Using the CSIRO Mk3L climate system model
Part 4: Consolidation and next steps

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1. Analyse your own experiment

Analyse your own experiment

- Last week, you created your own experiment
- Did it work? If not, why not?
- Use Ferret to analyse and plot the data
- Generate some GIF images and copy the files back to your local machine
- If it worked, maybe you could run additional experiments?
- If it didn't work, fix it and try again

2. Advanced configuration options

Summary: Basic configuration options

- What we've covered so far:
  - How to configure the model via the control file
  - How to change the atmospheric CO_2 concentration by generating a new auxiliary file
  - How to apply freshwater hosing
- This enables you to vary:
  - the epoch
  - the solar constant
  - the atmospheric CO_2 concentration
  - the freshwater flux into the ocean
  - which model statistics are saved

Advanced configuration options

- There are three other ways of configuring aspects of the model:
  - Modify the other auxiliary files
  - Modify the restart file(s)
  - Modify the source code

Auxiliary files: atmosphere model

- Bottom boundary conditions:
  - Sea surface temperatures (`ssta.nc`)
  - Ocean currents (`ocuv.nc`)
  - Topography (`psrk.nc`)
  - Albedo (`albedo.nc`)
  - Vegetation and soil types (`sib*.nc`)
- Radiative boundary conditions:
  - CO_2 transmission coefficients (`co2_datafile`)
  - Ozone mixing ratios (`amip2o3.dat`)

Auxiliary files: ocean model

- Upper boundary conditions:
  - Sea surface temperatures (`sst.nc`)
  - Sea surface salinities (`sss.nc`)
  - Surface wind stresses (`stress.nc`)
- Bottom boundary conditions:
  - Bathymetry (`orest.nc` – restart file)

Auxiliary files: coupled model

- Bottom boundary conditions:
  - Topography (`psrk.nc`, `landrun21`)
  - Bathymetry (`orest.nc`)
  - Albedo (`albedo.nc`)
  - Vegetation and soil types (`sib*.nc`)
- Radiative boundary conditions:
  - CO_2 transmission coefficients (`co2_datafile`)
  - Ozone mixing ratios (`amip2o3.dat`)
- Freshwater hosing (`hosemask`)
- Flux adjustments (`dtm.nc`, `*cor.nc`)

Auxiliary files: coupled model

- Bottom boundary conditions:
  - Topography (`psrk.nc`, `landrun21`)
  - Bathymetry (`orest.nc`)
  - Albedo (`albedo.nc`)
  - Vegetation and soil types (`sib*.nc`)
- Radiative boundary conditions:
  - CO_2 transmission coefficients (`co2_datafile`)
  - Ozone mixing ratios (`amip2o3.dat`)
- Freshwater hosing (`hosemask`)
- Flux adjustments (`dtm.nc`, `*cor.nc`)

Examples of advanced configuration

- Applying anomalies within the atmosphere and ocean models:
  - modify the SSTs, SSSs, currents, wind stresses
- Applying anomalies within the coupled model:
  - modify the flux adjustments
- Configuring the model for a different era:
  - modify the topography and bathymetry
  - modify the albedo, and the vegetation and soil types
  - modify the epoch, solar constant, CO_2 transmission coefficients, ozone mixing ratios
  - issues with restart files, spin-up procedures and flux adjustments

3. Next steps

Next steps

- Get a copy of Mk3L. Apply for an account on the subversion server:

`http://www.tpac.org.au/resources/csiro-mk3l-source-code/`

- Run Mk3L on katana, on your PC, on your laptop...
- Experiment with the model and get to know it
- Subscribe to the mailing list:

`https://www.lists.unsw.edu.au/mailman/listinfo/mk3l-users`

Next steps

- Ask questions:

Mk3L users mailing list `mk3l-users@lists.unsw.edu.au`
Me `s.phipps@unsw.edu.au`

- Share your experiences with other users
- Share your enhancements to the model
- Remember what a privilege it is to be a climate system modeller
- Have fun!

With great power, comes great responsibility