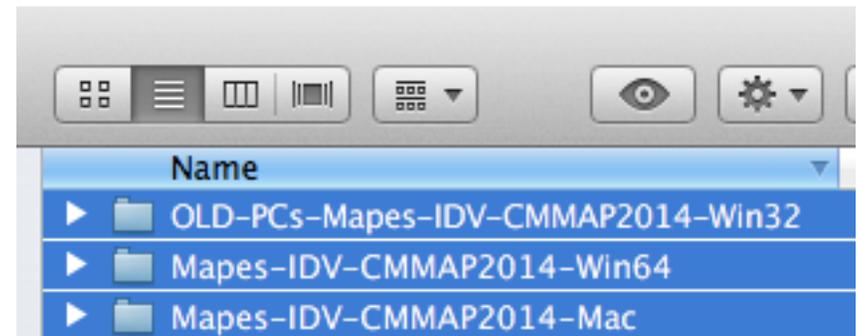
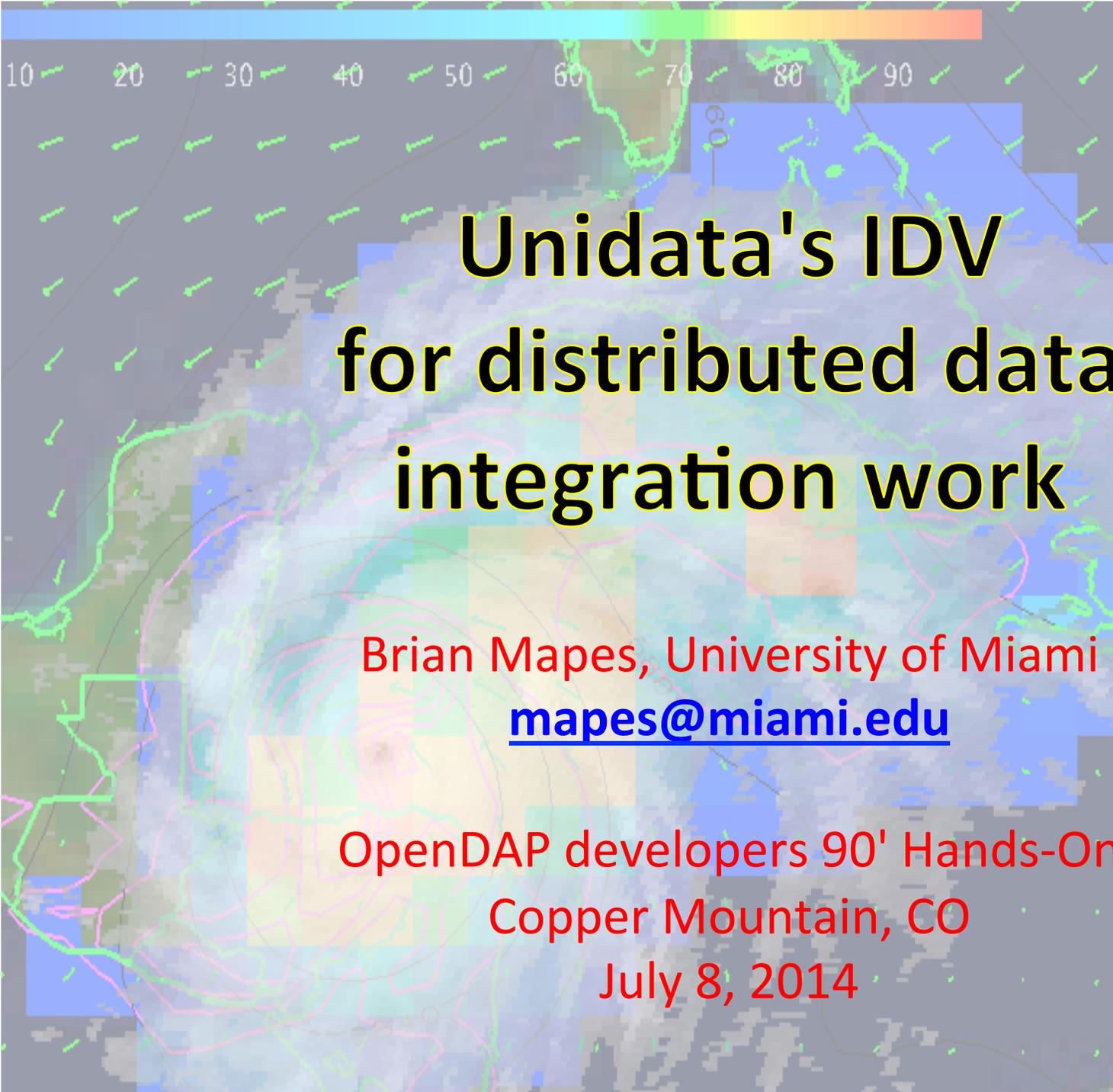


Grab Folder From USB Stick

- Mapes_IDV_CMMAP2014_(system)



- Drag whole folder to desktop
- Pass it on
 - (at leisure: Double click installer, Follow prompts)



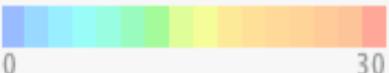
Unidata's IDV for distributed data integration work

Brian Mapes, University of Miami
mapes@miami.edu

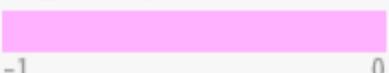
OpenDAP developers 90' Hands-On
Copper Mountain, CO
July 8, 2014

- Blue Marble - Static
- Default Background...
World Coastlines
North & Central America
- Flow Displays
- 10m winds
Color: █
- Plan Views
- 1DD precip (GPCP v1.1)

0 97.6
- SST anomaly

-5 5
- TRMM 3B42

0 30
- IR satellite

187.5 323.5
- Z500

5838.3 5914.3
- omega500

-1 0
- MFRA's vapor sink

Today's outline (45', trailing off...)

1. Install and launch The IDV. Open a zipped **bundle**.
Poke n play while I talk about intro stuff.
 - DYNAMO data in Indian Ocean
2. Close. Install **Mapes IDV Collection**. Restart.
 - "Collection" = a URL address of a *plugin*
 - every IDV launch you get my latest plugin (from Miami web site)
 - *plugin* = a bundle of resources at many levels
 - curated **bundles** in favorites bar & catalog area
 - color tables, display settings, formulas, etc.
3. Play with Web-served bundle (gulp... all of us?)
 - dial a time range, box a region -- CAREFUL with size!
 - this is the trailing off part... Web slam?...

Install and launch

- You should have a folder (from USB sticks) Mapes_IDV_CMMAP2014_(system)
 - Double click installer
 - Follow prompts
- CLEAR MEMORY (CLOSE LARGE APPLICATIONS)
- Launch The IDV. Two windows will come up.
- In either: File → Open
 - choose DYNAMO_for_CMMAP_noIR.zidv

What is The IDV?

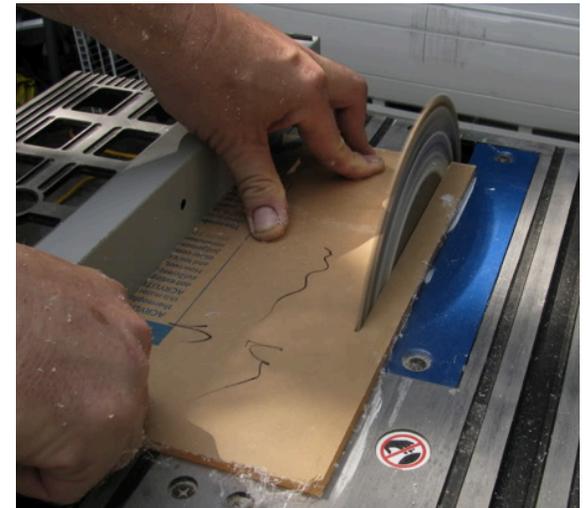
- NSF-supported UCAR/Unidata's **Integrated Data Viewer**
 - and previewer, and preprocessor, and processor, and ...
- **Free, supported, improving** software (in Java)
 - product of **decades** of thoughtful development
 - » nothing is non-sensible ... within its history...
- **Roots in Meteorology**
 - → specialty displays, our derived quantities, etc.
- **More than Met now -- geoscience-inclusive**

Don't let "errors" worry you

- Multi-threaded, each w/ many dependencies
 - » remote servers, etc. etc.
 - **IGNORE** (OK,OK,OK) whatever errors it throws
 - they are inscrutable (to me)
 - sup/dev team doesn't want raw error reports
 - Lots of goodies will still come up - maybe enough

Expectation management

- **Complicated**, *by necessity*... it does a lot
- All in menus, within much-pondered GUI
 - » Bears up to thought, once you internalize nomen-culture
- Get a mouse
 - » right-click has menus; scroll to zoom
- Measure twice, cut once
 - » *Think before you click!*
 - Some maddening 'Simon Says' games
 - Unstoppable 'Download Internet'
 - No auto-save or back button



Build a birdhouse: tips



A birdhouse is easy to build.
(Brandon Laufenberg)

It's fun to build a birdhouse. If you're a parent, your children will enjoy it, too. Here are some tips about building and hanging a birdhouse. (Go [here](#) for birdhouse dimensions and simple plans.)

Birds who use birdhouses (also called nest boxes) are cavity-dwellers. A cavity, such as a hollow tree limb or trunk, a crevice or cave, offers protection from the elements and some safety.

Unless you're a skilled woodworker, keep it simple to avoid frustration. Not only that, but it isn't necessary to create a work of art. There are thousands of intricately designed, beautiful birdhouses on the market that often go ignored by birds, because they don't look or feel natural to them. This isn't to say you shouldn't hang a lovely birdhouse or that it'll never attract an occupant. It isn't necessary, though; "Natural" is what they look for first, a nesting place that blends into the surroundings. Even an elaborate birdhouse is best when colored in earth tones -- brown, tan, gray -- such as the one pictured below.

Build the house to dimensions you know will be used by birds in your area. For example, building and positioning a nest shelf for Barn Swallows will give discouraging results if your yard is full of trees. ([This page](#) lists the birds who most commonly use birdhouses and their natural habitats.)

It's best to use wood, especially cedar, because it will be long lasting. It isn't imperative, but wood with some bark left on it is especially appealing to birds. You can also glue or nail strips of bark to the outside.



This birdhouse is stained a natural color to make it appealing to birds. (Xyno)

Simple toolbox
will suffice

Need workshop

Orientation to The IDV:

Take a breath, think like a programmer (from menus)



← It is like **this**



← (with a few parts more like this...)

Not **this** →



Menus within menus

- *Tools are available in more than one place*
- **Right-click** often pulls up menus
 - Everything was created and named thoughtfully
 - during those decades of programming
 - **Be patient, read**, try to think like a programmer/ craftsman



You *can* start from raw data...
but that is often frustrating and slow.



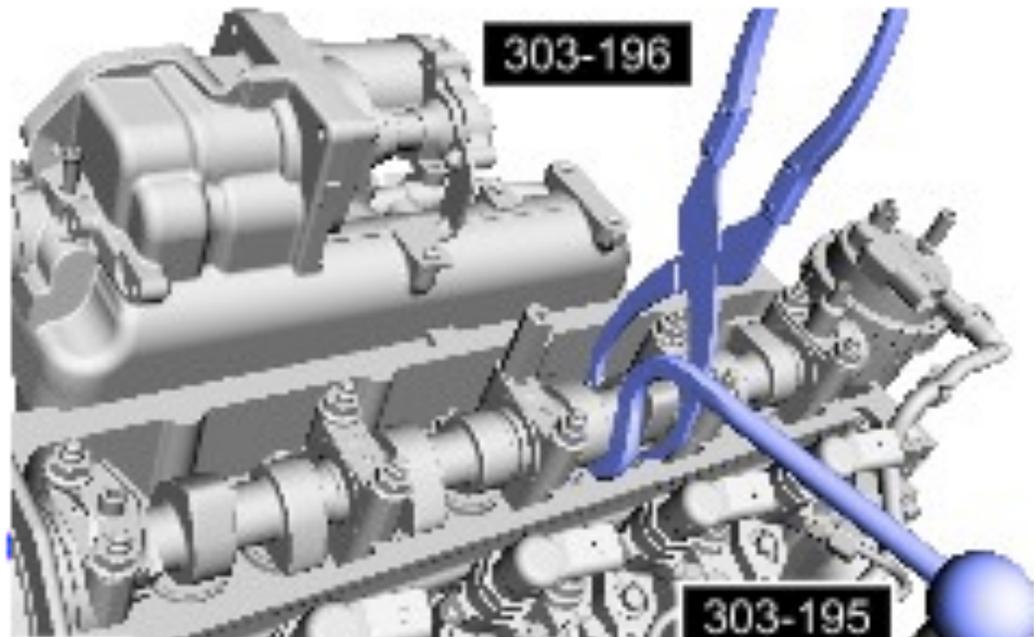
"Powerful" software

- **Powerful** software can do a million things
- *999,900 of those things don't make any scientific sense to do!*
- *Many of them will ruin your IDV session!*
 - like exceeding RAM memory limits

Instead, let's learn to **examine and adjust**
a rich **bundle** of data+displays



Later in the training, you will learn to create (add) your own field displays, and then to add whole new datasets. You can easily delete any of the initial template that you don't want any more.



Three kinds of Help:

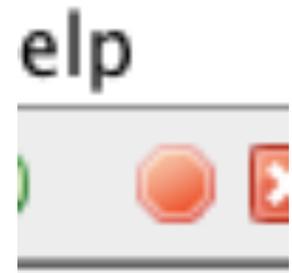
- **Reference manual:**
 - <http://www.unidata.ucar.edu/software/idv/docs/userguide/toc.html>
 - (this is also under the IDV's Help menu)
- From the IDV training **workshop:**
 - <http://www.unidata.ucar.edu/software/idv/docs/workshop/>
- Tutorial **screencasts** on YouTube:
 - http://www.unidata.ucar.edu/blogs/news/entry/new_idv_tutorial_videos_available

Key computer resource: RAM

- MEMORY (RAM):
 - 2GB is a minimum for reasonable IDV performance
 - 4GB or 8GB are *much better*
 - IDV reserves about 75% of system RAM on launch
 - CLOSE OTHER LARGE APPLICATIONS for best results
 - Update 2014: it only grabs 3GB even if you have 8G
 - trash collection is more efficient with bounds, I heard?
 - Exceeding memory limits can cause "STRANGE, UNPREDICTABLE" errors!
 - (just freezing up, most commonly)

Performance (speed)

- Slow processes: data reading, rendering
 - **Be patient.** It will finish, if memory is sufficient.
 - many sub-processes, not possible to monitor in detail.
 - *Stretch, breathe, do something else.*
- JAVA is multi-threaded
 - The "STOP" button is just another process
 - doesn't reliably work
 - **kill IDV if you see "loading hi-res data 1/1000...2/1000..."**



What is a Bundle?

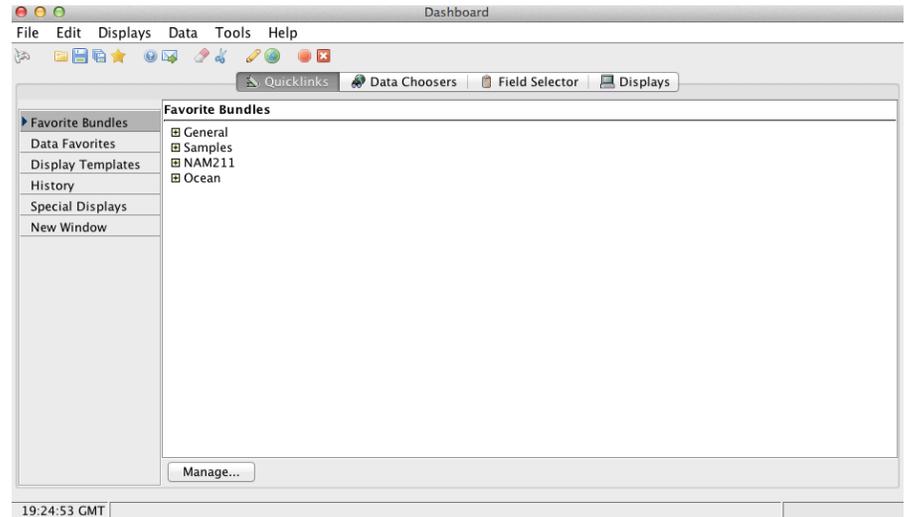
- myfile.**z**idv is a bundle with data **zipped** into it
 - allows faster access, and offline work
- myfile.**x**idv is a bundle of **xml** code only
 - just instructions, including *pointers* to data files/servers
- You see exactly what the bundle's creator saw when they saved it.
- File → Save a bundle of your IDV state any time
- Save often! There is no autosave, no Back button!

READY FOR EXERCISE 1!

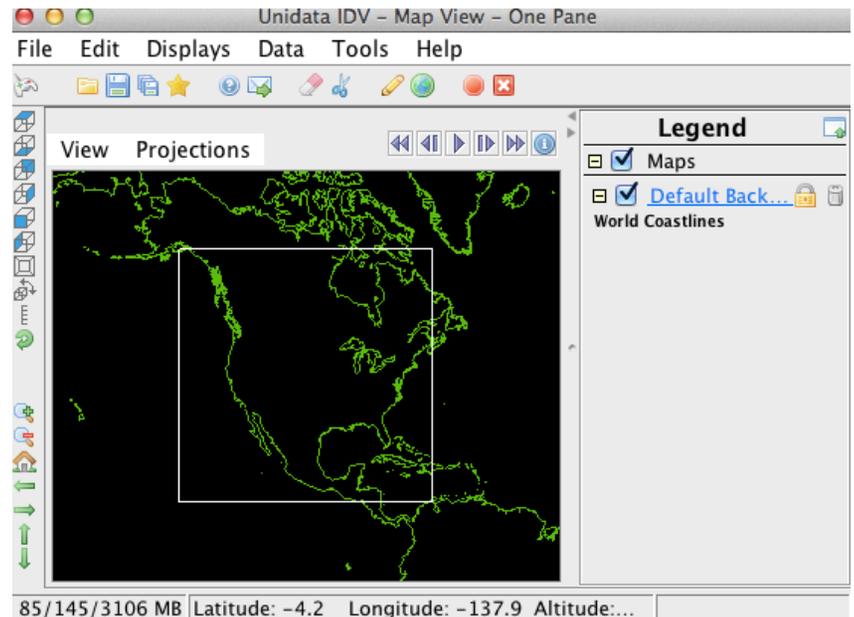
- Got the .zidv loading? Accept any errors

The IDV's **windows**

- Two main windows:
 - **Dashboard window**



- **Display window**
 - (may be more than one)



Display window's parts (**learn names**)

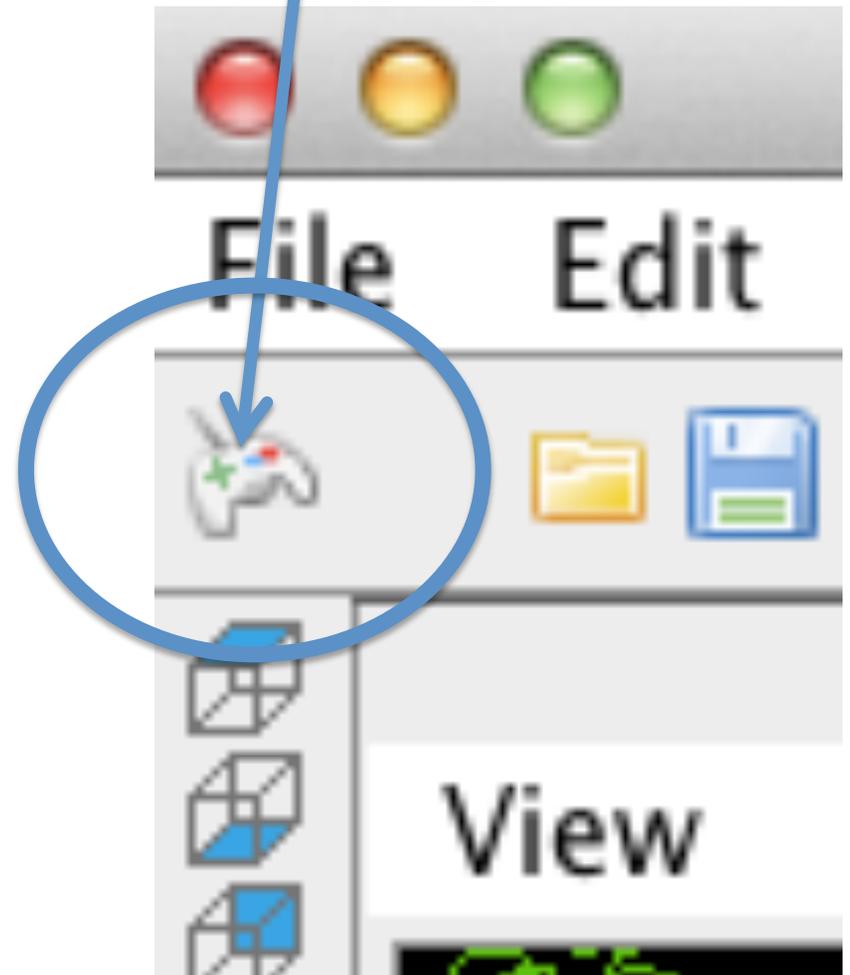
- Help
 - User's Guide
 - Getting Started
 - Zooming, Panning and Rotating
 - Show Contents

The screenshot shows the Unidata IDV - Map View - One Pane interface. The main window displays a 3D topographic map of a region with a color-coded elevation scale. The interface includes a Main Menu Bar (File, Edit, Displays, Data, Tools, Help), a Favorites Toolbar, and a Main Toolbar. A View Menu is located on the left side of the map. A Time Animation Widget is positioned above the map, showing the date and time '1998-06-29 12:00:00Z'. A Clipping Box is overlaid on the map. A Viewpoint Toolbar is on the left, and a Navigation Toolbar is below it. A Viewpoint Undo/Redo toolbar is also present. A Display List at the bottom left shows the active displays: 'T - Color-Filled Contour Cross Section 1998-06-29 12:00:00Z', 'Z - Contour Plan View 1998-06-29 12:00:00Z', 'Psl_et - Color-Shaded Plan View 1998-06-29 12:00:00Z', and 'windspeed - Isosurface 1998-06-29 12:00:00Z'. A Cursor Readout at the bottom right shows '18:20:39 GMT Latitude: 65.4 Longitude: -17.0 Altitude: -9152.5 m'. On the right side, there is a Legend panel with sections for Maps, Cross sections, Plan Views, and 3D Surface, each with a color scale and legend items.

HIDDEN BUT KEY!! Toggle for Memory Monitor

Recovering the Dashboard

- If you close the dashboard, click here in the display window to get it back



A very important corner:

Open a bundle

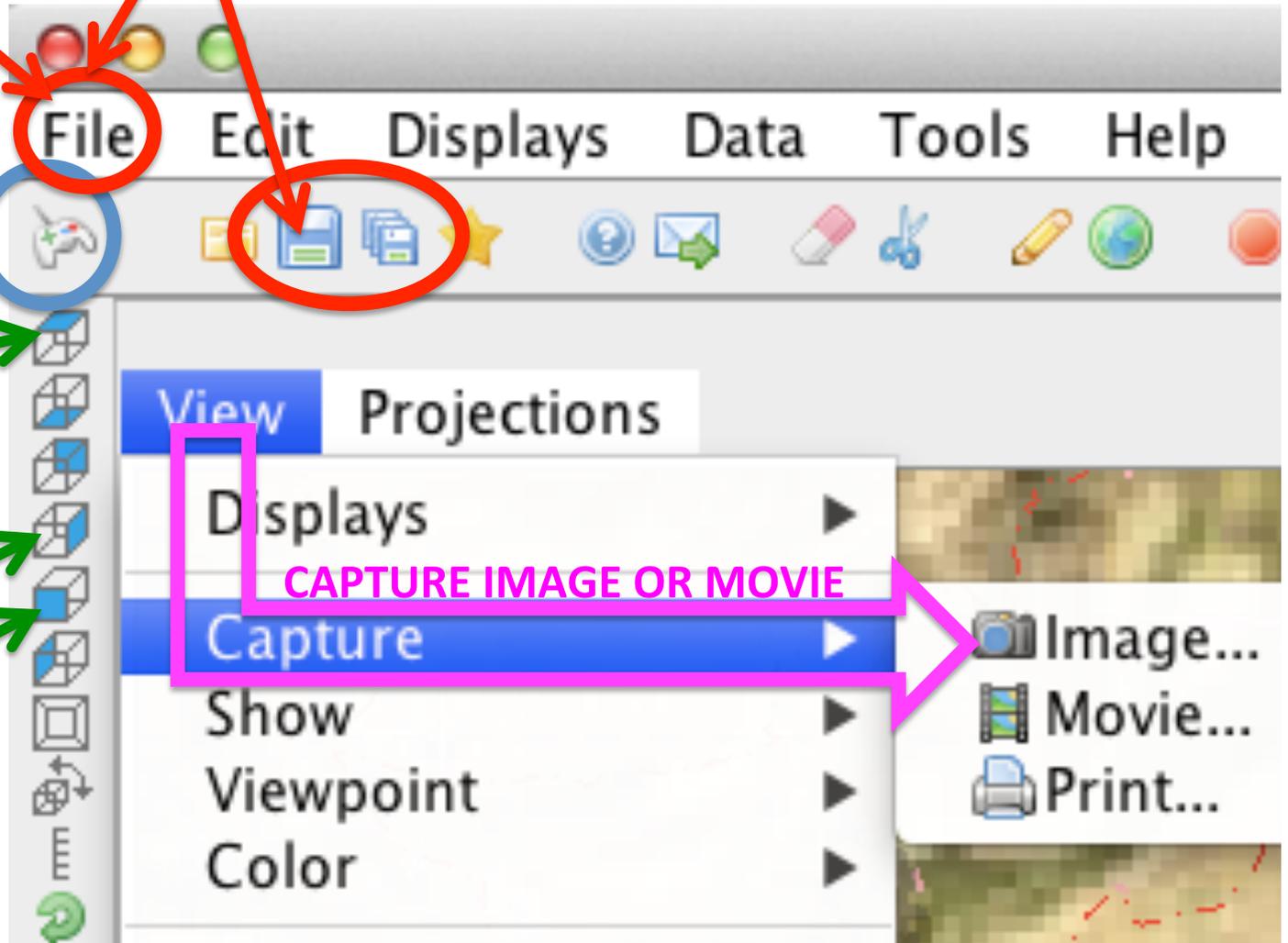
Save bundle (state)

Open Dashboard

Restore normal
top view after
too much
rotation
and zooming

view from east

view from south



Beyond the canned USB bundle

- Install the Mapes IDV collection

Relaunch and you will see many resources.

Nowhere near enough wifi to do much here...

Installing Mapes IDV Collection plugin with many resources

- Put these files in `~/.unidata/idv/DefaultIdv`
 - `idv.properties` and `mapes.rbi`
 - don't let the system mangle suffixes...
 - by terminal may be easiest if `.unidata/` hidden
- Kill and restart The IDV

The Mapes IDV collection

- Self-installs a **plugin from my Web site** whenever you launch The IDV while connected to the Internet
- I keep improving it – suggestions welcome!

Load bundle: MapesIDV DAP2014...xidv from Catalog or from Favorites folder

The screenshot shows a software interface with a menu bar (File, Edit, Displays, Data, Tools, Help) and a toolbar containing icons for Quicklinks, Data Choose, Field Selector, and Displays. A sidebar on the left lists categories like General, Sat & Radar, and Observations, with 'Catalogs' selected. The main area displays a catalog of datasets under 'The Mapes IDV collection'. A specific dataset, 'MapesIDV DAP2014 2008multi movable TRMM MERRA TWICE', is highlighted. A blue arrow points from this dataset to the 'Data Choose...' button in the toolbar. Below the catalog, there is a 'Please select a dataset from the catalog' message and an 'Add Source' button.

Dashboard

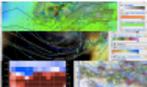
File Edit Displays Data Tools Help

Mapes IDV collection PSD Bundles

Quicklinks Data Choose Field Selector Displays

Catalogs:

Data Source Type:

- ▼ The Mapes IDV collection
 - ▶ Aggregations for more convenient access to Web datasets
 - ▼ IDV Bundles
 - ▶ Dataset-only IDV bundles
 - ▶ Displays of remote datasets (.xidv)
 - ▶ Displays with zipped-in data (.zidv)
 - ▶ Notes: About this collection
 -  GFS-T2m-Z-wind-CAPE-PW-IR-TRMM.movable.2004-2009
 - MapesIDV DAP2014 2008multi movable TRMM MERRA TWICE**
 - ▶ IDV Training and related powerpoints
 - ▶ Current weather data catalog
 - ▶ NOAA-PSD datasets
 - ▶ Unidata catalog link

Show Thumbnail Images

Please select a dataset from the catalog

05:22:23 UTC

A *plugin*: my favorites, colorbars, etc.



The Mapes IDV collection

*A self-updating, ever-improving IDV "plugin" maintained by Prof. [Brian Mapes](#)
The collection's 'repository' part is at http://bit.ly/Mapes_IDV*

Screencast introductions:

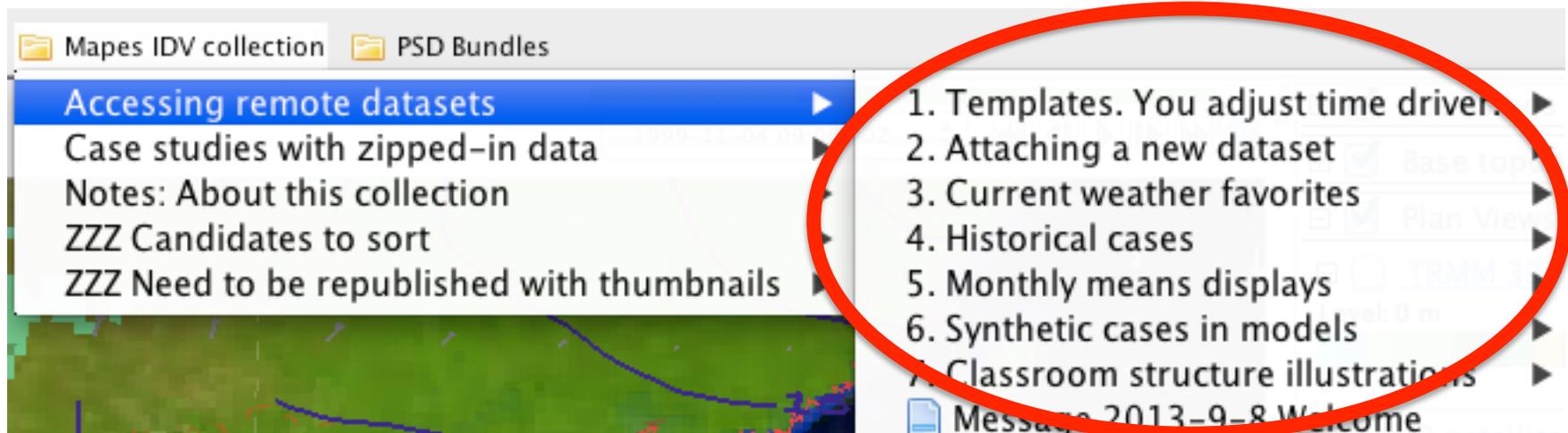
1. [Mapes IDVcollection- Why you want it](#) (5 minutes)
2. [Mapes IDV collection- How to get it](#) (4 minutes)
3. [Mapes IDV collection- Learn to create your own displays](#) (10 minutes)

The IDV (Integrated Data Viewer) is a great tool, from a great organization (Unidata, part of UCAR). It is even better when you install this set of self-updating customizations (called a "plugin").

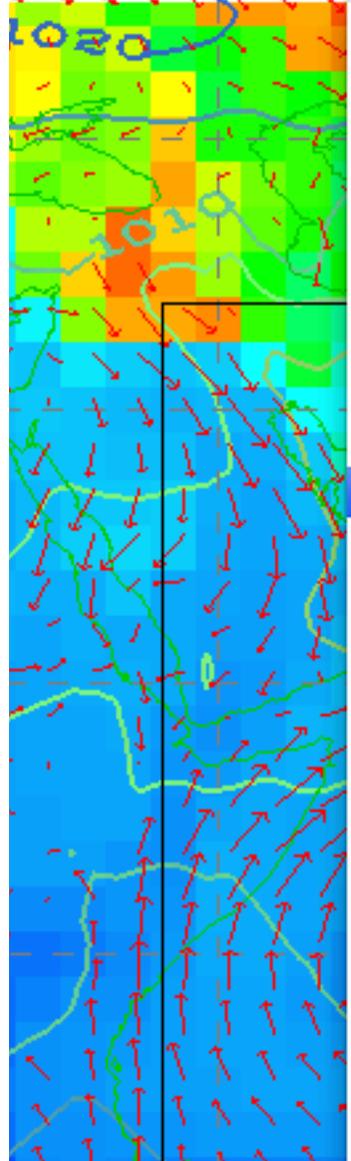
To install the IDV and the plugin, follow these directions:

What is The Mapes IDV Collection?

- 1. A curated collection of "bundles"
 - In the toolbar of The IDV
 - In the Catalog view of IDV (with thumbnail images)
 - Also at <http://bit.ly/MapesIDVcollection>



- 3. Attach a new dataset. You create displays. ▶
- Accessing online data servers (.xidv) ▶
- Case studies with zipped-in data (.zidv) ▶
- Notes: About this collection ▶



- 20Creanal MSLP 6h 1871-2008.xidv
- 20Creanal PW 6h 1871-2008.xidv
- All MERRA 1-3h datasets 1979-recent,bigindex.xidv
- EC-YOTC datasets 2008-05 to 2010-04 rdapassword
- GFS ana NOMADS 2004-13 1deg.xidv
- GFS analyses on NOMADS.xidv
- GLDAS land 1948-2010 3h.xidv
- HRRR CONUS at 3km on p levels
- HRRR CONUS at 3km surface data
- IR sat Tb grids 10km 1980-2010.xidv**
- MERRA 2D-hourly met.xidv
- MERRA 3D-3h state T units from IAO.xidv
- MERRA T budget 3D-3h.xidv
- MERRA V budget 3D-3h.xidv
- MERRA clouds 3D-3h.xidv
- MERRA land hourly.xidv
- MERRA layer budgets.xidv
- MERRA layer state.xidv
- MERRA ocean hourly.xidv
- MERRA q budget 3D-3h.xidv
- MERRA radiation 2D-hourly.xidv
- MERRA surface masks.xidv
- NARR 3h precip 1979-.xidv

- Daily averages
- Monthly averages
- SST
- Satellite_longitude

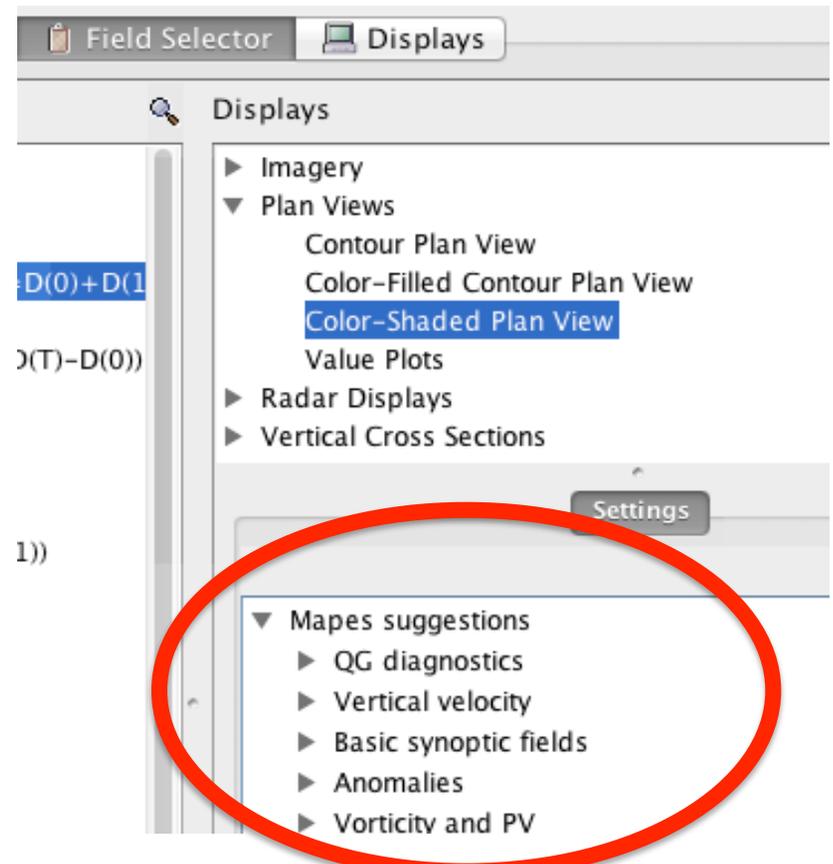
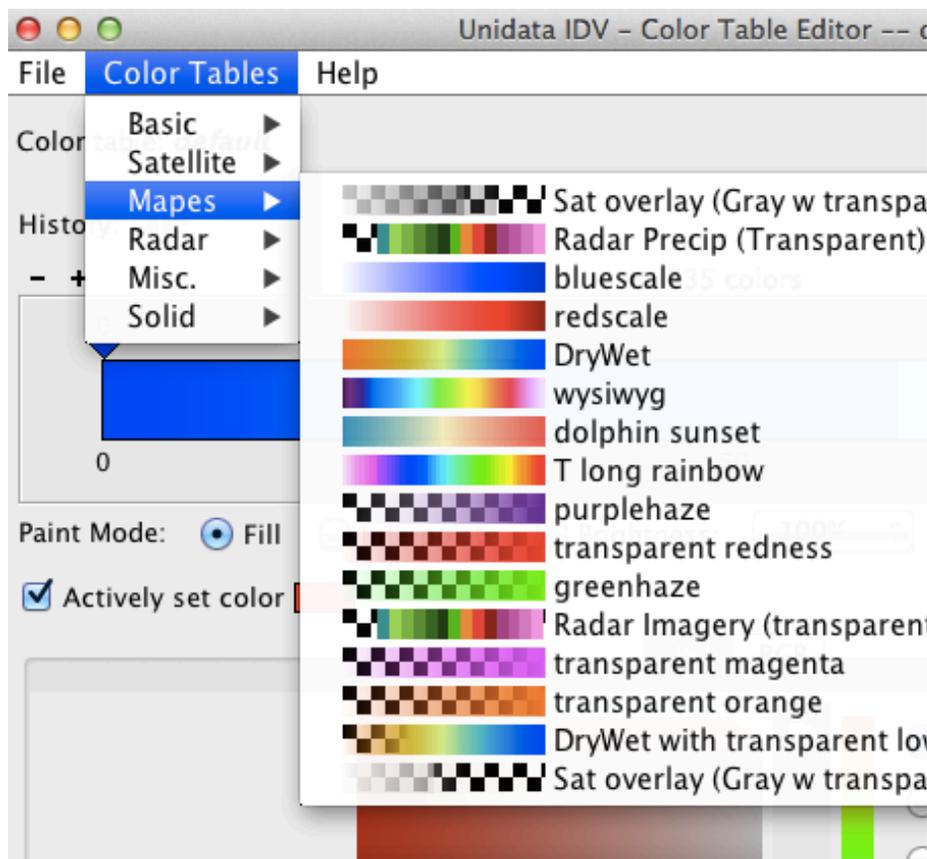
Sub-daily



Click to open favorite: IR sat Tb grids 10km 1980-2010.xidv

What is The Mapes IDV Collection?

- Other resources:
 - Custom color tables
 - Display Settings suggestions for various fields



The Mapes IDV collection

Welcome to the "back office" of the Ma

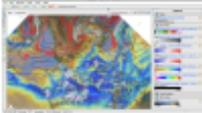
Please see <http://www.rsmas.miami.edu>

for the project's front face (a normal W

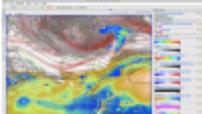
- Aggregations for more convenient
- IDV Bundles
 - 3. Attach a new dataset. You c
 - Accessing online data servers
 - 1. Favorite current-weather
 - 2. Templates at 1 time. You
 - Current weather sources
 - Past weather archives
 - Americas-North



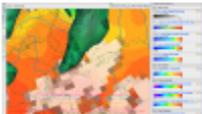
1888 "Schoolhouse Blizzard" 20Cv2 reanalysis



GFS 1deg vort PW SfcT TRMMrain 1999-now



MERRA,IR,TRMM



Subtropical upper jet-front in MERRA 2002-05-23

Data Sources:	Fields
▶ Formulas	▶ Maps
pr wtr.eatm.2008	▶ Grids
Cached data	▼ Mapes
units fixer for MERRA 3-h	<i>f(x)</i> Advection of scalar S by vector C
3 day trajectories for June	<i>f(x)</i> Average across the levels of a grid at all points
	<i>f(x)</i> Average along a grid column
	<i>f(x)</i> Average along a grid row
	<i>f(x)</i> Average along a grid row
	<i>f(x)</i> Average of 2 scalars
	<i>f(x)</i> Create Relative Humidity from Temperature, mix
	<i>f(x)</i> Divide
	<i>f(x)</i> Frontogenesis function from theta and the wind
	<i>f(x)</i> Gaussian weighted hor. smoothing (default N=6

stride Settings

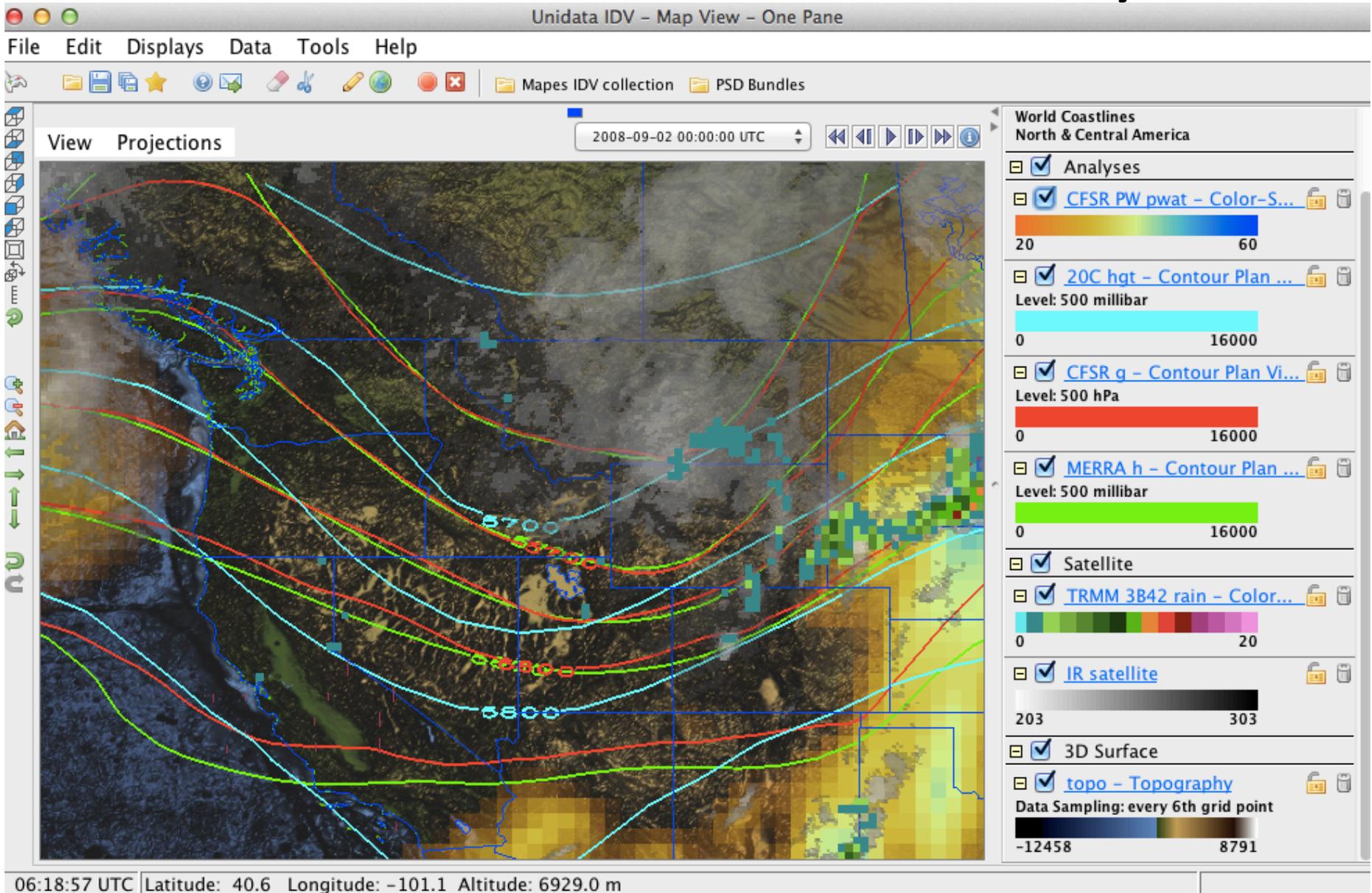
- ▼ Mapes suggestions
 - ▶ QG diagnostics
 - ▶ Vertical velocity
 - ▼ Basic synoptic fields
 - ✂ Temperature -30 to 35 <local>
 - ✂ SLP Blue thick 5mb <local>
 - ✂ Z contours thick=2 <local>
 - ✂ Big pink vectors <local>
 - ▼ Anomalies
 - ✂ SST anomalies blurred centered 4C <local>
 - ✂ SST anomalies rainbow 4C <local>
 - ▼ Vorticity and PV
 - ✂ thin abs. vort. contours <local>
 - ✂ Abs Vort blue-red centered <local>
 - ✂ Rel Vort blue-red -10 to 10 E-5 <local>
 - ✂ PV positive values <local>
 - ✂ Abs. Vort. 0-40 E-5 redscale <local>
 - ▶ Clouds and rain
 - ▶ Column water

Load bundle: MapesIDV DAP2014...xidv

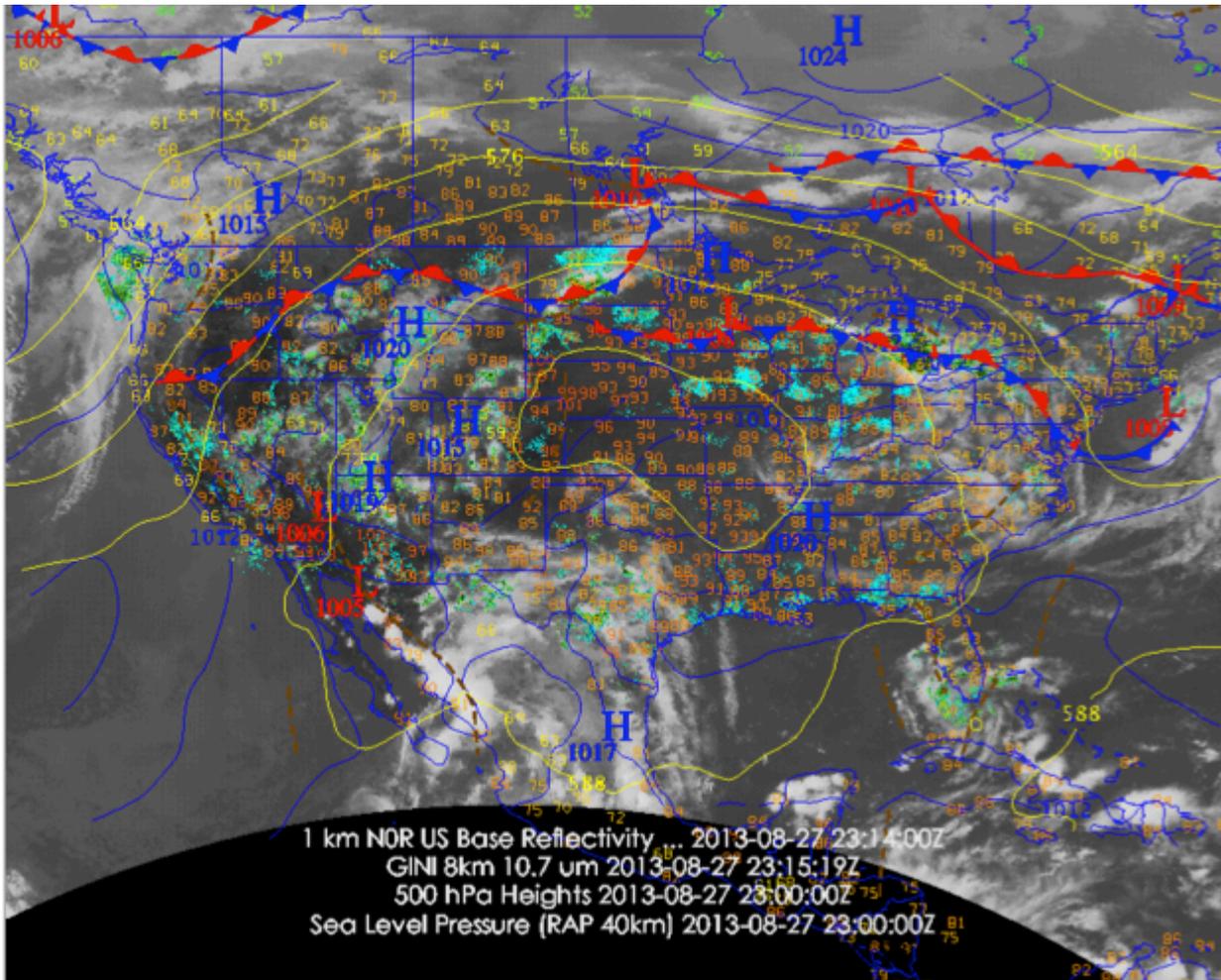
YOTC: anywhere, anytime in 2008

- ECMWF data at NCAR
 - requires rda.ucar authentication
- CFSR data at Albany
 - but Miami .ncml aggregates fields
- 20C data at NOAA PSD
 - Miami .ncml aggs fields
- MERRA at NASA-GSFC (great GDS server)
 - Miami .ncml adds units & valid_range
- Satellite (IRWIN) at NOAA NCDC -- huuge agg!
- TRMM satellite from NASA -- to present!
- Topography from USGS - adaptive res.

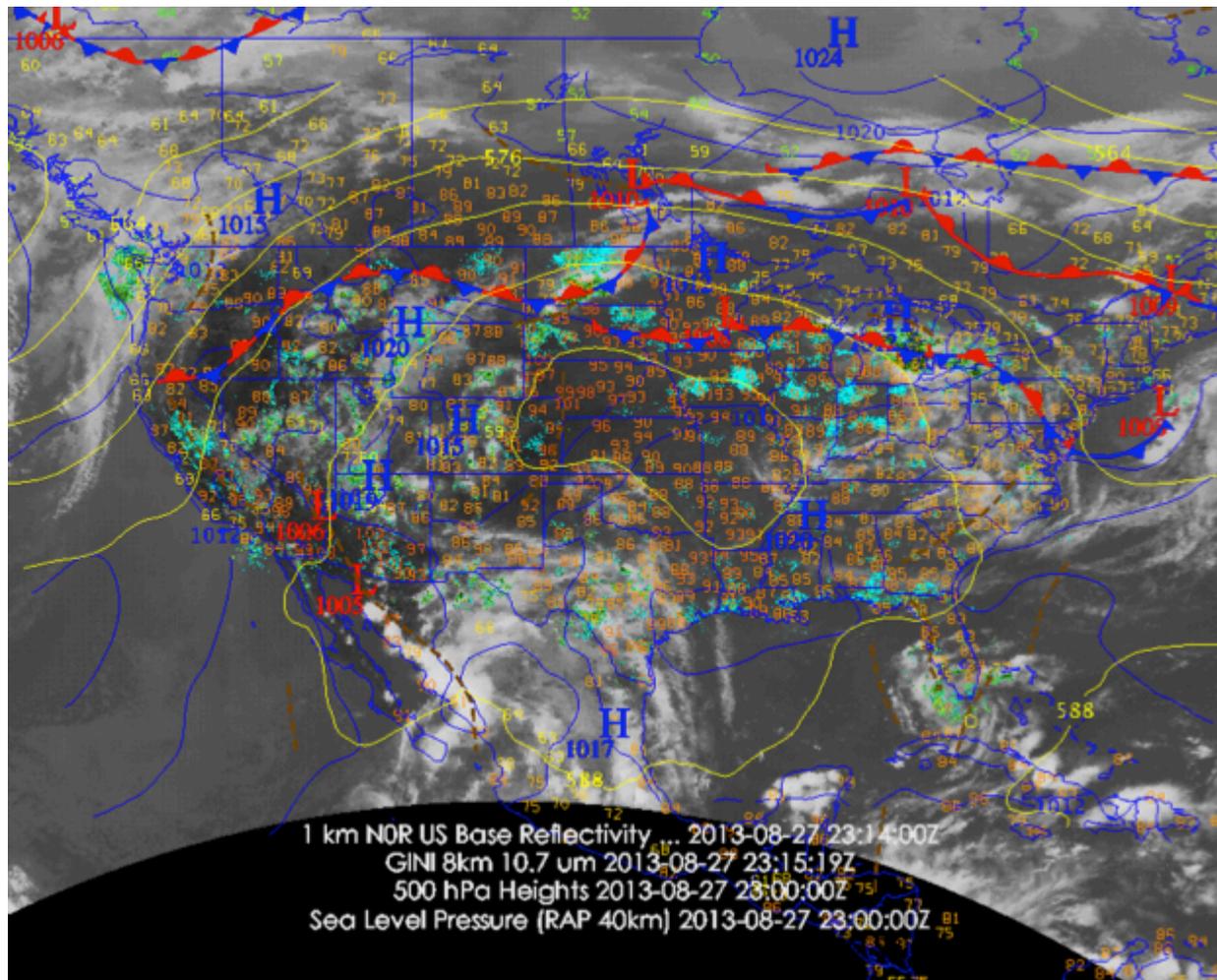
What's in Louisiana this day?



This is a **view**



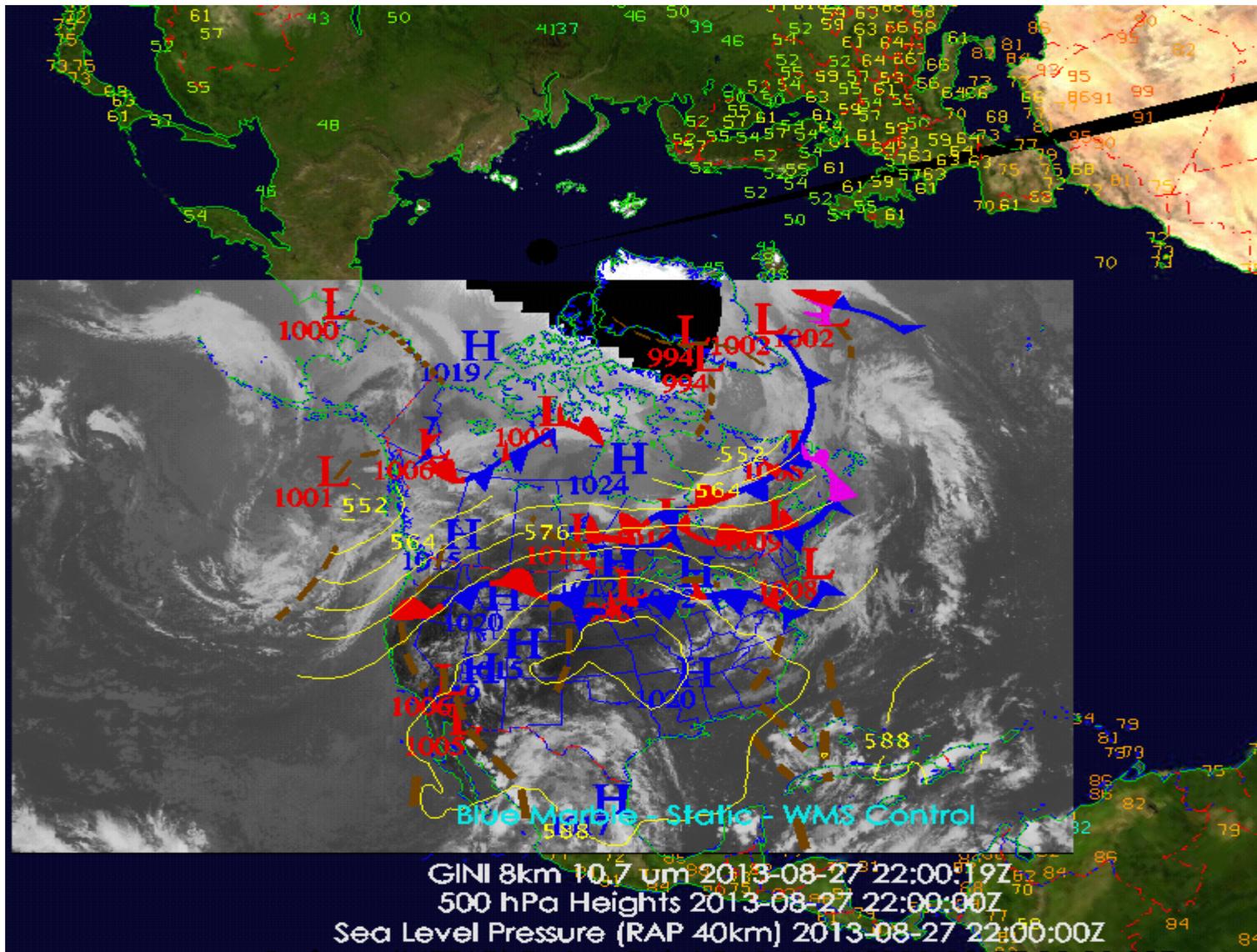
This **view** has several **displays**



- Default Background Maps
North & Central America
- Imagery
 - 1 km NOR US Base Reflectivity ... Ima...
0 80
 - GINI 8km 10.7 um Image Display
0 255
- General
 - Front Display
 - Plan Views
 - Geopotential height isobaric - Cont...
Level: 500 hPa
0 1600
 - Sea Level Pressure (RAP 40km)
952 1052
- Point Data
 - Surface (METAR) Data - Point Data Plot
Layout model: Temperature (colored)
TEMP:
-90 45

As described in this area, called a **legend**

Same **view** and **displays**, different (polar) *projection*



Unidata: home of The IDV

www.unidata.ucar.edu/software/idv

Home / IDV

- › IDV
 - FAQs
 - Examples
 - Documentation
 - Download
 - Support
 - RAMADDA
 - Related Projects

Integrated Data Viewer (IDV)

The Integrated Data Viewer (IDV) from Unidata is a Java-based software framework for analyzing and visualizing geoscience data.

See the IDV package overview >

IDV News & Announcements

- IDV version 4.0u1**
March 29, 2013
- IDV version 3.1u1**

IDV Display Examples

In the IDV **Globe Display**, displays and maps are projected onto a spherical globe.

- Part of Unidata's larger suite of free software
 - netCDF, THREDDS, RAMADDA, LDM, ...



Unidata (current and former)



Installing plugins

- A useful tool for customizing your IDV is a *plugin*.
 - Plug in some color tables
 - Plug in the RAMADDA Publisher
 - Plug in MapesIDVcollection...jar from USB drive, if internet is not accessible (it will only work online, though).

