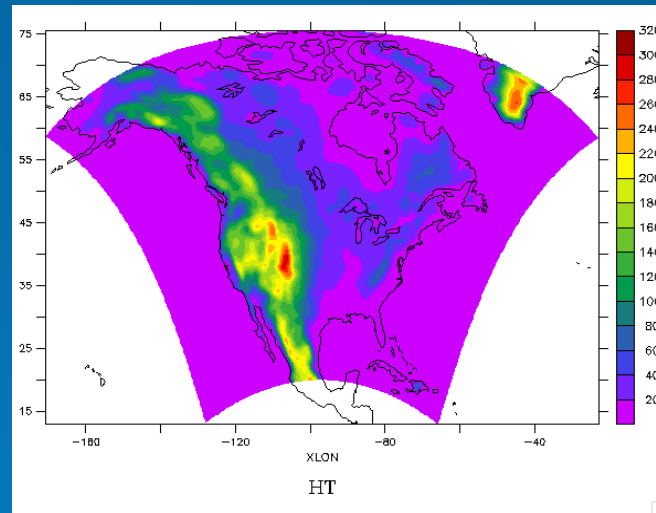# Meeting with Program Managers

April 17, 2008

Washington, D C

The North American Regional Climate Change Assessment Program (NARCCAP)

NCAR

Initiated in FY06, it is an international program that will serve the climate scenario needs of the United States, Canada, and northern Mexico.

GTOPO30 Topography (m) & GLCC Vegetation

NX=155 NY=130 ds=50km CLAT=47.5 CLON=-97 Mercator

- 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 – 3-4-year program
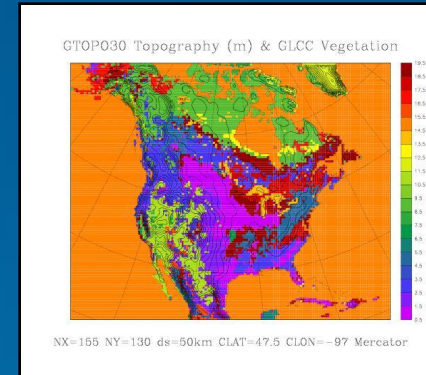
www.narccap.ucar.edu

NARCCAP - Participants

NCAR

Linda O. Mearns, National Center for Atmospheric Research

Ray Arritt, Iowa State, Dave Bader, LLNL; Sébastien Biner, Ouranos; Erasmo Buono, Hadley Centre; Daniel Caya, Ouranos; Phil Duffy, LLNL; D. Flory, Iowa State; Filippo Giorgi, Abdus Salam ICTP; William Gutowski, Iowa State; Isaac Held, GFDL; Richard Jones, Hadley Centre; René Laprise, UQAM; Ruby Leung, PNNL; Don Middleton, NCAR; W. Moufouma-Okia, Hadley; Ana Nuñes, Scripps; Doug Nychka, NCAR; John Roads, Scripps, Steve Sain, NCAR, Lisa Sloan, Mark Snyder, UC Santa Cruz; Ron Stouffer, GFDL; Gene Takle, Iowa State; Phil Rasch, Tom Wigley, NCAR

NARCCAP Domain
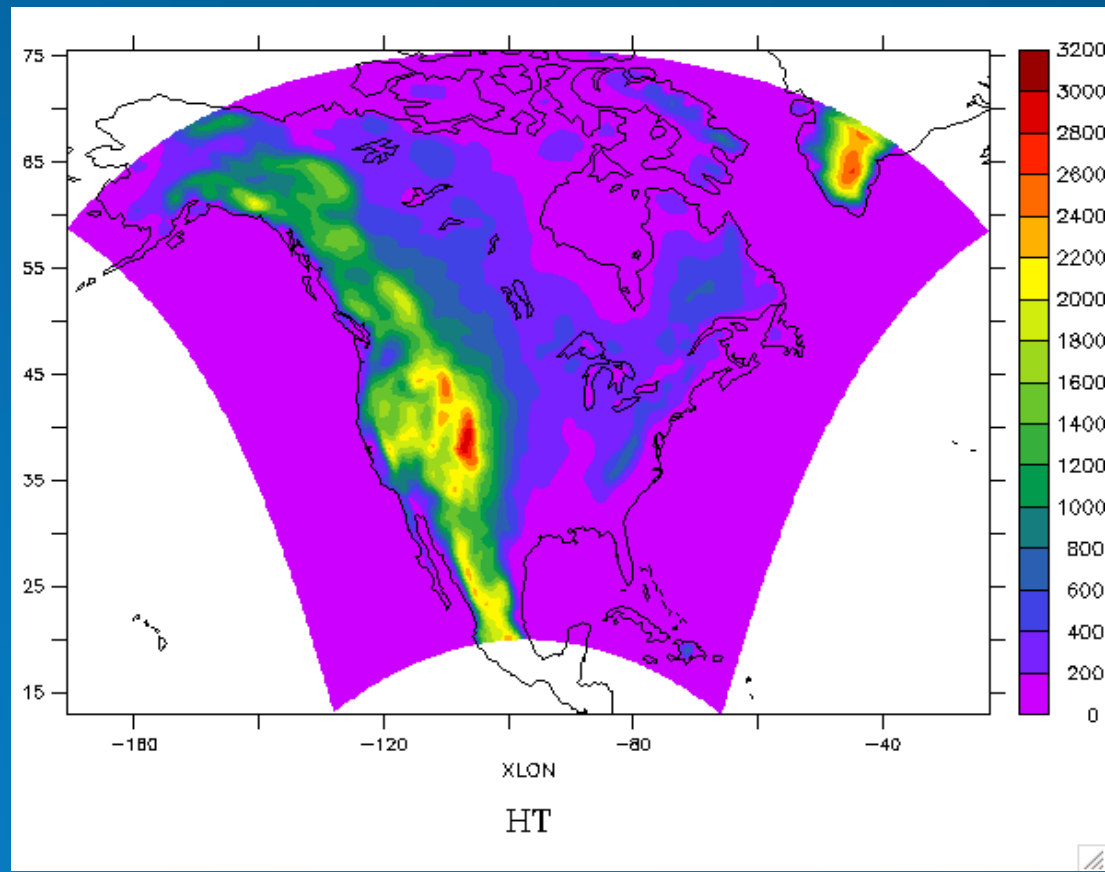
Phase I

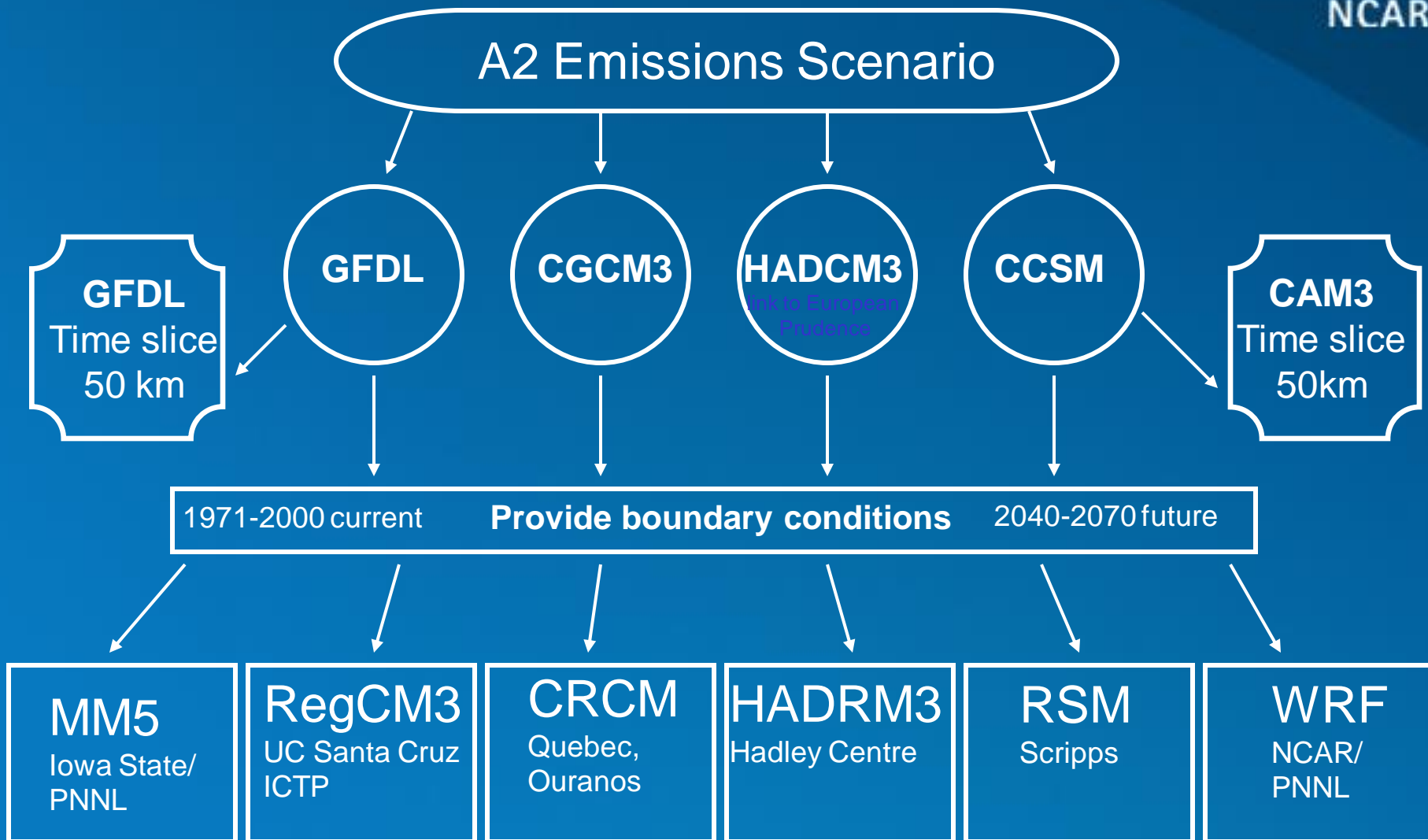- All RCMs have completed the reanalysis-driven runs.

- Configuration:
    - common North America domain (some differences due to horizontal coordinates)
    - horizontal grid spacing 50 km
    - boundary data from NCEP/DOE Reanalysis 2
    - boundaries, SST and sea ice updated every 6 hours

NARCCAP PLAN – Phase II

NCAR

A2 Emissions Scenario

GFDL Time slice 50 km

GFDL

CGCM3

HADCM3
link to European Prudence

CCSM

CAM3 Time slice 50km

| 1971-2000 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

Global Time Slice / RCM Comparison
at same resolution (50km)

NCAR

A2 Emissions Scenario

GFDL AOGCM

CCSM

Six RCMS
50 km

GFDL Time slice 50 km

compare

compare

CAM3 Time slice 50km

GCM-RCM Matrix

NCAR
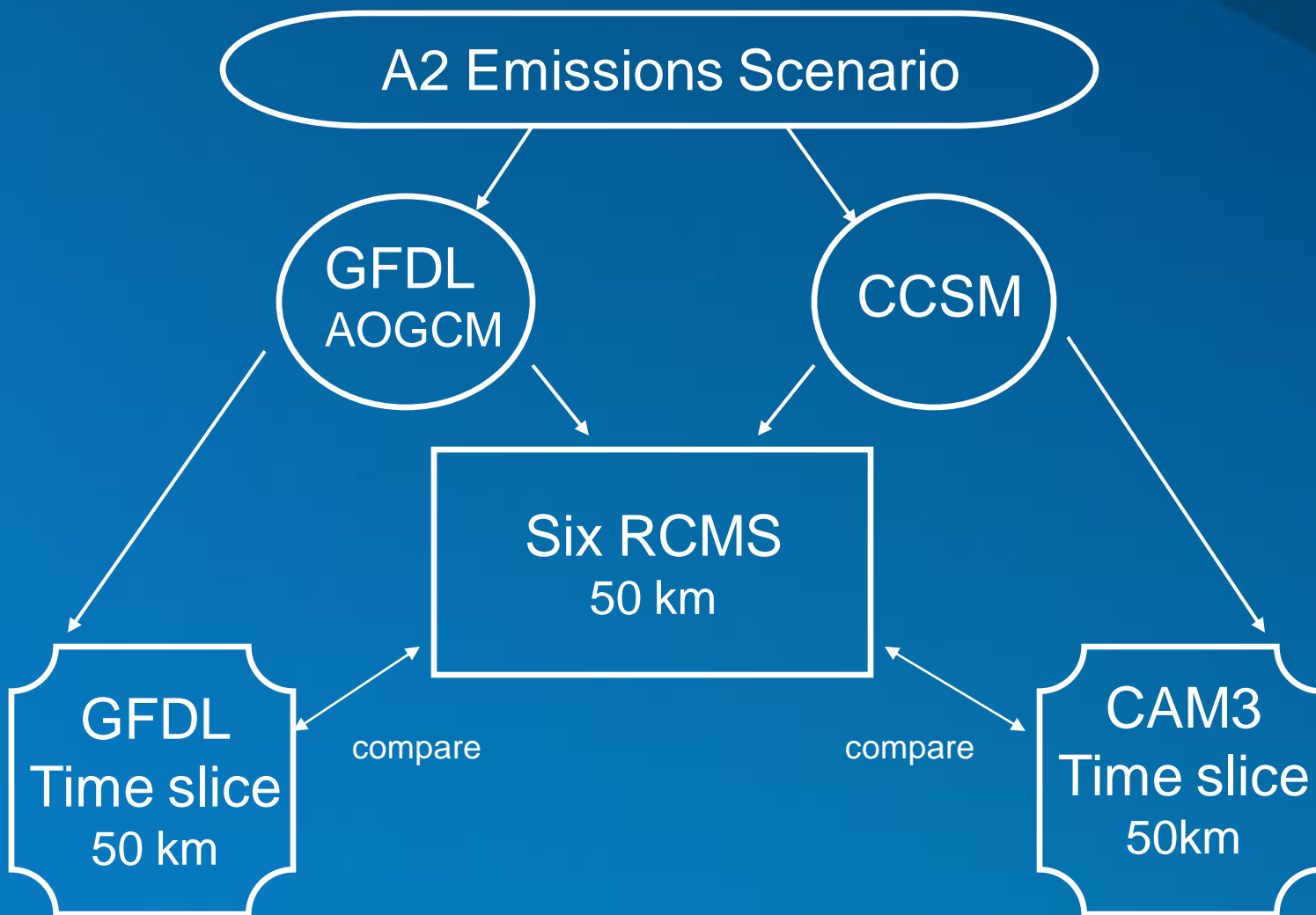
	GFDL	CGCM3	HADCM3	CCSM
MM5			X	X1
RegCM3	X1	X		
CRCM		X1	X	
HADRM3	X	X	X1	X
RSM	X1			X
WRF	X	X		X1
CAM3				X
AM2.1	X			

1 = chosen first GCM
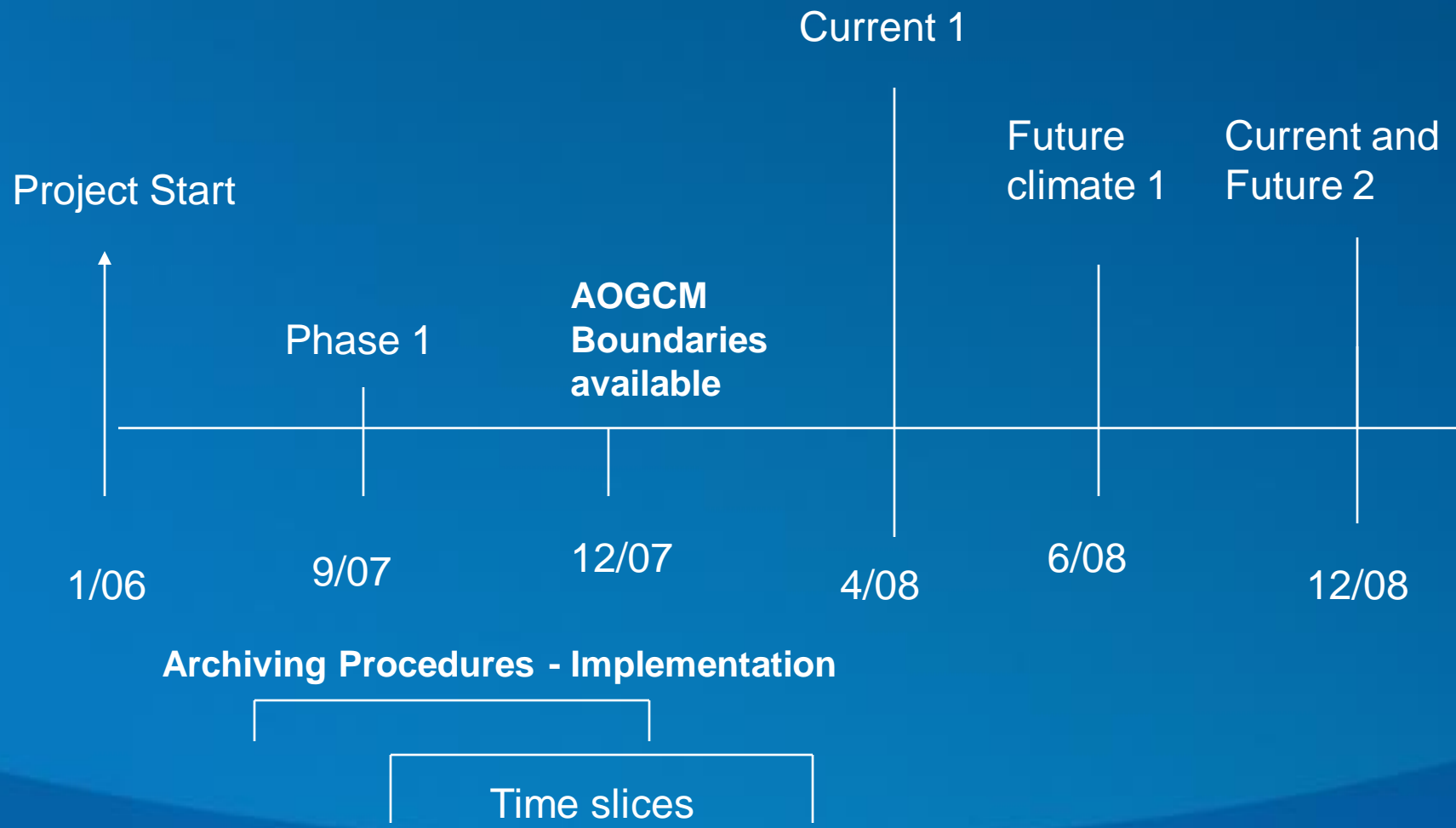
The NARCCAP User Community

Three user groups:

- Further dynamical or statistical downscaling

- Regional analysis of NARCCAP results

- Use results as scenarios for impacts studies

www.narccap.ucar.edu

Use of NARCCAP Data

- 14 users have downloaded 343 data files from ESG - 220 GB -   since workshop

- NARCCAP data set called out in RFP for US Clivar Drought in Coupled Models Project

- Used in other proposals, e.g., F. Semazzi – proposal to EPA on future air quality in N. Carolina

- Program described in senate hearing before Subcommittee on Water and Power of Committee on Energy and Natural Resources, June 6, 2007

NARCCAP Data Overview

15 RCM/GCM combinations + 6 NCEP-driven runs

7 x 3-D variables @ 42 pressure levels + 31 x 2-D variables

50 km resolution = ~ 130 x 110 grid cells

(25 years NCEP + 2 x 33 years GCM-driven) x 3-hourly data

Each 2-D NCEP variable is ~ 4 GB in total size

x_____

~60 terabytes total data volume

(~90% of volume is 3-D data)

NARCCAP Archiving Pipeline

1. Modeling groups run RCMs
2. Modeling groups iterate with ISU to check format of sample data files
3. Once format is approved, modeling groups generate NetCDF data files
4. Data is shipped on 1-TB external hard drives to LLNL/PCMDI
5. PCMDI makes disaster recovery copy of data on NERSC HPSS
6. NCAR QC team checks data for correct format, CF compliance, data integrity
7. QC team fixes minor problems, refers major problems back to modelers
8. Data passing QC is archived on NCAR MSS & copied to NCAR/PCMDI disk
9. Data is published via Earth System Grid web-based data portal

Future Work - Possible Levels

- <u>Level 0</u> - Completion of work as described in revised proposal – all runs completed, all data archived, active use by users' community

- <u>Level 1</u> - Level 0 plus with some minimal supplementary funding in 4th year perform some basic analyses

- <u>Level 2</u> – matrix completed plus some additional analyses

- <u>Level 3</u> – major follow-on 3-4 year project (e.g., using newest AOGCM simulations for AR5, mitigation scenarios, land use change)