Collaborative Research

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

Using Multiple GCMs and RCMs to Simulate Future Climates

and their Uncertainty

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PROJECT SUMMARY

NARCCAP will systematically investigate the uncertainties in regional scale projections of future climate and produce high resolution climate change scenarios using multiple regional climate models (RCMs) nested within multiple atmosphere ocean general circulation models (AOGCMs) forced with the A2 SRES emission scenario, over a domain covering the conterminous US, northern Mexico, and most of Canada. The plan also includes an evaluation phase through nesting the participating RCMs within reanalyses of observations.

This international program will include 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), 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 (50 km) global time slice experiments based on the GFDL atmospheric model (AM2.1) and the NCAR atmospheric model (CAM3) will also be produced and compared with runs of the regional models, also run at 50 km resolution. The resulting regional climate model runs and time slices will form the basis for multiple high resolution climate scenarios that can be used in climate change impacts assessments in the US and Canada.

To enable very high-resolution simulations of specific regions, both RCM and high-resolution time-slice simulations will save output needed for further downscaling. All output (140 Tbytes) will be made available to the climate analysis and the climate impacts assessment community, through an archiving and data distribution plan. Regional investigations of the North American monsoon, the low level jet, and snow evolution will be conducted in all simulations. Measures of uncertainty across the multiple runs will be developed by geophysical statisticians.

Broader impacts of the proposed research include support for the climate impacts community to provide decision-relevant information for public policy, in part through a user-oriented data access, formatting and archival facility for output from the proposed simulations. NARCCAP will contribute to a wide range of research in the climate community by producing regional-scale climate-change scenarios with estimates of uncertainty. In doing so, the program will enhance the infrastructure for climate-change research by linking several North American and European institutions into a collaborative network for multi-model simulation, output analysis and data dissemination. The program's output will promote undergraduate and graduate research at the participating institutions and foster cross-disciplinary links across campuses and between institutions.