Status and Release Schedule of CCSM4

Jim Hurrell
Chief Scientist, CCSM

jhurrell@ucar.edu
IPCC Fifth Assessment Report

• NCAR and partners will make a major contribution through simulations performed with the latest versions of the CCSM and WACCM

• CMIP5 Experimental Design (Taylor et al. 2009) will be followed:
  o A set of coordinated climate model experiments designed to:
    ✓ address outstanding scientific questions from AR4;
    ✓ improve understanding of climate variability and change;
    ✓ provide estimates of future climate change useful to those considering its possible consequences.

• CMIP5 is a 5-year experimental design, but a significant fraction of the experiments will be done in time to be included in AR5
  o Simulations underway (next slides)
  o December 2010: model simulations available to public
  o August 2012: Papers must be accepted, in press or published
  o September 2013: IPCC WG I plenary
Climate Prediction

Seasonal to Interannual Prediction

Initial value problem

Boundary value problem

Boundary value + Initial value

Centennial prediction

Decadal prediction

CMI P5
CMIP5 Decadal Prediction Experiments

- Ensemble initial conditions from ODA (DART facility)
- Ocean analysis for 1998-1999
- Improved depiction of Gulf Stream separation and reduced upper-ocean T bias compared to hindcasts
- First experiments to be for yr 2000 start
- Further strategy tbd by SSC (March 2010)
CMIP5 Long-term Experiments

- Core + some Tier to be done at NCAR (11M GAU & 15K yr)
- Others to be done on DOE machines
- Full set of CMIP5 forcings just now available
- Current simulations:
  - 1850 1 & 2°C cntrl
  - 1% yr-1 CO2
  - 20 C (AR4 forcing)
- Soon:
  - 1850 WACCM
  - 1850 CESM cntrl

Coupled carbon-cycle models

- Control, AMIP, & 20°C
- RCP4.5, RCP8.5
- 1%/yr CO2 (140 yrs)
- abrupt 4XCO2 (150 yrs)
- fixed SST with 1x & 4xCO2
- extend RCP8.5 to 2300
- extend RCP4.5 to 2300

individual forcing

ensembles:
- AMIP & 20°C
- RCP2.X, RCP6

last millennium

Mid-Holocene & LGM

aqua planet (clouds)

patterned SST (clouds)

uniform SST (clouds)

D&A ensembles

natural-only, GHG-only

1xCO2 (1% or 20C+RCP4.5)

carbon cycle sees

eradiation code sees

AC&C4 (chemistry)

ensemble of abrupt 4xCO2 yr runs
	aerosol forcing ca. 2000

Core + some Tier to be done at NCAR (11M GAU & 15K yr)
Release Schedule

- January 15, 2010: CCSM4.0 alpha release - to “friendly” users and vendors with minimal documentation (except for general script's User's Guide)

  ✓ Vendors and researchers who are granted access to the alpha release code should not redistribute this code to anyone outside of their company or research group.

  ✓ Anyone writing a paper or giving a presentation based on research that is done between the time when access is granted to the alpha release code and the date of the public release must offer co-authorship to code contributors...

- April 1, 2010: CCMS4.0 release - full documentation, including User's Guide and Model Reference Documents

- June 1, 2010: CESM1.0 release (including ocean ecosystem, advanced physics version of CAM)
Special Journal Issues

• *J. Climate*

  ✓ Tony Broccoli (Chief Editor) to oversee

  ✓ List of expected submissions by 1 April, 2010 from each CCSM WG

  ✓ All papers submitted by 1 January, 2011

• Interest is high for special issue to document SE advances

  ✓ John Drake, Phil Jones and Mariana Vertenstein to develop