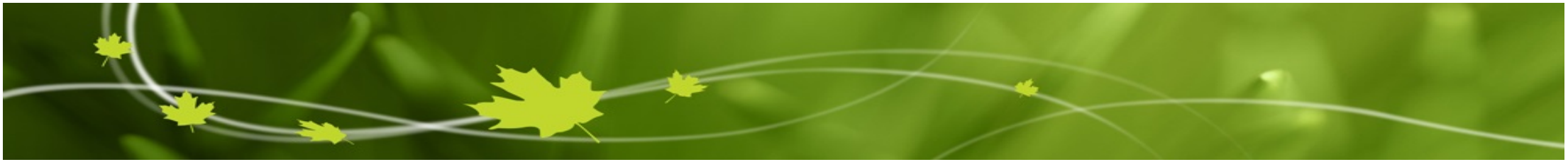

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Canada

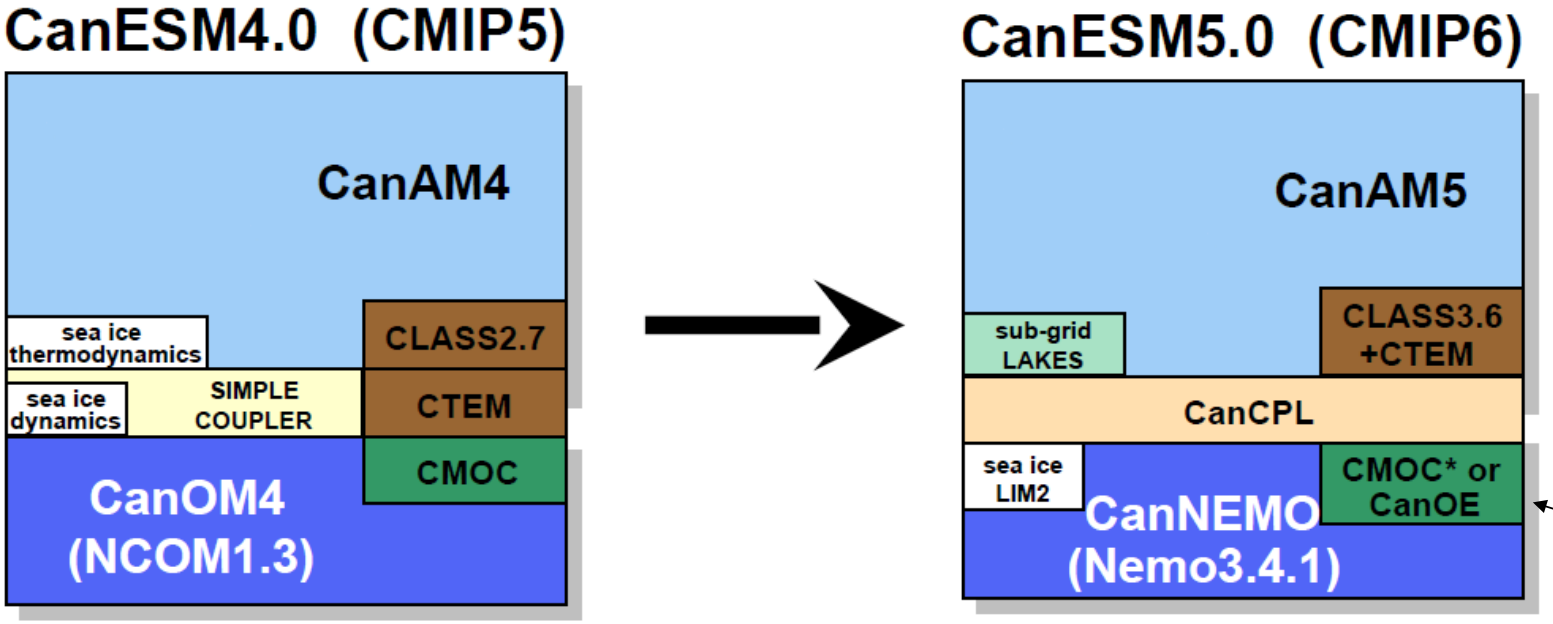
CCCma model update

WGCM 2020

Gregory M Flato
Science and Technology Branch

15 Oct 2020

CanESM5 overview & updates

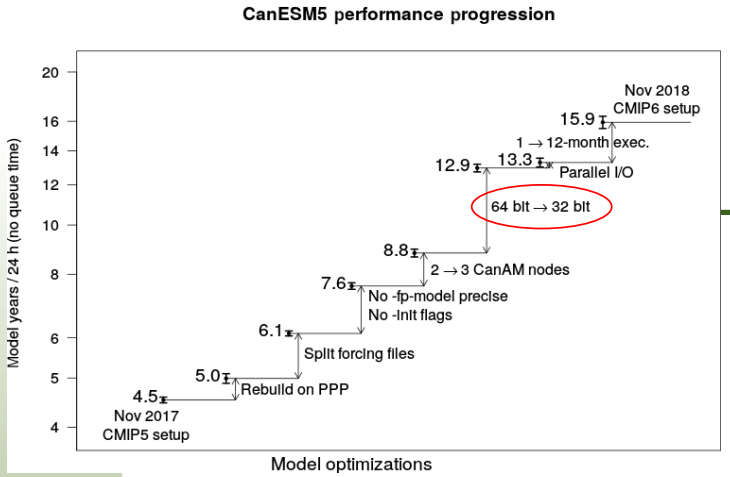


Note: two versions submitted

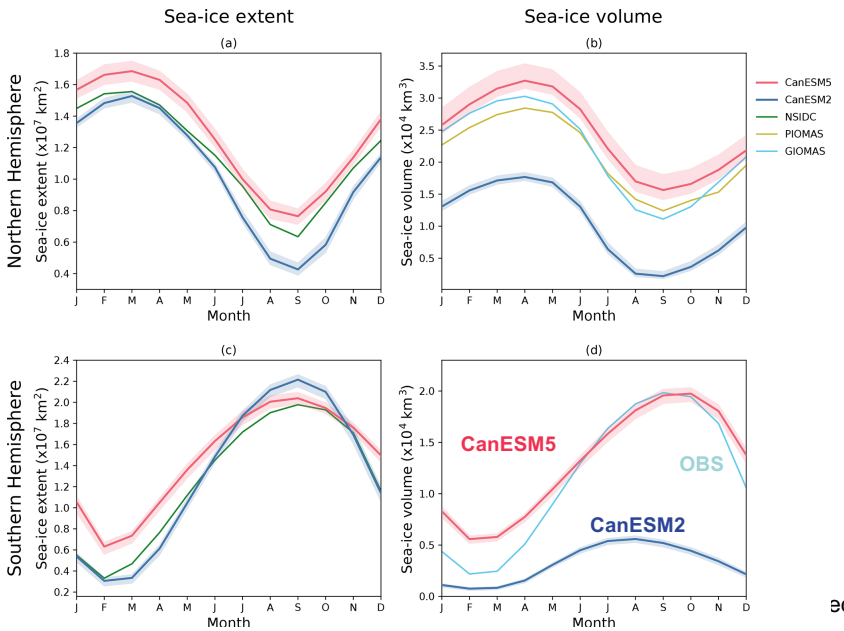
Main version: T63L49 atmos; nominal 1° ocean increasing to 1/3° at equator

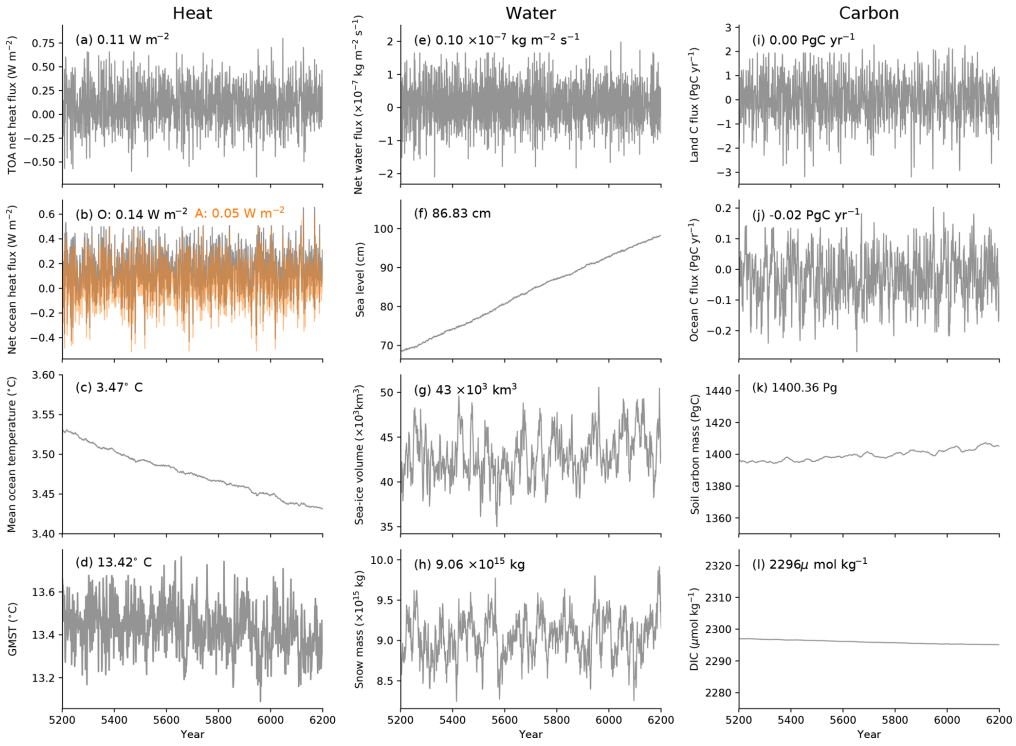
Documented in: Swart et al., *Geosci. Model Dev.*, **12**, 4823–4873, 2019
https://doi.org/10.5194/gmd-12-4823-2019

Courtesy J. Scinocca



A lot of work went into improving version control, code portability, and computational performance, improving various biases, and achieving stable, long-running control simulations.





ecember 15, 2020

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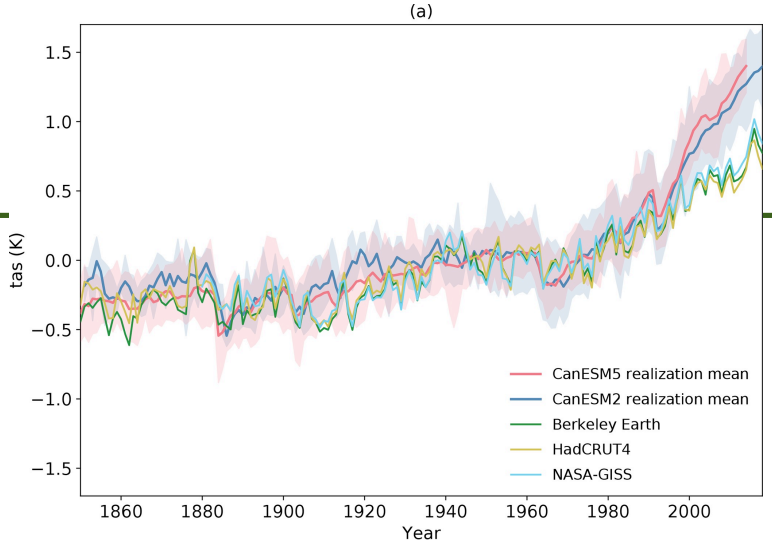
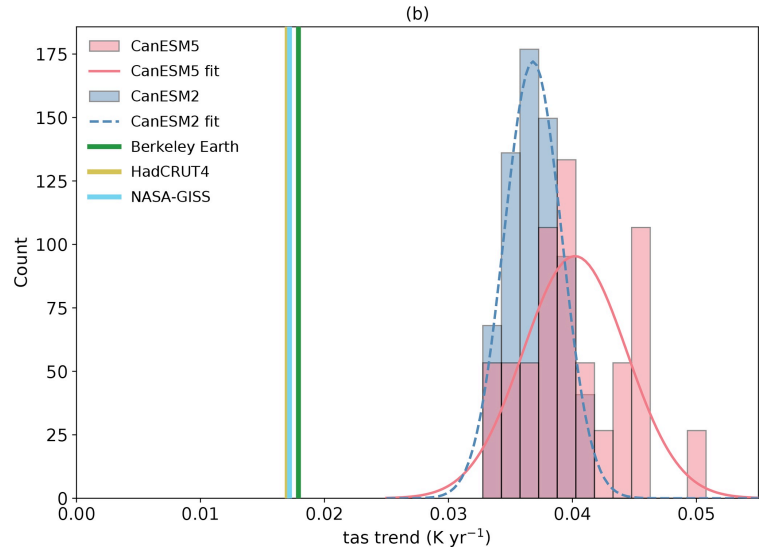
Our CMIP5-era model, CanESM2, displayed fairly high sensitivity (ECS of 3.7°C).

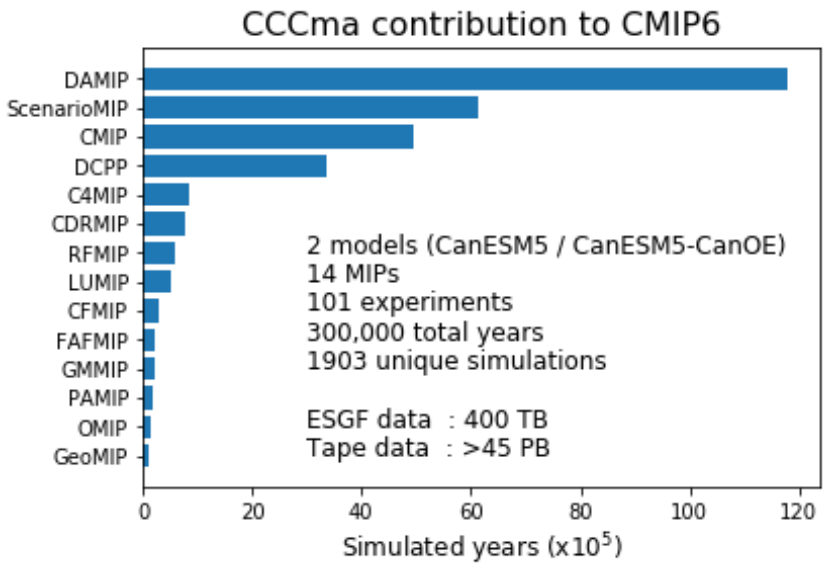
Despite many improvements, CanESM5 has even higher sensitivity (ECS of 5.6°C), although effective radiative forcing is similar to CanESM2. Cloud and surface albedo feedbacks seem to be the underlying cause.

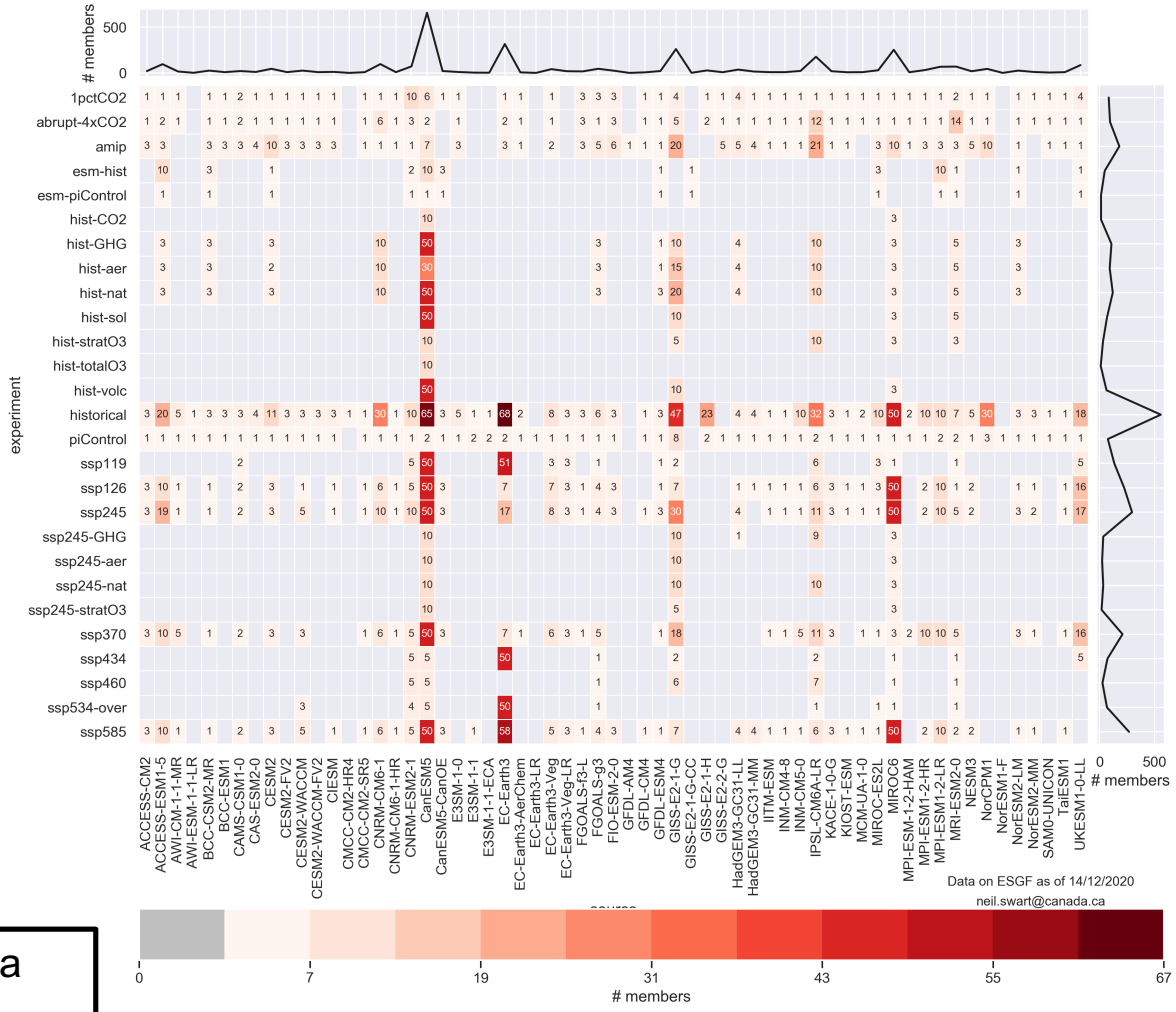
NOTE: we do not tune our model to historical temperature change or to sensitivity.





CMIP6 Contributions





We are involved in most MIPs, with CCCma scientists playing leadership roles in many.

Perspectives on CMIP7

- We consider international coordination of Earth System Model experiments to add significant value, allowing analysis of a consistent multi-model ensemble. We note the impressive body of science that has arisen from CMIP and the important role it plays in underpinning national and international assessments, and the development of climate products and services.

- We are concerned about the increasing scope and complexity of CMIP, and view the trajectory from CMIP3 to CMIP5 to CMIP6 to be unsustainable

- We would urge a careful (consultative) approach to planning CMIP7, with an eye to consolidating and simplifying some aspects, streamlining the data request, and leaving more open and flexible the development of 'associated' MIPs that build upon a stable 'core'.
  - 'core' aspects might be viewed as a stable, mature suite of experiments (DECK plus Scenarios?) that may be considered a bit more service-oriented or operational in nature.
  - 'associated' MIPs might be considered more in the realm of exploratory science; organized by community in an ongoing way; conform to requirements of 'core' experiments, provide specialized forcing data, but don't need specific CMIP Panel endorsement.
  - future data request should build upon (or even reduce from!) existing data request – don't start over.
  - Need to think about mechanism for contributing new model versions to existing CMIP instance (i.e. when to close)