



The North American Regional Climate Change Assessment Program (NARCCAP): Identifying sources of uncertainty in nested regional climate simulations

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The North American Regional Climate Change Assessment Program (NARCCAP) is an international effort that is evaluating propagation of uncertainty when nested regional climate models (RCMs) are used to dynamically downscale climate projections from atmosphere-ocean general circulation models (AOGCMs). NARCCAP is evaluating these uncertainties by using six nested RCMs at 50 km resolution to dynamically downscale realizations of current climate (1971-2000) and the A2 SRES emission scenario (2041-2070) from four AOGCMs. Comparative analysis of the resulting 24 pairwise AOGCM-RCM combinations will permit us to determine how much of the variability is attributable to using different AOGCMs, how much is attributable to using different RCMs, and the role of interaction between the two. The uncertainty evaluation will use both statistical and physical process-oriented analyses. All output is being made available to the climate analysis and climate impacts assessment communities through an archiving and data distribution plan, providing climate change projections over the coterminous United States and Canada at unprecedented spatial and temporal (hourly to six-hourly) resolution.

Simulations are presently being concluded that nest the six RCMs within reanalyses of observations. These simulations can be viewed as nesting the RCMs within a GCM that is nearly perfect (constrained by available observations), in effect isolating errors attributable solely to the RCMs. Results to date indicate that skill is greater in winter than in summer, and greater for temperature than for precipitation. Temperature and precipitation errors are uncorrelated from model to model; consequently, the multi-model ensemble has more robust skill than any single model.