Big Projects, Diverse Users, and Usable Data: Lessons and Examples from NARCCAP

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ABSTRACT

The North American Regional Climate Change Assessment Program (NARCCAP) is an international program to produce high resolution climate change scenarios and investigate uncertainties in regional scale projections of future climate by nesting multiple regional climate models (RCMs) within multiple state-of-the-art general circulation models (GCMs). For the AM2.1/GFDL and CAM3/CCSM timeslice experiments, the atmospheric driven historical RCM runs will also be presented. This presentation will describe the techniques and practices for the management of large collaborative modeling projects, promotion of data utility, and building and maintaining of a diverse end user community. Examples of some preliminary results from the high-resolution GCM timeslice experiments and the NCEP-DOE Phase I RCM runs will also be presented.

Map Projections, Sponge Zones, and GIS Metadata

Although all six RCMs have the same 5 km spatial resolution, there are some differences because they use different map projections they were driven by. The models also differ in the size of the sponge zone where the model data is mixed with the driving lateral boundary conditions. This results in differences in the effective domain size, and in some cases required adjustment of the simulated domains to increase the size of overlap. The models also vary in the extent to which they simply do not exist in some models, or cannot be specified as a single variable. These factors show that even in an experiment designed to facilitate the intercomparison of models, there are limits on how much they can be made to interrelate in some ways.

The impacts community uses GSI heavily in that it allows GIS compatibility is very important for making the data useful to impact users. ESRI's ArcMap v.9.3 supports direct import of data and information.

Techniques for Managing Large Distributed Projects

The biggest challenge faced by a project involving collaboration between multiple institutions is the disconnected nature. Geographical and organizational separation of the collaborators introduce disconnects that slow communications and introduce error. Frequent, disconnected collaboration induces a kind of friction that slows interactions and introduces error. Frequent, disconnected nature. Collaboration between multiple institutions is its clearest, and effective communication is the best tool for reducing these disconnects.

Don't hesitate to employ ad hoc substitutions for technologies that match medium to message well.

Automate everything you possibly can, including communications with users.

Don't hesitate to employ ad hoc substitutions for technologies that match medium to message well.

Restrict decision making.

Communicate with users.

One approach that greatly furthers access to data in the early stages of availability.

Seasonal Climatology

These plots show summer and winter seasonal averages of temperatures and precipitation for 5 of the 6 GCM-driven RCM runs. At left are points of seasonal climatology based on observed data from the University of Delaware dataset for the same 25-year time period. The models in general do a reasonable job of reproducing regional temperature patterns. Reproducing precipitation is, as always, more problematic. At the RCMs do a reasonable job of reproducing the northwestern high winter. Hurricane various climates in the eastern part of the domain, particularly in the southeast central US.

Developing and Supporting A Diverse User Base

The user base for high-resolution climate change research users also spans a broad spectrum of technological sophistication, from climate researchers, who require instantaneous access to the latest model configurations, to the high end, to members of the general public, who need data communications presented in a form suitable for the public, who need data communications presented in a form suitable for easy access.

Impacts users occupy a middle ground. Providing them with effective support requires making current data easily accessible. One approach that greatly furthers access to data. Such users, who require instantaneous access to the latest model configurations, to a form suitable for easy access. Such users, who require instantaneous access to the latest model configurations, to a form suitable for easy access.

This makes the biggest challenge a significant amount of the NARCCAP data into GIS for the impacts community, and involves the importance of using a standard and adhering to it strictly.

NARCCAP AT A GLANCE

• 4 different GCMs driving 6 different RCMs
• 72 km climate resolution
• 3 hourly temporal resolution
• 2 high resolution GCM timeslice experiments
• Future scenario: A2 SRES emissions

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