North American Regional Climate Change Assessment Program

RISA-NCAR Meeting
Tucson, AZ
March 20, 2006

National Center for Atmospheric Research
The North American Regional Climate Change Assessment Program (NARCCAP)

Initiated in FY05 is an international program that will serve the climate scenario needs of both the United States and Canada. Climate scenarios phase starts December 2006.

- Exploration of multiple uncertainties in regional model and global climate model regional projections.

- Development of multiple high resolution regional climate scenarios for use in impacts assessments.

- Further evaluation of regional model performance over North America.

- Exploration of some remaining uncertainties in regional climate modeling (e.g., importance of compatibility of physics in nesting and nested models).

- Program has been funded by NOAA-OGP, NSF, DOE – 3-year program
  - NOAA OGP explicitly stated that they wish NARCCAP to interact with RISA Programs

www.narccap.ucar.edu
NARCCAP - Participants

Linda O. Mearns, National Center for Atmospheric Research
Regional Modeling Strategy

Nested regional modeling technique

- Global model provides:
  - initial conditions – soil moisture, sea surface temperatures, sea ice
  - lateral meteorological conditions (temperature, pressure, humidity) every 6-8 hours.
  - Large scale response to forcing (100s kms)

Regional model provides finer scale response (10s kms)
Physical Contexts for Regional Modeling

- Regions with small irregular land masses (e.g., the Caribbean)
- Complex topography (mountains)
- Complex coastlines (e.g., Italy)
- Heterogeneous landscapes
NARCCAP Domain
NARCCAP PLAN

A2 Emissions Scenario

GFDL
CGCM3
HADCM3
CCSM

Provide boundary conditions

1960-1990 current
2040-2070 future

GFDL
Time slice
50 km

CGCM3

HADCM3
link to European
Prudence

CCSM

CAM3
Time slice
50 km

1960-1990 current

Provide boundary conditions

2040-2070 future

MM5
Iowa State/
PNNL

RegCM3
UC Santa Cruz
ICTP

CRCM
Quebec,
Ouranos

HADRM3
Hadley Centre

RSM
Scripps

WRF
NCAR/
PNNL
Organization of Program

- Phase I: 25-year simulations using NCEP boundary conditions.

- Phase IIa: RCM runs (50 km res.) nested in AOGCMs

- Phase IIb: Time-slice experiments at 50 km res. (GFDL and NCAR CAM3). For comparison with RCM runs.

- Opportunity for double nesting (over specific regions) to include participation of other RCM groups (e.g., for NOAA OGP RISAs, CEC, New York Climate and Health Project).

- Scenario formation and provision to impacts community led by NCAR.
# GCM-RCM Matrix

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<tr>
<th></th>
<th>GFDL</th>
<th>CGCM3</th>
<th>HADCM3</th>
<th>CCSM</th>
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<td>MM5</td>
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<td>X?N</td>
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<tr>
<td>GFDL/AM2</td>
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1 = chosen first GCM  
N = necessary for factorial design
NARCCAP Project Timeline

- **Project Start**: 1/06
- **End Phase 1**: 9/06
- **AOGCM Boundaries available**: 12/06
- **Start Current Climate 1**: 6/07
- **End Current 1**: 9/07
- **End Future climate 1**: 12/07
- **Current and Future 2**: 12/08
USERS

- Illinois Water Survey – Ken Kunkel - DS (WRF and MM5)
- CEC - Guido Franco - DS (N. Miller)
- Climate Impacts Group, NASA – Cynthia Rosenzweig – DS – MM5
- Barry Lynn – Columbia U. – DS
- U. North Carolina – Larry Band – impacts (hydrology)
- CLIMAS - Greg Garffin – output (impacts)
- Climate Impacts Group, UW – Ed Miles – impacts, climate analysis, and DS
- Western Water Assessment – Brad Udall – impacts
End