# Atmosphere Working Group

## Kickoff meeting 17th of May, 2023

**AGENDA:**

- Welcome and acknowledgment
- Round-table introductions
- ACCESS-Hive and Forum
- Introduce Atmosphere WG: it’s purpose, how it operates, meeting format and frequency
- Discuss draft Terms of Reference
- Near-term objectives and key activities

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# Welcome and acknowledgement

***Acknowledgement of country***

We at ACCESS-NRI 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.

***For those in the ACT:***

I am talking to you from the lands of the Ngunnawal and Ngambri people, who are the Traditional Owners of the land upon which the University's Acton campus is located.

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# Introductions

- *Research interests:*
- *Current / upcoming projects:*
- *Experience level with UM / atmospheric modelling:*
- *Tools used (UM configurations):*

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# Heidi Nettelbeck

## ACCESS-NRI, ANU

### Atmosphere Working Group ACCESS-NRI Liason

- *Research interests:* Atmospheric Modelling software Infrastructure (Team Lead)
- *Current / upcoming projects:* Documentation (ACCESS model configurations), CMIP7
- *Experience level with UM / atmospheric modelling:* Beginner/ spinning up

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# Charmaine Franklin

## Bureau of Meteorology

- *Research interests:* Representation of clouds and convection in high-resolution models
- *Current model development activities:*
  - ACCESS-A/AE – 1.5km deterministic and 2.2km ensemble national models
  - Urban-scale modelling – 333m model over greater Sydney region, 100m model for Paris
  - Antarctic regional model - 1.5km resolution covering Davis and Mawson
  - RAL development and testing of new configurations (jointly with Met Office)
  - Km-scale global model configuration development and testing (jointly with Met Office)
- *Experienced UM user and developer (have microphysics code developments in the UM trunk)*
- *UM configuration* RAL3.1@UM13.0, Regional Nesting Suite, Regional Ancillary Suite, Regional Ensemble Nesting Suite

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# Yi Huang

## The University of Melbourne

- ***Research interests***:
  Cloud dynamics and physics, cloud-aerosol-climate interactions, mesoscale meteorology, precipitation and hydrometeorological processes
- ***Current / upcoming projects***:
  (1) ACCESS High-resolution Regional Modelling Project (AUS2200) – CI and lead coordinator
  (2) Cloud-climate interactions over the Great Barrier Reef (ARC DP230100639) - lead CI
  (3) Heavy precipitation in SE Australia wintertime storms (CLEX and ARC LP160101494) - CI
- ***Experience level with UM / atmospheric modelling***:
  Over 10 years of experience with atmospheric modelling, including WRF (primary) and ACCESS regional models
- ***Tools used (UM configurations)***:
  Primarily the AUS2200 framework and associated tool boxes

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# Matt Woodhouse

## CSIRO

- *Experience level with UM / atmospheric modelling:*
  - *Long term UM user; contributor to UM trunk*
- *Current / upcoming projects:*
  - *Role of hydrogen in the atmosphere*
  - *Marine cloud brightening over the GBR – RRAP*
  - *Southern Ocean aerosol – AAPP*
- *Tools used (UM configurations):*
  - *ACCESS-CM2(-Chem)*
  - *UM Nesting Suite*
  - *UKCA inc. GLOMAP*
- *Research interests*
  - *Atmospheric composition, especially marine aerosol*

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# Martin Dix

## ACCESS-NRI (on leave from CSIRO Environment)

- Working with the UM since the beginning of ACCESS
- CAWCR Model Systems team lead 2008-2014 working on both NWP and climate configurations
- Development of ACCESS1-0 and 1-3 for CMIP5, ACCESS-CM2 for CMIP6
- Currently ACCESS-NRI Associate Director for Model Development
  - Training
  - Documenting existing configurations and making them more robust
  - Planning for CMIP7
  - Testing new coupler

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# Christian Jakob

## ARC COE for the Weather of the 21st Century, Monash University

- *Research interests:* The future of day-to-day weather, Hydrological Cycle, Convection
- *Current / upcoming projects:* The ARC COE of the Weather of the 21st Century – strong focus on very very high resolution modelling for research with ACCESS both globally and regionally.
- *Experience level with UM / atmospheric modelling:* 8 years of parametrization development at ECMWF; 25 years of convection parametrization development; No hands-on experience with the UM
- *Tools used (UM configurations):* None, relying on the work of wonderful students and postdocs

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# Peter Steinle

## Bureau of Meteorology

- *Research Interests:* Atmospheric data assimilation
  - – especially km-scale
- *Current Projects:* National Analysis, ACCESS-Australia
  - Have used the cycling NWP configurations on and off for many years
  - Trying to get the transition to JEDI underway
- Assessing an assimilation system can really only be done by assessing a forecast system
  - Both forecast model and ensemble have huge influence on assimilation systems
  - So have dabbled in assessing both km-scale UM forecasts and ensembles for many years

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# Negin Nazarian

**Scientia Senior Lecturer, University of New South Wales (UNSW Sydney)**
**Chief Investigator, ARC Centre of Excellence for Climate Extremes (CLEX)**

- *Research interests:*
  - Urban Climatology, Microscale Urban Climate modelling, Urban Canopy Parameterization, Urban Climate Informatics
- *Current / upcoming projects:*
  - Development of urban canopy models using high-resolution LES modelling of urban flow
  - WRF-Comfort: Simulating micro-scale variability of outdoor heat exposure at the city scale with a mesoscale model
  - Regional modeling of urban heat exposure in Australian Cities
- *Experience level with UM / atmospheric modelling:*
  - Expert in microscale urban climate modeling using Large Eddy Simulations.
  - No prior experience with UM and (personally) never ran a mesoscale model. However, we develop urban canopy models for regional/mesoscale models and my group members use Weather Research & Forecasting Model (WRF).

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# Sonya Fiddes

## Australian Antarctic Program Partnership, IMAS, UTAS

- *Research interests:*
  - Southern Ocean & Antarctic cloud-aerosol interaction
- *Current / upcoming projects:*
  - Testing of cloud/aerosol microphysics over SO/A – can we improve cloud/aerosol representation, using campaign obs to evaluate.
  - Using machine learning to evaluate models (see Fiddes et al. 2022 ACP, Fiddes et al. 2023 in review GMD)
- *Experience level with UM / atmospheric modelling:*
  - Can set-up, run, make small changes to model code, debug basic problems – would like to continue advancing UM knowledge.
- *Tools used (UM configurations):*
  - ACCESS-AM2, ACCESS-AM2-Chem, UM Nesting Suite

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# Zhaohui Wang

## CSIRO

- Zhaohui Wang recently joined the CSIRO Coupled Climate Modelling team as an atmospheric modeller. My main responsibility in this role is to provide research support involving ACCESS climate model configurations and applications, with a particular focus on the atmospheric component and its interactions with land-surface and chemistry.

- Prior to my current role, I obtained my PhD degree at the University of Tasmania, where I conducted research on the interactions between the atmosphere and Antarctic sea-ice using numerical weather prediction models. I have more than 4-year atmospheric modelling experience for WRF/PolarWRF. Recently, I just started running the ACCESS-CM2/ESM1.5 models to increase the scenario ensemble members. I also interested with the model output processing and evaluation, such as the upcoming APP5.

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# Greg Roff

## Australian Bureau of Meteorology

I work at the Bureau in the Atmospheric modelling team on Antarctic regional modelling as well as on a project using an ACCESS C3 downscaler run in near real time to provide fields to drive ocean and wave models.

- *Research interests*

Improving Antarctic Regional NWP modelling, using operational downscalers for NRT forecasting

- *Current / upcoming projects*

Developing an ACCESS Antarctic/High Latitude regional model

Running operational ACCESS-C3  model in as a downscaler in NRT  and new domains

- *Experience level with UM / atmospheric modelling*

Have run climate, NWP, and Single column models

- *Tools used (UM configurations)*

UM10.6 UM13.0

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# Belinda Roux

## Bureau of Meteorology

- Working in the Atmospheric Modelling Team
  - Developing ACCESS-A/AE regional NWP model
- Interested in high-res NWP modelling
  - fog and near-surface processes
- Experienced UM user
  - Atmospheric modelling
  - Currently using RAL3p1 science configuration
  - RES (Regional Evaluation Suite) for model evaluation
  - Python programming

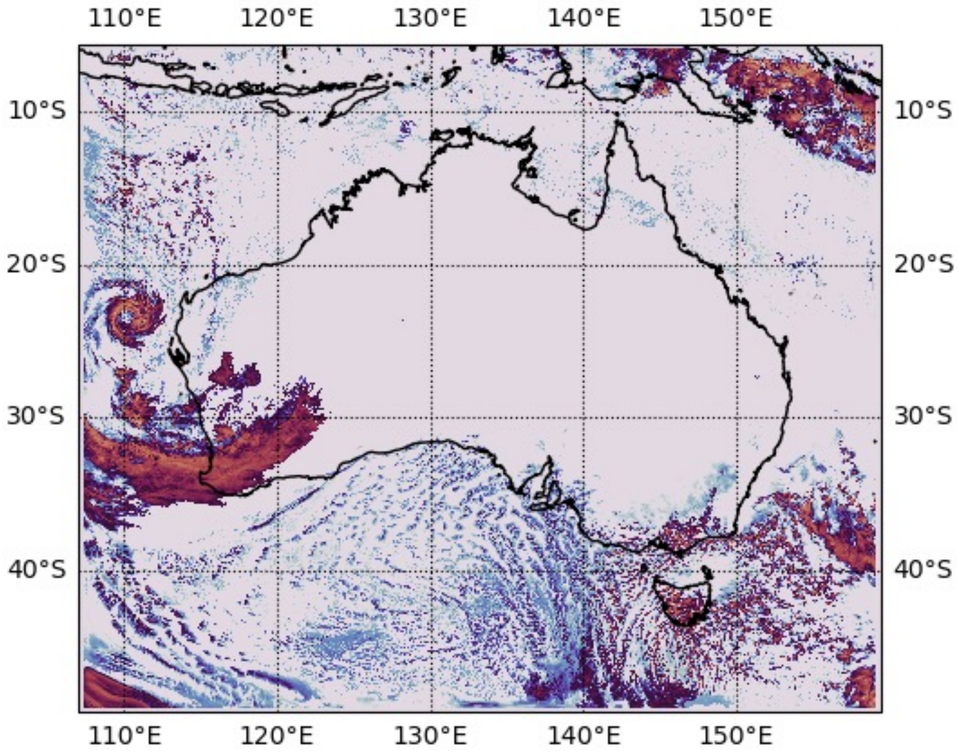


Image: ACCESS-A 1km reflectivity at 00Z, 11 April (24hr forecast) on full stretched domain

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# Dale Roberts

## CLEX CMS

- *Research interests:* Mostly tech support
- *Current / upcoming projects:* AUS2200
- *Experience level with UM / atmospheric modelling*: Somewhat experienced
- *Tools used (UM configurations):* Yes?

climate extremes
ARC centre of excellence

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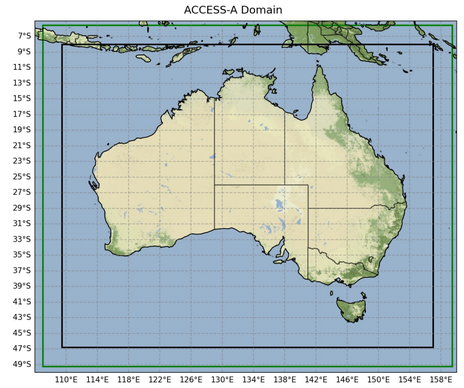
# Shaun Cooper

## Bureau of Meteorology




- *I am interested in convective scale modelling, in particular, convective scale ensembles.*
- *Currently working on the Bureau's next convective scale NWP system, ACCESS A. Focus will then turn to the ensemble counterpart, ACCESS AE.*
- *I have been working with the UM for the past 7 years, predominantly the development of the Bureau's first operational convective scale ensemble system, ACCESS CE.*
- *Currently using the Regional Atmosphere and Land version 3.1 configuration at UM 13.0 in the ACCESS A work.*
- *Have experience running the Regional Nesting Suite and the Regional Ancillary Suite.*

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# Tim Raupach *(absent)*

## UNSW Sydney Climate Change Research Centre
## ARC Centre of Excellence for Climate Extremes

I'm a lecturer at the CCRC. I studied at ANU, moved to Switzerland to do my PhD (2016) on small-scale rainfall variability and radar meteorology at EPF Lausanne, did postdocs at EPFL and University of Bern, then returned to Australia to work at UNSW.

- Research interests:
  - Climate change effects on severe convective storms - particularly hailstorms.
  - Climate impact and risk in relation to extreme weather events.
  - Precipitation microstructure representation, model microphysics.

- Projects: hail in a changing climate, modes of variability effects on hail, "drizzle mode" in model microphysics.
- Experience: lots of experience with running/modifying WRF. UM experience limited to tutorial and using outputs.
- UM tools used: AUS400, AUS2200.

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# ACCESS-NRI

ACCESS-NRI created to support development and research with the ACCESS modelling system.

*Specific goals:*

- Creating an ACCESS model framework which is easier for researchers to develop and use
- Improve the quality and performance of ACCESS model configurations
- Make ACCESS output and input data transparent, open and accessible
- Build a connected community across academia, government, science, industry and society

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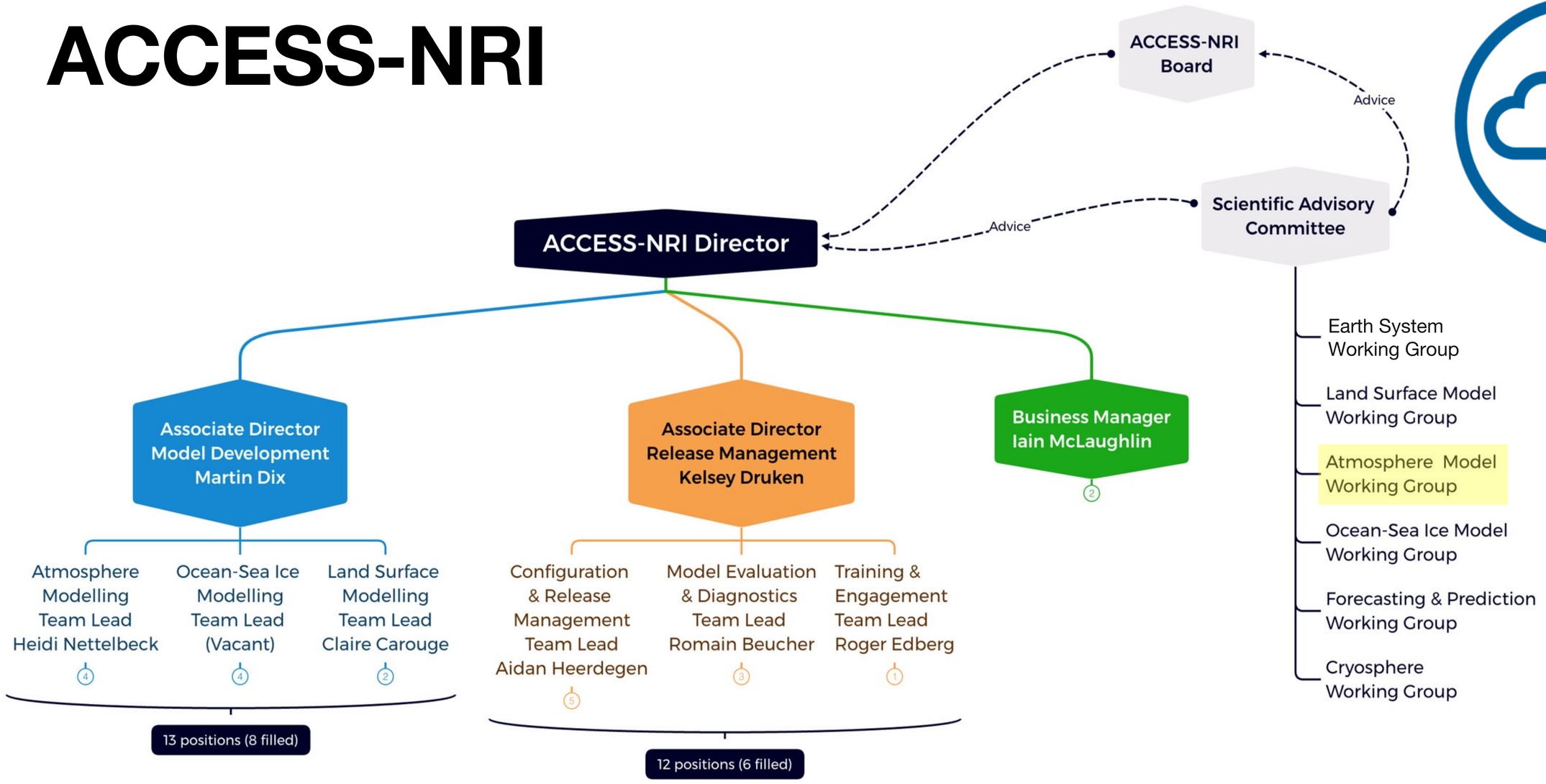
# ACCESS-NRI

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# **Practical:** ACCESS-Hive and Forum

**ACCESS-Hive:** *https://access-hive.org.au/*

Portal to documentation: collate existing; more accessible documentation

Community resource facilitated by ACCESS-NRI; needs community input

**ACCESS-Forum:** *https://forum.access-hive.org.au/*

For whole ACCESS Community to share information, have fruitful discussions, organise and plan shared activities.

Resourced and facilitated by ACCESS-NRI

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https://access-hive.org.au/

ACCESS-Hive

Search

ACCESS-Hive
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Home

- Supported
- Recommended
- Community

ACCESS-Hive Forum

# ACCESS-Hive

contributors 10 forum 224 users

ACCESS-Hive is a portal to all documentation relevant to the Australian Community Climate and Earth System Simulator, ACCESS, and the wider ACCESS community. ACCESS-Hive is developed for and by the ACCESS community following an open-source development model.

ACCESS-Hive is part of an effort to design higher quality and more accessible documentation for ACCESS and its community. Providing a single access point to any relevant documentation improves the accessibility and visibility of the documentation. As a portal, ACCESS-Hive provides links to documentation hosted on other sites. It is not intended to host the documentation itself.

ACCESS-Hive is curated to ensure it is relevant and of reasonable quality, and all links have an annotated summary to help you find what you need. Annotations also makes the in-built live search function extremely effective.

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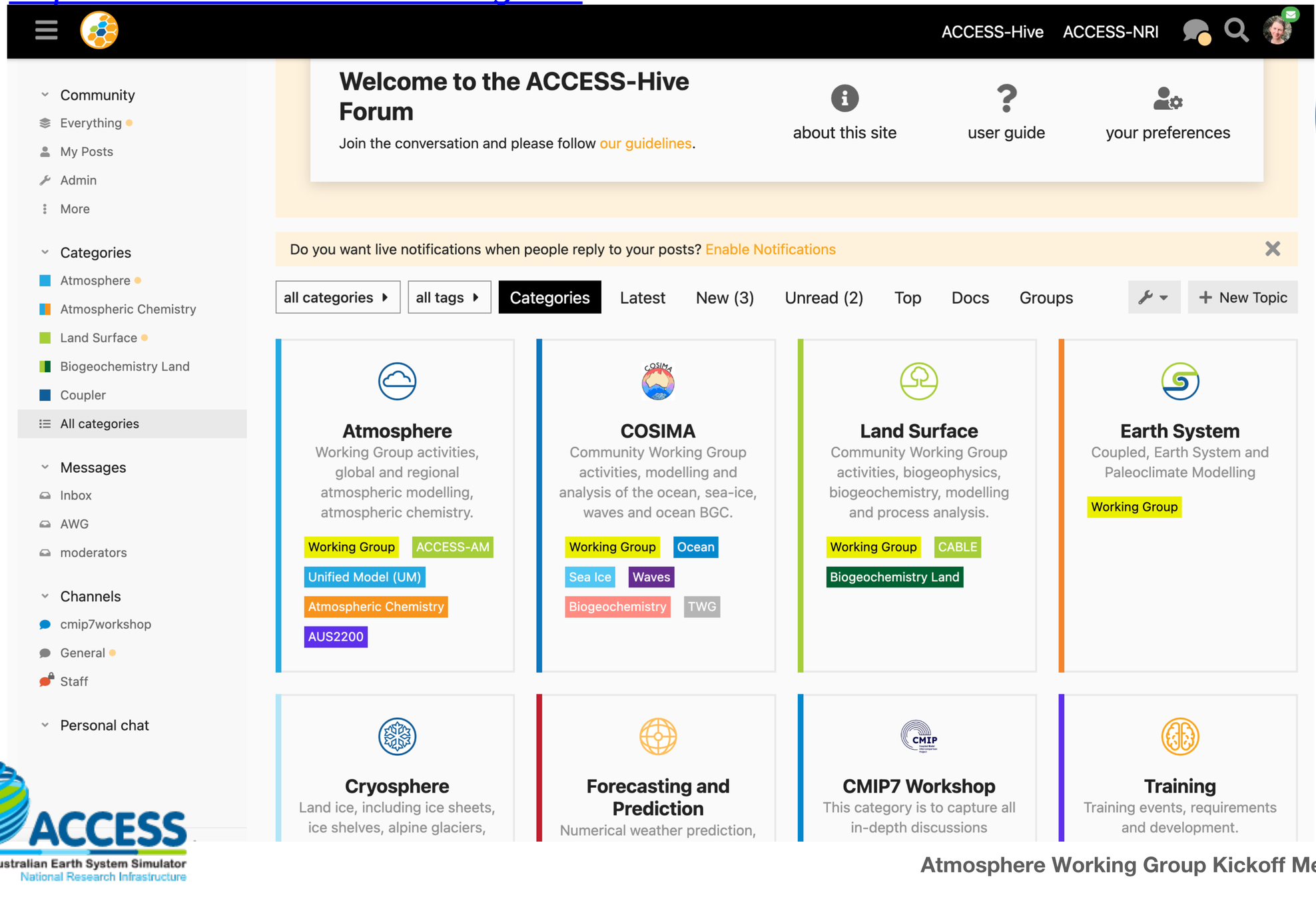
https://forum.access-hive.org.au/

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# Introduce Atmosphere WG

*Co-chair: Charmaine Franklin*

Brief Introduction about Atmosphere WG

Discuss draft Terms of Reference:

*https://forum.access-hive.org.au/t/atmosphere-working-group-terms-of-reference/665*

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# Atmosphere Working Group

## Key aims and scope

- Establish and maintain an Australian atmospheric modelling community.
- Working group is broad and covers global and regional atmospheric modelling on weather and climate timescales, and includes atmospheric composition modelling.
- Provide a forum for discussing atmospheric modelling research activities and sharing information about model configurations and experiences with the community.
- Identify and inform the ACCESS-NRI of training and documentation needs, as well as datasets required for running and evaluating the model.
- Review priorities of the national atmospheric modelling community to advise the ACCESS-NRI SAC on near-term and longer-term development and application needs.
- Identify and encourage areas of collaboration.
- What do you want and expect from this working group?

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# Atmosphere Working Group Terms of Reference

- Establish and maintain a national atmospheric modelling community by promoting regular contact between Australian researchers working with the UM.
- Provide a forum for discussing atmospheric modelling research activities and sharing information about model configurations and experiences with the community.
- Provide an opportunity for working group members to deliver short presentations on their atmospheric modelling work to the community.
- Provide information about training and UM Partnership atmospheric modelling research activities to improve engagement with international research organisations using the UM.
- Maintain a list of national atmospheric modelling research activities using the UM.
- Review priorities of the national atmospheric modelling community to advise the ACCESS-NRI SAC on near-term and longer-term development and application needs.
- Recommend key datasets that are needed for model inputs, and observations and tools/techniques required for model evaluation.
- Manage the computational resources allocated to the working group.
- Participate in the annual ACCESS-NRI Community Workshop.

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# Near-term objectives & key activities

- Structure for Atmosphere Working Group
- Meeting frequency
- Support ACCESS community can expect from ACCESS-NRI:
  - ✓ Documentation, Support existing releases (OM2, CM2, ESM1.5)
  - ✓ Training
  - ✓ Atmos WG compute: 1.25MSU / quarter
- How users can access support ==> ***Hive-Forum***

- ***Satellite meeting*** at ACCESS-NRI workshop *5-8 September, 2023*

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