

Notes on the Consortium for Ocean Modelling in Australia (COMA) Meeting

Hobart, Feb 8 & 9 2012

Present: Andy Hogg, Marshall Ward, Matt England
Dave Bi, Simon Marsland, Petteri Uotila
Richard Matear, Matt Chamberlain, Terry O'Kane, Russ Fiedler
Tony Hirst, Gary Brassington, Andreas Schiller
Steve Griffies, Trevor McDougall, Siobhan O'Farrell (telephone)

Apologies: Paul Spence



Large-scale ocean modelling development in Australia is comprised of the ocean and sea ice components of ACCESS, ocean forecasting and reanalysis (Bluelink) and biogeochemical modelling (all of whom were represented at this meeting) as well as seasonal prediction and coastal applications. In addition, the recently funded ARC Centre of Excellence for Climate System Science (CoE) will now contribute to this space. This workshop was formulated to explore mechanisms of collaboration in both model development and science, to formulate plans to align development priorities and to discuss the long-term future of ocean modelling in Australia.

The following notes outline the key outcomes from these discussions. The ordering is not chronological, nor ordered by speaker, but is a summary of views that is intended to represent a consensus of the meeting.

ACCESS

- ACCESS is now implemented and working towards CMIP-5.
- Current targets are to broaden the program, conduct scientific analyses (with collaborators) and to begin to map out the future of ACCESS-2 and Australia's contribution to AR6.
- There is a long-term aim to move towards a hierarchy of ACCESS-based models, including ocean slab, ocean eddy-resolving, etc.
- Shortage of personnel in the ocean modelling area was flagged.

Bluelink

- Bluelink-3 is now funded to implement ocean state estimation, eddy-resolving models, reanalysis and forecasts.
- Current aims are for global $1/10^\circ$, tidal-resolving, etc.
- Currently locked into 75°S — 75°N for Bluelink-3.
- Bluelink-4 may expand to entire globe if funded; this would not start until 2014.
- 365-day restoring in the deep ocean.
- Surface wave parameterisation desirable.
- Coupled model uses OASIS-4 – because of the need for parallel coupling, but this code is no longer supported; a new coupler will be required in the future.
- Future requirements include coastal applications (C grid), submesoscale closures.

MOM4p1

- Next release of MOM is due in a couple of months.
- Still using piecewise parabolic advection scheme, but improved 7th order scheme is under development.
- Lagrangian blobs and NCAR overflow schemes will be included.
- Emphasis on lateral friction (biharmonic Smagorinsky) to suppress spurious mixing.
- Emphasis on development of diagnostics.
- Eddies will be standard in climate models at GFDL: CM2.5 is $1/4^\circ$ and will be run for 1000 years; CM2.6 is $1/10^\circ$ and will be run for 100 years+.
- Both GOLD & MOM are going forward at GFDL.

AusCOM

- AusCOM currently running with CORE I, II and III forcing.
- Spinup includes multiple loops of IAF – in line with WGOMD plans.
- Note that AusCOM is MOM, OASIS and CICE. It seems likely that these three will be employed in future versions of ACCESS.

CICE

- MOM is moving towards using CICE via FMS.
- CICE appears to give a big improvement over SIS – but then again, SIS has not been extensively tuned and is easier to pick up and use with MOM.

- Petteri has a stand-alone CICE model (ACCICE).

OASIS

- AusCOM uses 3.2.5 of OASIS. This version runs on a single core, which is fine for a 1° ocean model, but higher resolutions will require a parallel version of OASIS.
- OASIS 3.3 can run in pseudo-parallel mode, but requires an independent executable for each processor.
- OASIS 4 is no longer supported, and development has been abandoned.
- The replacement appears to be OASIS 3-MCT which is due for release soon, and contains many of the desirable features of OASIS-4.
- AusCOM uses the same grid for CICE and MOM, but they don't have to (it just saves coupler time).
- ACCESS uses different coupling frequencies between atmosphere<->ice and ice<->ocean.
- CICE and MOM are coupled every timestep (every hour).
- AusCOM uses serial coupling (i.e. models do data gathering rather than parallel coupling in which the coupler does data gathers). This is a necessary step for a single-processor OASIS implementation.

CoE

- The CoE has modest resources available for ocean model development, which needs to be balanced against the need to generate scientific goals.
- Current plans are to work towards developing a high-resolution version of (what is currently called) AusCOM which can be used for high resolution ocean or coupled ocean-atmosphere studies.
- A parallel goal is to build Australian experience in high-resolution ocean-climate models and thereby contribute to the next generation of ACCESS.
- Currently, an early version of the CM2.5 ¼° ocean is running on NCI, using SIS sea-ice via FMS. There are complications with topography – especially near Antarctica and the Persian Gulf.
- General agreement that all parties would benefit from the CoE using the same modelling strategies as CAWCR. This will require sharing code and information, as well as consulting on development activities.

Subversion

- Strong agreement that we would all benefit from a single trunk of MOM used for all Australian ocean modelling applications in the NCI subversion repository.
- Currently, the subversion repository on NCI has multiple branches and no agreed trunk. A high priority is for MW (and MC? + Justin Freeman) to visit Aspendale to merge the branches. This will require input from all modelling groups.
- In the future, periodic mergers (3-monthly?) will be required. Again, this should be lead by the technical people from each group.
- Requirement for runs that are reproducible – i.e. a script to compile and run code, downloaded from subversion. Also need a testing framework for each merger.
- How do we merge new versions of MOM with our trunk?

- Will need to separate MOM from OASIS, and AusCOM “trunk” will be simply set of scripts.

Sharing Information/Wiki

- Single public common wiki detailing our MOM/OASIS/CICE knowledge.
- Paste in existing content from independent wikis for each group.
- Dual purpose of user’s guide and scientific/technical details.
- All private so people need to register – will help communication.
- Details to be sorted out by technical guys.

Discussion Paper

- The concept of a white paper to summarise the direction of Australian ocean modelling was supported.
- CAWCR have already instituted a review of their future modelling platforms, with the possible aim of merging all ocean modelling activities (including coastal and estuarine). Any white paper needs to be conscious of this review (AS to scope out current state and report back).
- ACCESS-SAG would probably need to endorse a white paper.
- GB suggested we would outline requirements for each modelling group for the next decade and work towards a common vision. This should include seasonal forecasting and coastal groups.
- Should look to produce a draft document within 2 months.

Model Name

- Strong consensus that the “AusCOM” name is outdated, and should be altered to reflect current practise.
- Primary suggestion is that what is currently called AusCOM should become ACCESS-O (for ocean) or -OI (ocean-ice).
- Future higher resolution versions may acquire suffixes like -OEP (ocean eddy-permitting), -OQ (ocean quarter degree), -OHD (ocean high definition) or -O/4 (1/4°); -OER (ocean eddy resolving), or O/10 (1/10°)
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Pressing Unanswered Questions

- Which version of OASIS should we adopt for the future?
- Which grid should we adopt? Presumably Tri-Polar, but will it be Mercator all the way to 78°S?
- Should ACCESS-OEP be ¼° or 1/6°? Don’t forget vertical resolution too.

Immediate Action Required

- Merge MOM trunk
- Test OASIS 3-MCT
- Write white paper
- Merge wikis