

An Eight-Year Unidata Reflection

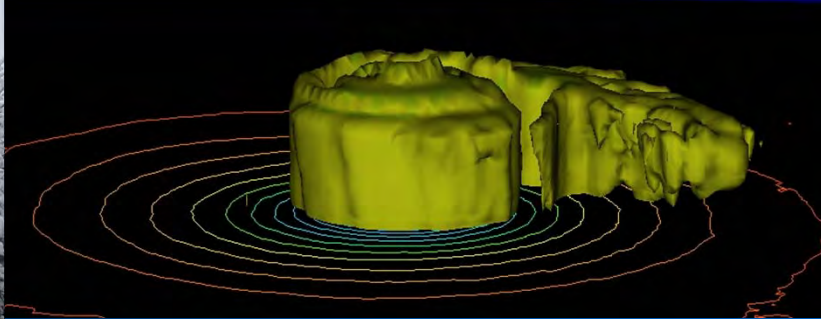
Gary Lackmann
NC State University



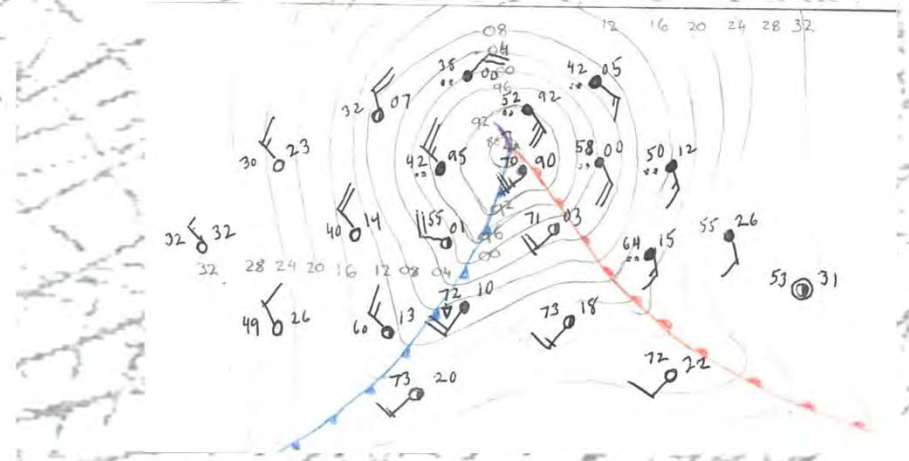
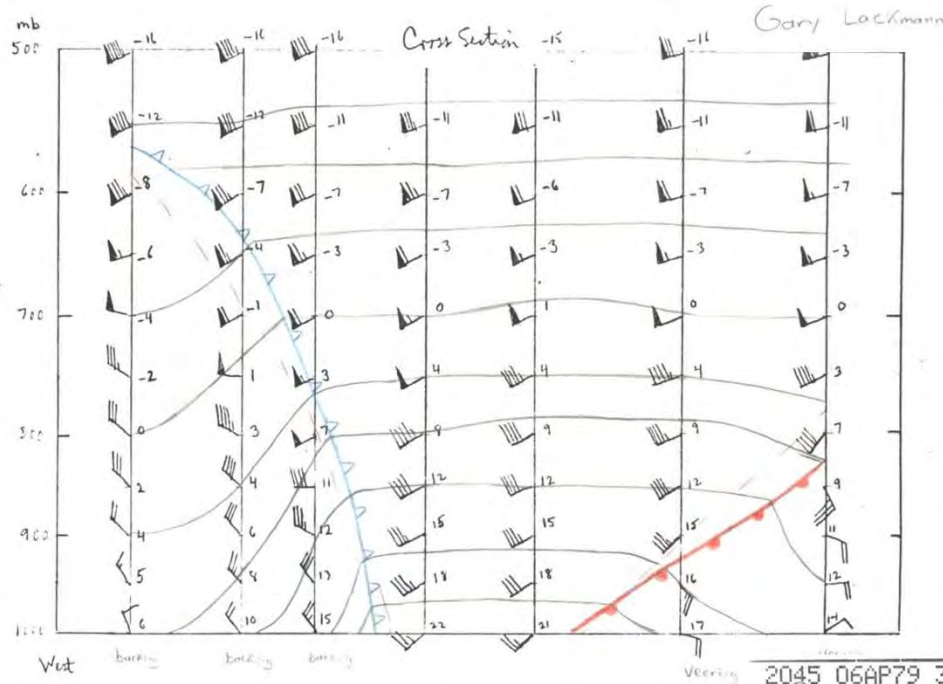
How has Unidata
changed my life?



And how about the future?

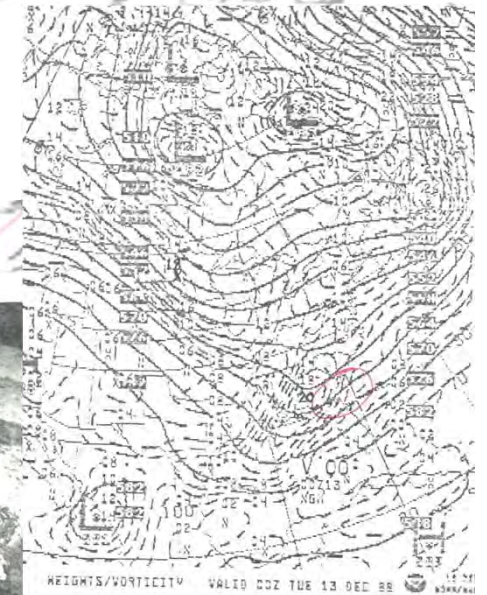
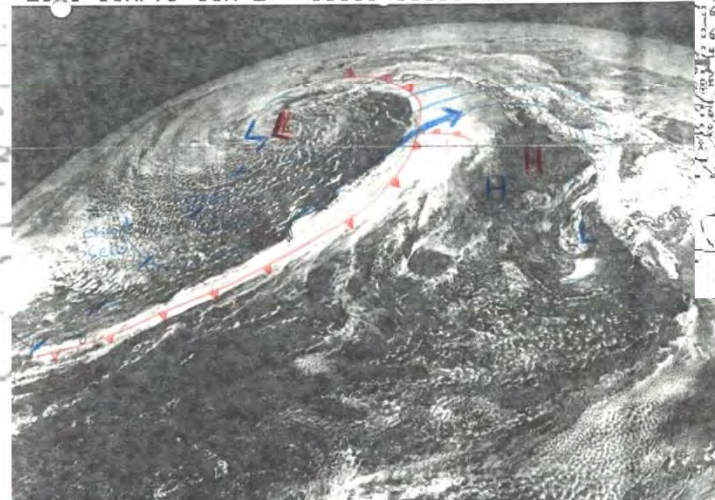


Before Unidata...



From ATS 350 (UW, circa 1985, Prof. C. Mass)

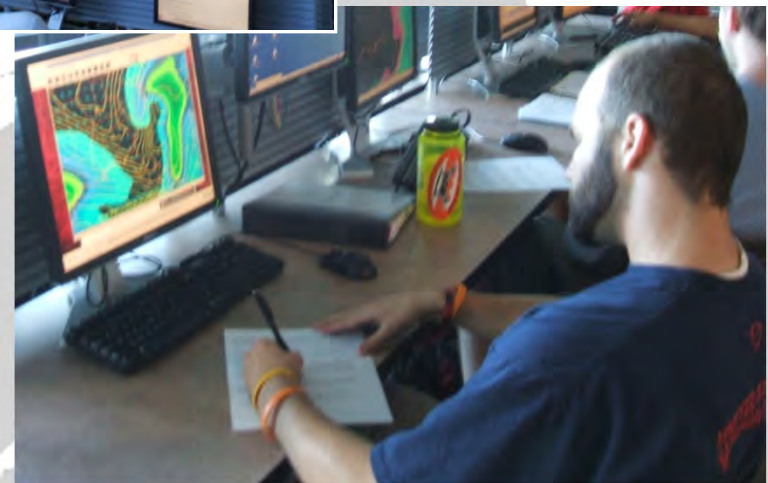
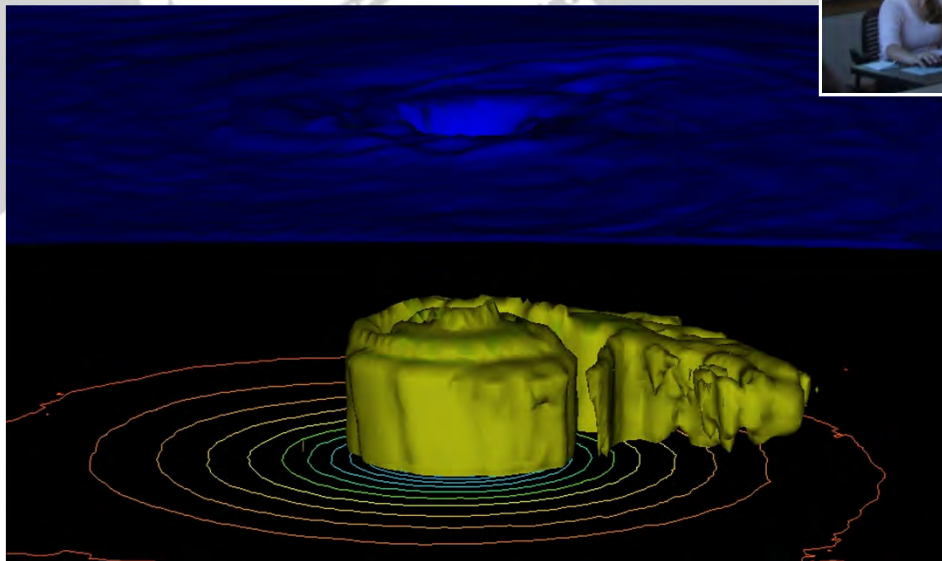
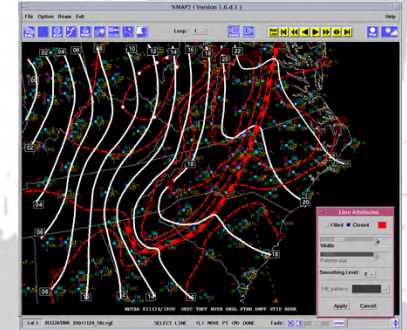
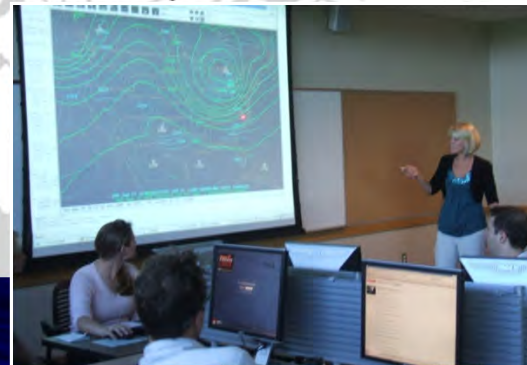
Drawing, hand plotting exercises, "idealizing" ...



HEIGHTS/VORTICITY

After Unidata...

- Quantum leap in ability to access, analyze, visualize data
- Student expectations now very high
- Support from Unidata incredible (thanks!)
- Greatly strengthened community ties

















8-years on Unidata committees

Usercomm member, chair, then Polcomm member

20 trips to Boulder, 26 total committee meetings

2 Triennial Users Workshops

Near-perfect attendance!

Personal Reflections on Committee Service

The rewards:

- A time to see friends and colleagues in a fairly relaxed setting
- A welcome break from the hectic stress of the semester
- ... and Boulder is simply a nice place to visit... NSF too
- Opportunity to translate my “in the trenches” experiences to Unidata
- For me, an effective way to keep up with latest technology
- Return from meetings full of ideas & inspiration – share with students



2009 Desouza Awardee

Elen M.C. Cutrim, Western Michigan University

The Russell L. DeSouza Award honors "individuals whose energy, expertise, and active involvement enable the Unidata Program to better serve the geosciences."

Professor Cutrim has been a member of the Unidata Users Committee since 2003, and has been actively engaged in the Unidata triennial workshops. She has been an inspiration and a source of strength for her colleagues on the Users Committee, as well as the Unidata staff, always projecting her generosity, enthusiasm, radiant smile, unwavering optimism, and incredible kindness.

Elen has made significant contributions to broadening the Unidata community. She has expanded the user base to geography with Unidata tools such as the Integrated Data Viewer. She has been a strong promoter and ambassador for Unidata in national and international venues conveying the importance of community leadership and participation. Her efforts, including serving as a co-organizer of many sessions at the AGU, EGU, and Congresso Brasileiro de Meteorologia to address issues important to the community, have not only expanded the participation in Unidata in the U.S., but also in Latin America, Europe, and beyond.

She has been tirelessly devoted to her students and her classes, establishing high expectations while serving as a true community role model. She graciously takes on responsibility with no expectation of gratitude in return, but merely because she thinks it's the right thing to do.

As her long-time colleague, Professor Perry Samson, University of Michigan wrote:

Her energy is infectious, and her attitude is ALWAYS positive and inspirational. In many ways she exactly reminds me of Russ DeSouza, with whom I had the honor of sharing Users Committee membership long ago.



Elen M.C. Cutrim
1946-2009



JPS VISAD TDS CADIS HDF5 NMAP
AWIPS UCAR UPC RAMADDA
THREDDS XML JOSS TIGGE GALEON
COSMIC CONDUIT DODS/OPeNDAP
LEAD DDS UNAVCO CRAFT CUAHSI
McIDAS KML McIDAS LDM ADDE IDV
GEMPAK NLDM NetCDF UDUNITS
CBTEC MADIS IDD GEOSS WRF MM5
KMZ CyRDAS GEON OPULS AGU GIS
CADIS COMET DLESE, etc....

14 October 2004 – my first UserComm meeting – what do I remember about this?



October 2010 Polcomm

October 2011 Polcomm

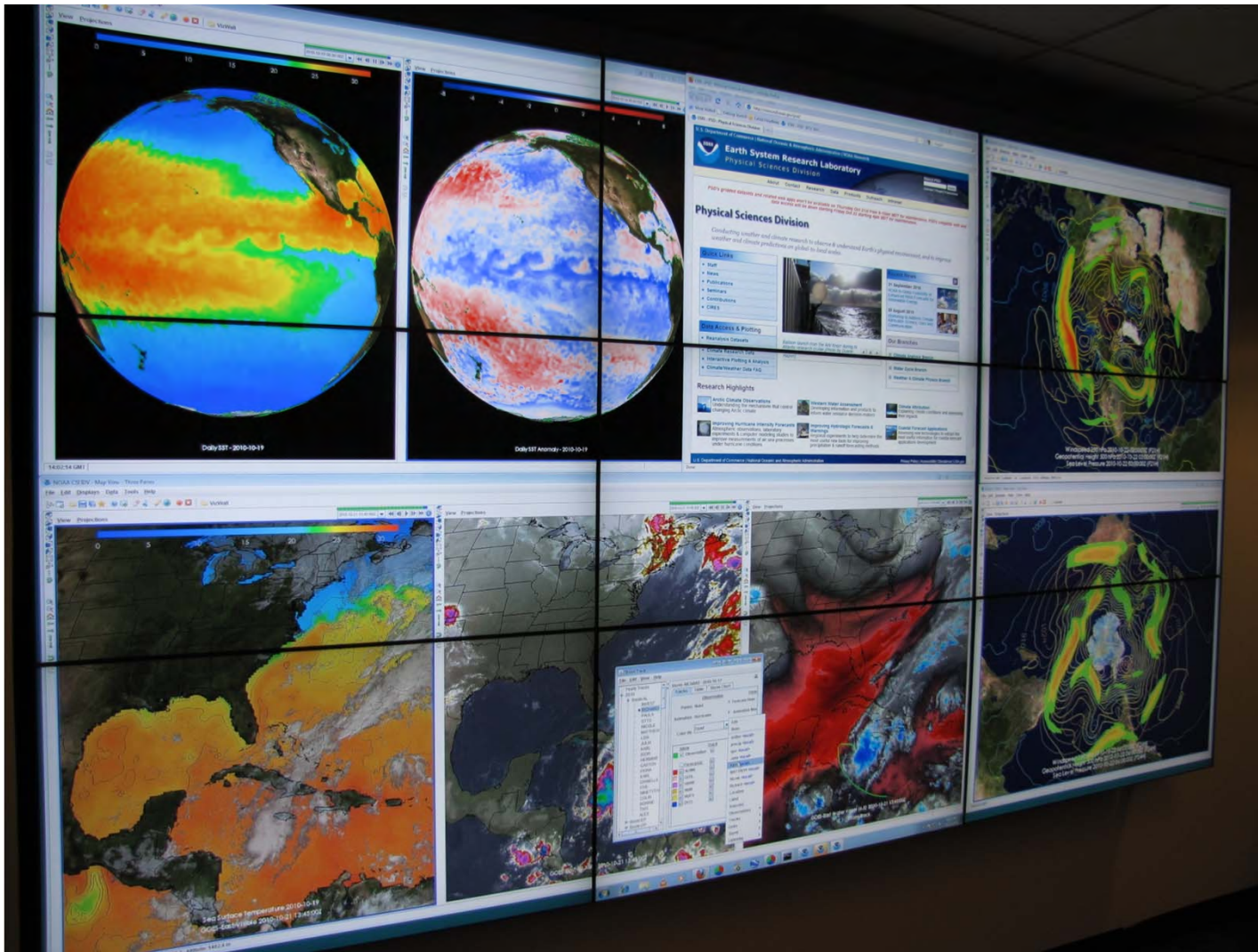




October 2011 Polcomm

Unidata meeting highlights (Oct 2010)

Met at NOAA Earth Systems Research Lab (ESRL):



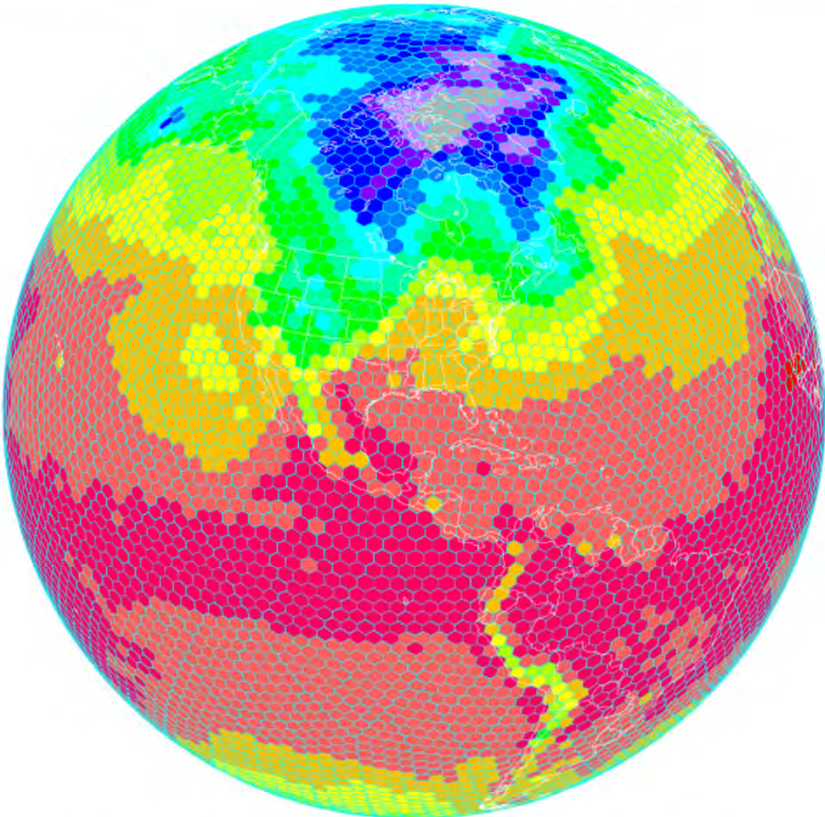
Unidata meeting highlights (Oct 2010)

New global model: FIM

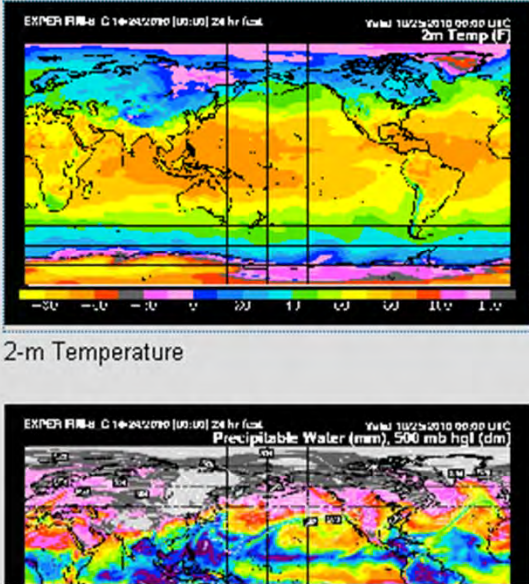
U.S. Department of Commerce | National Oceanic & Atmospheric Administration | NOAA Research

del (FIM)

AMB Job Opportunities



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EXPER FIM-0 C10042010 (00:00) 24 hr (sat) Wed 10/25/2010 00:00 UTC
2m Temp (F)


EXPER FIM-0 C10042010 (00:00) 24 hr (sat) Wed 10/25/2010 00:00 UTC
Precipitable Water (mm), 500 mb hgt (dm)

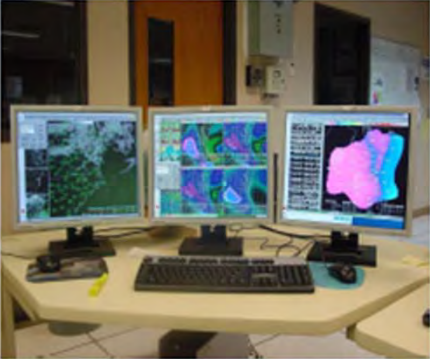
FIM)

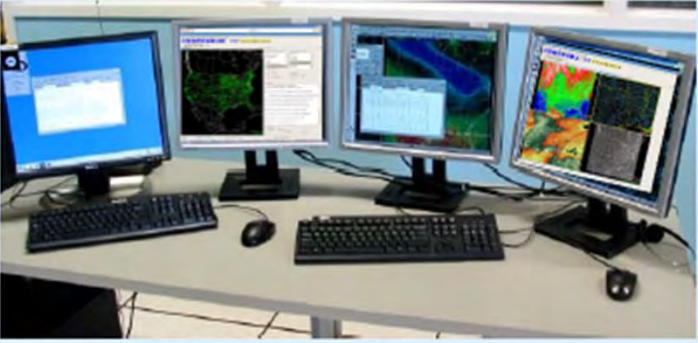
Unidata meeting highlights (Oct 2010)

AWIPS-II Demo – impressive combination of NMAP, AWIPS

 **Hardware Consolidation** 

 **N-AWIPS**

 **AWIPS**

 **AWIPS II System**
With N-AWIPS
(will include large monitors)

Unidata Policy Committee Meeting - NAWIPS/AWIPS-II Status

5

The Future? Challenges?

Of course, my suggestions are of no special priority or significance... but here's a few anyway!

What software can we use to *manipulate* and *visualize* Tb-scale data files (model output, radar, satellite, etc.)?


Can we do more to make simple numerical experiments more accessible to students (easier to set up and perform)?

WRF Preprocessing System (WPS)

WRF Domain Wizard: 'unidata'

Actions Help

1) Wizard Option 2) New Domain 3) Horizontal Editor 4) Namelist Input Editor 5) Run Preprocessors 6) Visualize NetCDF



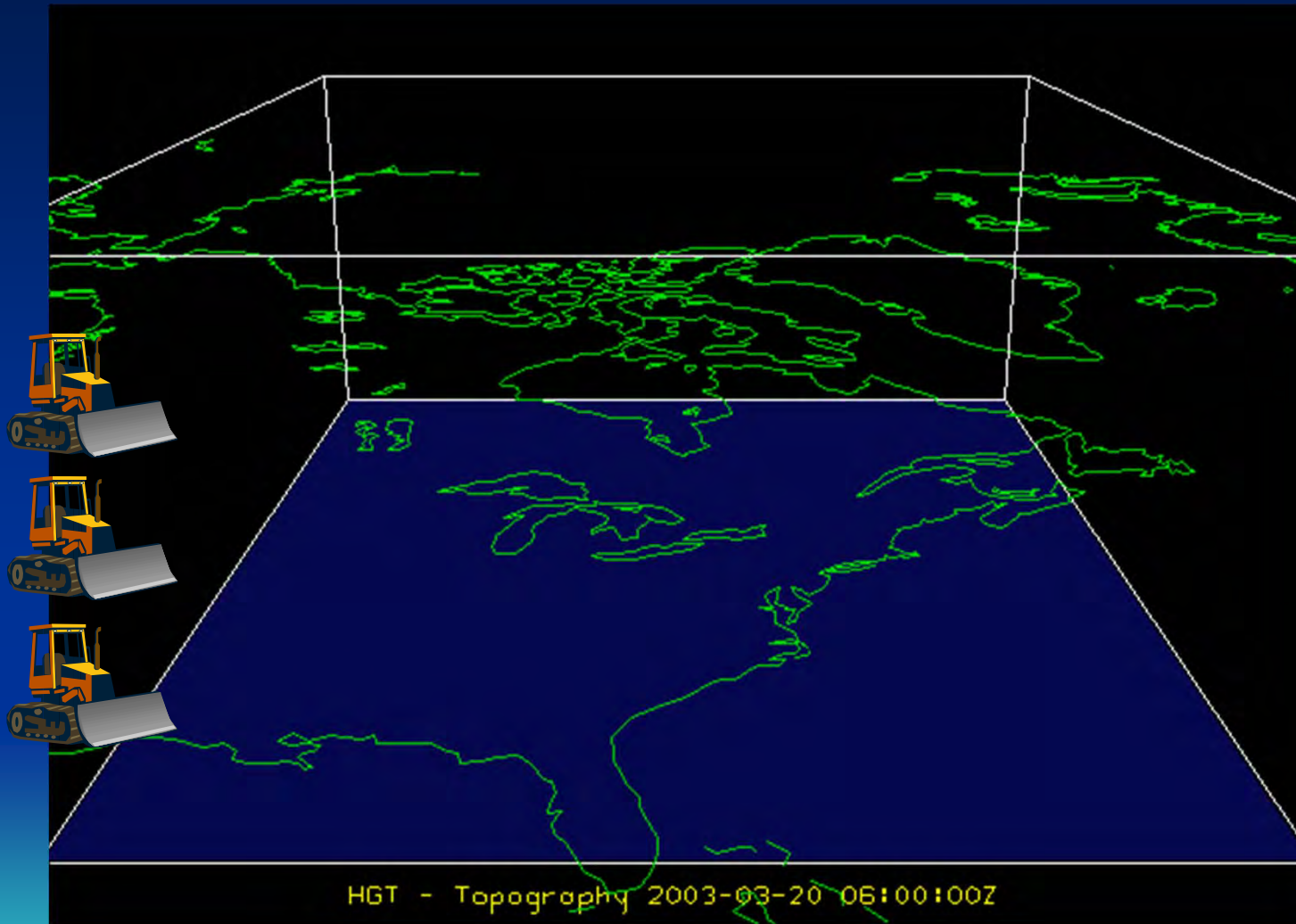
Nests										
Nest Properties										
ID	PID	Ratio	Left	Right	Top	Bot	NX	NY	Res	
1	1	1	1	100	112	1	100	112	10m	
2	1	3	8	60	90	46	156	132	10m	
3	2	3	26	127	112	17	303	285	10m	

New Edit Delete Clear

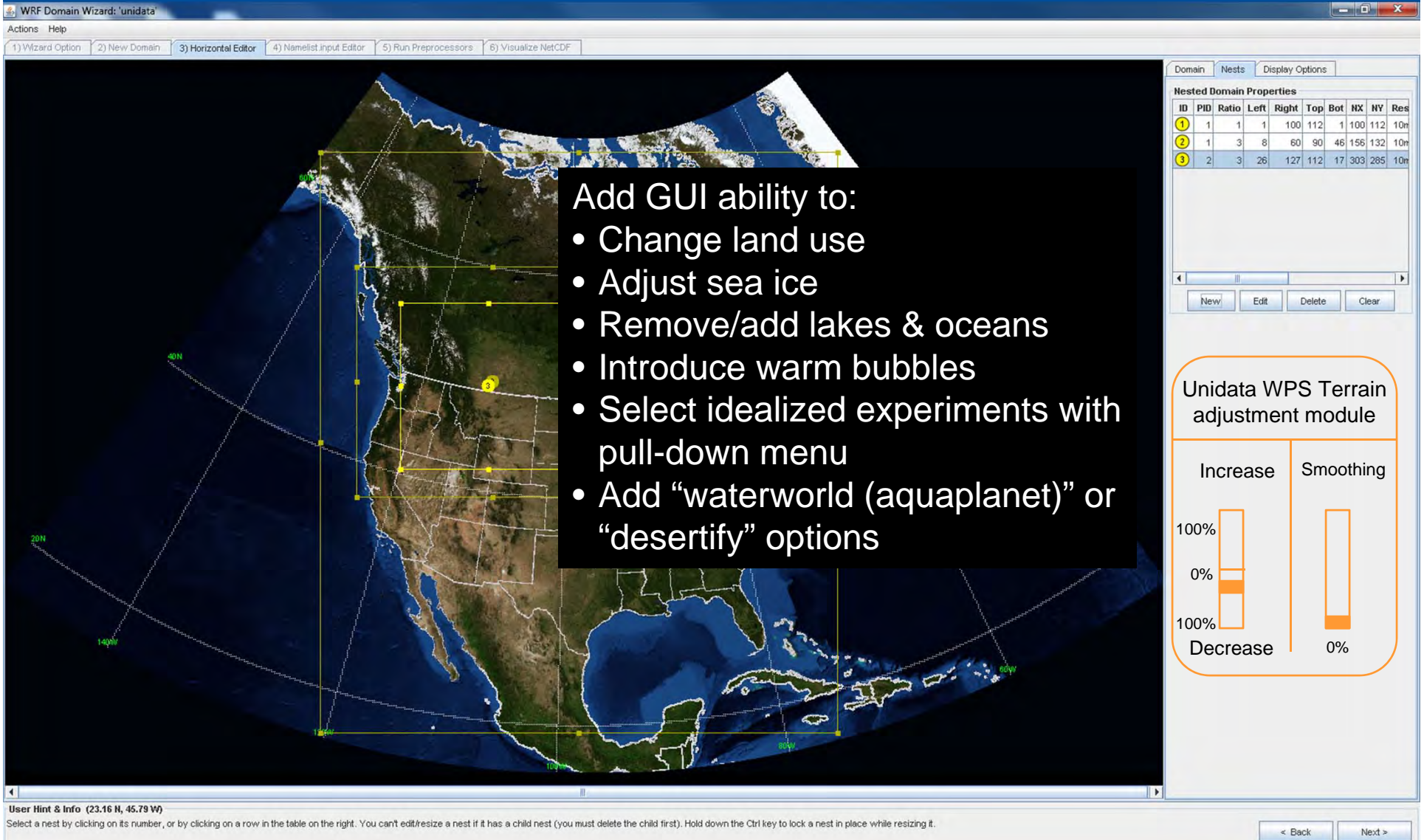
User Hint & Info (23.16 N, 45.79 W)
Select a nest by clicking on its number, or by clicking on a row in the table on the right. You can't edit/resize a nest if it has a child nest (you must delete the child first). Hold down the Ctrl key to lock a nest in place while resizing it.

< Back Next >

Slide from former Grad Student Adam Baker



Unidata add-on version of WRF Preprocessing System (WPS)



The screenshot displays the WRF Domain Wizard software interface. The main window shows a map of the United States with several nested domain boundaries overlaid in yellow. The interface includes a menu bar at the top with options like 'Wizard Option', 'New Domain', 'Horizontal Editor', 'NameList input Editor', 'Run Preprocessors', and 'Visualize NetCDF'. On the right side, there is a 'Nests' tab with a table titled 'Nested Domain Properties' and a 'Display Options' section. Below the table, there are buttons for 'New', 'Edit', 'Delete', and 'Clear'. At the bottom right, there is a 'Unidata WPS Terrain adjustment module' with two sliders: 'Increase' and 'Smoothing', each with a vertical bar and a horizontal line indicating the current setting. The 'Increase' slider is set to approximately 25%, and the 'Smoothing' slider is set to 0%.

Nested Domain Properties

ID	PID	Ratio	Left	Right	Top	Bot	NX	NY	Res
1	1	1	1	100	112	1	100	112	10m
2	1	3	8	60	90	46	156	132	10m
3	2	3	26	127	112	17	303	285	10m

Unidata WPS Terrain adjustment module

Increase Smoothing

100% 0% 100% 0%

Decrease 0%

User Hint & Info (23.16 N, 45.79 W)
Select a nest by clicking on its number, or by clicking on a row in the table on the right. You can't edit/resize a nest if it has a child nest (you must delete the child first). Hold down the Ctrl key to lock a nest in place while resizing it.

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Add GUI ability to:

- Change land use
- Adjust sea ice
- Remove/add lakes & oceans
- Introduce warm bubbles
- Select idealized experiments with pull-down menu
- Add “waterworld (aquaplanet)” or “desertify” options

Other Suggestions:

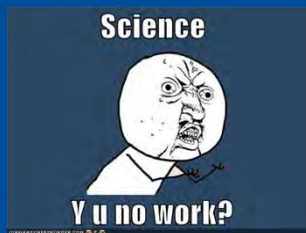
Unidata Universal Data Format Converter (UUDFoCon)

- Reduce “data friction” immensely!
- Leads to surge in Unidata popularity

Datafile- need netCDF

2065031821_cmip5.nc

1994091821_eta.gem



UUDFoCon:

Select output format:

- Grib
- Grib2
- NetCDF
- other...

1994091821_eta.nc



More Ambitious?

GUI for 1-D model physics
parameterizations, idealized 2-D
numerical experiments, etc

“Visualize output as model runs”

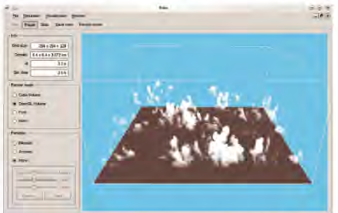
“Steer” model as it runs (change
environment, add warm bubbles,
alter physics parameterizations...)

IN BOX
INSIGHTS and INNOVATIONS

High-Performance Simulations of Turbulent Clouds on a Desktop PC

Exploiting the GPU

BY JÉRÔME SCHALKWIJK, ERIC J. GRIFFITH, FRITS H. POST, AND HARM J. J. JONKER



GALES has a graphical user interface which shows statistical information as well as three-dimensional visualizations of the running simulation. An example of the 3D visualization is given in Fig. 1, which shows how GALES visualizes the current cloud field, volume-rendered for more realistic cloud appearance. Since all simulation data natively reside on the video card, these kinds of visualizations can be activated with minor impact on performance. Moreover, the three-dimensional visualization can be interactively navigated by rotating and scaling. This provides the possibility to study in detail the turbulent cloud processes happening in the simulation, without having to wait for the simulation to finish, or even having to write 3D fields to disk (which can severely reduce performance due to relatively slow disk access). Other processing possibilities include visualization of scalar fields such as temperature or humidity by an interactively placed 2D cross section (Fig. 2) as well as live statistics plots for mean vertical profiles or time series. During the simulation, the user can also release Lagrangian particles to study dispersion characteristics or to investigate cloud-mixing properties. In addition, the simulation view, including the user's navigation actions, can be stored as an MPEG movie that can be played back later for review of the simulation or for demonstration purposes.

Working with full three-dimensional datasets is important for more than just a nice visual display; it provides a wealth of information that might otherwise be missed. An example of this is the shell of subsiding air surrounding cumulus clouds, which is vital to understanding dispersion in shallow cumulus fields but does not show up in ordinary cloud statistics. GALES requires no further expensive software packages, nor does it require dedicated clusters or network facilities. Indeed, at the time of writing,

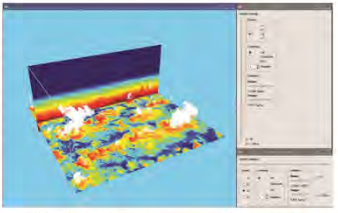


FIG. 1. A screenshot of an interactive simulation with GALES. The 3D cloud field visualization is shown using volume rendering. During the simulation, the visualization can be actively zoomed and rotated to directly obtain insight into the simulation process.

FIG. 2. While the simulation is active, users can add horizontal and vertical cross sections to visualize the 3D fields of velocity, temperature, or (in this case) humidity. The cross sections can be interactively positioned and the color scale adjusted.

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Thoughts, opinions, suggestions?

Unidata has been tremendously successful –
keep doing what you're doing!

Expand into areas of unmet need, including very
large datasets, user-friendly analysis and
visualization tools

Forge strongly into numerical modeling- many
opportunities await there

Acknowledgements

It has been a tremendous honor to participate in the governance of Unidata for the past 8 years

I am certain that I've gained more than I've given back

Thanks to Mohan and Linda for keeping me around for so long

Thanks for this opportunity to share my ideas, and memories

