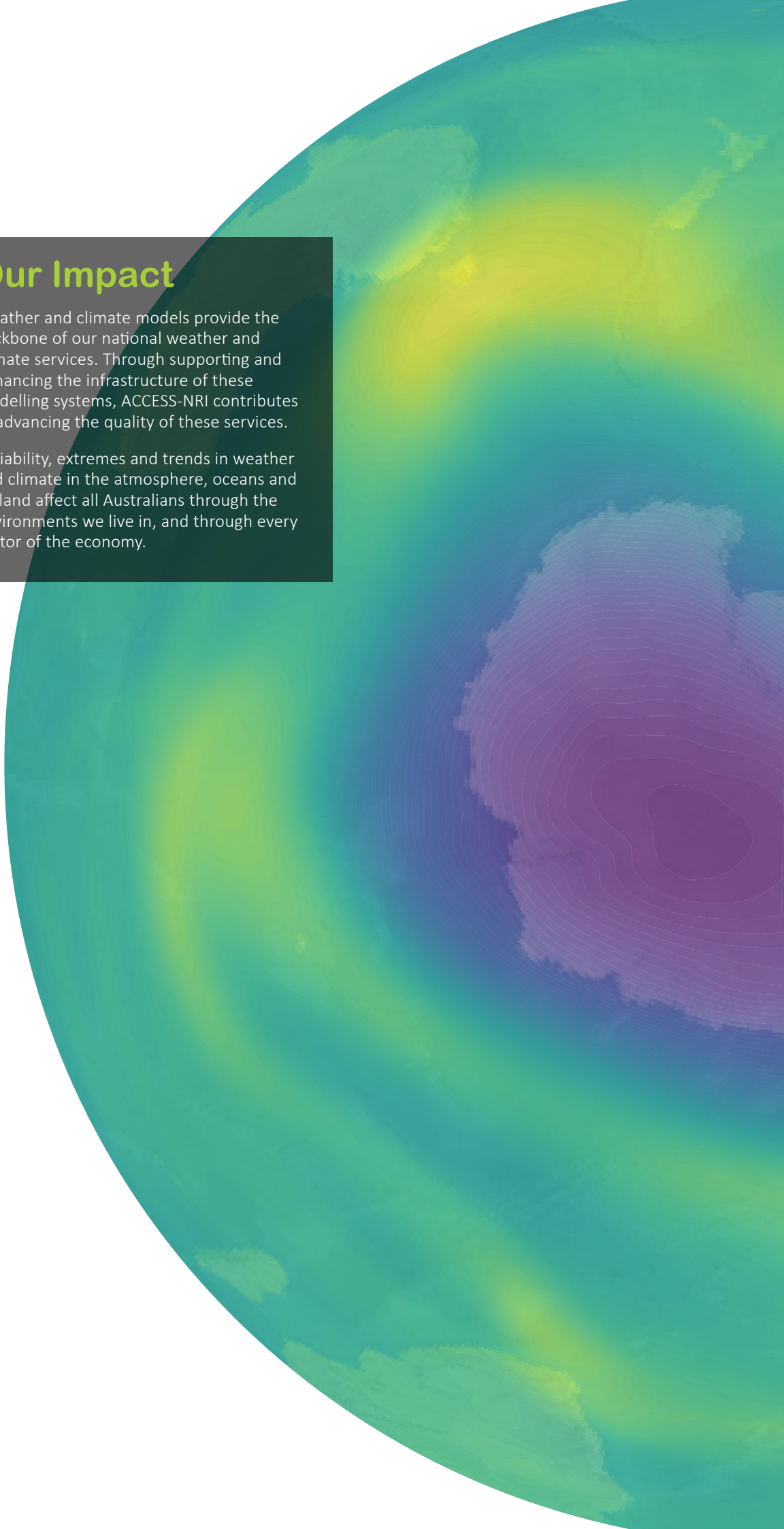
Our goals

Our impact

Our Impact

Weather and climate models provide the backbone of our national weather and climate services. Through supporting and enhancing the infrastructure of these modelling systems, ACCESS-NRI contributes to advancing the quality of these services.

Variability, extremes and trends in weather and climate in the atmosphere, oceans and on land affect all Australians through the environments we live in, and through every sector of the economy.



Our impact

ACCESS-NRI infrastructure has a wide range of existing and potential impacts upon the broader Australian community, researchers and decision-makers. These impacts include:

- Helping to meet Australia's commitments under the Paris Agreement
- Contributing to the infrastructure supporting net-zero and sustainable development goals
- Improved understanding of adaptation and mitigation options, thereby preparing Australia for the effects of human-induced changes in our current and future climate
- Creating an essential tool to enhance our knowledge of the fundamental science of climate and climate variability
- Forecasting extreme events and emergencies such as heatwaves, bushfires, cyclones, floods, coral bleaching, sea-level rise, coastal inundation and more
- Daily and seasonal weather forecasts
- Longer-term intelligence on drought and water availability for agriculture, insurance, security, environment and many other industries
- Simulations on paleoclimate, which are key to understanding our future by looking back at our past

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Our founding partners:

Australian National University
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The University of Melbourne
UNSW Sydney
University of Tasmania