

## **NARCCAP: Future Scenarios of Regional Climates for Assessing Impacts of Climate Change**

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The North American Regional Climate Change Assessment Program (NARCCAP) is an international, multi-agency program to produce multiple realizations of future scenario climates at regional scales by use of global climate models (GCMs) and regional climate models (RCMs). Output from this modeling program will be available for assessing the impacts of climate change at regional scales for the US, Canada, and northern Mexico, and for climate science studies.

The goals of NARCCAP are to (1) quantify the multiple uncertainties of GCM-RCM regional projections of future climate, (2) develop multiple high-resolution regional climate-change scenarios for impact and risk assessments, (3) evaluate regional model performance over North America by nesting RCMs in reanalyses, (4) understand critical regional climate-change processes, (5) create greater collaboration among US, Canadian, and European climate modeling groups, and (6) derive added value from diverse, ongoing regional and global modeling projects.

Results from four atmosphere-ocean GCMs (AOGCMs) for contemporary and future scenario climates created for the IPCC Fourth Assessment Report are used as input for six RCMs to produce dynamically downscaled climate information at 50-km grid spacing for most of North America. In addition, two high-resolution atmospheric GCMs are producing time-slice climate information at the same resolution for comparison with RCM results.

In Phase I, results of RCM simulations driven by reanalysis ('observed') boundary conditions from 1979-2004 are being used to quantify uncertainty introduced by regional models and tracking uncertainty through impacts models. In Phase IIa, the RCMs are being run with lateral boundary conditions for 1971-2000 produced by the 'Climate of the 20th Century' runs of the AOGCMs. This period was chosen to overlap with the period of the reanalysis driven simulations. In Phase IIb, RCMs will use lateral boundary conditions from AOGCM output from the emission scenario SRES A2 (nominally 2041-2070). Results of Phases IIa and IIb will be available for studying impacts of climate change at regional scales. Output from the regional models and time slice models will be available in standard data format similar to that used for GCM results produced for the IPCC Fourth Assessment Report.

Phase I of this program has been completed, and Phase II is underway.

NARCCAP includes RCMs developed or maintained by European groups (PRECIS and RegCM3), the Canadian regional climate model (CRCM), and U.S. models including the ECPC regional spectral model (RSM), NCAR/Penn State Mesoscale Model version 5 (MM5), and the Weather Research and Forecasting Model (WRF). AOGCMs include the NCAR CCSM3, the Canadian Climate Centre CGCM3, the GFDL CM2.1, and the Hadley Centre HadCM3. High-resolution global time slice experiments are being produced by the GFDL atmospheric model (AM2.1) and the NCAR atmospheric model (CAM3).

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