ACCESS-NRI Scientific Advisory Committee

Thursday 26 October 2023 2.00pm - 3.30pm

Attendance

Chair: Andy Hogg
Rapporteur: Lauren Vieira
Attended: Rachel Law, Tilo Ziehn, Claire Vincent, Laurie Menviel, Charmaine Franklin, Andrew Kiss, Oscar Alves
Observers: Martin Dix, Kelsey Druken, Victoria Allen, Claire Carouge
Apologies: Adele Morrison, Paul Spence, Ben Galton-Fenzi, Christian Jakob, Ben Evans

Item 1 – Welcome and Acknowledgement of Country

Item 2 – Previous Minutes

The previous minutes of the meeting has been approved and uploaded on the ACCESS-NRI website.

Item 3 – Matters Arising

A1: Workshop Planning for 2024/2025.

ACCESS-NRI has started to plan for a September 2024 workshop in Canberra. In December, we will begin scoping for a 2025 interstate workshop.

A2: ACCESS-NRI to provide dedicated support to help newer working groups fast-track their effectiveness.

Each group has different needs – we are happy to discuss these needs under Item 5 or off-line.

A3: ACCESS-NRI to review and address the HIVE concerns and report back at the next SAC Meeting.

A number of new features have been added to the HIVE Forum setting to help users easily subscribe to updates, including: addressed users concerns about missing updates, added shortcuts to each working group, cleaned up the sidebar menu, added voting posts for stack overflow posts.

The committee discussed the recently raised concern at the Board meeting around the risks posed by forum openness to the reputation of ACESSS-NRI or our partner organisations. The committee understood the concern, however, agreed that HIVE's openness gives the ability to learn from each other. Additional security features could include:

- Locked topics for sensitive content
- Anonymous posts (which may also encourage users to send help requests)

ACTION: A.1 - ACCESS-NRI to enable anonymous post settings.

A4: ACCESS-NRI will be finalising a contract with NCI regarding data and will discuss attribution and cooperation as part of that process.

A5: ACCESS to create public-facing pages to provide clarity on current work/priority levels
Work is being done on a roadmap of ACCESS-NRI's current and future projects, once ready this will be posted on our website

A6: The proposal of model development scholarships has been discussed internally and with other NCRIS Projects – our approach is likely to be finalised in the coming year.

ACTION: A.2 - ACCESS-NRI to liaise with the Bureau of Meteorology regarding timings of September 2024 Workshops. [Update – BoM has advised that their workshop will be held on 9-13 September]

Item 4 – ACCESS-NRI Updates

NCRIS Funding

NCRIS (as of Thursday 19th Oct) announced the results of their 2023 funding round. ACCESS-NRI will receive an additional $9,642,548 over the next 4 years. Another round will be opened in 2024. See below table for funding allocations.

NCRIS 2023 Funding Round

- ACCESS-NRI Request: $15,359,806 over 4 years

Activity	Funding Awarded	Program
Software Transformation, Compute & Storage	$4,500,000 over 4 years	~50MSU Compute & 2-4 PB storage at NCI 2-3 FTE in new Software Transformation Team
Coastal Research Infrastructure	$2,459,729 over 4 years	2-year pilot on coastal ocean models (with UNSW) Ice sheet modelling capacity within ACCESS
Expanding Australia's Land and Earth System Modelling	$2,682,819 over 2 years	Work with UNSW to use TERN data with CABLE Help to deliver CMIP7, including CABLE development
TOTAL	$9,642,548	

Activity 1: Software Transformation, Compute & Storage

- Due to the delay in the funding announcement, we are yet to secure an agreement with NCI. Therefore, we have not yet been able to satisfy any requests for compute storage. NCI have provided a small amount of data to Working Groups in the interim. Discussions with NCI will commence this week.
- A Software Transformation Team was part of the original ACCESS-NRI proposal, however, it was not funded as part of our baseline operations. This team is now partly funded and will investigate new technologies, focusing on AI and machine learning. To be discussed within the coming months, hopefully with input from Working Groups.

Activity 2: Coastal Research Infrastructure

- This is part of a wider increased effort to emphasise coastal research infrastructure.
- The funds will be utilised to support capability in regional and coastal ocean modelling.
- ACCESS-NRI and UNSW are working on a small pilot study on coastal ocean modelling.
- ACCESS-NRI are working with ANCOMS to propose a Nation-wide coastal model – similar to COSIMA.
- There are also fund to support ice sheet modelling capability and there will be a Cryosphere workshop next week to discuss which ice sheet model to use.

Activity 3: Expanding Australia's Land and Earth System Modelling

- This is focused primarily on:
    - Developing improvements to CABLE and the CABLE Land Surface scheme, and how to use existing data within NCRIS and the TERN facility.
    - A direct contribution towards CMIP7 consortium.
- This activity was funded 100% for two years, we plan to reapply for further funding in the 2024 round.

Overall, we are satisfied with the funding received. Working Groups were advised to start proposing experiments for storage as this can be supported in the short term.

ACTION: A.3 – Working Groups to start organising proposals for data storage allocation.

Discussion

Staffing

ACCESS-NRI will be hiring approximately 12 full time employees (employed by ANU) which is approximately a 35% increase on current staff funding.

A portion of this funding will be allocated to partners to do the hiring, such as partnering with UNSW on TERN Data. Work was done during the year to change the collaboration agreement so we could provide funding to partners that provide services more efficiently.

Ice Sheet Modelling Team

We expect to hire 3 – 4 full time employees, this timeline depends on advice from the Cryosphere group. Partners may be involved in this project, however we hope by the end of these 4 years we have an Ice Sheet Modelling Team up and running, and in a similar position to Land, Ocean or Atmosphere Teams.

The committee discussed the importance of including Greenland. The community is developing some capability at UTas and Monash for Greenland, and are confident there will be further development. Further discussions will occur at the Cryosphere workshop next week.

Presentation from the ACCESS-NRI Land Surface Modelling Team

Scientific Evaluation of CABLE

- Goal is to provide testing framework to evaluate CABLE routinely, using standard tests and statistical methods using Python and Benchcab.
- The team have developed a website which statistically analyses scripts, observations and model outputs, producing a URL which is easily shared.
- Potential interest from NCAR.

- Benchcab v2.0 was released in June 2023 – ACCESS-NRIs first release.
- Benchcab v3.0 is planned for release end of 2023, which will support offline spatial simulations.
- The next version will support ESM1.5 simulations, during the first quarter of 2024.
- Future additions hope to include support for Rose/Cycl, CM2. CM3, ESM3, JULES.

CABLE Code Management

- Currently difficult to recognise which features are in divergent versions of CABLE.
- Lack of standardised testing and software design makes it hard to trust the code.
- Documentation is critically out of date.
- No standard configurations exist that can be shared.
- Input data can be hard to locate.

- CABLE will move to GitHub in November 2023, creating fully open access code, built-in tools. for code reviews and testing.
- New working practices will be introduced. These are being currently written and reviewed.
- There may be difficulties around streamlining the synchronisation of CABLE offline within ACCESS.
- Scientific validation will depend on the research community.

ACCESS-AM3 Development

- A simplified version of ACCESS-AM3 is currently running – no river scheme, no vegetation (land cover is ice or bare soil)
- The next items to add are:
    - Vegetation
    - River scheme
    - Re-implement dust fixes from UM10.6 into UM13.1
    - Recreate ancillary files compatible with ACCESS-OM3 land mask
    - Completion is expected by July 2023

Discussion

More investigation surrounding adding nutrients into the river scheme is needed especially if focusing on emission-driven scenarios – it's important to have a good link between the rivers and the oceanic biogeochemistry.

Nutrients into the ocean model have been added, distributed in a way they could have come from rivers. We don't have any formal connection between the land and the ocean, nor does carbon flow from land to ocean down the rivers. This is an area to investigate in the future.

CMIP7 Update

Submission to DCCEEW

Priority work has been compiling resourcing request documents for DCCEEW, the draft was submitted at end September. The next draft will be ready to submit end of October. Core targets include:

    - Funding the development of ACCESS-ESM3
    - Participation in fast-track experiments for CMIP7
    - As a second add-on, would be additional community-led MIPs.

- It is critical we move swiftly to get ACCESS-ESM3 up and running.

- The ACCESS- OM3 is progressing – the 1 degree model is running however not yet stable.
- Work is being done to see how WOMBAT is best added into the MOM6 code.
- ACCESS-AM3 is still running JULES rather than CABLE.
- Other model development pathways are being kept open, as a testing environment fall-back position.
- MOM5 coupling to ACCESS-AM3 (as a test for ACCESS-ESM2.5) will go ahead.
- CSIRO and Wilma have been working on ¼ degree ocean in ACCESS-CM2 and running them with biogeochemistry.

After valuable discussion at ACCESS-NRI Workshop, we proposed bringing a group together in March, supported by the ACCESS-NRI Model Evaluation Team. Progress has been made on setting up topics of discussion.

The CMIP7 topic needs to be announced to the community. We have an oversight committee and a project leadership team being formed.

Meetings are set up with the UK CMIP7 team regarding atmospheric model configuration, climate sensitivity, and other issues which need our involvement.

Item 5 - Update from Working Groups

Forecasting & Prediction

Working Group meeting after the ACCESS-NRI workshop

After the ACCESS-NRI workshop, we had a meeting which focused on Machine Learning;

- This community is a larger more active Machine Learning Group that includes the Bureau, CSIRO, universities, and other people outside our climate modelling area.
- From the meeting we'd planned to draft a document that would describe how ACCESS-NRI could support modelling machine learning in the future – this document is still in preparation
- Data preparation plays a large role. The Bureau's data preparation tools are useful to the community –for data input, rather than applications.

Data Assimilation Meeting

The main presentation was from Chun-Hsu, The Bureau, to gauge if there is a university DA community and how ACCESS-NRI could support them.

- There does not seem to be much of a community yet, it's too early and people are using fairly different things.
- The Bureau is moving to use a new system - Jedi (which is a common tool used in the US and by the Met Office Partnership) – it comes with simple models so might be useful for students and people learning DA.
- Still yet to determine if there is a role for the NRI there, possibly in machine learning as part of the new software transformation team?

UM Partnership Meeting in Singapore

- 2 days on science presentations – mainly around next-gen systems and challenges of the new super-computing and moving to cloud. Forecast centres are challenged by the performance of the machine learning models, and are trying to find their niche.
- 2 days on partnerships for the next-generation systems and the licensing agreements going forward. NGMS codes will be open source for researchers. Some of the exact configurations for the forecast system will be protected and under a license. This won't affect anyone using the models or research and climate configurations that we are mostly interested in. UM will continue under its existing license even when it's moved to GitHub and retired from active use.

Atmospheric Modelling

Working Group meeting after the ACCESS-NRI workshop

Morning focused on;

- Science lightning presentations with a focus on updates.
  Then science presentations that are of interest to the community and not currently supported by ACCESS-NRI. One was on idealising modelling and another on atmospheric composition modelling, the last one on modelling plans for 21st century CoE.

Afternoon focused on;

- Tutorial on Regional emissions modelling focused on AUS2200 system and using this subset of that domain.
- The AUS2200 system can be used to run any region around the world, not just Australian.
- As part of the tutorial we did a case study that taught how to setup and run a smaller domain over Canberra for severe weather, using a tool called the regional nesting suite.

Regular Working Group Meeting

- Focused on datasets that are required to run and evaluate a model, with both a global and regional configuration of the atmospheric model.
- Presentation on BARRA, as there is a lot of interest in using this for forcing our regional model and also for evaluation.

Coupled and Earth System Modelling

Regular Working Group Meeting

- We had a fortnightly meeting prior to SAC with good attendance, 18 people
- New subgroups were set up for the Paleoclimate Coupled Model and the Earth System Model
- Concerns by some members, that support in some areas is not happening fast enough, we could lose members or they may not engage when things aren't happening fast enough.

Discussion

Questions regarding the process for requesting compute/storage were raised. A set of merit guidelines have been prepared. Given the full funding announcement a week ago, these will need to be reviewed. They will be made available to Working Groups within a couple of weeks. In the interim, a judgement call can be made this quarter by the working chairs, particularly in relation to compute and when there is a need.

ACTION: A.4 - ACCESS-NRI to review merit guidelines and formalise within a few weeks.

Ocean-Sea Ice Modelling

Hackathon and Working Group meeting after the ACCESS-NRI workshop

- Hackathon on the Monday attended by a dozen people, working on the Cookbook.
- 2-day COSIMA working group meeting
    - well attended
    - 16 different talks, international invited key notes, posters
    - Breakout session on biogeochemistry, ocean observations, sea ice and waves, regional coastal improvement to COSIMA, training session
    - Have noted on HIVE.

Regular Working Group Meeting

Mostly weekly meetings with speakers.

Technical Working Group Meeting

Monthly meetings are becoming fortnightly.

Development work with OM3

- Built a system that is working well. It is designed to facilitate the update of some model components, working towards basing it on SPACK.
- Versioning being set up
- Using the latest CSM branches model components. 1 degree configuration is running but not stable. It is not using the sort of parameters we want to use i.e. it's not using the finalised topography and land-sea mask. The 1 degree is basically testing configurations that we've begun working on coupling with UM, and including architectural work, such as libraries.
- IAF and RYF versions of 1 degree.
    - WOMBAT port more complicated than expected.
    - Currently working on technical advice from NCAR on the best approach. Wave watch is built and running, with current configurations.
- We have recently started work on the sea ice.
- We are also in discussion with Los Alamos/NCAR about formally joining the sea ice consortium, which will require us to contribute staff resources.

Land Surface

Working Group meeting after the ACCESS-NRI Workshop

- 1.5 days.
- First day included talks from community, scientific and technical. Various discussions around future developments by different scientific areas of CABLE and JULES. Various attendance including people from ecology
- Second day, ½ day training went well, although ran out of time for one module – consequently we are rerunning that training module online - in about 2 weeks' time.

Regular Working Group Meeting

Fortnightly meetings continue to be well attended. Many discussions have been around organising data sets.

Cryosphere

- Melbourne meeting in November to discuss the process for choosing an ice sheet model.
- The working group chair is away for a while.

Working Group meeting after the ACCESS-NRI workshop

- 1 day.
- Lots of discussion, for a young working group.
- A big step is next week's discussion on a potential ice-sheet model

Regular Working Group Meeting

- Meets every 6 weeks.
- Lots of discussion around a common cookbook – looking at COSIMA but for ice-sheet modelling community needs.

Item 6: Any Other Business

No comments.

Item 7: Next Meetings

Committee to review the proposed meeting dates for 2024, please advise if these meeting dates are problematic, otherwise we will send out meeting requests.

The Thursday 2-3.30pm timeslot seems to be working around everyone's schedules. If it doesn't, please let us know and we will send out a poll.

ACTION: A.5 - SAC Provide feedback on 2024 meeting dates.

End of meeting.

ACTION Items

A.1	ACCESS-NRI	Enable anonymous post settings on HIVE.
A.2	ACCESS-NRI	Liaise with the Bureau of Meteorology regarding timings of September 2024 Workshops.
A.3	Working Groups	Working Groups to start organising proposals for data storage allocation.
A.4	ACCESS-NRI	Review merit guidelines and formalise within a few weeks.
A.5	SAC Members	Provide feedback on 2024 meeting dates by next SAC meeting.