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The North American Regional Climate Change Assessment Program (NARCCAP):

A Multiple AOGCM and RCM Climate Scenario Project over North America

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The North American Regional Climate Change Assessment Program is using an ensemble of global and regional climate models (GCMs and RCMs) to produce downscaled estimates of changes in regional climates decades into the future. Models in the program include the RCMs MM5, HadRM3P, RegCM3, the Canadian regional climate model (CRCM), the UCSD Experimental Climate Prediction Center's regional spectral model (RSM), and eventually a regional climate version (under development) of the U.S. Weather Research Forecast (WRF) model. The models are being driven by NCEP and ERA reanalyses and will also use output from several GCMs: the Hadley Centre's HadCM3, the NCAR CCSM, the Canadian CGCM3 and the GFDL AOGCM. The resulting climate model runs will form the basis for multiple high-resolution climate scenarios to be used in climate change impacts assessments in the US and Canada. High-resolution global time slice experiments using the GFDL atmospheric GCM and the NCAR atmospheric model CAM3 will also be produced and compared with runs of the regional models. The collective analysis of output from multiple models provides a framework for projecting regional climate change and, equally important, its uncertainty.

Initial evaluations of model skill show precipitation and temperature biases that are comparable to those seen in previous regional simulations, even though NARCCAP is using a large domain covering most of North America. Circulation biases and precipitation biases are only weakly correlated, especially in summer. Results also highlight

a common precipitation bias in the southern U.S. for fall and winter that has appeared in many other models and even suggest deficiencies in analyses of observed precipitation in the mountainous western North America. Perhaps most important, model output indicates that the collection of all models produces a more complete depiction of the uncertainty in estimating precipitation change than could be obtained from a single model or the driving data, because the collective biases from all the models show a more even distribution than biases from individual models.