

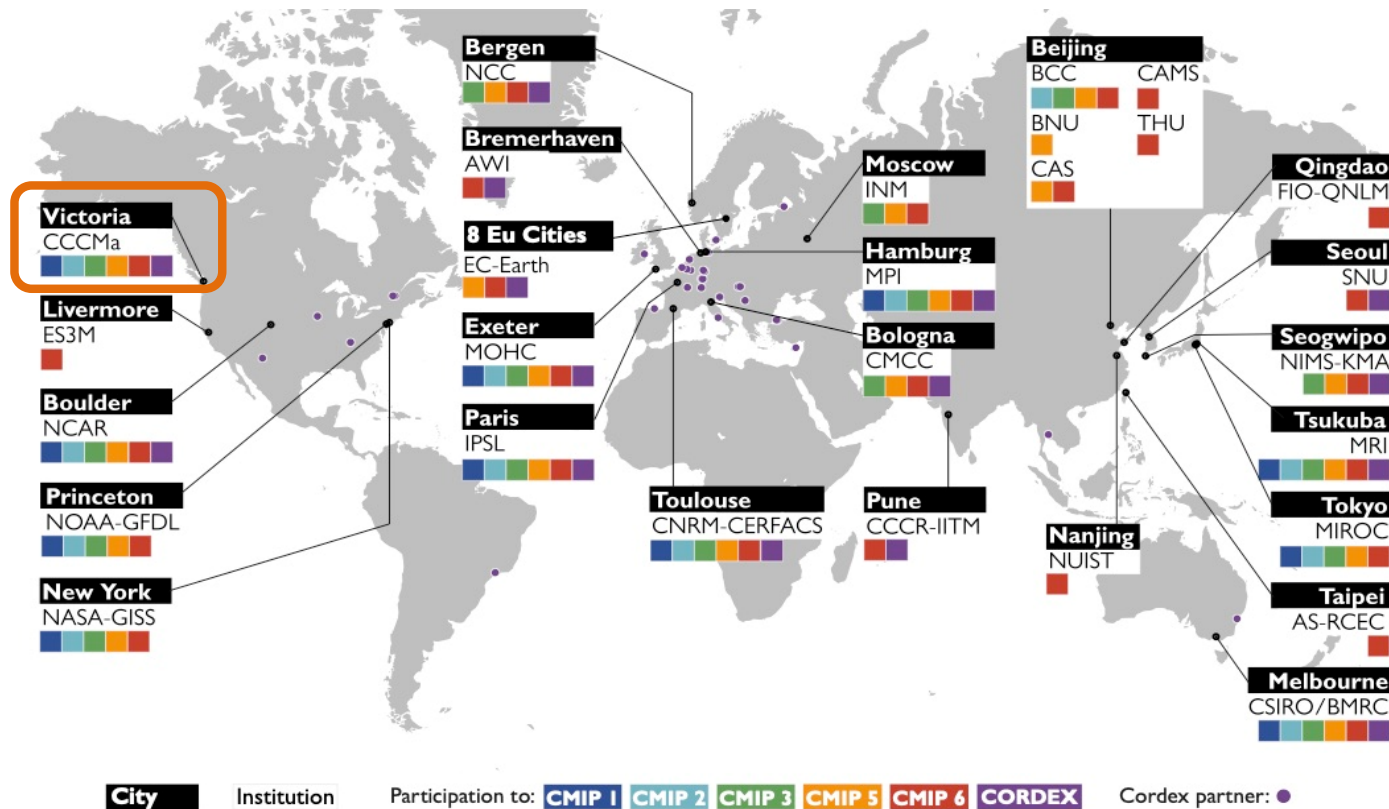


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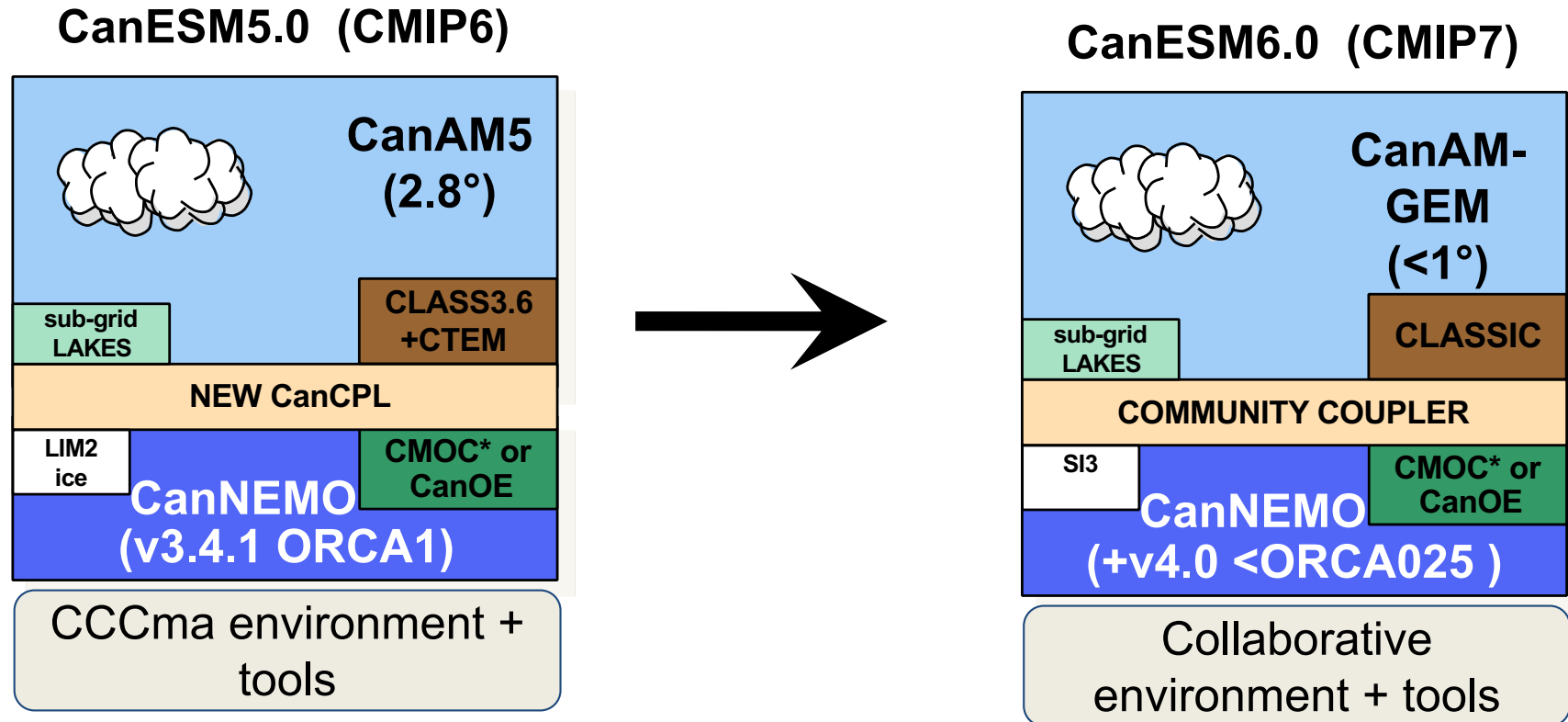
Canadian Centre for Climate Modelling and Analysis (CCCma)

WGCM 2021



Canada

Model development since CMIP6



- Moving from spectral to GEM semi-lag dynamical core in CanAM
- Upgrading from NEMO3.4 to NEMO4
- Updating land surface scheme from CLASS3.6+CTEM to CLASSIC
- Creating a more portable and collaborative modelling system infrastructure
- Continued physics / process development in each area (e.g. convection scheme, radiation scheme, ocean sediment model, nutrient limitation on land, etc).

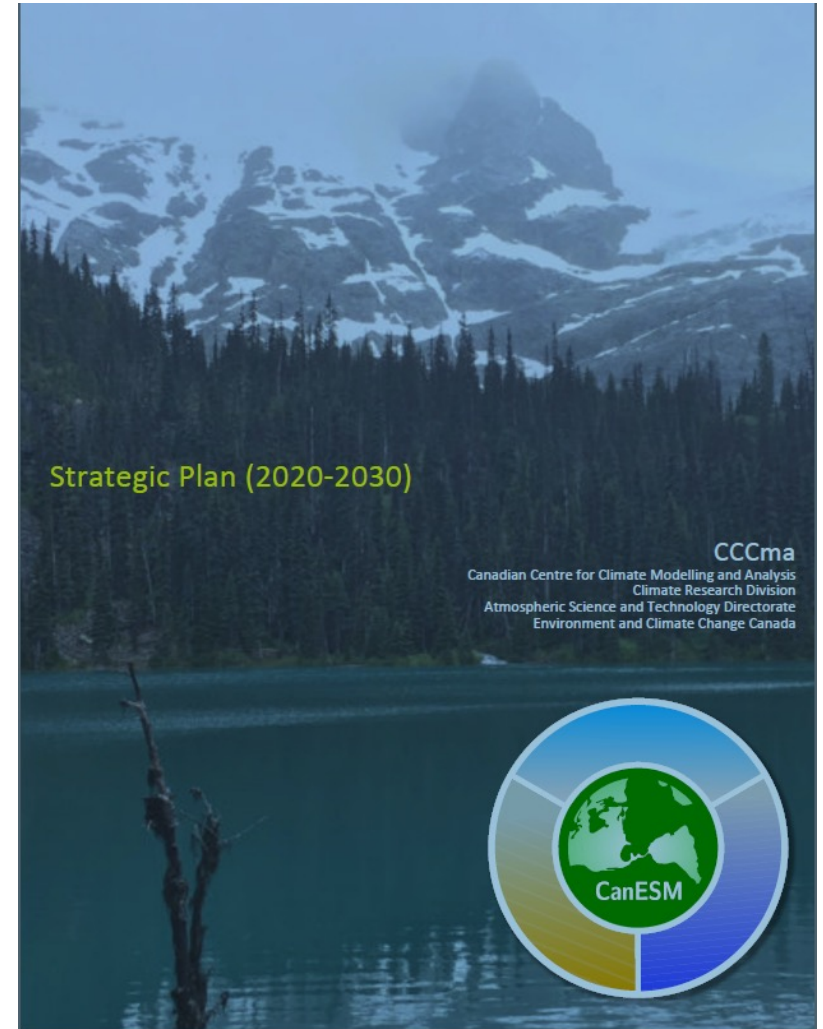
Model development / Science directions

- Preparation of CanRCM5, with CanAM5 physics, to run CORDEXII in 2021/2
- Increased focus on regional downscaling, including attempts to collaboratively build ocean downscaling systems.
- Continued contribution to operation seasonal and decadal and efforts to move operational predictions to CanESM5.
- New approach to model tuning employing perturbed physics-parameter ensembles and history-matching theory to objectively discover a range of plausible model parameter settings.
- Detailed examination of climate sensitivity in CanESM5, and sensitivity to parameter settings vs changing physical schemes.
- Broader “Analysis for Development” effort within CCCma, to more comprehensively validate and understand models prior to release.
- Numerous bespoke large ensembles for science applications, including the “original” COVID19 large ensemble resulting in >4 papers.

New science directions

Strategic plan priorities:

- The changing earth system –past and future
- Detailed regional climate information
- Carbon cycle Earth System Feedbacks
- Seasonal to Decadal climate prediction
- Climate extremes and event attribution
- Role of short lived climate forcings
- Implications of climate engineering and response to mitigation options



Suggestions for CMIP7

Rationalize the data request

- Data request was the most onerous part of contributing to CMIP7
- There is need for a process to allow, simplification, community vetting, and continuity across phases of CMIP and a less convoluted process for dealing with changes one production runs have started
- Multiple groups created their own bespoke software pipelines to process data – possible opportunity for coordination.

Improve forcing data consistency

- Forcing data should comply to a standard and have a common format, like CMORized output.
- Search interface for forcing data could be improved

Avoid becoming too large / complex

- CMIP6 was overwhelming. A small and simple CMIP7 with a clear focus would be better than being a catch all for every MIP.
- Improve vetting of MIP designs by modelling experts, to ensure they make sense.

Clarify usage of “p” numbers

- When to use a perturbed physics member versus using a new *source_id* should be clearer. The requirements for new “p” members should be explicit (require DECK?)

Clarify & support the usage of ESGF

- Model versions appear in between CMIP cycles. Is it appropriate to publish DECK results on ESGF for these, even e.g. after CMIP6?
- Improve the stability of and support for the base ESGF node software to avoid frequent crashes.
- The emergence of independent cloud archives of data are extremely popular in the user community, and provide utility not present in ESGF, but have issues of correctness, citations, etc. Coordination with projects like Pangeo should occur.