And now for something completely different ...

(data management?)

HYCOM Data Management & Services

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HYCOM Nat'l Meeting

HYCOM Data Management & Services

Part I. The Requirements, the Vision, the Tools Steve Hankin, NOAA/PMEL

Part II. Current System and Capabilities Ashwanth Srinivasan, RSMAS

Part IIb. - Product serving activities at the IPRC Peter Hacker

Part III. Plenary discussion: goals and priorities

Outline

Part I.

- Quick Review
- Data Management Requirements
- Around the corner (FDS)

Part II. Current System and Capabilities

Part III.

Plenary data management priorities



Web access to model outputs and observations from distributed sites

🗿 US GODAE Model Results - Microsoft Internet Explorer File Edit View Favorites Tools Help 😓 Back 🔹 🤿 🗸 🕼 🖓 🖓 🖓 Search 👔 Favorites 🖓 History 🛛 🖏 🖬 🚽 🗐 📿 Address @ http://ferret.pmel.noaa.gov/GODAE/servlets/dataset -🔗 Go 🛛 Links 🔌 **US GODAE Model Results** Go Search: Datasets single data set com two Click on a dataset to continue or an 🕦 for information about a dataset Help Datasets See the note on units conversion for discussion of data comparison issues. Variables Please select a dataset from below Constraints. Output Data from CDC Data from JPL NODC World Ocean Atlas 1998 IPL Global Simulation NCEP Pacific Analysis IPL Global Assimilation (adjoint) Output Options Reynolds SST Previous Output Reynolds Reconstructed SST Define variable Data from NSIPP Data from GFDL **OPOSEIDON Global Assimilation** GFDL Global Simulation GFDL Global Assimilation About Data from HYCOM (sigma coords) North Atlantic (1/3 deg) North Atlantic (1/12 deg) 1985 1990 1980 19952000 ۲ 🙆 Internet

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Compare variables from different models and data products





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Compute simple analyses

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Ocean obs via LAS (incl. custom "constraints")



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pare two

Datasets

data set

Address 🙋 http://ferret.pmel.noaa.gov/WODB/servlets/data

Live Access to the World Ocean Data Base

Variable(s): Temperature

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Help

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Search:

You may modify the appearance of plots through the "Options" page.

GTS Ocean obs on **US GODAE Server**





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LAS -- an "Information Product Server"



- XML Metadata contains the "intelligence"
- Back end applications do the real work
- OPeNDAP provides remote data access

OPeNDAP: network access to data and "semantic metadata"



"Scripted" access to LAS

Query available data sets:

>lasls http://cpu/LAS

Query variables in data set "model_1":

>lasls http://cpu/LAS model 1

Query space-time domain:

>las1s http://cpu/LAS model_1 sst

Request a subset of data as a file: ("asc" for ASCII format)

>lasget -x 20:60 -y 20:60 -t 11-Dec-2000 -f asc http://cpu/LAS model_1 sst

HYCOM information & data portal



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Our goal:

Create a framework for sharing data that permits HYCOM modeling projects (and others) to subset, browse, analyze and inter-compare model outputs and compare to observations

Why is this important?

- Facilitate collaboration between partners (especially basin scale → coastal models)
- Facilitate model validation

 Reach other users; increase the visibility of the project

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FDS "Ferret Data Server"

- OPeNDAP output for ...
 any variable available from LAS
 with uniform metadata standards
- Built on a Java framework from COLA (called 'Anagram')



• We can configure an LAS to present HYCOM output variables, regridded to the Levitus grid (2001) ...



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Similarly from hybrid-Z to rectilinear



TIME : 01-NOV-1995 00:00 DATA SET: HA01.1995.305

20⁰N

LATITUDE

zaxreplace_zlev regridding

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LONGITUDE : 25W TIME: 01-NOV-1995-00:00 DATA SET: HA01.1995.305



zaxreplace zlev regridding

LONGITUDE : 25W TIME : 01-NOV-1995 00:00 DATA SET: HA01.1995.305

10°N 30°N ß٩ 20°N 40°N Latitude LAYER TEMPERATURE (degC)



LONGITUDE : 25W TIME: 01-NOV-1995-00:00 DATA SET: HA01.1995.305

30°N

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 The rectilinear-grid "view" of that data is now available via OPeNDAP for a number of purposes ... HYCOM data at the desktop (for Matlab, IDL, Ferret, GrADS, ...)

The remote dataset is just a "filename" http://server/FDS/my_HYCOM_dataset

The dataset will be exactly as LAS presents it.

Collaborating "sister" servers



Comparison between datasets becomes straightforward: Servers request regridded data from one another via FDS.

HYCOM data at the desktop (for Matlab, IDL, Ferret, GrADS, ...)

You can ask FDS to perform simple analyses:

Vertical average of variable "TEMP"
http://server/FDS_expr_{my_output}{Tave=TEMP[Z=@AVE]}

(reduces data volumes transferred over the net)

FDS

- FDS employs "delayed analysis"
 - It appears that the whole dataset has been transformed
 - In reality the selected subset is transformed on-demand
- Arbitrary regridding on-demand, too (with cautions)



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Part III. Plenary: data management priorities

- Immediate priorities
 - To make HYCOM basin-scale outputs readily usable by coastal modeling groups
 - Curvilinear? hybrid-Z? rectilinear?
 - Formats (CF)? Format for finite element modeling sites?
 - How much data kept on-line ?
 - Are we succeeding ? How to gather feedback ?

• 2nd tier priorities

- A "data portal" for all project participants ?

- Basin-scale and regional data, model outputs, and descriptions
- How can we make it easy/tempting/compelling to get ALL models on-line ?

 Other suggestions? How else can we facilitate coastal modeling activities?

Who and what specific needs ?

'Next' Priorities

– What reference data sources for comparisons?

- Moored time series? GTS surface obs? Climatologies? Met models? Other ocean models?
- Model-data comparison techniques ?
 - Sparse data techniques? Dense data techniques? Error fields? Correlations?
- Comparison between neighboring domains?
- Ensemble comparison techniques ?
- Metrics useful for comparison ?

- 'Next' Priorities
 - "3 time axis" data management
 - Special user interfaces? Education? GISstyle?
 - Are there other applications to make compatible with the HYCOM framework ?

Other suggestions?(Break out of the box!)

"Technical" priorities

- Visualizations of time series, profiles, sections, ... from curvilinear data ? (done)
- Graphics on 'native' curvilinear coordinates ?
- Automate synchronization of Web portal with model outputs
- Higher efficiency storage techniques (e.g. HDF with "chunking" and compression)?

Suggestions:

- .push capability?
- LAS production of native HYCOM format
- outputs available daily?
- Mercator projection of maps?
- How to encourage regional modeling sites to make data available (via OPeNDAP, LAS, FTP, or other)?

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