

# Appendices

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### A. CCSM Run Categories

CCSM runs categories are defined based on such attributes as the length of the run, changes introduced into the model and the intent of the run.

CCSM Control Runs are very long integrations (hundreds to thousands of years), with no changes to the model, to establish the baseline climate of the model.

CCSM Experiment Simulations are long integrations (tens to hundreds of years) made with modifications introduced into the baseline CCSM model or the model boundary datasets in order to simulate a scientific experiment or policy scenario.

CCSM Validation runs are short runs (weeks to years) made to examine specific model behavior such as response to changes or yearly mass and energy conservation/budgets.

CCSM Test Runs are very short runs (days to weeks) made to test specific model software behavior such as exact restartability or proper time coordination of the components.

CCSM forecast runs: While the CCSM is not designed to be a weather forecast model, some researchers have used and assessed it in this manner.

#### a. CCSM Control Runs

CCSM Control Runs define the basic long-term climate of the CCSM. A control run needs to run long enough for slow adjustment processes, such as subsurface water in land model, to come into balance. Some of these, such as the deep ocean heat and salinity, may take thousands of years to into balance. By default, Data output frequencies are monthly averages, with daily averages for a few select variables. Higher frequency data output for analysis or to drive regional-scale models is also supported. However, these high frequency data are often only created for limited periods of the integration. CCSM Control Runs are documented on the CCSM experiments and data web page. This documentation includes a description of the run and pointers to the validation plots and data files from the control run.

#### b. CCSM Experiment Simulations

A CCSM Experiment Simulation is a run or a series of runs made with some changes made to the control version of the CCSM. Typically, these changes are introduced to investigate a scientific or policy questions. The changes may be either to the CCSM code, the model boundary datasets or both. Experiment Simulations tend to be long (model centuries to millenia)

- Validating the changes: The model response to the changes must be verified before beginning the run. This includes making short runs with the changes and validating the basic energy and mass conservation budgets or adding printed or data outputs for the variables being changed.
- Ensemble Runs: Ensemble runs are runs which run repeatedly using slightly different initial conditions. In time, the solutions of the different ensemble members will diverge from each other, giving a picture of the range and significance the model response to the changes. CCSM Experiment Simulations are documented on the CCSM experiments and data web page. This documentation includes a description of the run and pointers to the validation plots and data files from the control run.

#### c. CCSM Validation runs

A CCSM Validation runs are made under the direction of an individual working group or investigator for the purpose of documenting the models response to a change or upgrade made for scientific purposes. Validation runs tend to be short duration (model weeks to years) to evaluate such things the response and mass and energy conservation/budgets from the modified model.

#### d. CCSM Test runs

CCSM Test Runs verify that the CCSM successfully meets the requirements defined in the [CCSM Requirements document](#). Test runs are very short duration (days to weeks). Different test suites exist