

NCAR DCPC Update

*With a Focus on CMIP/IPCC & ESG, and
on behalf of an international collaboration*

WMO ICG-WIS

Seoul, Korea February 22-26, 2010

Don Middleton & Al Kellie

National Center for Atmospheric Research
Computational & Information Systems Laboratory



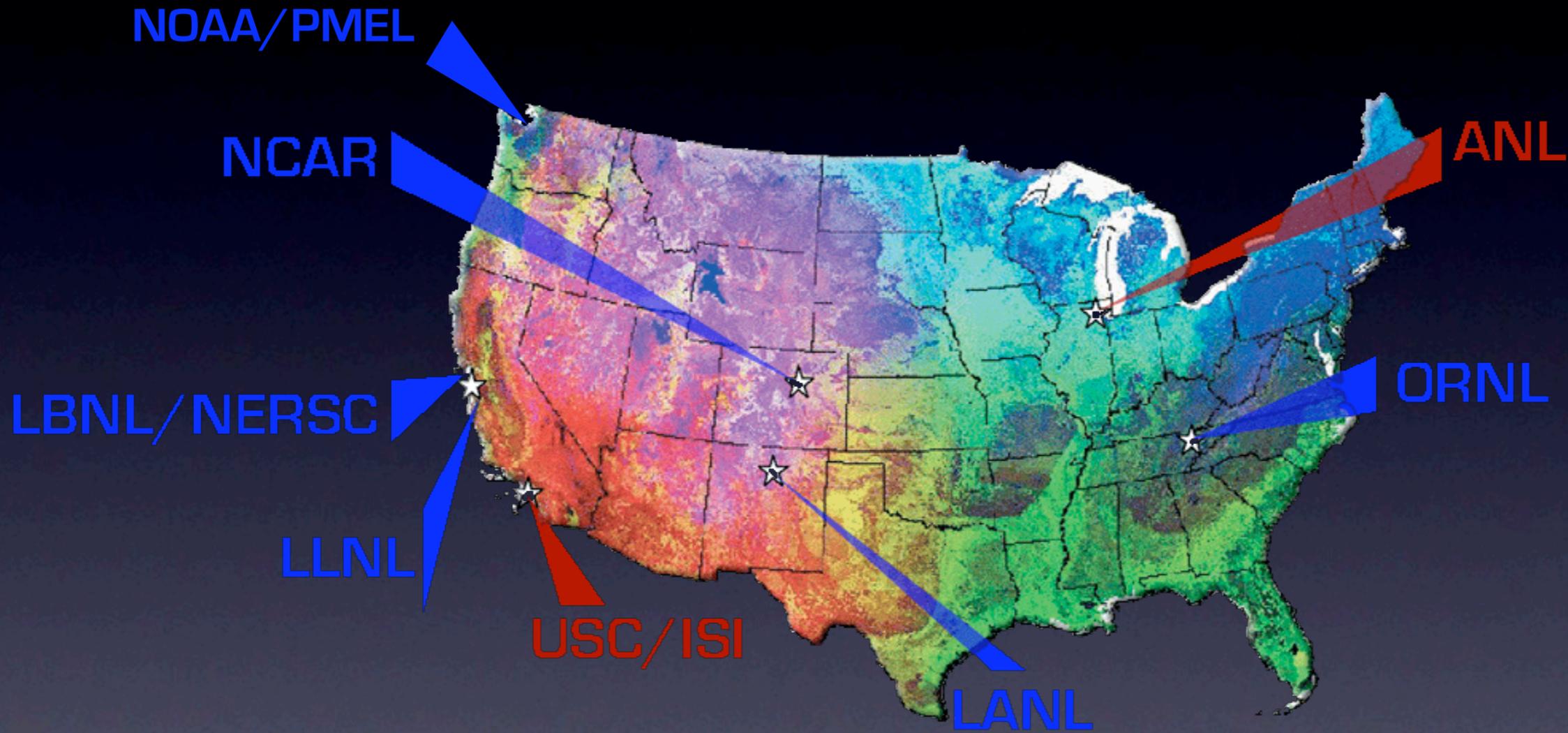
NCAR



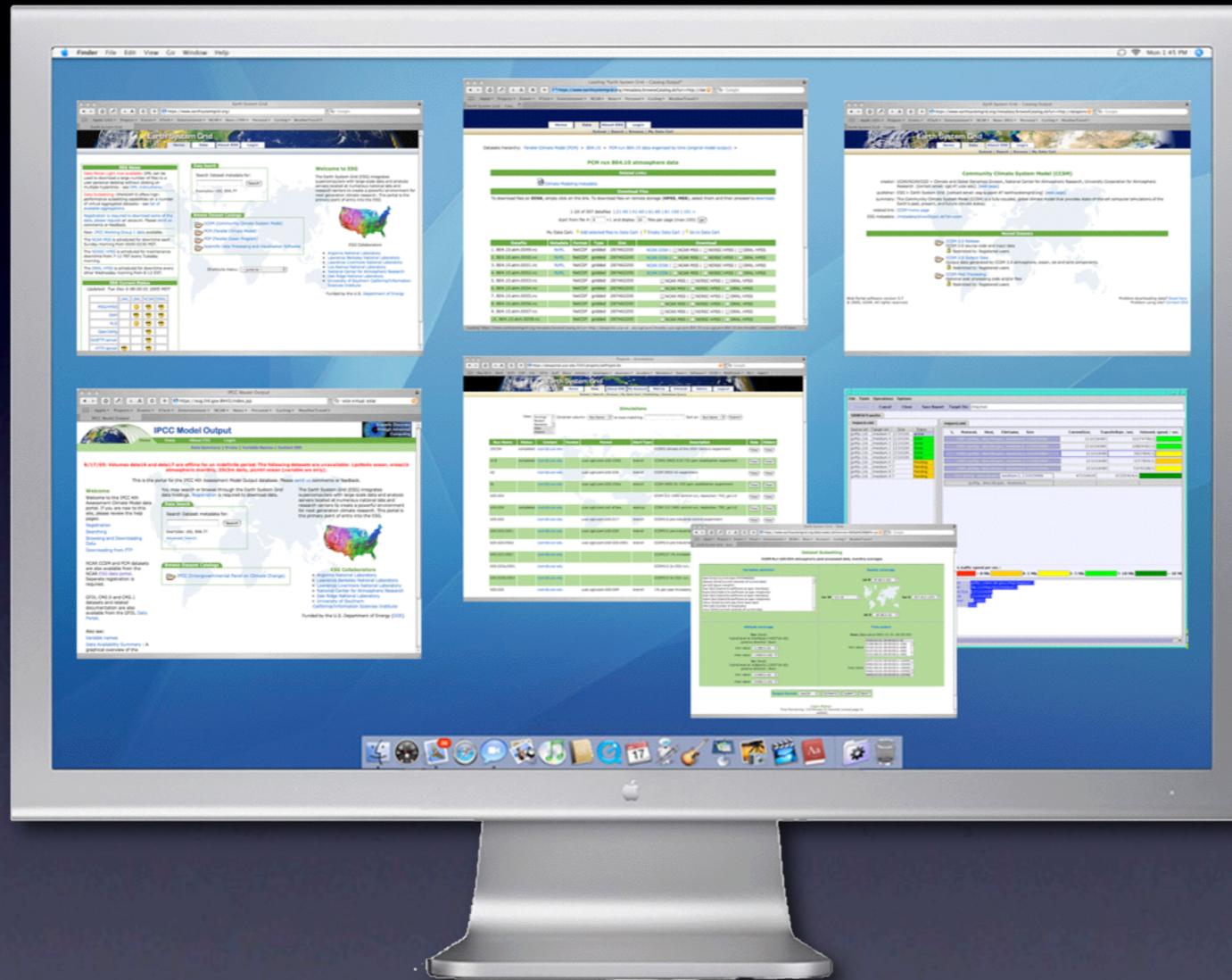
The Earth System Grid



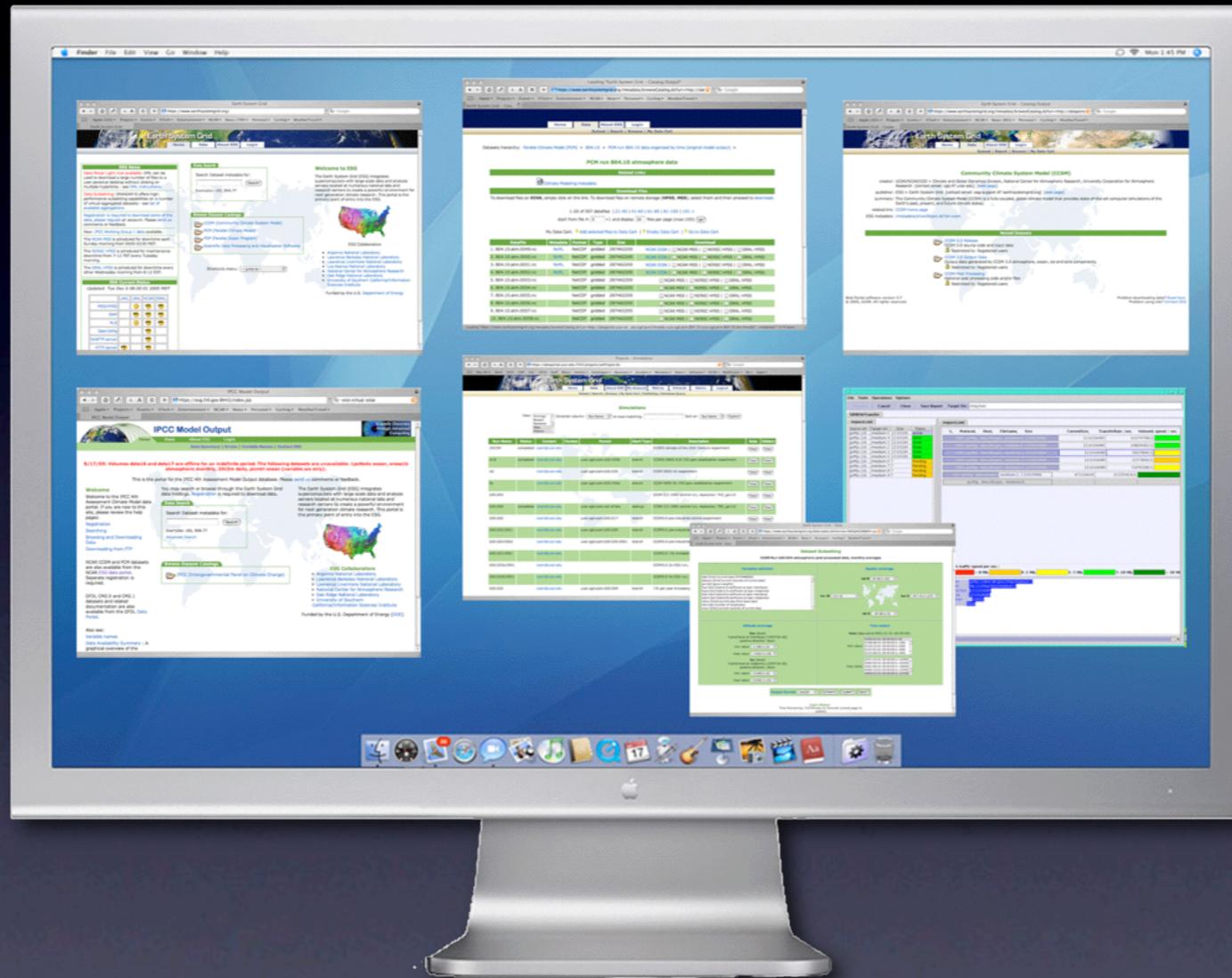
The Earth System Grid



The Earth System Grid



The Earth System Grid



ESG provides access to 250TB of CCSM, IPCC, CSIM, CLM, POP, PCM data; the CCSM model, and analysis and visualization tools.

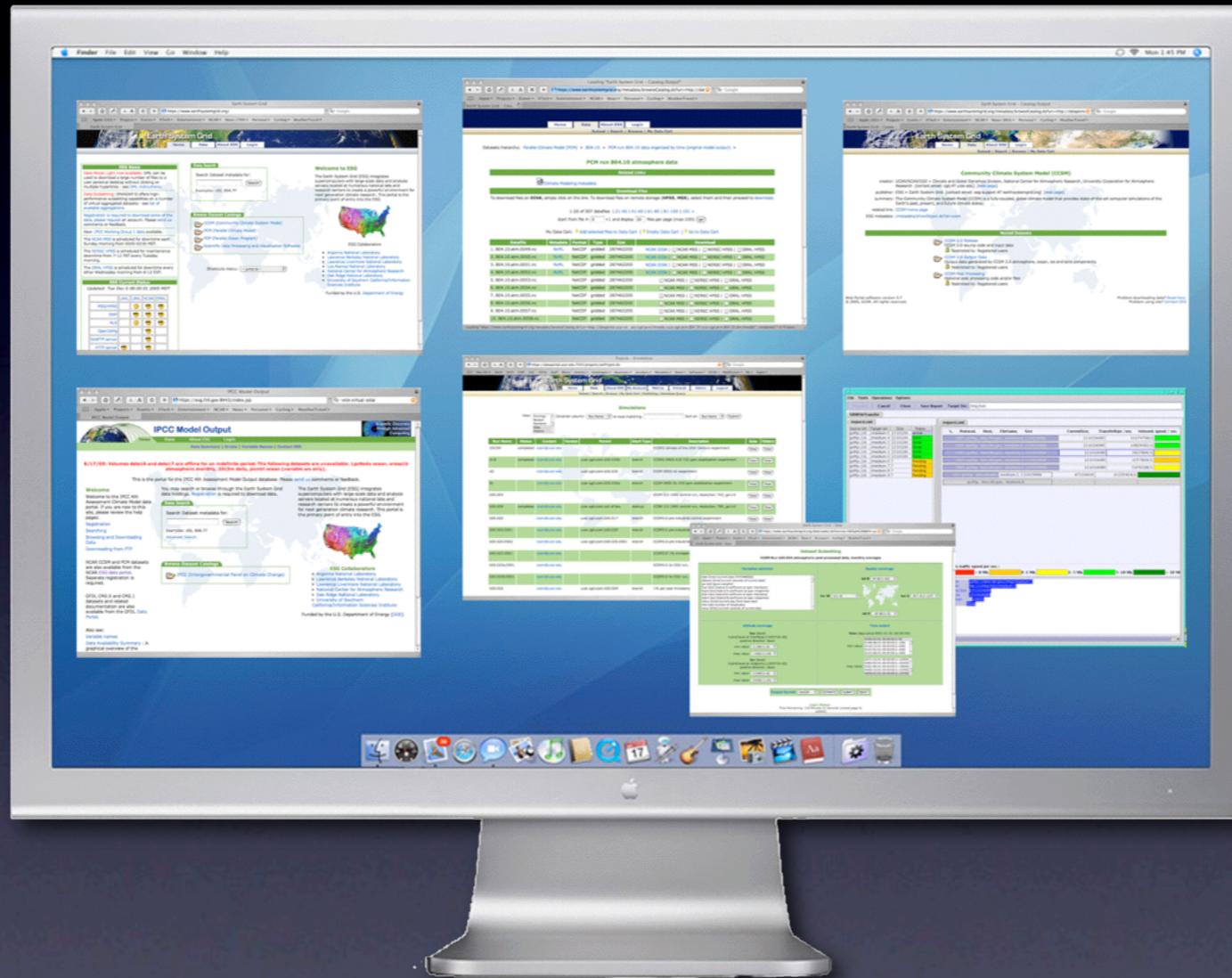


The Earth System Grid

DOE SciDAC2 Center for Enabling Technologies



PI's: Dean Williams (LLNL), Don Middleton (NCAR), & Ian Foster (ANL)



Global Climate Grid

ESG provides access to 250TB of CCSM, IPCC, CSIM, CLM, POP, PCM data; the CCSM model, and analysis and visualization tools.



The Earth System Grid

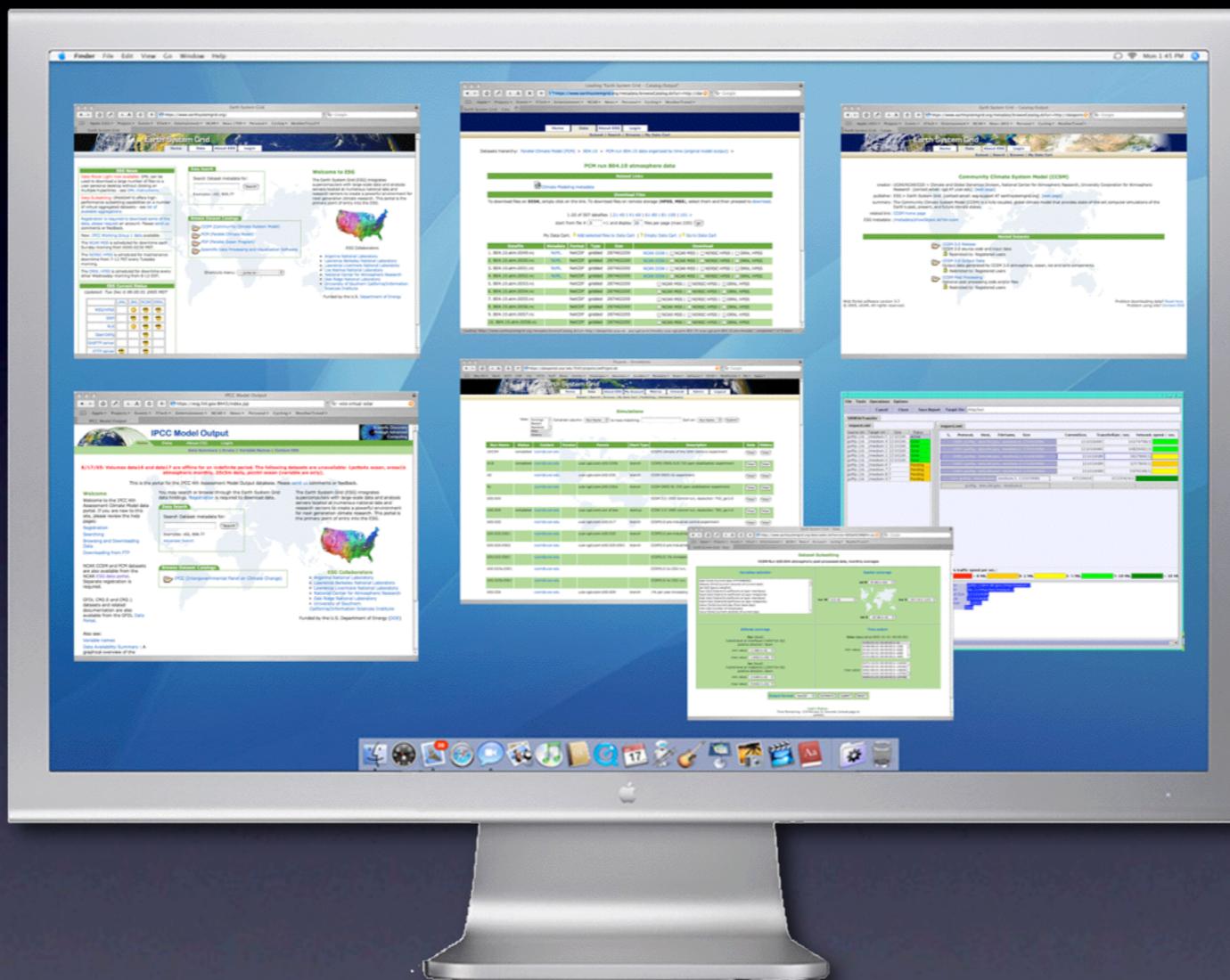
DOE SciDAC2 Center for Enabling Technologies



PI's: Dean Williams (LLNL), Don Middleton (NCAR), & Ian Foster (ANL)



Science Gateway



Global Climate Grid

ESG provides access to 250TB of CCSM, IPCC, CSIM, CLM, POP, PCM data; the CCSM model, and analysis and visualization tools.



An Operational DataGrid for Climate Research

Earth System Grid (ESG)

http://www.earthsystemgrid.org/ metafor

Apple BaseCamp FB Google Huff IMDB MacRum OS Salon VETSblog News Events Feeds (1558) InBox NCAR Personal Projects and Proposals WeatherTravel

Earth System Grid

Home Data About ESG Login

ESG News

New Multifile Download Options: ESG now offers two ways of downloading multiple files at once to the user machine: [Data Mover Light](#) (see [DML instructions](#)) and the standard Unix command `wget` (see [wget instructions](#)). Both DML and `wget` are desktop clients that can be used to download large number of files from the ESG system without clicking on multiple hyperlinks.

New Browsing Options: now the ESG browsing interface allows to specify an optional string to match filenames, and to select many files with one single click.

Data Subsetting: OPeNDAP-G offers high-performance subsetting capabilities on a number of virtual aggregated datasets - see [list of available aggregations](#)

Registration is required to download some of the data: please [request](#) an account. Please [send us](#) comments or feedback.

New: [IPCC Working Group 1 data](#) available.

The [NCAR MSS](#) is scheduled for downtime each Sunday morning from 0000-0230 MST.

The [NERSC HPSS](#) is scheduled for maintenance downtime from 7-12 PST every Tuesday morning.

The [ORNL HPSS](#) is scheduled for downtime every other Wednesday morning from 8-12 EST.

Data Search

Search Dataset metadata for:

 Search

Examples: c02, B06.77

Browse Dataset Catalogs

- CCSM (Community Climate System Model)
- CCSM POP (modified version of Parallel Ocean Program)
- CSIM (CCSM Sea Ice Model)
- CLM (CCSM Community Land Model)
- NARCCAP (North American Regional Climate Change Assessment Program)
 - Restricted to registered NARCCAP users [[Register For Access](#)]
- PCM (Parallel Climate Model)
- POP (Parallel Ocean Program)
- Scientific Data Processing and Visualization Software

Welcome to ESG

The Earth System Grid (ESG) integrates supercomputers with large-scale data and analysis servers located at numerous national labs and research centers to create a powerful environment for next generation climate research. This portal is the primary point of entry into the ESG.

ESG Collaborators

- Argonne National Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- Los Alamos National Laboratory
- National Center for Atmospheric Research
- Oak Ridge National Laboratory
- University of Southern California/Information Sciences Institute

Funded by the U.S. Department of Energy

ESG Current Status

Updated: Wed Mar 25 15:39:02 MDT 2009 MDT

	LANL	LBNL	NCAR	ORNL
MSS/HPSS		☹️	☹️	☹️
SRM	☹️	☹️	☹️	☹️
RLS	☹️	☹️	☹️	☹️
OpenDAPg			☹️	
GridFTP server			☹️	
HTTP server	☹️		☹️	

([Explanation of current status](#))

Shortcuts menu:

User: guest | [ESG Home](#) | [Contact Us](#) | [UCAR Privacy Policy](#) | [Terms of Use](#) | [My Data Cart](#)

Portal Software version 4.7 © UCAR, all rights reserved.

Earth System Grid, funded by the U.S. Department of Energy

<http://www.earthsystemgrid.org>

Earth System Grid

An Operational Archive for CMIP-3/IPCC

Hosted at LLNL Program for Climate Model Diagnosis and Interpretation

The screenshot shows a web browser window displaying the WCRP CMIP3 Multi-Model Database website. The browser's address bar shows the URL <https://esg.llnl.gov:8443/index.jsp>. The website has a green header with the title "WCRP CMIP3 Multi-Model Data" and navigation links for Home, Data, About ESG, and Login. A secondary navigation bar includes links for Data Summary, Errata, Variable Names, and Contact ESG. The main content area features a central message: "Please send us comments or feedback. You may search or browse through the Earth System Grid data holdings. Registration is required to download data." Below this are three main sections: "Data Search" with a search box and examples (c02, B06.77); "Browse Dataset Catalogs" listing the IPCC; and "Visualize Data" with a link to the Live Access Server. On the left, a "Welcome" section provides links for registration and data access. On the right, a section titled "ESG Collaborators" lists several research institutions. The footer contains copyright information for UCAR and LLNL, and a link for site support.

WCRP CMIP3 Multi-Model Database

https://esg.llnl.gov:8443/index.jsp

metafor

Apple BaseCamp FB Google Huff IMDB MacRum OS Salon VETSblog News Events Feeds (1558) InBox NCAR Personal Projects and Proposals WeatherTravel

WCRP CMIP3 Multi-Model Data

Home Data About ESG Login

Data Summary | Errata | Variable Names | Contact ESG

Please send us comments or feedback.

You may search or browse through the Earth System Grid data holdings. Registration is required to download data.

Data Search

Search Dataset metadata for:

Search

Examples: c02, B06.77

Advanced Search

Browse Dataset Catalogs

IPCC (Intergovernmental Panel on Climate Change)

Visualize Data

Live Access Server

Welcome

Welcome to the WCRP CMIP3 multi-model database. If you are new to this site, please review the help pages:

Registration

Searching

Browsing and Downloading Data

Downloading from FTP

Downloading from OPeNDAP

NCAR CCSM and PCM datasets are also available from the NCAR ESG data portal. Separate registration is required.

GFDL CM2.0 and CM2.1 datasets and related documentation are also available from the GFDL Data Portal.

Several updates and bug fixes for the GISS models are available here.

Also see:

Variable names

Data Availability Summary : A graphical overview of the current datasets being served.

Errata : Withdrawn data, files with errors.

The Earth System Grid (ESG) integrates supercomputers with large-scale data and analysis servers located at numerous national labs and research centers to create a powerful environment for next generation climate research. This portal is the primary point of entry into the ESG.

ESG Collaborators

- Argonne National Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- National Center for Atmospheric Research
- Oak Ridge National Laboratory
- University of Southern California/Information Sciences Institute

Funded by the U.S. Department of Energy (DOE)

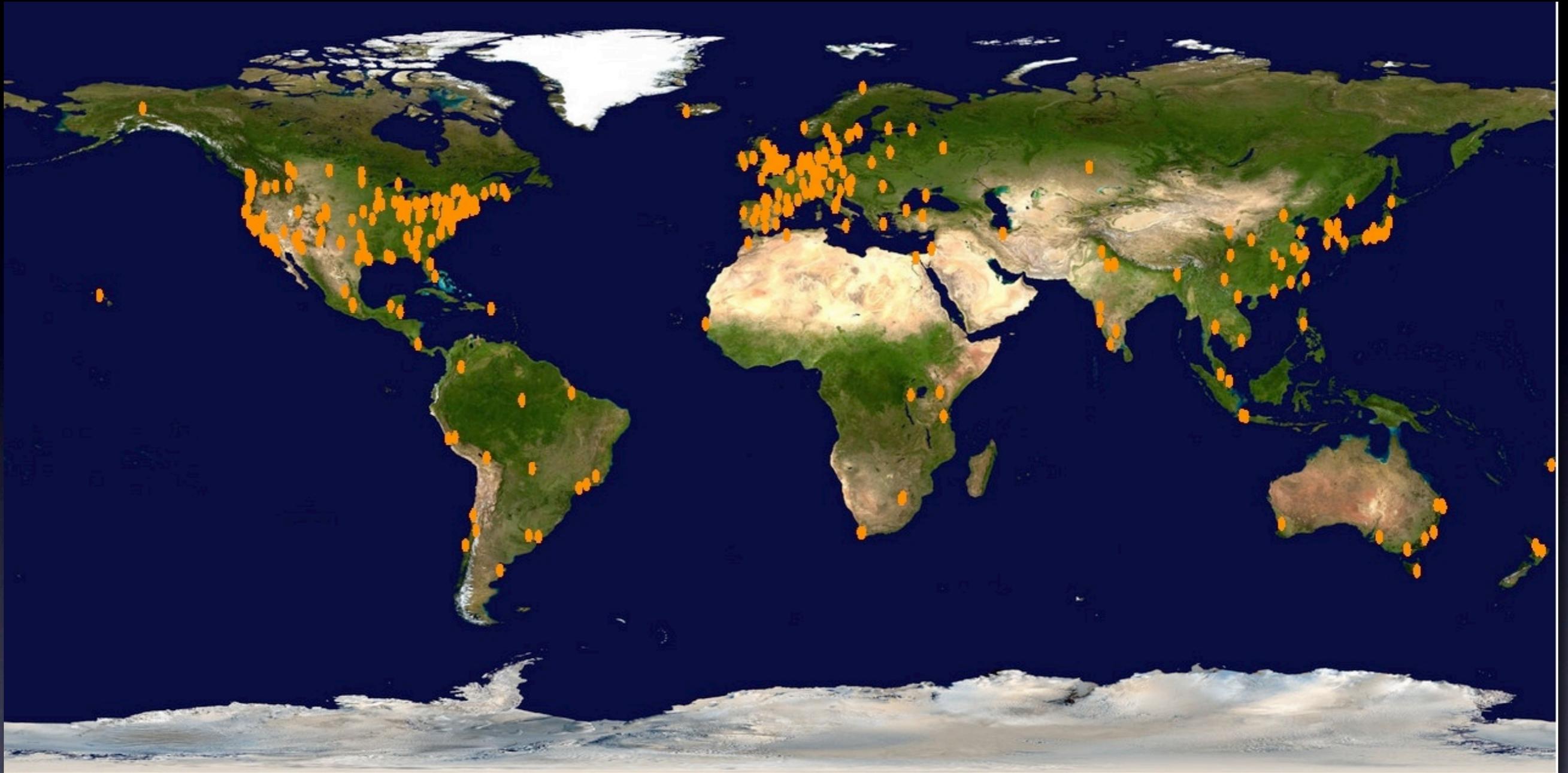
Home | Data | About ESG | Login

Login Status: Not logged in.

© 2004, UCAR. All rights reserved.
Portions © 2004, The Regents of the University of California. All rights reserved.

Problem using site? Contact ESG
Forgot username or password?

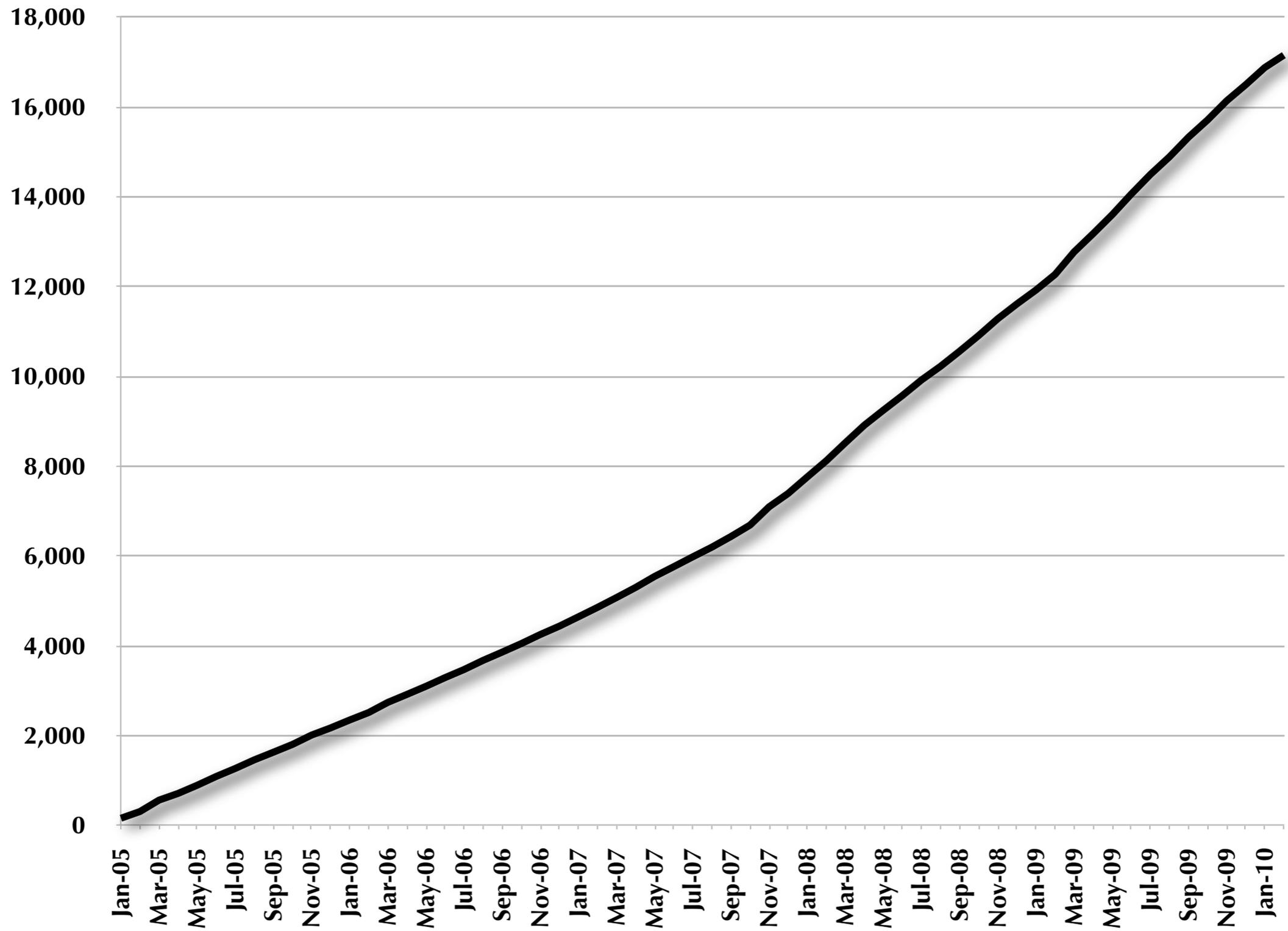
Earth System Grid



Over 500 Sites Ingesting ESG Products
Image courtesy Gary Strand, NCAR

Earth System Grid

Cumulative users, NCAR ESG portal



A Few Metrics

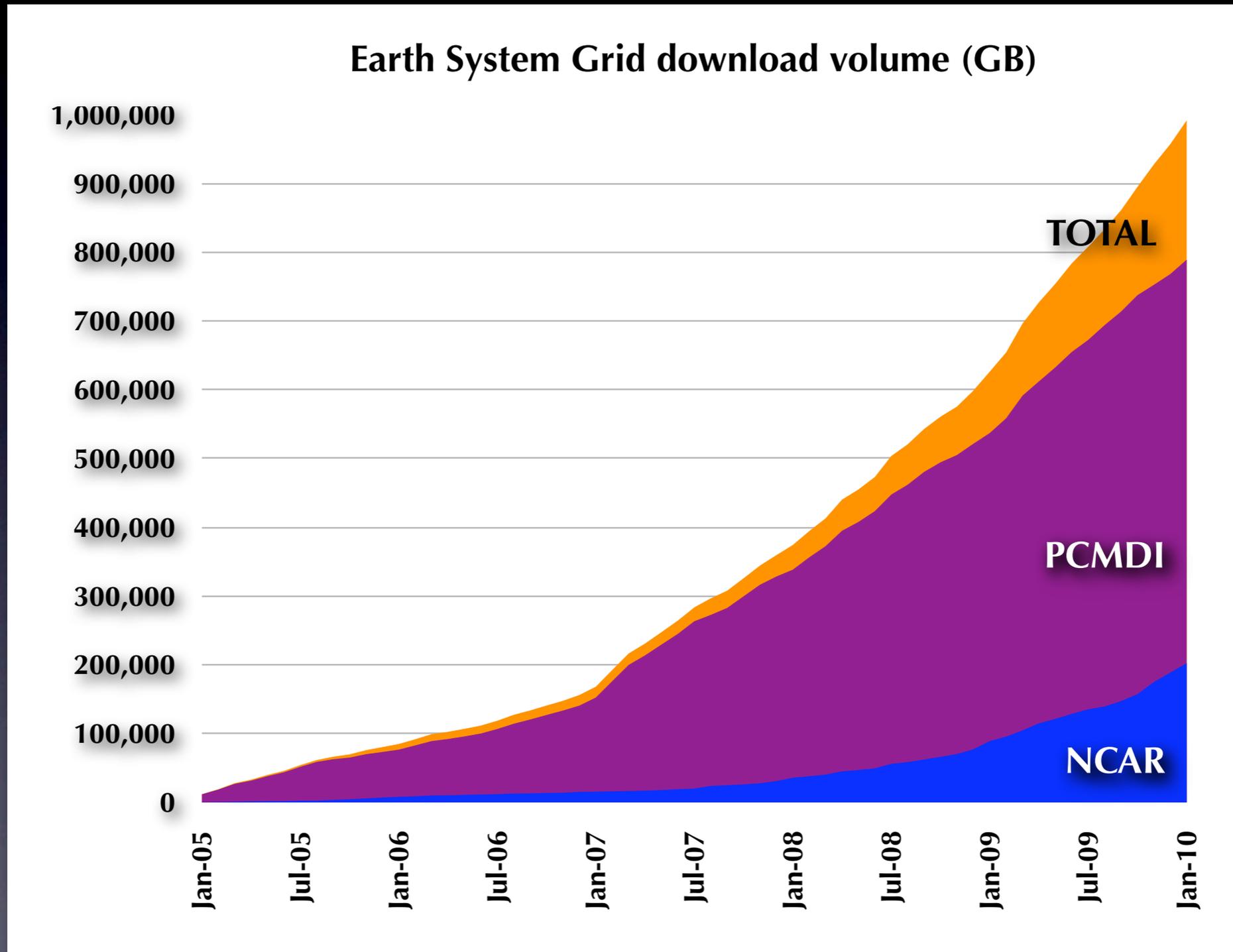


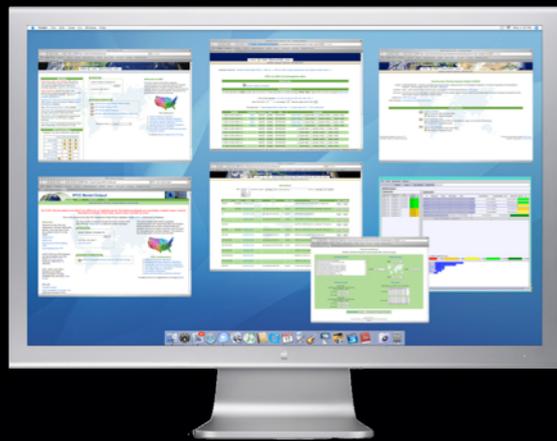
A Few Metrics

- Across all ESG portals, approximately 18,000 registered users
- Over 250TB of climate simulation data available, from models and centers around the world
- Current rate of data delivery approximately 850GB/day
- More than just data: model source code, initialization datasets, analysis and visualization tools
- 540 scientific papers authored via analyses of ESG data hosted at DOE/PCMDI

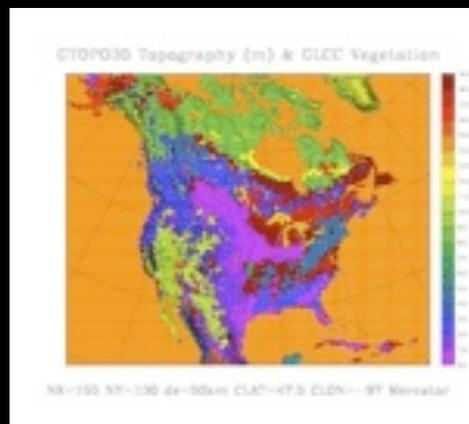


February 2010: ESG has delivered a *Petabyte* of climate data to the global community

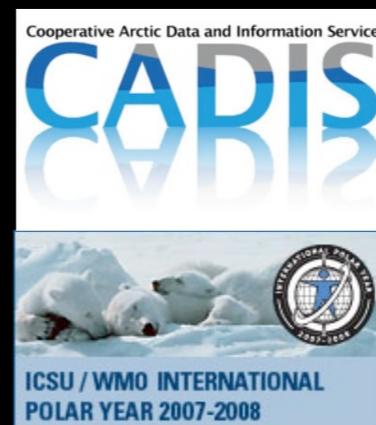




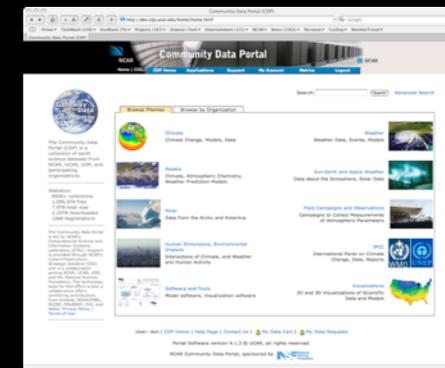
The Earth System Grid
(Climate/IPCC,
DOE+NSF)



NARCCAP
(Regional Climate:
NSF, DOE, NOAA)



Cooperative Arctic Data
and Information Service
(Polar, NSF)



NCAR's Community
Data Portal



WMO-WIS DCPC
(Global Federation)



Global Interoperability
Program (GIP)



TIGGE
(Ensemble weather)



NSF
TeraGrid



Earth System Curator
(Models+Data, NSF)

Science Gateway Framework (SGF, in development)



NCAR



Developing the ESG Federation (ESGF)

Preparing for CMIP5 and IPCC AR5



New ESG Gateway

Advanced Search

Search: for:

This gateway can be used to search for datasets, models, model components, simulations, and software tools. To conduct a search, select a category from the pull down menu or alternatively, enter free text into the the text box (e.g. atmosphere, CMIP5, surface temperature). Hit submit to initiate the search.

Search Categories

- + Frequency
- Project
 - < Any Project
 - CCSM
- + Experiment
- + Model

Total Number of Results: 9
1-9 of 9 results

1. [CCSM run b30.004, Atmosphere History Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
2. [CCSM run b30.004, Atmosphere Post Processed Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
3. [CCSM run b30.004, Ice History Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
4. [CCSM run b30.004, Ice Post Processed Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
5. [CCSM run b30.004, Land History Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
6. [CCSM run b30.004, Ocean History Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
7. [CCSM run b30.004, Ocean Post Processed Data, Annual Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR
8. [CCSM run b30.004, Ocean Post Processed Data, Monthly Averages, version 1](#)
Authorization: Guest Users
 Data Center: ESG-NCAR

Data Cart

Add the selected datasets to your Data Cart.

Files Download

Download all files for the selected datasets. Optionally use a regular expression to filter the filenames (example: use `.+\\.nc` to select all files with extension `nc`).

- User admin
- Security
- VO functions
- Extensive metadata
- Browse & Search (federated) - across datasets, models, & tools
- Data services

Gateways for ESG, and more

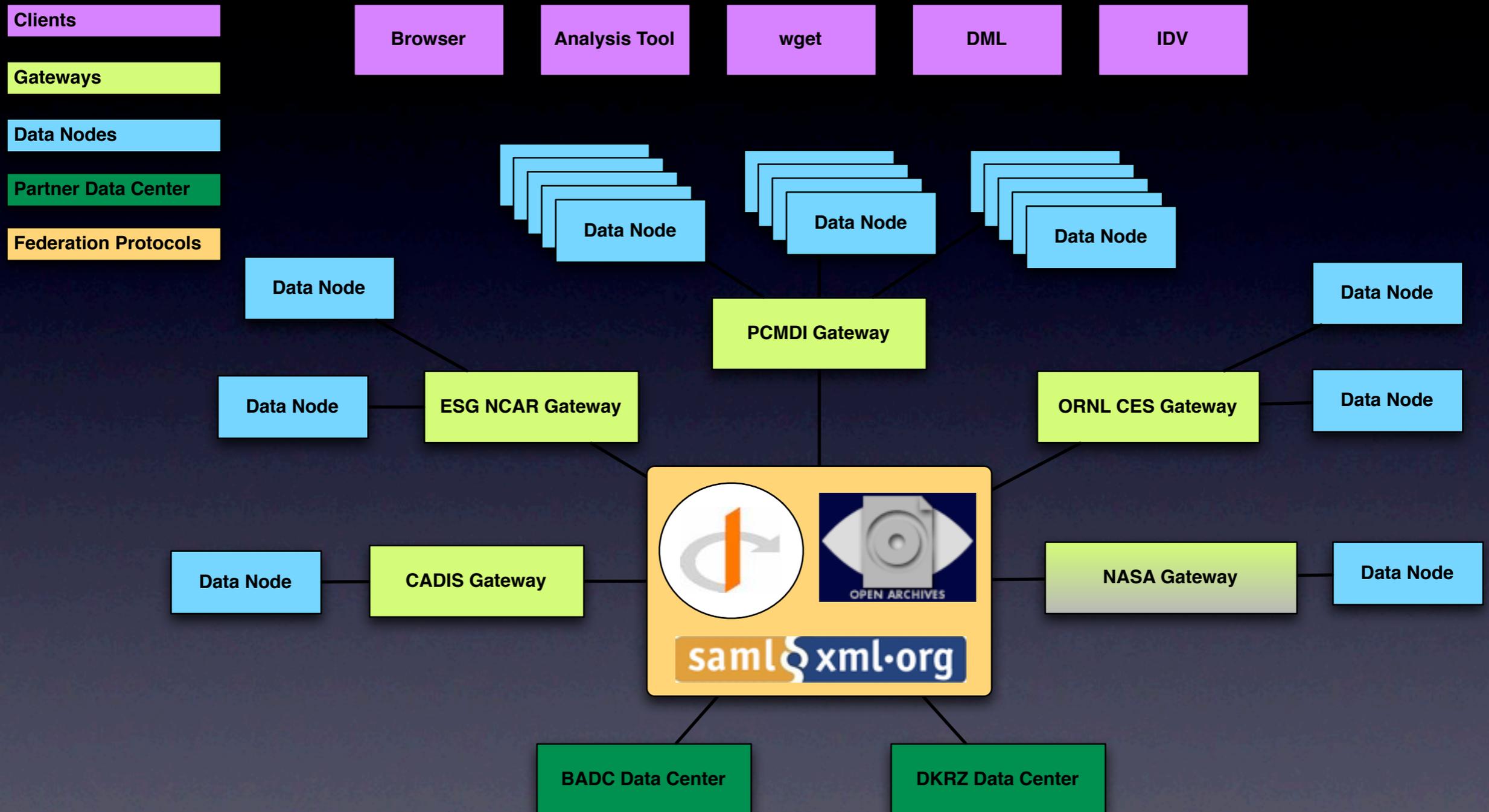


Diagram Courtesy of Luca Cinquini (NCAR)



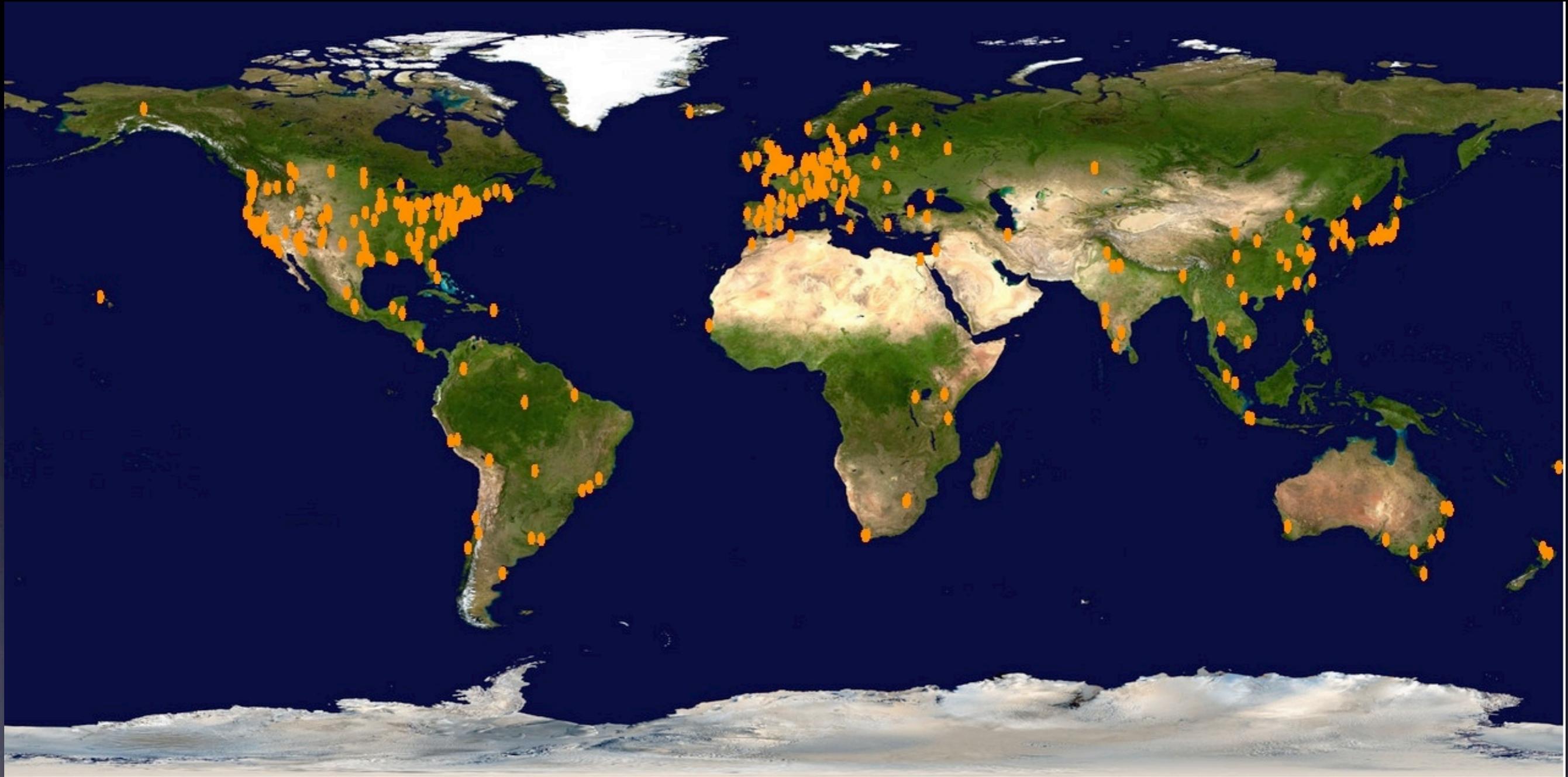
NCAR



ESG Testbed

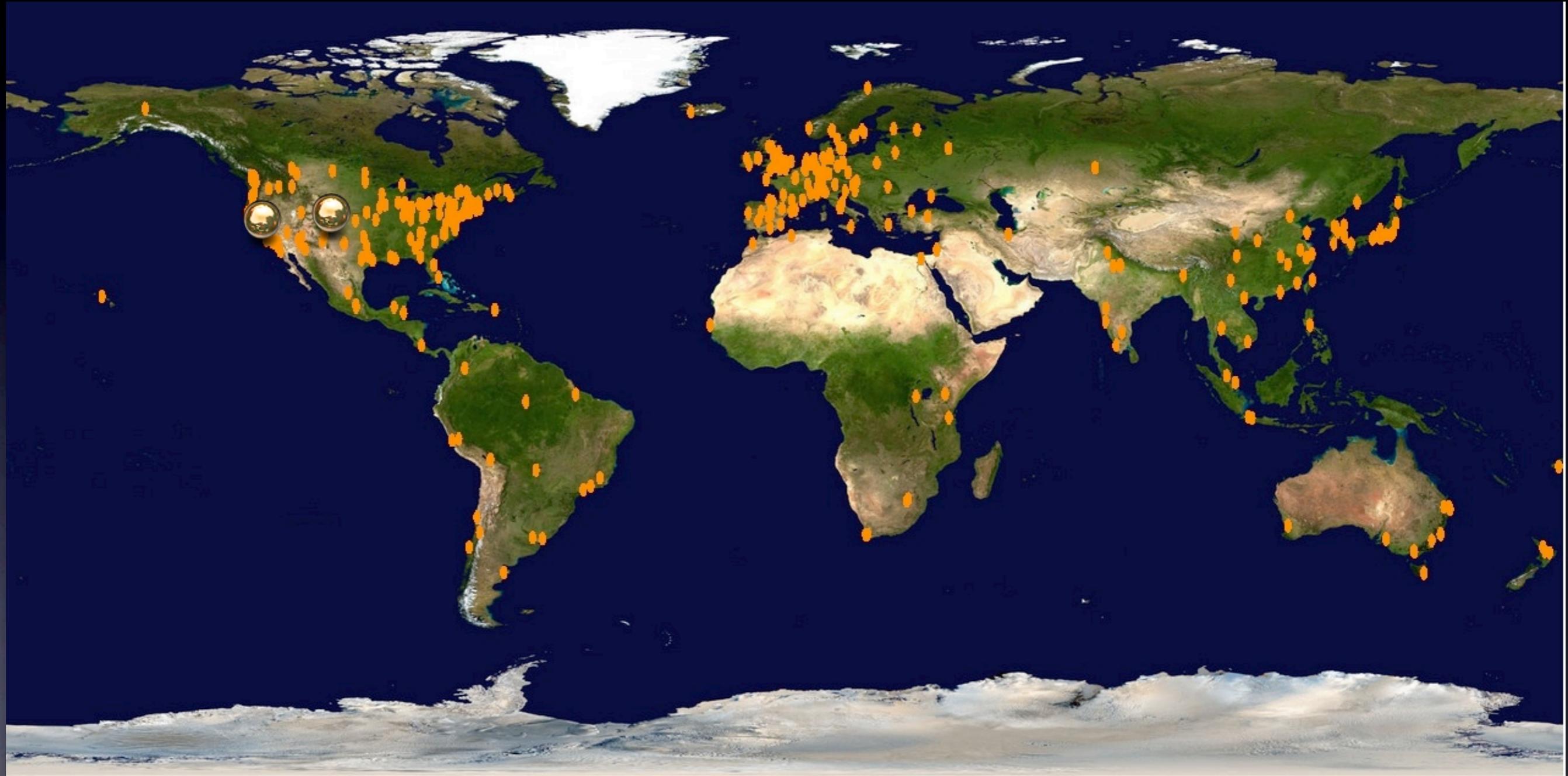


ESG Testbed



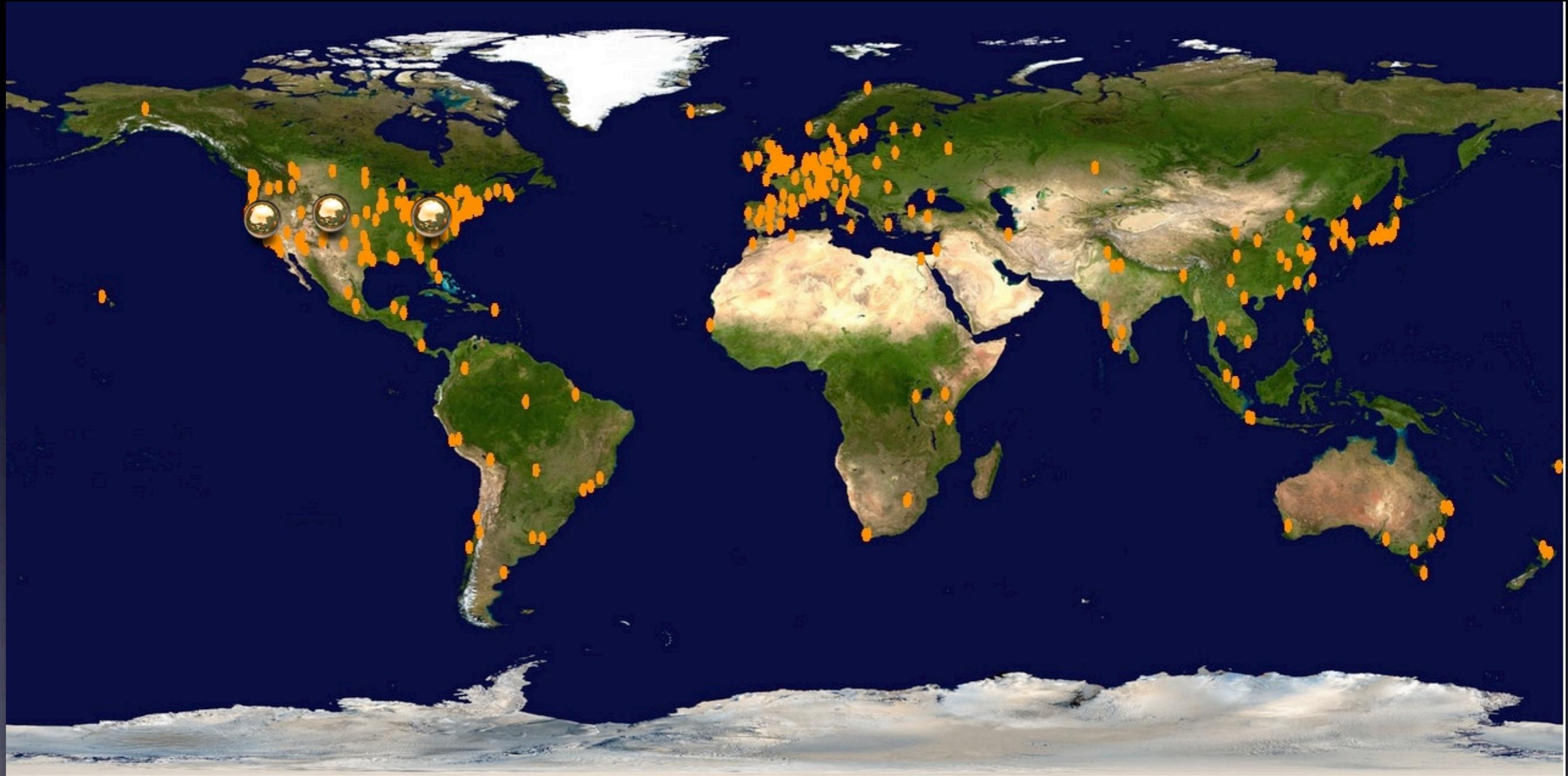
Earth System Grid

ESG Testbed



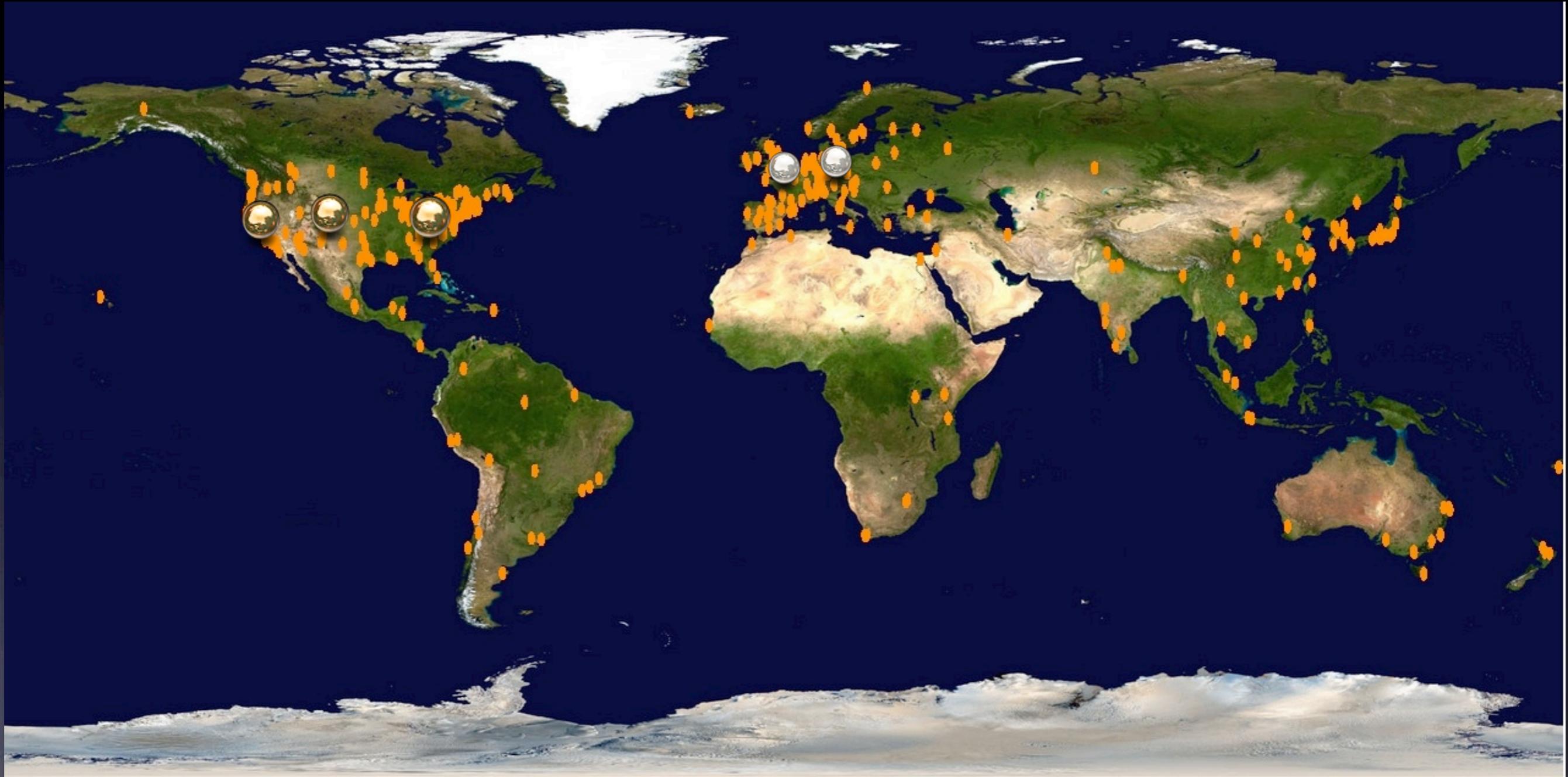
Earth System Grid

ESG Testbed



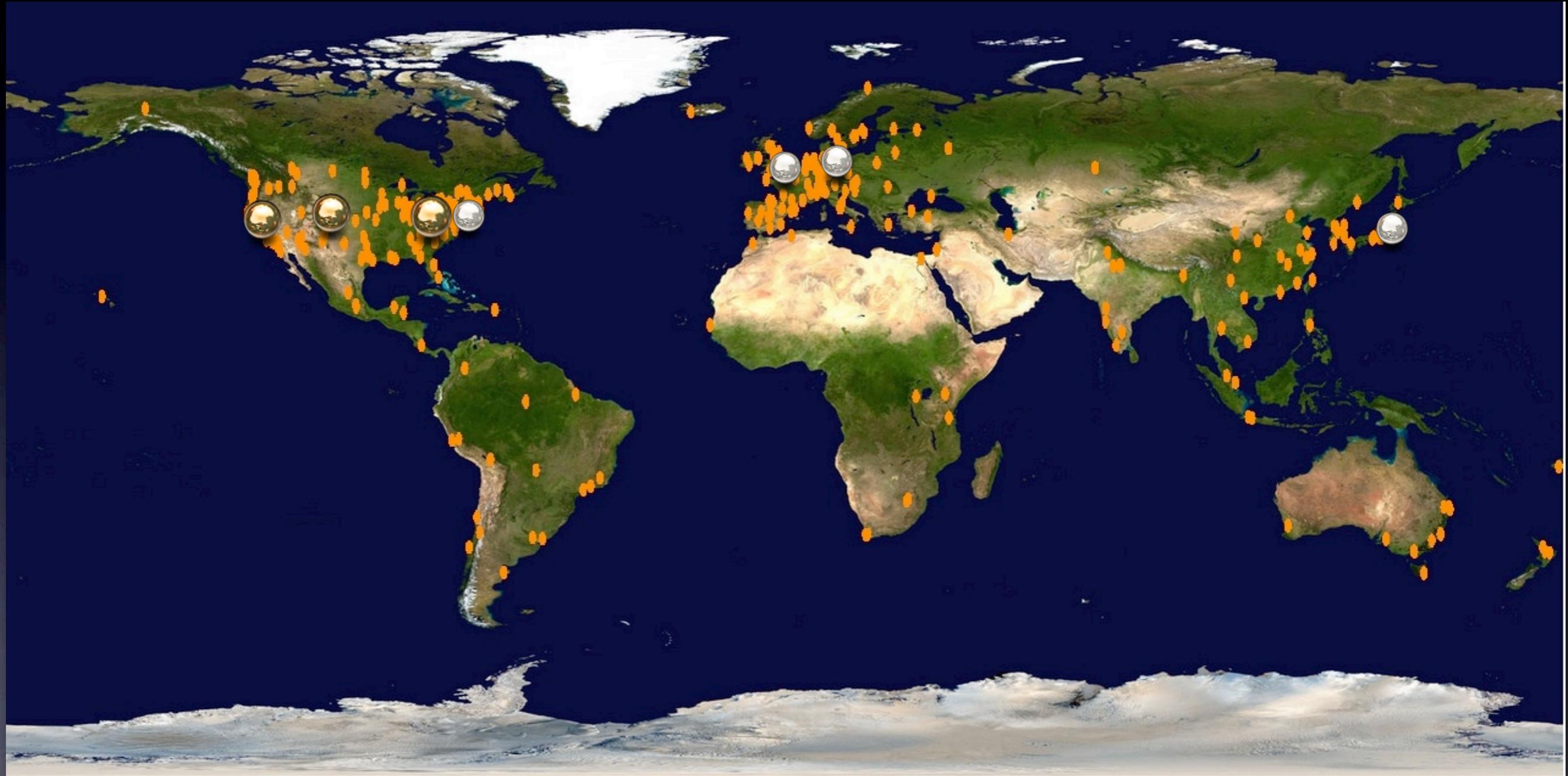
Earth System Grid

ESG Testbed



Earth System Grid

ESG Testbed



Earth System Grid



Building Community

The Global
Organization for Earth
System Science Portals



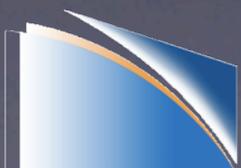
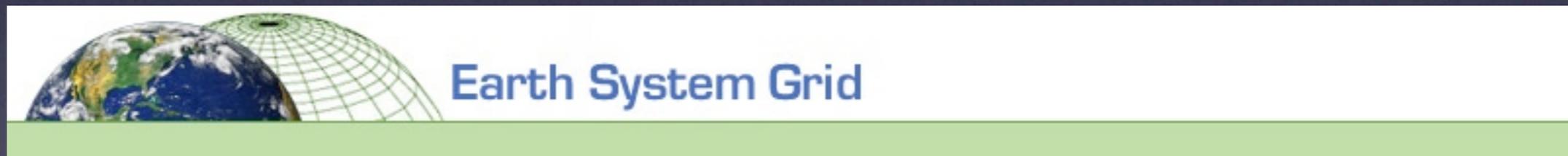
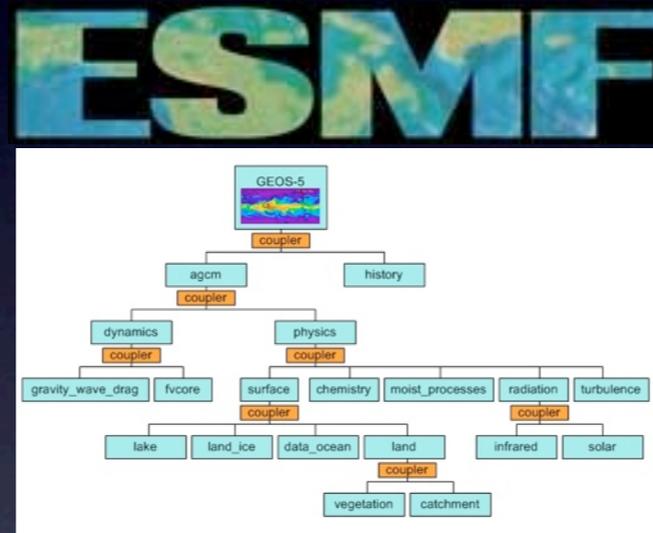
*October 2009 CMIP Meeting in Hamburg,
Germany*



June 2007 GO-ESSP Meeting in Paris, France

Earth System Grid

Information Integration Across Models, Data, and Knowledge



NCAR



Model Metadata

The screenshot shows a web browser window with the URL `http://esg.prototype.ucar.edu/trackback/query.htm?id=esg%3amodel_gfdl_esm2m_control_1860_r1i1&session=`. The page title is "Resource Metadata" and the main heading is "Earth System Grid". The navigation menu includes "Home", "Data", "Account", "About", "Contact Us", and "Login".

The main content area is titled "Simulation Metadata" and features a tree view on the left and a detailed view on the right.

Simulation Metadata Tree View:

- GFDL ES2M Control-1860 r1i1
 - Realm: Climate
 - Physical Domain: Earth system
- GFDL MOM4 Control-1860 r1i1
 - Realm: Ocean
 - Physical Domain: Ocean
- GFDL TOPAZ Control-1860 r1i1
 - Realm: Biogeochemistry
 - Physical Domain: Ocean
- GFDL AM2 Control-1860 r1i1
 - Realm: Climate
 - Physical Domain: Atmosphere
 - GFDL Atmospheric Chemistry Control-1860 r1i1
 - Realm: Atmospheric chemistry
 - Physical Domain: Atmosphere
 - GFDL AM2 FV Dynamical Core Control-1860 r1i1
 - Realm: Atmospheric dynamical core
 - Physical Domain: Atmosphere

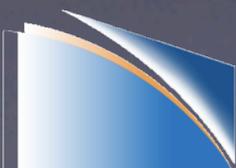
GFDL ES2M Control-1860 r1i1 Details:

Full Name: Geophysical Fluid Dynamics Laboratory Earth System Model Version 2 Control 1860 r1i1 Ensemble
Physical Domain: Earth system
Description: Simulation to arrive at the initial conditions for CMIP5 Experiment 3.1. This is an example intended to demonstrate the ESG model metadata display. Some values may be incorrect or artificial.

[BACK TO SEARCH](#)

Properties: Basic | Technical | All

Version	quebec
Previous Version	perth
Project	CMIP5
Contact Name	John Dunne Ron Stouffer
Contact Email	john.dunne@noaa.gov ronald.stouffer@noaa.gov
Principal Investigator	John Dunne Ron Stouffer
Physical Domain	Earth system
Realm	Climate
Institution	Geophysical Fluid Dynamics Laboratory
Funding Source	NOAA
Note	The data collections associated with this example are for demonstration purposes only. This is an example intended to demonstrate the ESG model metadata display. Some values maybe incorrec or artificial.

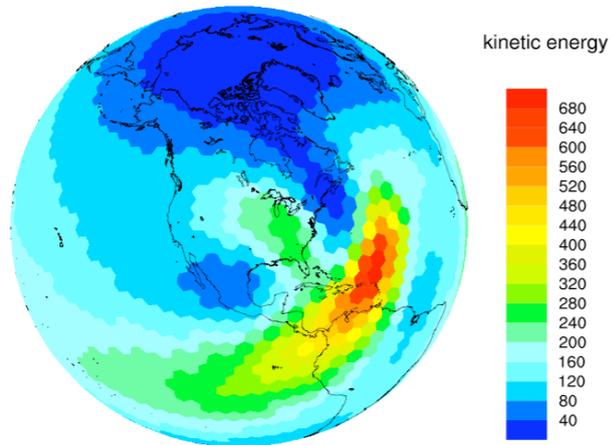


NCAR

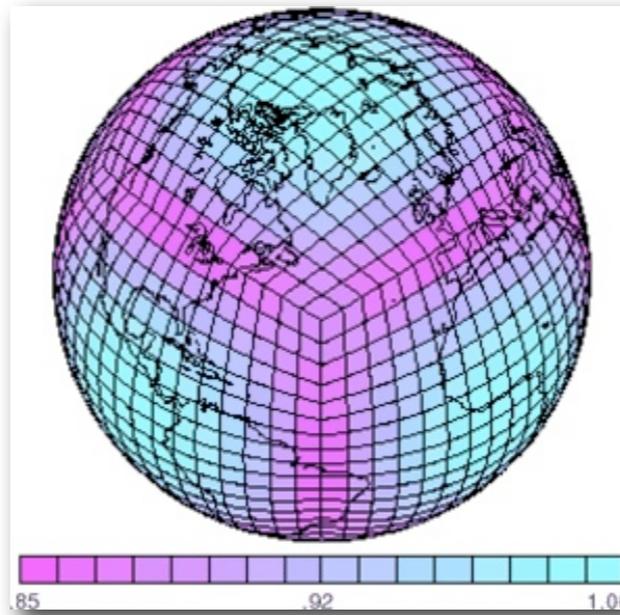


Dealing with Grids

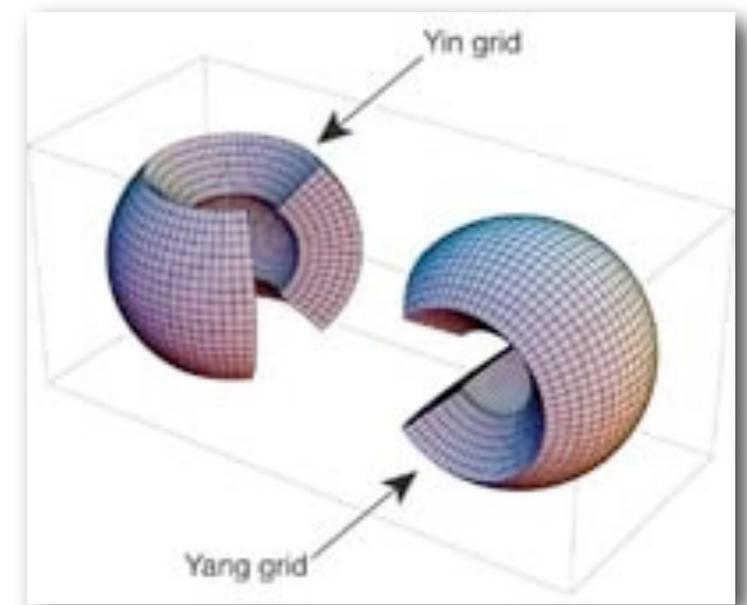
2562 Element Geodesic grid



Cube-sphere

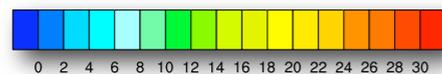
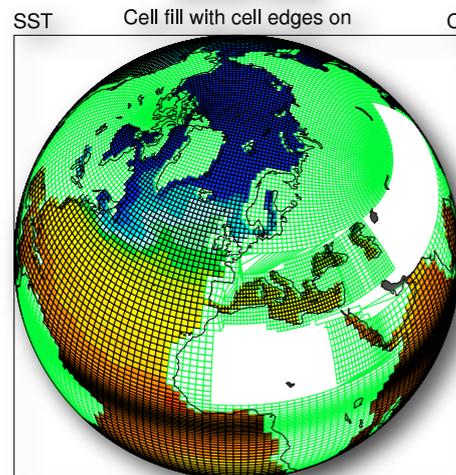


Yin-yang Grid



Courtesy Randall, CSU

ORCA Grid



Courtesy V. Balaji, NOAA/GFDL

Courtesy Cassou, CERFACS

Earth System Grid

Towards Global Data Federation



World Meteorological Organization

A United Nations Specialized Agency • Working together in weather, climate and water



National Digital Information Infrastructure & Preservation Program
A Collaborative Initiative of the Library of Congress



Global Change Master Directory
Discover Earth science data and services

SGF: Shared
Cyberinfrastructure



NCAR



Challenges

- Timelines:
 - Migrating to new Gateway March 31st, 2010
 - CMIP data publication Spring 2010, operational
- Versioning
- Petascale replication and management
- DOI's and citation
- Managing the global distributed system



NCAR



An RB-DCPC in the making...



NCAR



An RB-DCPC in the making...

(Really Big DCPC ;-)



NCAR



Questions?

don@ucar.edu