

A very short history of

ACCESS-OM2

Software Architecture

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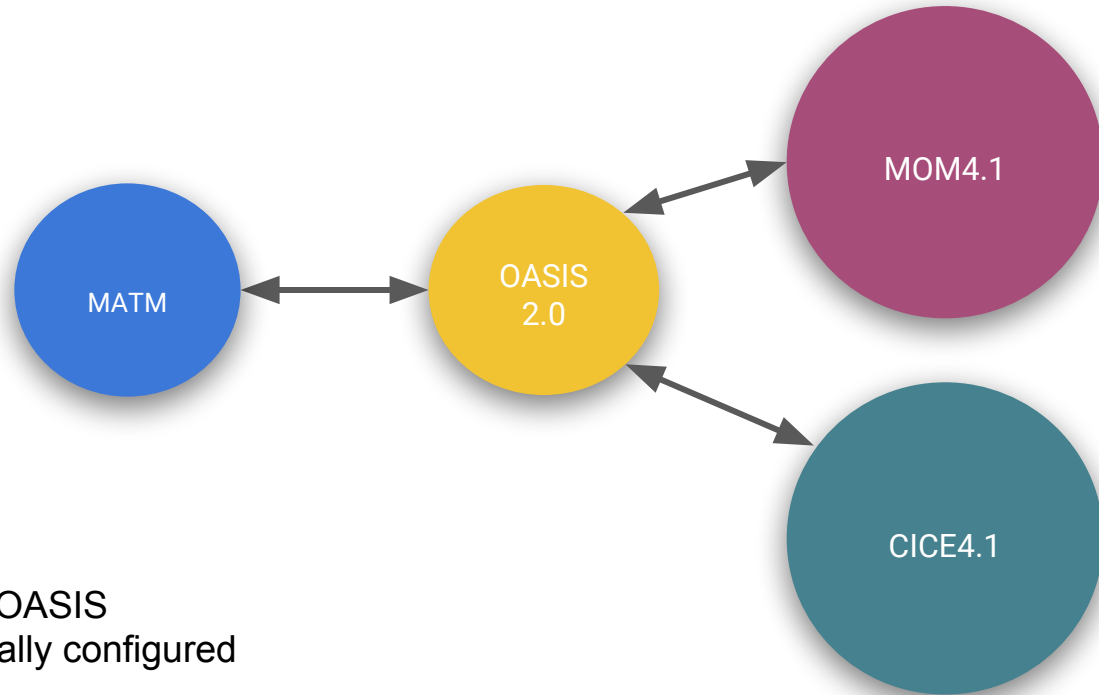
Overview of this talk

Part 1: A description of the components of ACCESS-OM2 and their interaction.

Part 1.1: Introduction to REDB (The Reproducible Experiment Database)

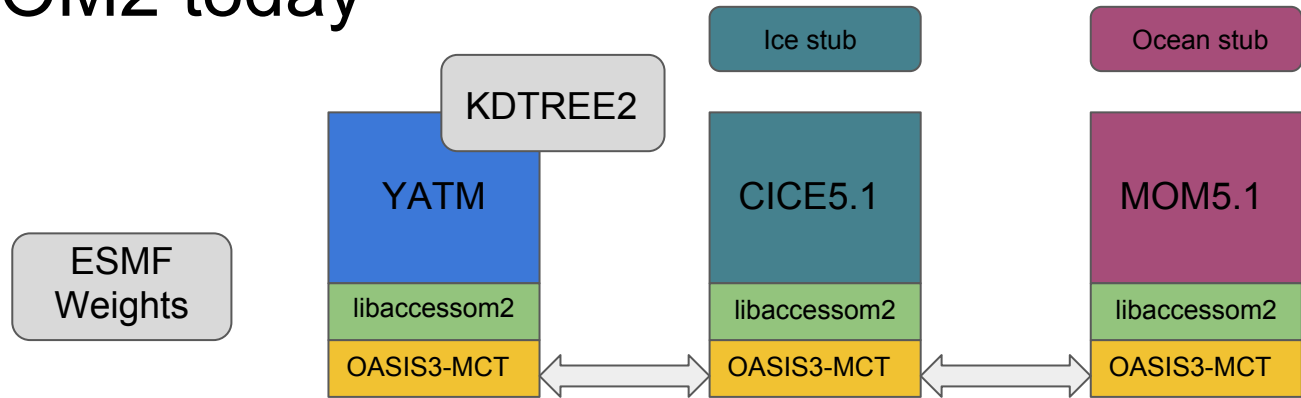


Part 1. Back in 2009 ...



- Serial coupling with OASIS
- Each model individually configured

ACCESS-OM2 today



- OASIS3-MCT does parallel coupling. Regridding weights generated using ESMF.
- YATM (Yet Another Atmosphere) has replaced MATM.
 - Runoff remapped in real time using ESMF and KDTREE2.
 - New forcings very easy to add.
 - Easy to understand and maintain.
- Ice and ocean stub models can replace CICE and MOM. They have the same coupling behaviour but don't do any work.
- Libaccessom2 links to all models:
 - greatly simplifies coupling code, time-keeping and logging.
 - allows submodels to set and get model wide configuration.
 - single accessom2.nml configuration file for all common configs

```

do while (.not. accessom2%run_finished())

    cur_runtime_in_seconds = int(accessom2%get_cur_runtime_in_seconds())

    ! Send each forcing field
    do i=1, num_atm_to_ice_fields
        if (mod(cur_runtime_in_seconds, fields(i)%dt) == 0) then
            call forcing%update_field(fields(i), &
                                     accessom2%get_cur_forcing_date())
            if (index(fields(i)%name, 'runof') /= 0) then
                call runoff%remap(fields(i)%data_array, &
                                   runoff_field%data_array, ice_grid%mask)
            endif
        endif

        if (index(fields(i)%name, 'runof') /= 0) then
            call coupler%put(runoff_field, cur_runtime_in_seconds, err)
        else
            call coupler%put(fields(i), cur_runtime_in_seconds, err)
        endif
    enddo

    ! Block until we receive from ice. Ice will do a nonblocking send immediately
    ! after receiving the above fields. This prevents the atm from sending continuously.
    call accessom2%atm_ice_sync()

    call accessom2%progress_date(dt)

    call logger%write(LOG_INFO, 'cur_exp_date '//accessom2%get_cur_exp_date_str())
    call logger%write(LOG_INFO, 'cur_forcing_date '//accessom2%get_cur_forcing_date_str())
    call logger%write(LOG_DEBUG, 'cur_runtime_in_seconds ', &
                      int(accessom2%get_cur_runtime_in_seconds()))

enddo

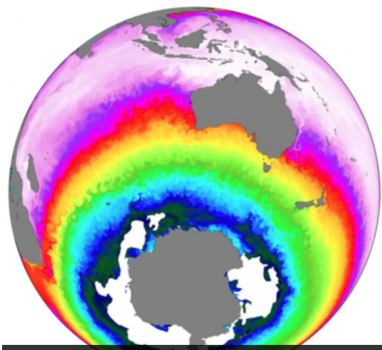
```

Part 1.1 REDB (Reproducible Experiment DB)

- (Also back in 2009) Martin Dix showed me a very simple but effective system he had developed for experiment management.
- The idea stuck and grew.
- What if we had a web-based information system to publish experiments, their configuration, source code, analyses, and links to the output?
- With this information we should be able to reproduce past work and easily build on it.
- This is not a new idea: e.g. apart from Martin's system: UMUI, Rose, COSIMA website and github.
- Demo ...
- Mention API and `redb2payu.py` and `payu2redb.py`

Welcome to REDB

The Reproducible Experiment Database is a place to explore, share and manage Earth System Model experiments. Each experiment includes all documentation, configurations, inputs and model source code, making it easy to reproduce and extend past work.



Featured: COSIMA global ocean experiments

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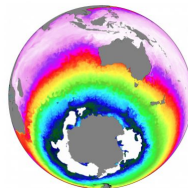
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ACCESS-OM2 1 deg JRA55 RYF

ACCESS-OM2 is comprised of MOM5.1, with the CICE5 sea ice model and OASIS-MCT coupling.

The model lateral resolution is 1° at the Equator, with a tripolar grid in the north and Mercator projection down to 65°S. It has 50 vertical levels. The model is configured to run with both the CORE and JRA55-do forcing datasets.

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