

Earth System Curator: Status Report

METAFOR Launch Meeting, Reading, UK

V. Balaji

Princeton University

NOAA/GFDL

13 February 2008

Talk outline...

- 1 ESC use cases: AR5
 - Querying model characteristics
 - Regridding

- 2 ESC projects
 - CDP Curator
 - GFDL Curator and FRE
 - Gridspec

- 3 Summary

Talk outline . . .

- 1 ESC use cases: AR5
 - Querying model characteristics
 - Regridding

- 2 ESC projects
 - CDP Curator
 - GFDL Curator and FRE
 - Gridspec

- 3 Summary

Can ESC answer these questions?

- What's the difference between the NASA GISS-EH and GISS-ER models? (*Answer: the ocean component*). (Russell et al 2006).
- Which runs from the GFDL CM2.1 model would I compare to isolate the effects of volcanoes on 20th century climate? (Stenchikov et al 2006).
- Do volcano runs from GFDL CM2.1 and HadCM3 use the same forcing dataset?
- Which runs in the database include the *indirect effect of aerosols*?
- Retrieve “high cloud amount” from multiple models.
- Return data from IPCC models on the NARCCAP grid.

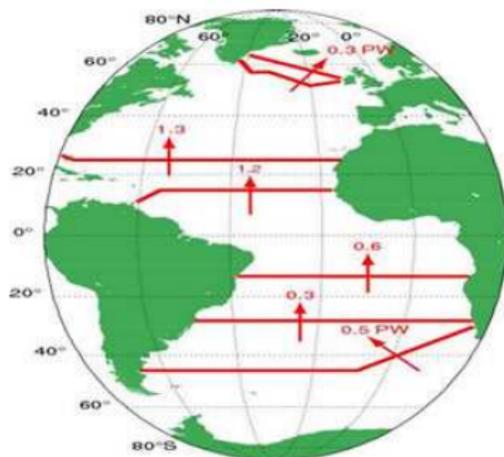
Horizontal regridding: poleward heat transport

- Atmospheric data:

- $v, T, q, \overline{v'T'}, \overline{v'q'}$
- $F_{\text{sfc}}^{\uparrow}, F_{\text{TOA}}^{\uparrow}$
- p_s

- Ocean data:

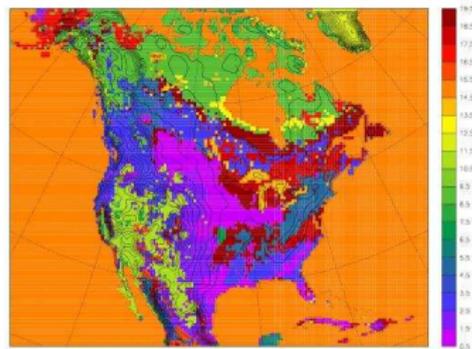
- $v, T, \overline{v'T'}_{\text{total,gyre,eddy},\dots}$: total and per basin.
- meridional mass overturning circulation: total and per basin



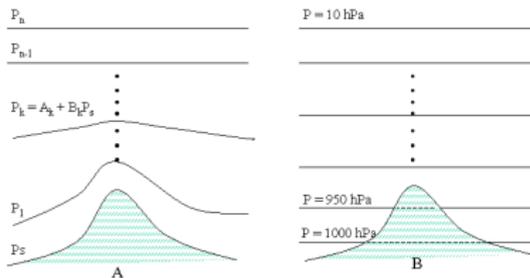
http://www-pcmdi.llnl.gov/ipcc/project_detail.php?ipcc_subproject_id=174

Vertical regridding: NARCCAP

GTOPO30 Topography (m) & GLCC Vegetation



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



- The NARCCAP experiment is a MIP aimed at the “development of multiple high resolution regional climate scenarios for use in impacts assessments.”
- High-resolution models requires forcing data from global models and analysis in specified resolution, projection, and vertical levels.
- Data volumes are high: GFDL has chosen to supply data on its native grid (24 levels) instead of the required 40; in conjunction with a program for converting data from σ -hybrid to pressure.

Talk outline . . .

- 1 ESC use cases: AR5
 - Querying model characteristics
 - Regridding

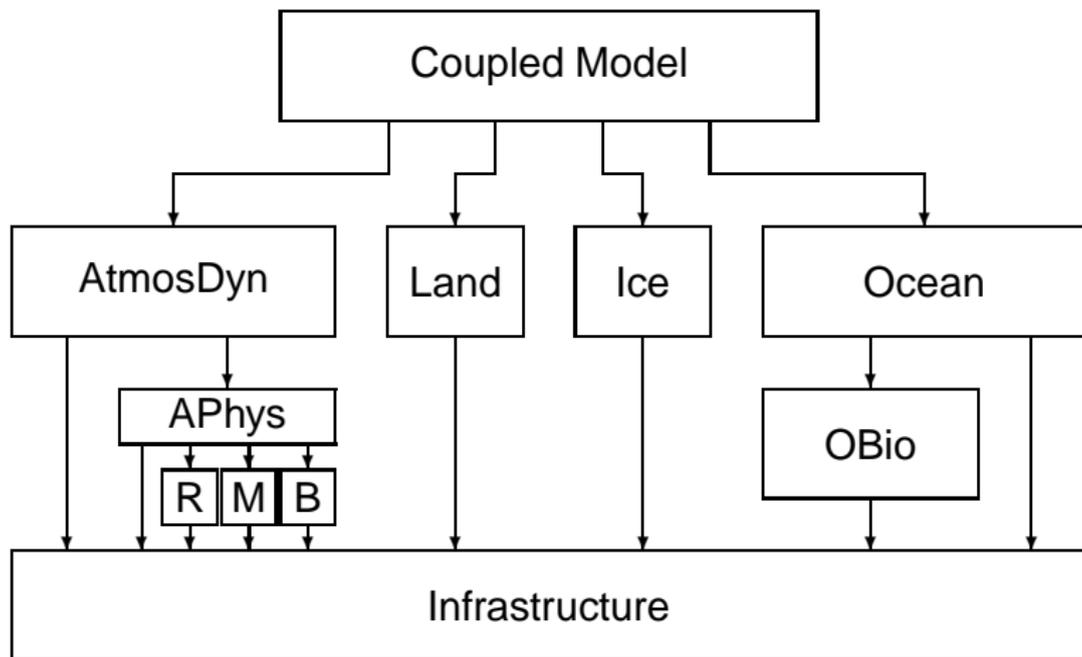
- 2 ESC projects
 - CDP Curator
 - GFDL Curator and FRE
 - Gridspec

- 3 Summary

ESC schema status

- ESC not to define a single monolithic schema, but an aggregation of multiple overlapping schemata (Curator-NMM, ESG, Genie-Gridspec, CIAO, FRE)
- Use of RDF/OWL for semantic mediation.
- *ESC use profiles* define RDF subsets tailored to particular end use.
- Advanced prototype: generation of ESG *model* schema from `modelcomponent` schema, using GEOS5 as a dense component tree example.
- GEOS5 coupling semantics under CIAO soon to follow.
- FRE use profile describes FMS workflow from model assembly to harvesting by ESG.
- Draft governance mechanism.

Component hierarchy



Coupling fields between components using CIAO by mid-2008.

Curator Faceted Search

File Edit View Go Bookmarks Tools Help

http://cdp.ucar.edu:28080/query/queryESC.htm

princeton junction nj

Arts Books Canada Commercial DIY Film GFDL Google Libraries Mail Manuals Music News Photos Politics Princeton Science Sports Technology Tlemcen Weather

Google http://...sg.owll WonderWe... Submit XML Proposed C... Metaedit Problem loa... Use Case Sc... Earth Syste... Google Cale... NCAR/UCAR... CDP-Curat...

Earth System Curator

Home Data About Login

Collection Browsing | Simple Search | Power Search (1) | Power Search (2) | Data Visualization

CDP-Curator Search

START OVER TEXT SEARCH

Select All Model Components Models Datasets Software Simulations

COMPONENT TYPE

- Atmosphere
- Atmospheric Chemistry
- Atmospheric Dynamical Core
- Atmospheric Dynamics
- Atmospheric Physics
- Biogeochemistry
- Climate
- Coastal Ocean
- Coupled Atmosphere/Ocean General Circulation
- Fisheries
- General Circulation
- Hydrology
- Ice
- Land
- Land Ice
- Magneto Hydro Dynamics
- Ocean
- Radiation
- Sea Ice
- Space Weather
- Storm Surge
- Turbulence

Done

Component schema harvesting

File Edit View Go Bookmarks Tools Help

http://www.earthsystemcurator.org:8080/metaedit-yui/submit.htm

Go princeton junction nj

Arts Books Canada Commercial DIY Film GFDL Google Libraries Mail Manuals Music News Photos Politics Princeton Science Sports Technology Tlemcen Weather

Google http://data...mas/esg/owl WonderWeb OWL Ont... Submit XML

Submit Curator Use-Profile XML

This submitted XML will be validated against the Curator Use Profiles and the converted to RDF. Your XML should conform to the following schemas:

- Model Components: [modelcomponent.xsd](#)
- Resource: [resource.xsd](#) (required by modelcomponent.xsd)

Submit a local XML file

Submit a file on the WWW (by URL) **[not yet implemented]**

Copy/paste XML

Done

FRE: model production workflow

- fremake** Checkout an appropriate subset of the FMS source code for an experiment and create an executable;
- frerun** run an experiment in multiple *segments*; resubmit if necessary;
- frestatus** check the status of an experiment that is underway;
- frelist** list available experiments;
- frepriority** switch a job sequence between queues;
- frecheck** run RTS checks for bitwise accuracy;
- frepp** FRE post-processing: create time series, time averages, and plots;
- frescrub** remove intermediate and redundant files;
- freppcheck** RTS checks on history and post-processing files.
- freversion** tool to upgrade the XML, should the syntax change.

URL: <http://www.gfdl.noaa.gov/fms/fre>
FRE schema (“XML 4.0”) is a Curator use profile.

File Edit View Go Bookmarks Tools Help

http://nomads.gfdl.noaa.gov/CM2.X/

Arts Books Canada Commercial DIY Film GFDL Google Libraries Mail Manuals Music News Photos Politics Princeton Science Sports Technology Tlencen Weather

Google Gmail - eTicket Itinera... CM2.X Coupled Cli...

geophysical fluid dynamics laboratory

About us Research Products and Services Reference GFDL Only

search gfdl: go

smaller bigger reset

Public Data Files

- DecGen Coupled Climate Experiments
- Ocean Data Assimilation Experiments
- Ocean Simulation
- Flexible Modeling System

Public Source Code

- MOM4 registration
- MOM4 related data sets
- HIM registration
- HIM beta source code

Related Sites

- National Oceanic and Atmospheric Administration
- OAR
- Dept. of Commerce

[gfdl's home page](#) > [products and services](#) > [data portal](#) > [deccen coupled climate models](#) > CM2.X Coupled Climate Models

gfdl cm2.x coupled climate models

GFDL CM2.X Coupled Climate Models

- [Documentation and References](#) (published or submitted to journals)
- [FAQ List](#)
- [Things to consider before downloading CM2.X model output](#)
- Two page brochure: *GFDL's CM2.0 & CM2.1 Models: Efforts in Support of the IPCC AR4* (from IPCC WG1 Workshop, March 2005) [450KB pdf]
- [Brief overview of GFDL deccen models](#)

CM2.0

- [Info on the CM2.0 Experiments for which Model Output is Available](#)
- [Info on CM2.0 Data Variables Available by Experiment](#)
- [Download CM2.0 netCDF files via ftp](#) from the GFDL data portal
- [Download CM2.0 netCDF files via http](#) from the GFDL data portal
- Download CM2.X data from [PCMDI/IPCC archive](#) data portal (registration with IPCC/WGCM required)

CM2.1

- [Info on the CM2.1 Experiments for which Model Output is Available](#)
- [Info on CM2.1 Data Variables Available by Experiment](#)
- [Download CM2.1 netCDF files via ftp](#) from the GFDL data portal
- [Download CM2.1 netCDF files via http](#) from the GFDL data portal
- Download CM2.X data from [PCMDI/IPCC archive](#) data portal (registration with IPCC/WGCM required)

CM2.X Interactive Data Downloads and Browsing

File Edit View Go Bookmarks Tools Help

http://cobweb.gfdl.noaa.gov/~pcmdi/database/db_index.html

Go princeton junction nj

Arts Books Canada Commercial DIY Film GFDL Google Libraries Mail Manuals Music News Photos Politics Princeton Science Sports Technology Tlencen Weather

Google Gmail - eTicket Itiner... FMS FMS Model Develo...

The GFDL FMS Model Development Database

Experiment Overview · Database Login · Supported web browsers · User Guide · GFDL Utilities · Feedback/Support

- ▶ AM2p1
- ▶ AM2p2
- ▶ AM2p3
- ▶ AM2p4
- ▶ AM2p5
- ▶ AM2p6
- ▶ AM2p7
- ▶ AM2p8
- ▶ AM2p9
- ▶ AM2p10
- ▶ AM2p11
- ▶ AM2p12
- ▶ AM2p13
- ▶ AM2p14
- ▶ AM2_strat1
- ▶ AM3p1
- ▶ AM3p2
- ▶ AM3p3
- ▶ AM3p4

- c48_am3p4
 - c48_am3p4_lm2_3
 - c48_am3p4_lm3r659
 - c48_am3p4_lm3r670c48
 - c48_am3p4_rich_crit_10
 - c48_am3p4_snowlogged
 - c48_am3p4_ss2_off_warm
 - c48_am3p4_ss4_13b
 - c48_L48_am3p4
 - c48_L48_am3p4B

- ▶ AM3_configuration
- ▶ AMIP
- ▶ CM2
- ▶ CM2p1
- ▶ CM2p2
- ▶ CM3_configuration
- ▶ FSM2n1

Submission Information

Date and time of submission: 2008-01-09 11:24:27
 Contact name: Ming, Yi
 Contact e-mail: Yi.Ming@noaa.gov

Source Code Information

Model type: AMIP
 FMS release version: omsk

Checkout Procedures

See the xml file

Compile Procedures

see the xml file

Input Files

Original File Path
Run script
RTS XML file

Original File Path

/home/yim/fms/omsk/scripts/c48_am3p4_ss2_off_warm
/home/yim/fms/omsk/c48_am3p4_ss2_off.xml

Output Files

Archive files	/archive/yim/fms/omsk/c48_am3p4_ss2_off_warm
Diagnostic figures	/net2/yim/fms/omsk/c48_am3p4_ss2_off_warm/analysis

Experiment Timing

Done

Gridspec: latest status

- Tools released:

- `make_hgrid`: specify a horizontal grid.
- `make_vgrid`: specify a vertical grid.
- `make_solo_mosaic`: make a mosaic file out of a list of grid tile files.
- `make_topog`: specify topography and a land-sea mask.
- `make_coupler_mosaic`: create exchange grids between input mosaics.
- `fregrid`: interpolate input data fields from source to target gridspec.

<http://www.gfdl.noaa.gov/~vb/grids/gridspec-tools.html>

- Progress on unstructured grids (in conjunction with Rich Signell, USGS).
- Paper, CF proposal to follow.

Talk outline . . .

- 1 ESC use cases: AR5
 - Querying model characteristics
 - Regridding

- 2 ESC projects
 - CDP Curator
 - GFDL Curator and FRE
 - Gridspec

- 3 Summary

Summary

- The boundary between discovery and use metadata is fuzzy: many relatively simple applications require more metadata than is currently available.
- The information model consists of multiple overlapping schema using RDF/OWL for semantic mediation.
- Curator use profiles produce XML or RDF output tailored to output application.
- CDP Curator and GFDL Curator attempt to produce metadata for harvesting by ESG.
- Future directions:
 - Embedding of pre-configuration metadata in framework standards (ESMF, PRISM).
 - Semantic mediation extension to include Metafor CIM.

ESC team: Aaron, Amy, Balaji, Cecelia, Don, Julien, Luca, Rocky, Sergey, Spencer, Sylvia, . . .