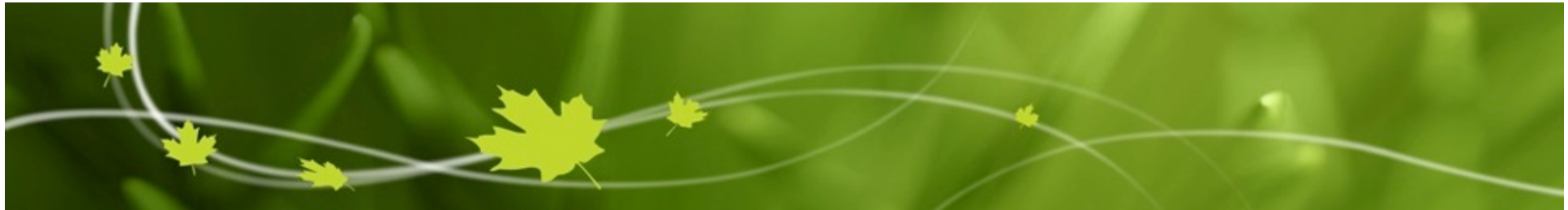




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CCCma model update

WCRP Modelling Meeting

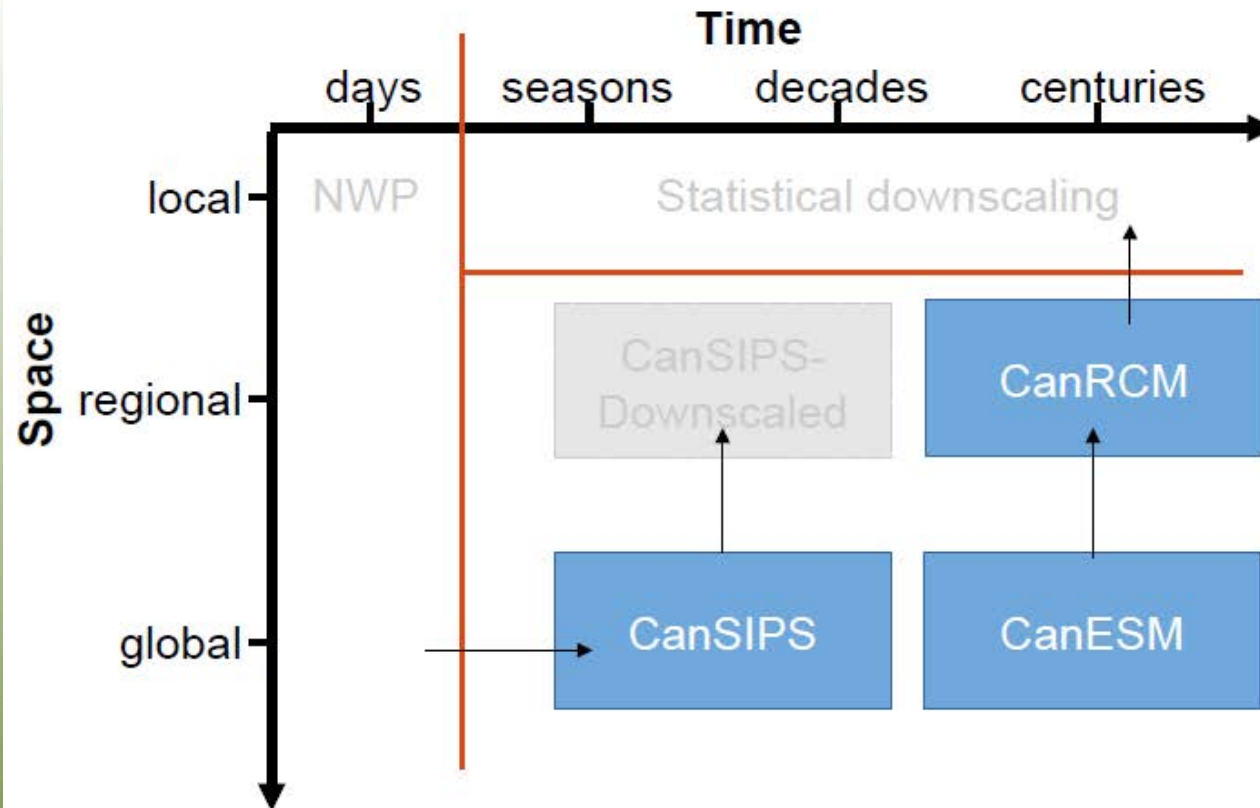
Exeter, UK

Gregory M Flato

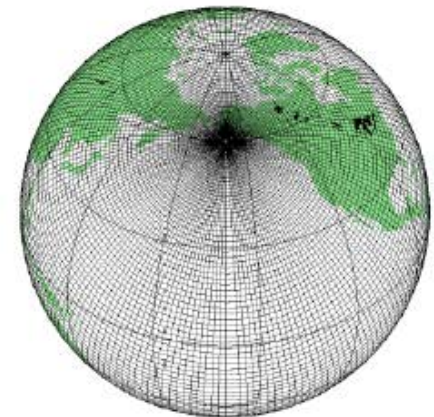
Science and Technology Branch

10 Oct 2017

Stable of models at CCCma



Models share a common framework and components

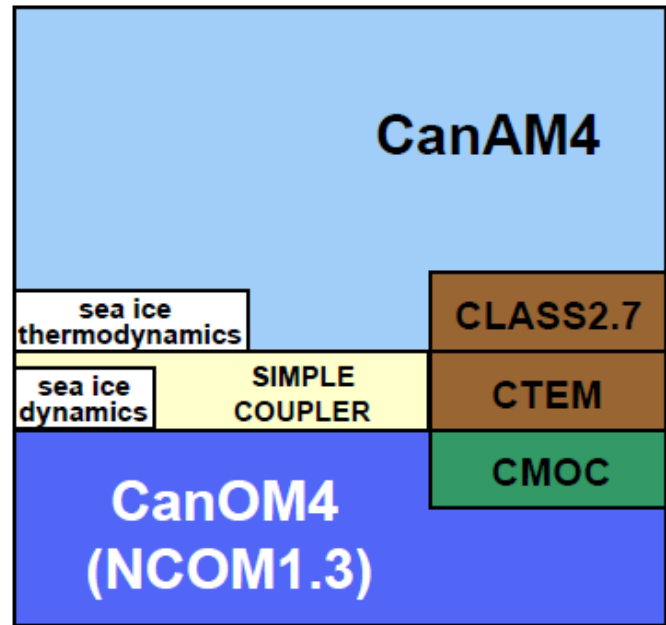


Courtesy J. Scinocca

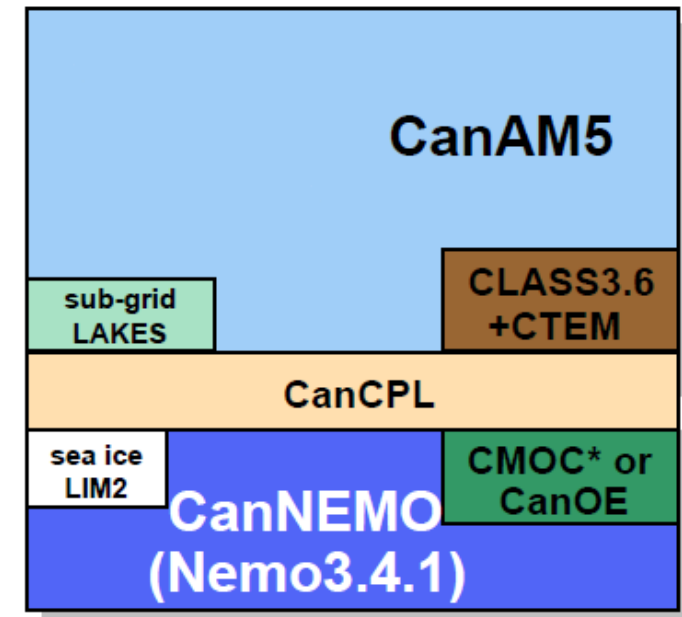


CanESM5 overview & updates

CanESM4.0 (CMIP5)



CanESM5.0 (CMIP6)



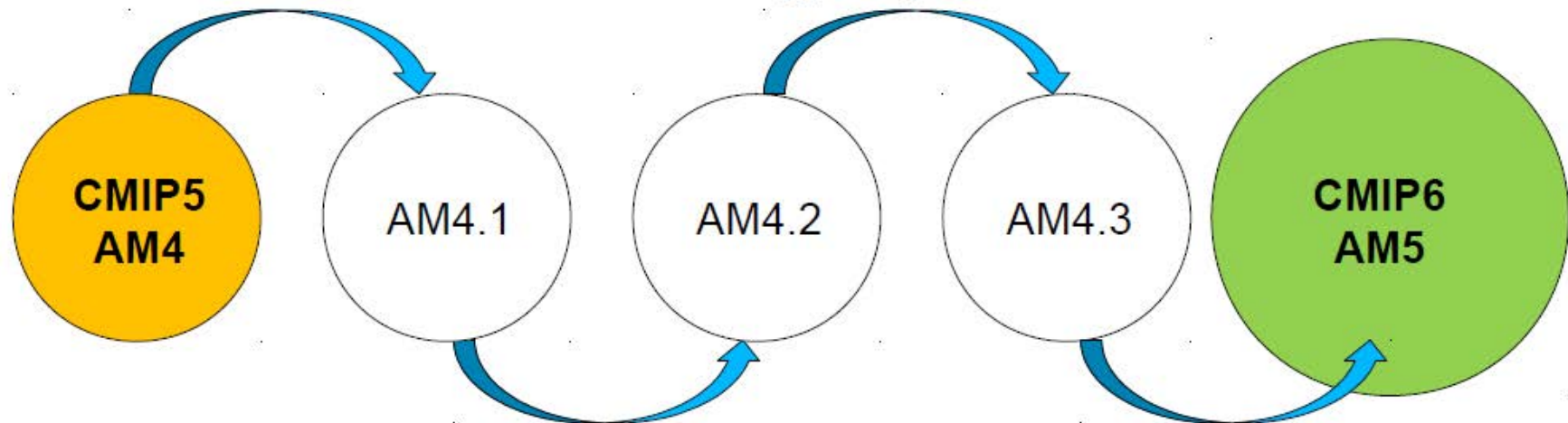
Main version: T63L49 atmos; nominal 1° ocean increasing to 1/3° at equator



CanAM Physics development highlights

- Radiation (solar water vapour continuum & constant)
- New mineral dust emissions
- Improved diagnostic capabilities
- 49 levels (up from 35)

- Radiation (Ice crystal shape & bare soil albedo & whitecap albedo)
- Hydrology of snow & ice
- Land tiling capability in CLASS
- PLA aerosol radiative transfer (optional)



- Radiation (snow albedo & polluted cloud droplets)
- Improved DMS emissions from ocean
- Snow microphysics
- CLASS upgrade to version 3.6
- PLA aerosol microphysics model (optional)

- CMIP6 (forcings & coupling)
- Spectral horizontal diffusion
- Lake model
- Ocean/land/lake tiling capability (current development cycle)

Slide courtesy
Knut von Salzen

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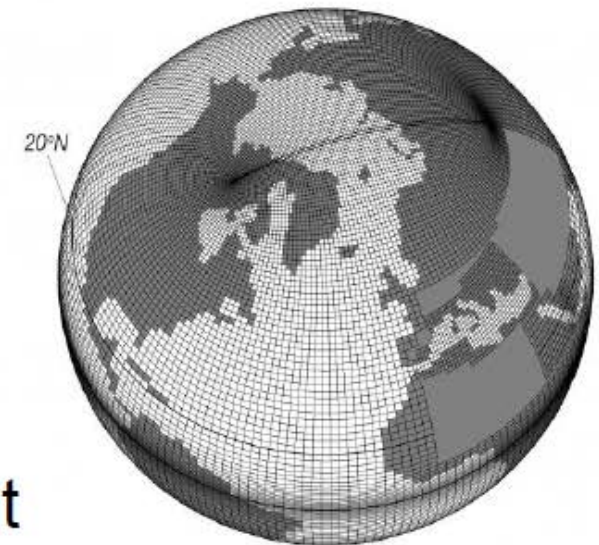
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New CanNEMO ocean & sea-ice

- **ORCA1** nominal 1° , refining to $1/3^\circ$ in tropics
- LIM2 sea-ice model
- CCCma physics:
 - Modified Gent McWilliams coefficient
 - Lee wave mixing parameterization
- CMOC and CanOE biogeochemistry



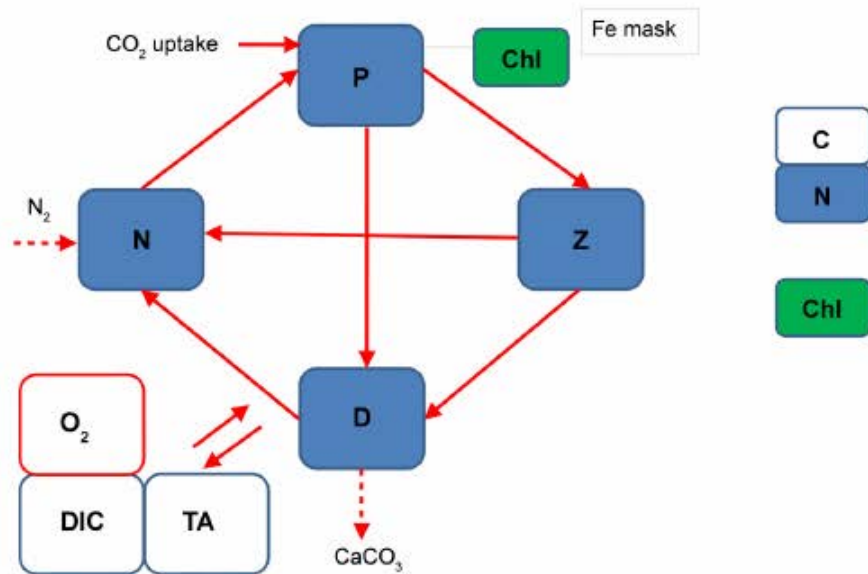
V3.4.1

Courtesy N. Swart

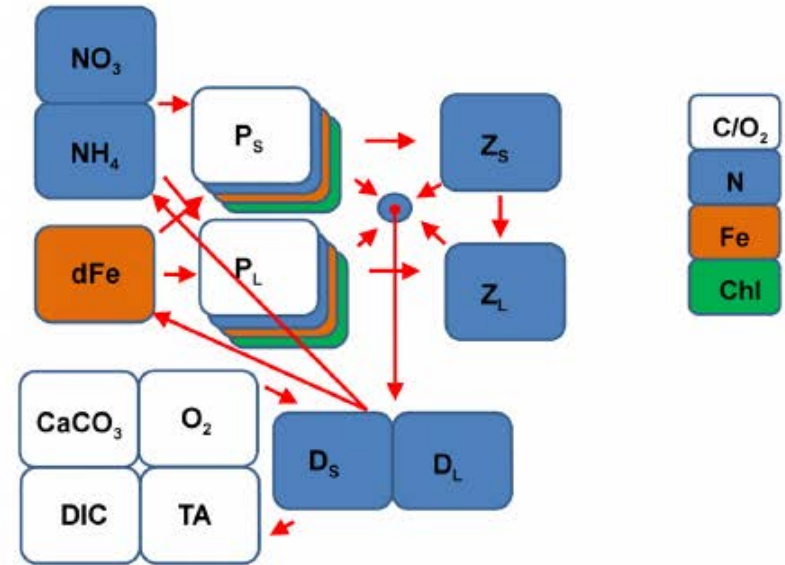


CanNEMO biogeochemistry

Canadian Model of Ocean Carbon (CMOC)



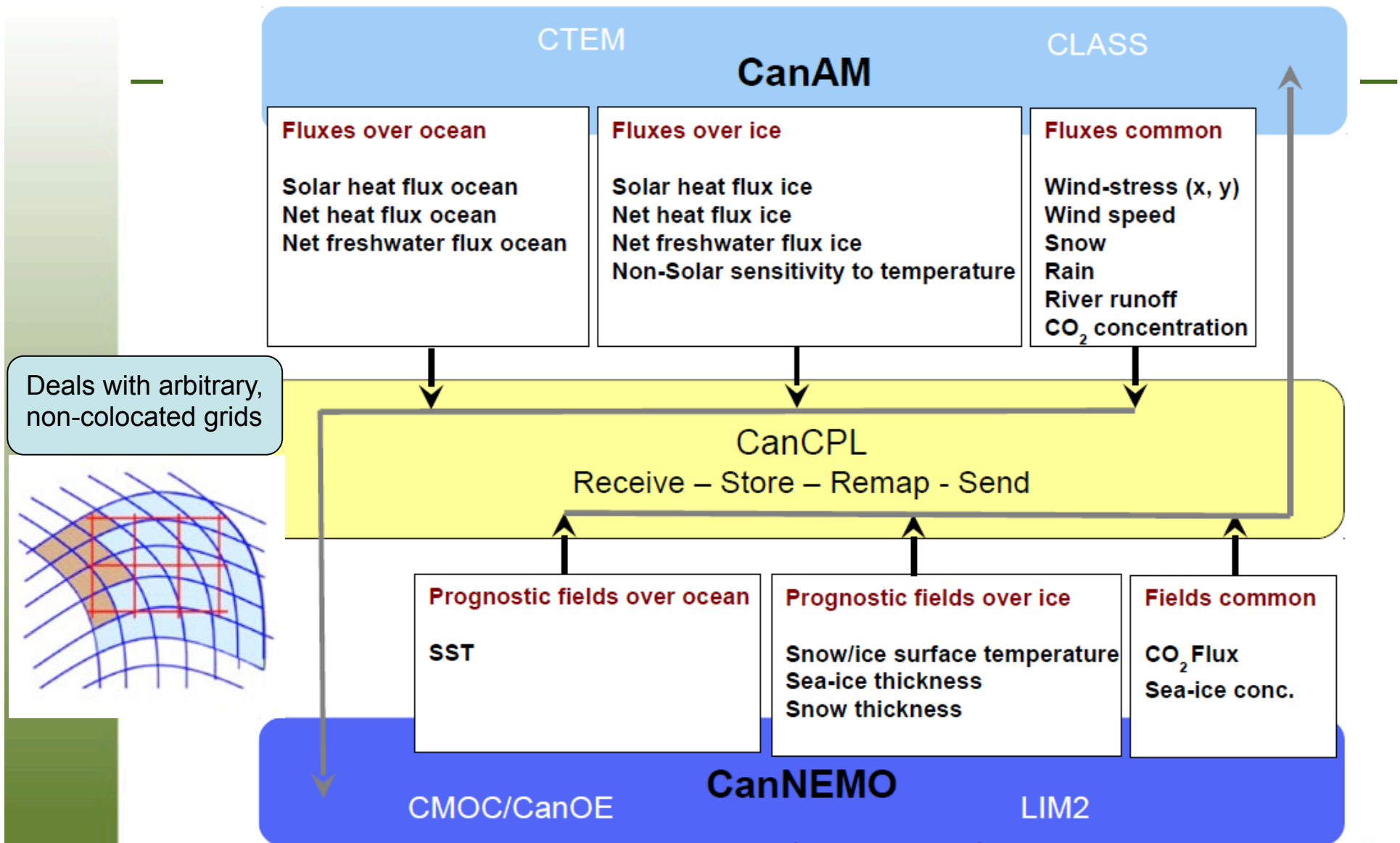
Canadian Ocean Ecosystem (CanOE)



Courtesy N. Swart



CanCPL exchanges



Courtesy J. Scinocca



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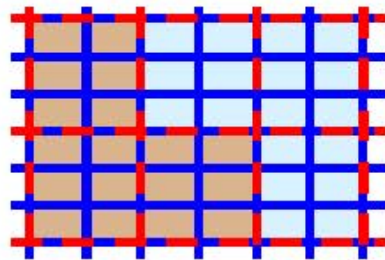
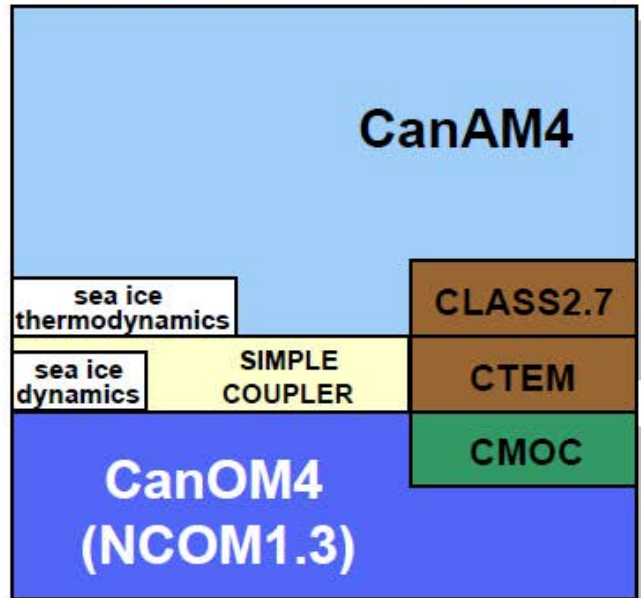
Schedule

- Conversion to new Cray XC40 now complete (end of summer)
- Spin-up runs underway
- Will commence piControl shortly
- Plan to produce large(ish) ensembles
 - We produced multiple 50-member ensembles with our CMIP5 version

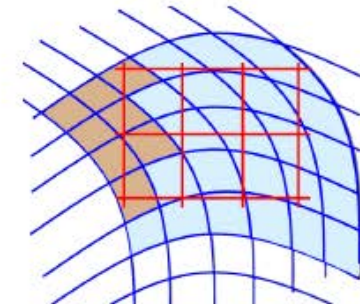
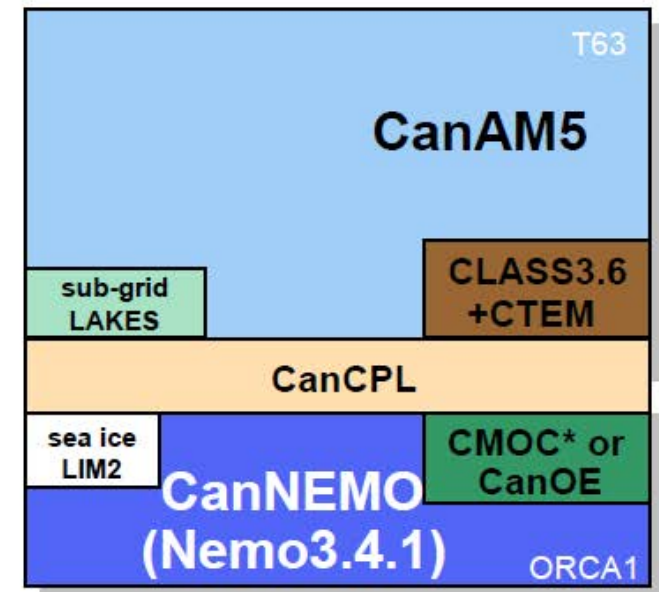


CanESM5: non-coincident grids

CanESM4.0 (CMIP5)



CanESM5.0 (CMIP6)



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John Scinocca



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