

# McIDAS-V Tutorial

## Using Simulated ABI Data

updated January 2010 (software version 1.0beta5)

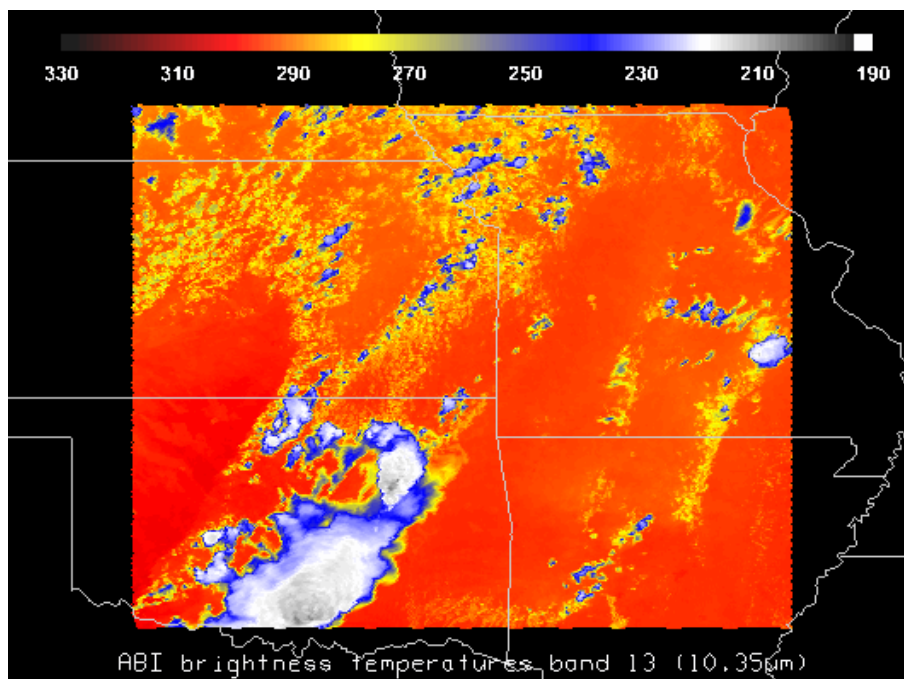
McIDAS-V is a free, open source, visualization and data analysis software package that is the next generation in SSEC's 35-year history of sophisticated McIDAS software packages. McIDAS-V displays weather satellite (including hyperspectral) and other geophysical data in 2- and 3-dimensions. McIDAS-V can also analyze and manipulate the data with its powerful mathematical functions. McIDAS-V is built on SSEC's VisAD and Unidata's IDV libraries, and contains "Bridge" software that enables McIDAS-X users to run their commands and tasks in the McIDAS-V environment. The functionality of SSEC's HYDRA software package is also being integrated into McIDAS-V for viewing and analyzing hyperspectral satellite data.

McIDAS-V is currently a beta version of the software, which means that the software may contain bugs and not always work as expected. If you encounter any errors, please send them to the McIDAS Help Desk at [mug@ssec.wisc.edu](mailto:mug@ssec.wisc.edu). You will be notified at the startup of McIDAS-V when new versions are available on the McIDAS-V webpage - <http://www.ssec.wisc.edu/mcidas/software/v/>. More training materials are available on the McIDAS-V webpage and in the Getting Started chapter of the McIDAS-V User's Guide, which is available from the Help menu within McIDAS-V.

This tutorial assumes that you have McIDAS-V installed on your machine, and that you know how to start McIDAS-V. If you can not start McIDAS-V on your machine, you should follow the instructions in the document entitled *McIDAS-V Tutorial – Installation and Introduction*.

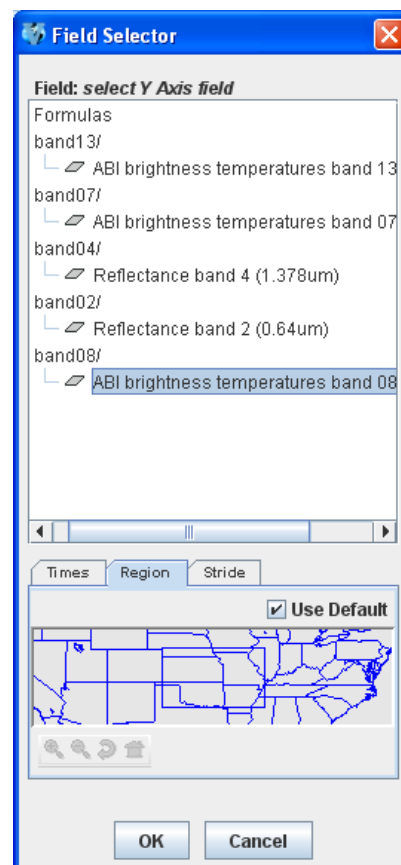
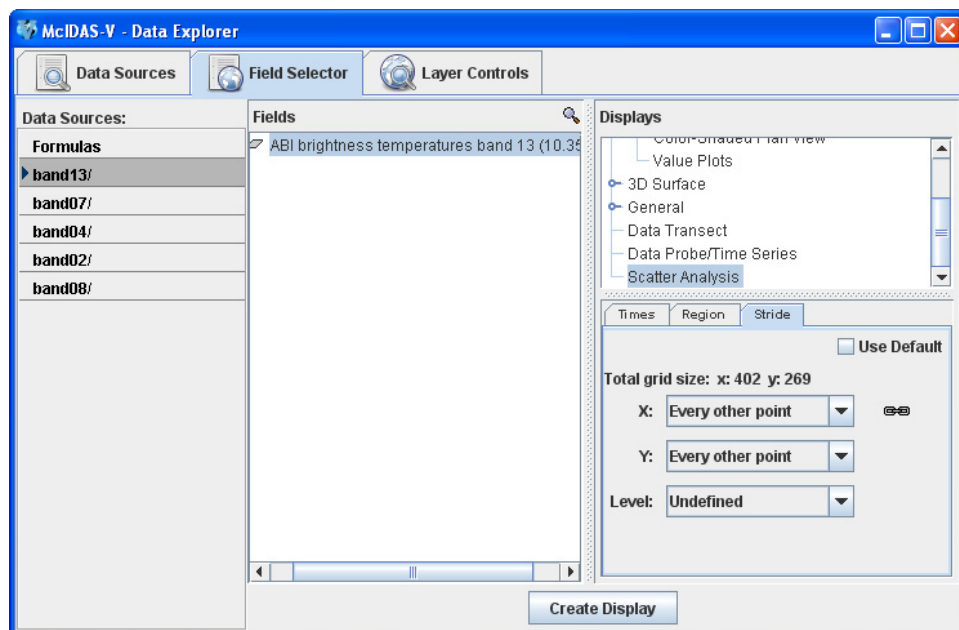
### Load the ABI Data Bundle into McIDAS-V

1. Copy the **June-04-2005.mcvz** bundle (~32 MB) to your local computer. Load the data bundle by selecting **File -> Open File...**, selecting **June-04-2005.mcvz** from the directory it was saved to, and clicking **Open**. A window will pop up giving you several options for loading the bundle. Select *Replace session* and click **OK**. There may be a pause, as the data is unzipped before the bundle loads. The bundle will load 5 bands of the simulated ABI data, listed under "Plan Views" in the **Legend** in the **Main Display** window.

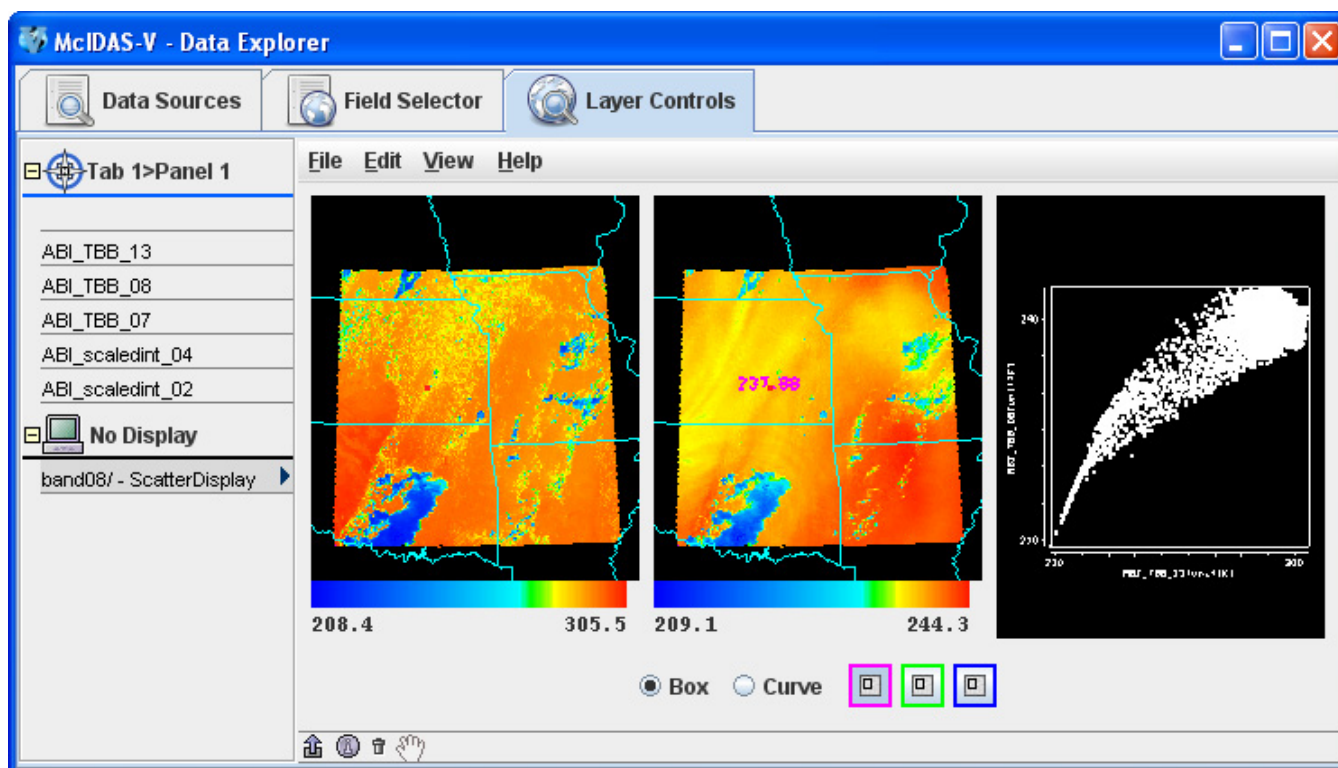


## Create a Scatter Analysis of two fields

1. To make a scatter analysis (plot) of two fields, go to the **Data Explorer** window and click on the **Field Selector** tab. If you don't see the **Data Explorer**, go to the **Main Display** menu and select **Window -> Show Data Explorer**. In the **Field Selector** tab:
  - a. Select the band 13 data file in the **Data Sources** list on the left to be the x-axis.
  - b. Select the field to display in the **Fields** list.
  - c. Select **Scatter Analysis** for display type in the **Displays** list.
  - d. In the lower-right panel, select the **Times** tab, uncheck the **Use Default** box, and select the first time. Then, select the **Stride** tab, uncheck the **Use Default** box, and select *Every other point* in the X: drop-down list.
  - e. Click **Create Display**.
  
2. A second **Field Selector** window will pop up where you can select a field for the second data source to represent the y-axis. In this new **Field Selector** window,
  - a. Select *band 8* as the second field to use for scatter analysis.
  - b. Click **OK**.



3. You should see plots similar to those shown below in the *Layer Controls* tab. The plot on the left represents the first field selected, the plot in the middle represents the second field and the plot on the right is the scatter analysis of the two fields. The first field selected is represented on the x-axis (abscissa) and the second field selected represents the y-axis (ordinate). In the case above, it is band 13 (10.35  $\mu\text{m}$ ) versus band 8 (6.19  $\mu\text{m}$ ).



4. The scatter plot and images can be analyzed by highlighting a box or region in either display. To draw a box, click the “Box” radio button, select a color, and use *the Shift+Left click and drag* option to draw a box over a region of the scatter plot. The corresponding points in the image will be highlighted. Conversely, one can select a region of interest in one of the images and then the corresponding points in the scatter plot will be highlighted. To select your own shape, click the “Curve” radio button and use the Left Click and drag option to draw an enclosed shape. Band differences (not shown) can be constructed as a formula and used as one or both of the axes for a scatter plot.


The various ABI (Advanced Baseline Imager) visible (1,2), near-infrared (3-6) and infrared (7-16) bands, plus some of their uses, are listed in the table below. This table shows which band would be used in conjunction to highlight various features. For example, during the daylight hours, bands 2 and 3 for vegetation or a land mask, bands 2 and 4 for high versus low clouds, bands 2 and 5 for snow cover or water/ice clouds. During the day or nighttime, the IR bands can be used to identify fires, fog, cloud-top phase, upper-level SO<sub>2</sub>, ozone, volcanic ash, land surface temperature, etc.

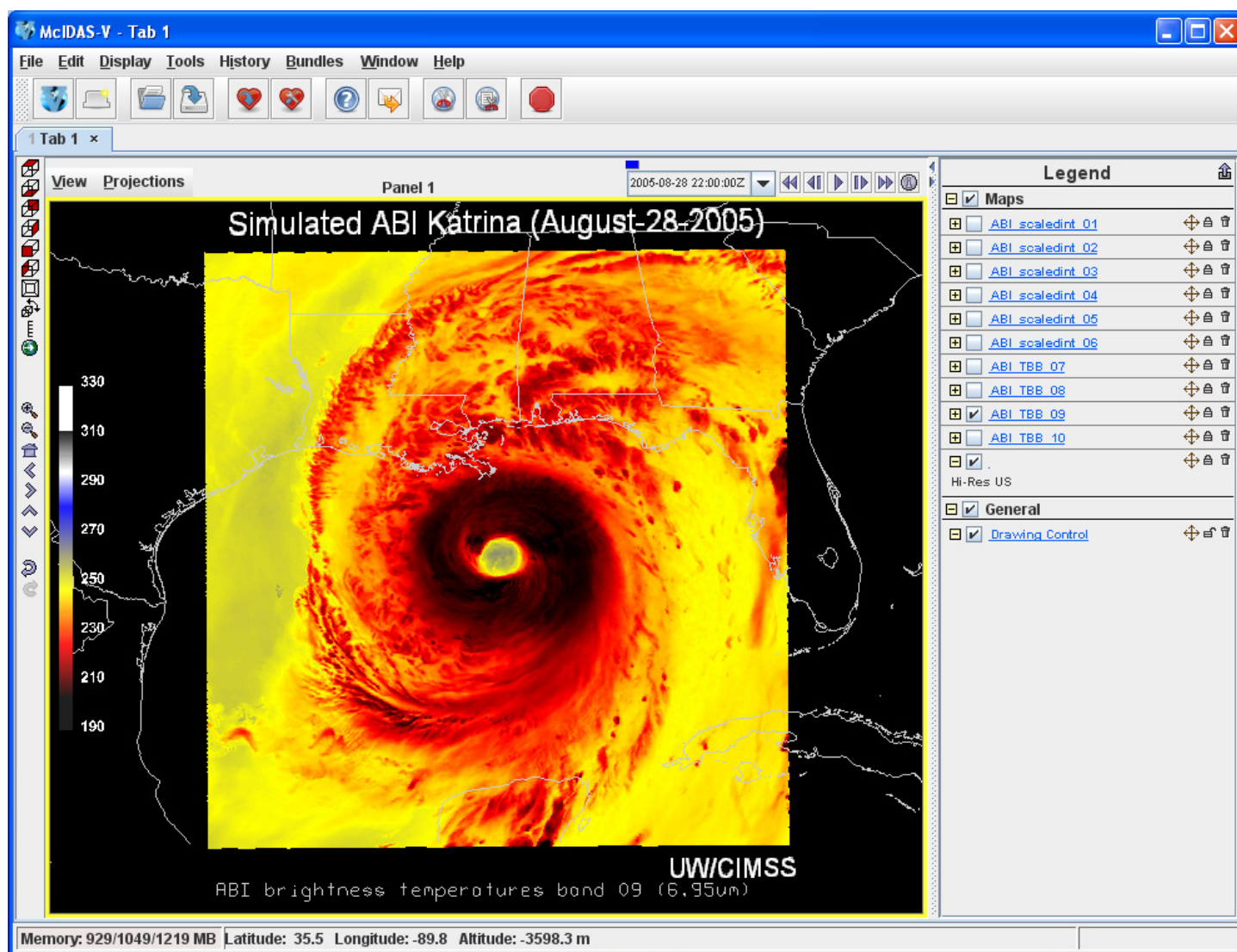
<b>TABLE 1. Summary of the wavelengths, resolution, and sample use and heritage instrument(s) of the ABI bands. The minimum and maximum wavelength range represent the full width at half maximum (FWHM or 50%) points. [The Instantaneous Geometric Field Of View (IGFOV).]</b>					
<b>Future GOES imager (ABI) band</b>	<b>Wavelength range (µm)</b>	<b>Central wavelength (µm)</b>	<b>Nominal subsatellite IGFOV (km)</b>	<b>Sample use</b>	<b>Heritage instrument(s)</b>
1	0.45–0.49	0.47	1	Daytime aerosol over land, coastal water mapping	MODIS
2	0.59–0.69	0.64	0.5	Daytime clouds fog, insolation, winds	Current GOES imager/sounder
3	0.846–0.885	0.865	1	Daytime vegetation/burn scar and aerosol over water, winds	VIIRS, spectrally modified AVHRR
4	1.371–1.386	1.378	2	Daytime cirrus cloud	VIIRS, MODIS
5	1.58–1.64	1.61	1	Daytime cloud-top phase and particle size, snow	VIIRS, spectrally modified AVHRR
6	2.225–2.275	2.25	2	Daytime land/cloud properties, particle size, vegetation, snow	VIIRS, similar to MODIS
7	3.80–4.00	3.90	2	Surface and cloud, fog at night, fire, winds	Current GOES imager
8	5.77–6.6	6.19	2	High-level atmospheric water vapor, winds, rainfall	Current GOES imager
9	6.75–7.15	6.95	2	Midlevel atmospheric water vapor, winds, rainfall	Current GOES sounder
10	7.24–7.44	7.34	2	Lower-level water vapor, winds, and SO <sub>2</sub>	Spectrally modified current GOES sounder
11	8.3–8.7	8.5	2	Total water for stability, cloud phase, dust, SO <sub>2</sub> rainfall	MAS
12	9.42–9.8	9.61	2	Total ozone, turbulence, and winds	Spectrally modified current sounder
13	10.1–10.6	10.35	2	Surface and cloud	MAS
14	10.8–11.6	11.2	2	Imagery, SST, clouds, rainfall	Current GOES sounder
15	11.8–12.8	12.3	2	Total water, ash, and SST	Current GOES sounder
16	13.0–13.6	13.3	2	Air temperature, cloud heights and amounts	Current GOES sounder/GOES-12+ imager

**ABI band list from Schmit et al, 2005 (BAMS).**

## Loop Through All 16 Bands and Create a New Scatter Analysis

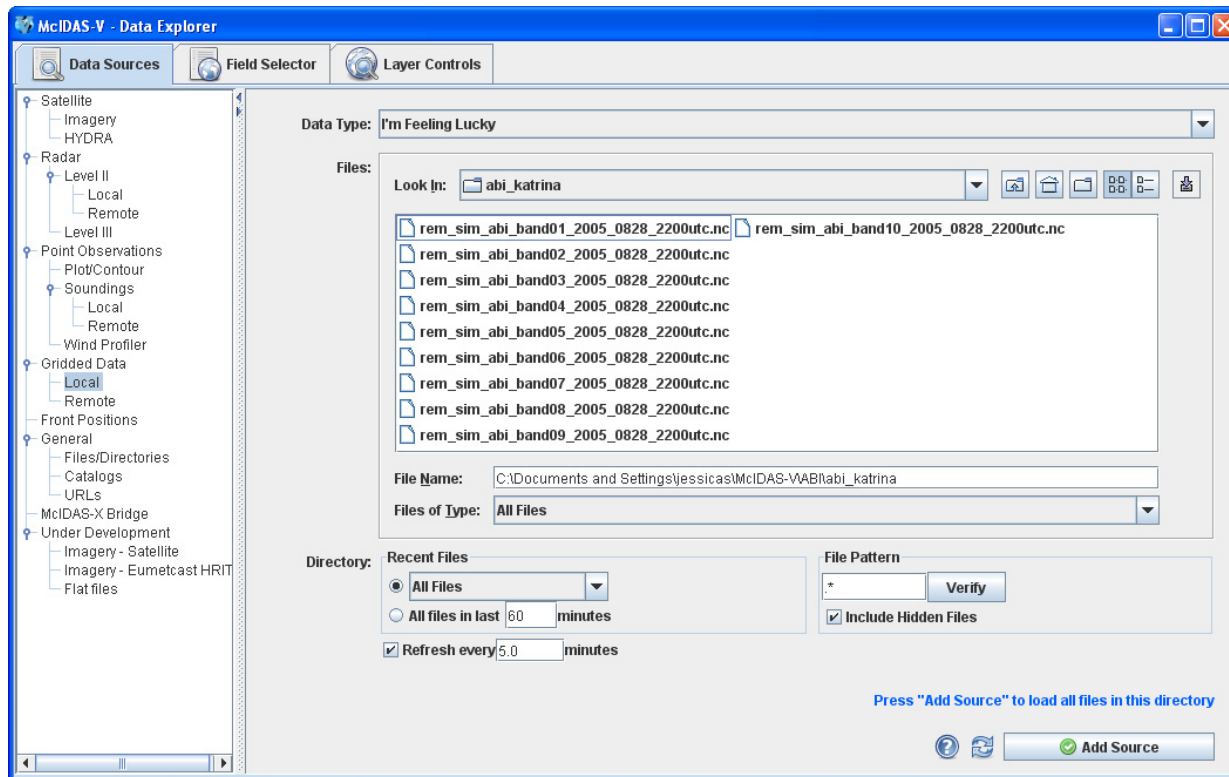
1. The second bundle, **Katrina.mcvz**, shows Hurricane Katrina on August 28<sup>th</sup>, 2005 at 2200 UTC. Before loading the new bundle, remove all layers and data sources to free up enough memory for the new bundle. To do this, select *Edit ->Remove ->All Layers and Data Sources*. You may then load the new bundle using the same procedure as before. You may need to increase the **Main Display** window size to see all of the text labels correctly.

2. When the bundle loads, 10 simulated ABI bands are displayed. To loop through the bands, select *View ->Displays ->Visibility Animation ->On*. This will loop through all of the layers in the **Legend** that are marked with the  Visibility Toggle Lock in the unlocked position. To exclude a layer from the animation, click the Visibility Toggle Lock to “lock” the current visibility of the layer and not change it during the animation. A scatter analyses can also be done in a similar manner with this bundle as demonstrated above.

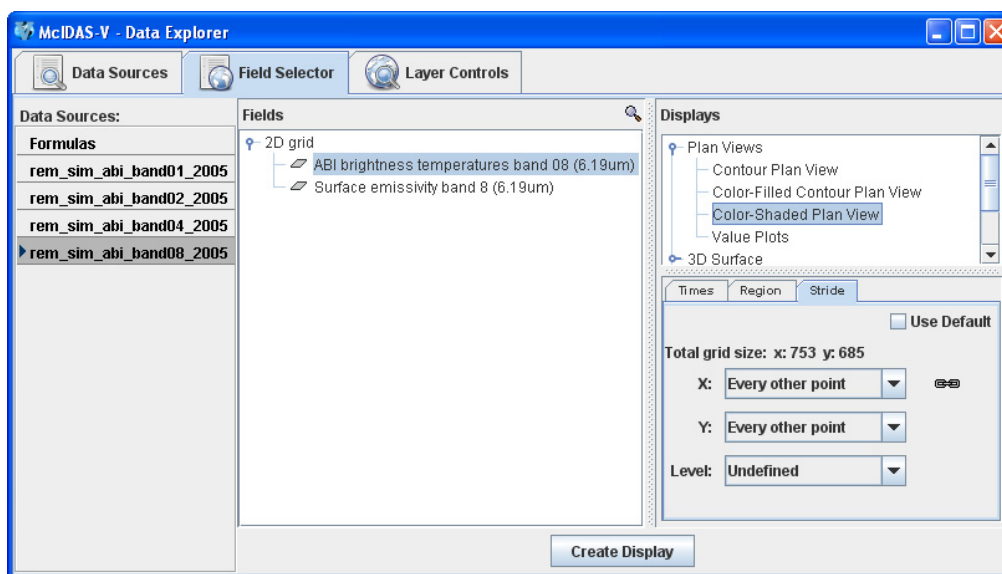


## Load Local Simulated ABI netCDF files

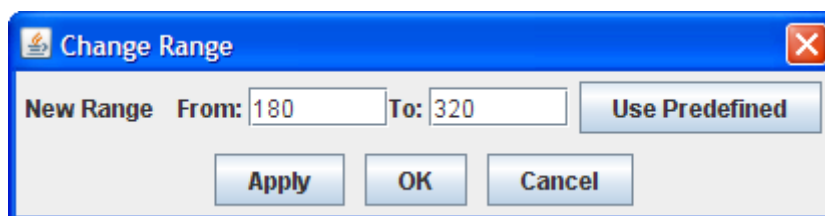
1. In the **Data Explorer** window, click on **Data Sources**, and select on **General -> Files/Directories**. Locate and select (highlight) the netCDF file(s) you want to display in McIDAS-V by using the drop down arrow found on the right side of the “**Look in**” label. Click **Add Source**.



2. In the **Field Selector** tab (if needed), select a file in the left panel, the Field to be displayed in the center panel, and **Color-Shaded Plan View** in the upper-right panel. To display only a certain region of the data, click **Region**, unselect **Use Default**, and **left click + drag** over the region you want to select. To reduce the data points to display, click on **Stride**, unselect **Use Default**, click on the drop down arrow by **X:**, and select **every other point**. Do the same for the **Y:** and click **Create Display**.



3. To adjust the data range, right click on the color bar in the **Legend**, and select *Change Range*. A new window called **Change Range** will pop up where you can set your new ranges (for example, 0 to 1 for the reflective bands or 180 to 320 for the IR Bands, 7-10) . Enter the new range and click **OK**.



4. To adjust the color enhancement, right click on the color bar in the **Legend**, and select *Basic -> Gray Scale* for visible and near-IR bands (1-6) and *Basic -> default* for the infrared (IR) bands.