WCRP Working Group on Coupled Models (WGCM)

Co-chairs: Gerald Meehl and Sandrine Bony

WGCM promotes balance between
simulation – evaluation – understanding

WGCM Missions

- **Review and foster the development of coupled climate models (AOGCMs) and Earth System Models (ESMs, usually defined as an AOGCM with at least a coupled carbon cycle, can also have dynamic vegetation, chemistry, aerosols, etc.)**

  Connect to IGBP AIMES (carbon cycle, ESM development), WGNE (processes and atmospheric model improvement), WGSIP (decadal climate prediction)

- **Coordinate model experiments and inter-comparisons:**
  - better understand natural climate variability
  - predict the climate response to natural & anthropogenic perturbations
  - assess the climate predictability at the decadal timescale

  CMIP (with many MIPs/partners), CMIP Panel in WGCM,

  PMIP (with IGBP/PAGES),

  CFMIP

        Decadal Climate Prediction Panel (WGSIP/WGCM)

        Transpose-AMIP (WGNE/WGCM),

  CORDEX (JSC/WGCM)

- **Promote and facilitate model validation and diagnosis of shortcomings, and understanding processes and feedbacks in the climate system**

→ joint WCRP-WWRP-THORPEX "survey on model evaluation and improvement"

    → Metrics panel (WGNE/WGCM)

    → facilitating connections between global modelling / observations / processes

      Obs4MIPs, CFMIP/GCSS station outputs, CFMIP observations simulator (COSP)

The most recent WGCM meeting:
Hamburg, Sept. 2012

One day joint with Working Group on Seasonal to
Interannual Prediction (WGSIP)

Grand Challenge GC4 overseen by WGCM:
 "Clouds, Circulation and Climate Sensitivity"

Proposed targeted research around 5 initiatives:

1. Climate and hydrological sensitivity
2. Leveraging the past record
3. Coupling clouds to circulations
4. Changing patterns
5. Towards more reliable models

WGCM/WGSIP interface

Decadal climate prediction

Coordinating experimental design for CMIP5 (and CMIP6)

Decadal climate predication Panel (Joint between WGCM and WGSIP) designed to oversee decadal climate prediction experiments and issues that arise in CMIP5 (and CMIP6), and to more broadly deal with questions related to decadal climate prediction:

George Boer (WGSIP, chair)

Ron Stouffer (WGCM)

Mojib Latif

Ben Kirtman (WGSIP)

Gerald Meehl (WGCM)

Doug Smith

Scott Power

Karl Taylor (WGCM)

Planning for CMIP6:

Assume CMIP6 would be comparable to CMIP5--involving several communities, with a core set of experiments with calibration idealized experiments (e.g. 1% runs, 4XCO2, etc.), historical and future prediction/projection runs, and several layers of other experiments

(comments made related to de-coupling CMIP from the IPCC assessment cycle, but recognizing the reality of having models that would be state-of-the-art for IPCC assessment, not ruling out other MIPs that would occur out of cycle due to facilitation of ESGF)

Experiment specification, requires sufficient detail far enough in advance for effective configuration, and finalize prioritized fields early

CMIP6 should have continuity with CMIP5

Try to retain continuity with scenarios, though IAM community and our community may need to adjust or add sensitivity experiments (e.g. aerosols, land use change, 2C warming bigger peak and decline in RCP2.6)

Details of land-use change that are adapted by each group need to be addressed

Modeling groups would like CMIP6 to be smaller than CMIP5; But there are more research communities that want their experiments to be part of CMIP6 which would make it bigger…

More CMIP6 issues:

Land use –aerosols—ESM applications— SSPs show different outcomes from RCPs?

reversibility or geo-engineering

More idealized experiments, e.g. 1% runs but for other forcings, idealized aerosol, ozone, land use, like the 1% runs

Decadal prediction and extremes

systematic biases

Very high res time slice exps for tropical cyclones and other aspects of storms and circulation changes

Higher res coupled simulations for tropical cyclones, extremes, and circulation changes

Coupled land ice for global and regional sea level rise

Data management: Promote CMOR as standard protocol, output could be directly saved into CMOR format

"near-exabyte" scale of CMIP6—need to recognize and plan for how to handle that data volume

Evaluation: International approach to evaluation, metrics panel useful, expanded role, semi-regular model analysis workshops

 Logistics: High frequency temporal data desirable for some experiments—perhaps have a different fields list for different experiments, prioritize fields, check what fields are being used from CMIP5

make data access easier -- secure funding for ESGF, data access and retrieval need for scriptable and need better download methods

metafor needs work in concept and application

TIMING

CMIP6:
exploratory Aspen Global Change Institute workshop: August 2013
Iterations on experimental design in research community: 2013-2015
WGCM approve experimental design: 2015 (duration of CMIP6 2015-2020)
Modeling groups receive scenario info from IAM groups: 2017 and start runs
CMIP6 model analysis workshop: 2018
deadline for papers assessed in IPCC AR6: 2019
WGI AR6 report published: 2020
Ongoing analysis of CMIP6 data: 2020 onward