Task Menu

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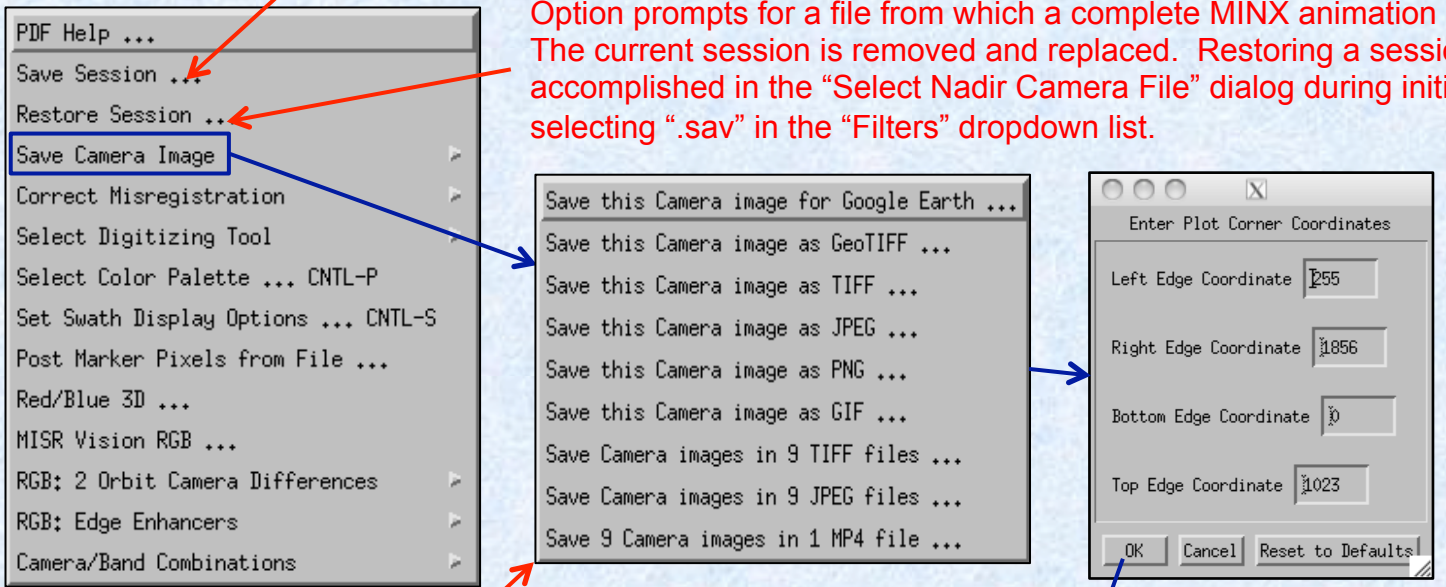
Save/Restore Session & Save Image to File

Option prompts for a file name into which a complete MINX animation session (images, digitizing, markers, settings etc.) is saved. Saved session files must have an extension of .sav. Saving and restoring a session can be slow.

Option prompts for a file from which a complete MINX animation session is restored. The current session is removed and replaced. Restoring a session can also be accomplished in the "Select Nadir Camera File" dialog during initial orbit loading by selecting ".sav" in the "Filters" dropdown list.



- **Specify the edge pixel coordinates of a region in the animation window that you want to capture and save in a graphics file.**

Select 1 of 9 image formats into which the selected region of the image window is to be saved (saving to MP4 requires an IDL license).

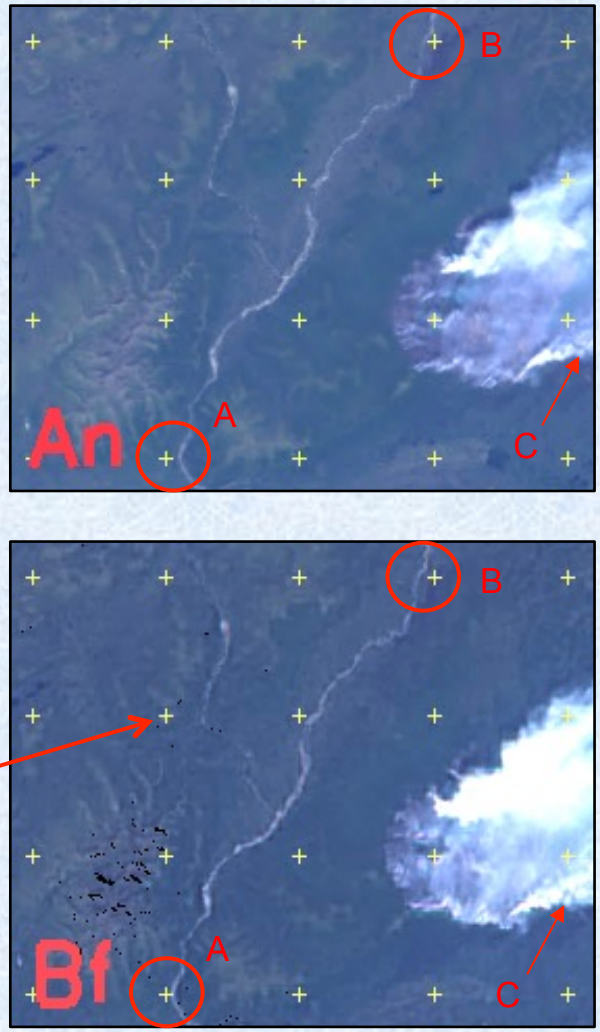
Dashed outline of region to save is drawn on the image. User is given a chance to change the region before being asked for a file name into which the image will be saved.

- **To find edge coordinates, click in the animation window, read values from the "Pixel x/y:" box at the bottom of the animation window, and test until desired values are found.**
- **All PNG images have transparent edges.**
- **Google Earth images are projected into a geographic coordinate system.**
- **GeoTiff images are projected into the UTM map coordinate system.**

Camera Registration Correction - 1

The purpose of correcting camera registration is to improve stereo height retrieval accuracy by reducing errors in camera-to-camera geometric registration before image matching is performed.

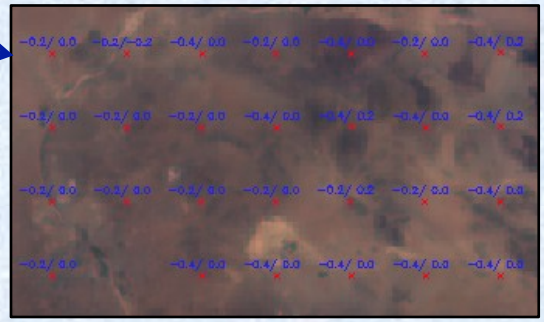
- A 1 pixel registration error can lead to a height error of ~ 550 m for Af/Aa cams and ~ 150 m for Cf/Ca.
- Mean co-registration error of MISR data < 1 pixel.
- However, one or more cameras on some orbits are misregistered by more than 2 pixels.
- Co-registration errors are evaluated on a regular grid of control points over the entire image using image-matching with An as the reference camera.
- To assess misregistration:
  - ① Turn on MINX "Fixed Grid" (yellow + symbols).
  - ② Animate cameras.
  - ③ Study distinctive terrain features near yellow grid points (circles A and B). In this example, the Bf image is displaced left relative to An by ~3 pixels.
  - ④ Do not compare features in clouds or plumes (C) which are expected to be offset by parallax or wind.

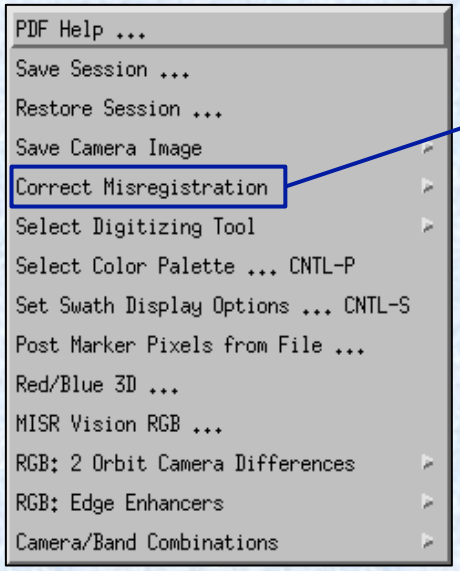


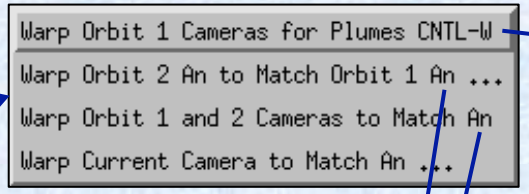
Bf camera is mis-registered by -3 across-track pixels relative to An

Camera Registration Correction - 2

- It is generally wise to perform a registration correction on every orbit for which you intend to perform a height retrieval. On some orbits a second pass of correction will improve results further.
- Correcting misregistration involves an automatic assessment of the position of terrain features on off-nadir cameras relative to the An camera. The assessment is performed on a grid of points over the entire image. The off-nadir camera image is then warped to match the An camera. Warping corrections at grid points are then shown as fractional 275 m pixels for across/along directions over the camera image.
- You will be asked to select a MISR AGP file (Ancillary Geographic containing DEM terrain heights) before correction begins.
- Warping corrections are conservative and do not correct for rapid variations caused by DEM inaccuracies.

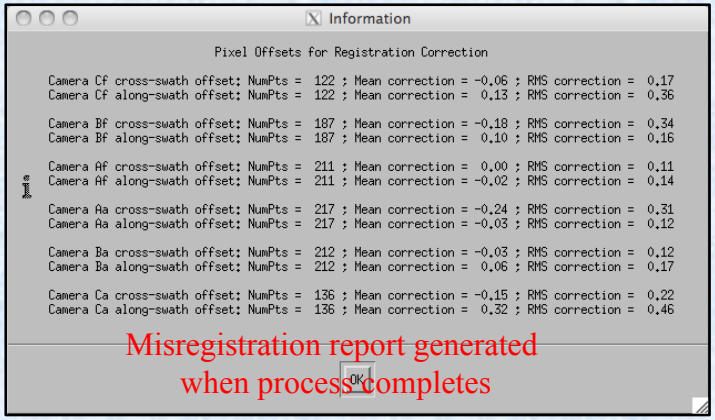






Use this for routine misregistration correction during plume height analysis.
Note – this option has a keyboard shortcut.

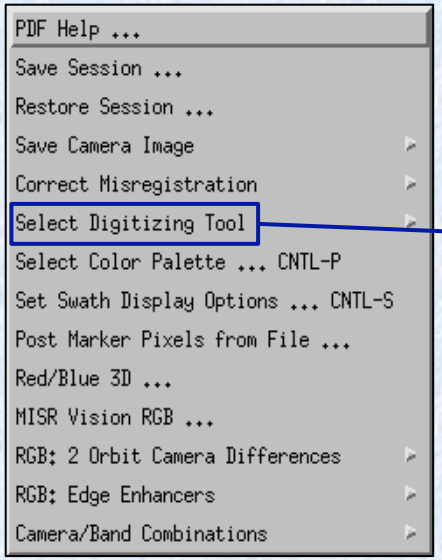
If you loaded 2 orbits and wish to correct the 2nd orbit to match the 1st, first correct the orbit 2 An camera relative to the orbit 1 An camera, then correct the non-nadir cameras to match their respective An cameras.



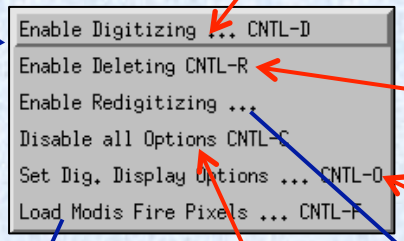
Misregistration report generated when process completes

Digitizing Tools

- **The "Select Digitizing Tool" option contains most of the features required for digitizing aerosol plumes and determining their height and motion.**



"Enable Digitizing", opens a dialog box containing numerous options and is the subject of an entire PDF Help file accessed from that dialog box. It also puts MINX into a state where mouse clicks are interpreted as digitizing commands until a different state is selected. **Note keyboard shortcut.** See slides in section on Digitizing Options for details.

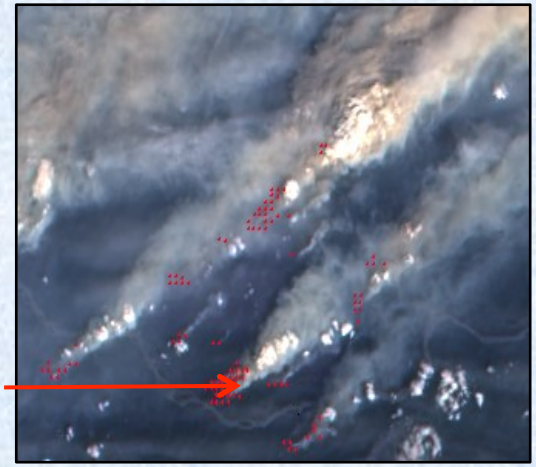


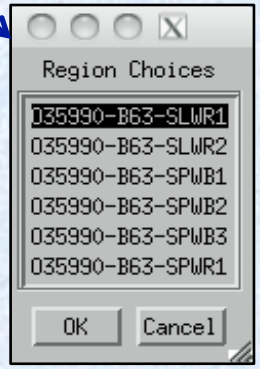
The "Delete Objects" option puts MINX in a state where clicking the mouse on a digitized feature identifies it for deletion. Then, if you agree to continue with deletion, the digitized feature is removed from the screen, from MINX memory and from files on disk. **Note keyboard shortcut**.

"Set Dig. Display Options" enables you to change the type of data displayed inside digitized polygons, the color bar scale and other parameters. **Note keyboard shortcut.** See a following slide for details.

"Disable Digitizing" cancels either the "Enable Digitizing" or "Delete Objects" states. **Note keyboard shortcut.**

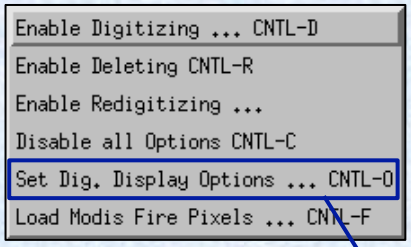
- **The "Load MODIS Fire Pixels" option prompts you for the fire pixel file to load.** ***Note keyboard shortcut.***
- **MODIS thermal anomalies or fire pixels can be generated in a MINX format file using "Plume Utilities" options on the MINX Main Menu.**
- **Fire pixels are displayed as red dots over MISR imagery and carry with them the per-pixel fire radiative power (FRP).**





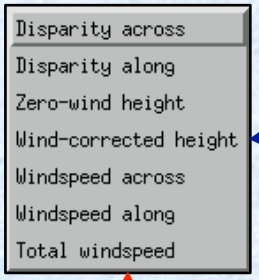
- **If you exit MINX after digitizing plumes but later want to redigitize one or more of them, use the "Redigitize Objects" option and choose the plume name from the list that's presented. This prevents MINX from over-writing the incorrect file on disk.**
- **Plume names contain a reference to the MISR orbit and block and a plume number incrementing from 1 to N within each block.**

Data Overlay Options

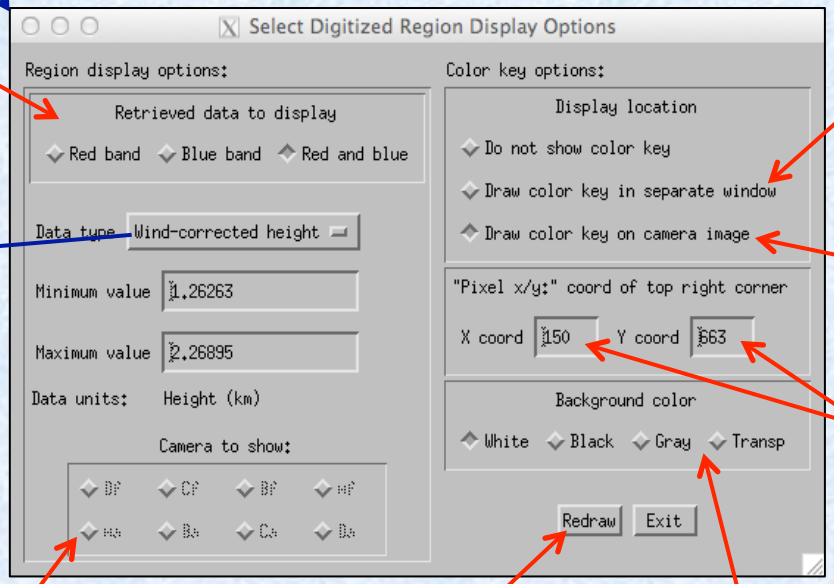


- **This option allows you to select the type of colored pixel data to show inside digitized polygons (e.g. plumes) on the animation window, to scale the colors and to display a color key.** ***Note the keyboard shortcut.***
- **If several digitized plumes are present in the animation window, all are rescaled using the same minimum and maximum scale values you specify.**
- **When a new plume polygon or line is digitized, MINX automatically sets the "Data Type" to "Zero-wind height" or "Wind-corrected height" as appropriate and rescales the colors so they are also appropriate for that plume. This is so the automatically captured and saved screen images of the current plume are presentable.**

If both red and blue bands were used to retrieve heights, you can choose which to display in the animation window.



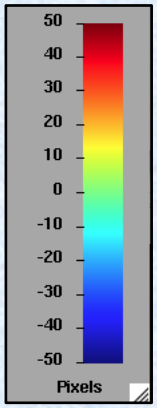
The type of data chosen in this listbox determines what appears inside digitized polygons as well as the units shown at the bottom of the color key.



For routine use, draw the color key in a separate window for convenience.

If you're saving an image for presentation, you can overlay the color key on the image so it will be captured. This button enables entering data in the X/Y coordinate boxes below it.

Use Pixel x/y: coordinates at the bottom of the animation window to set the location for the upper right corner of color key if drawn on the image.



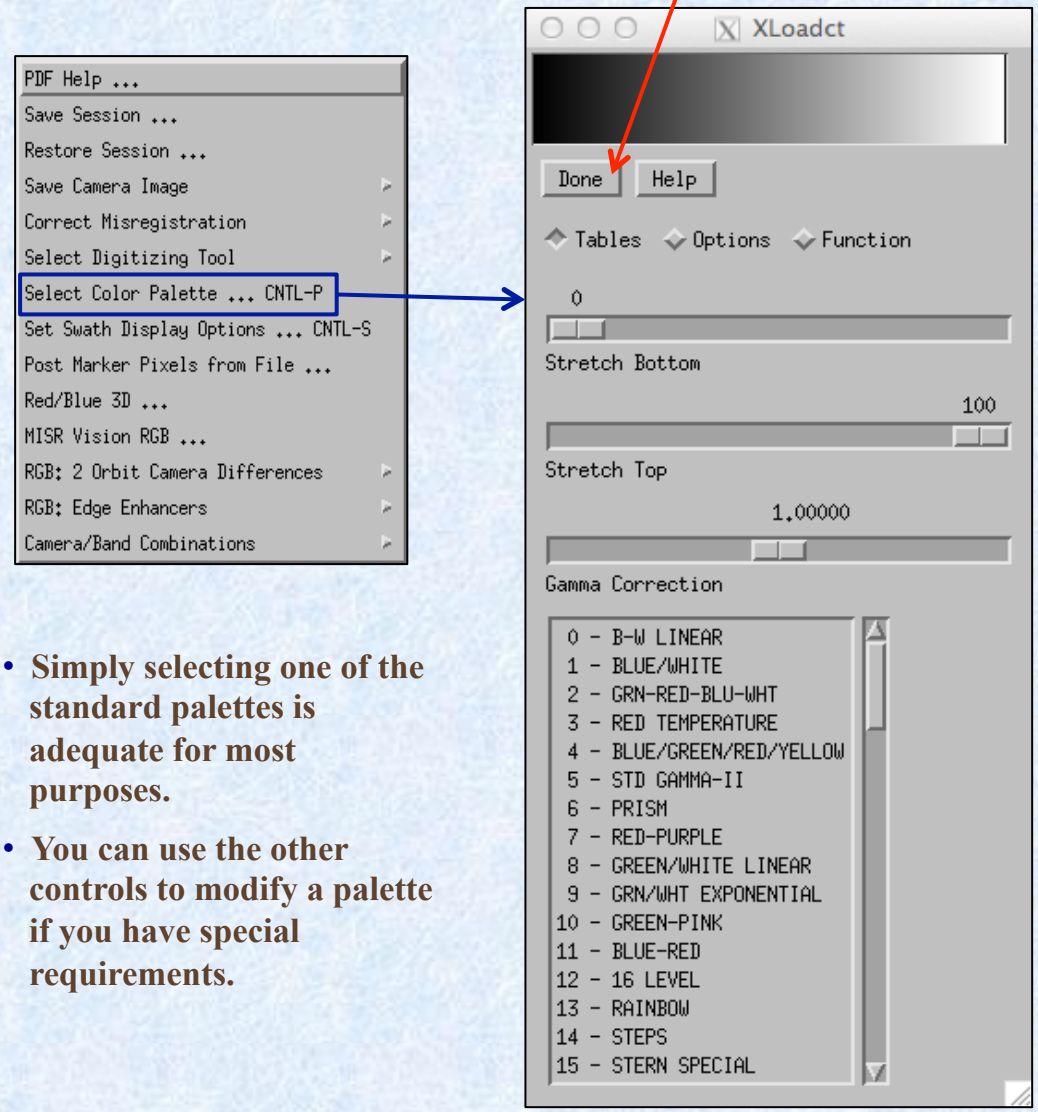
After changing any parameter, click "Redraw" to redraw window.

The background color can be chosen for the color key. Gray is shown in the example at right.

Choosing "Disparity across" or "Disparity along" enables these camera buttons. Disparity is the offset in pixels between a feature in the chosen camera and the An camera.

Select Color Palette

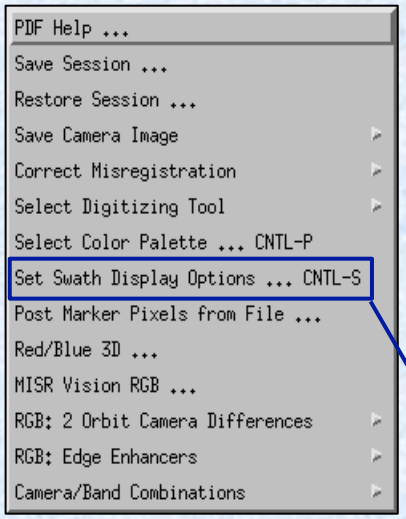
When finished, click the "Done" button and redraw your image.



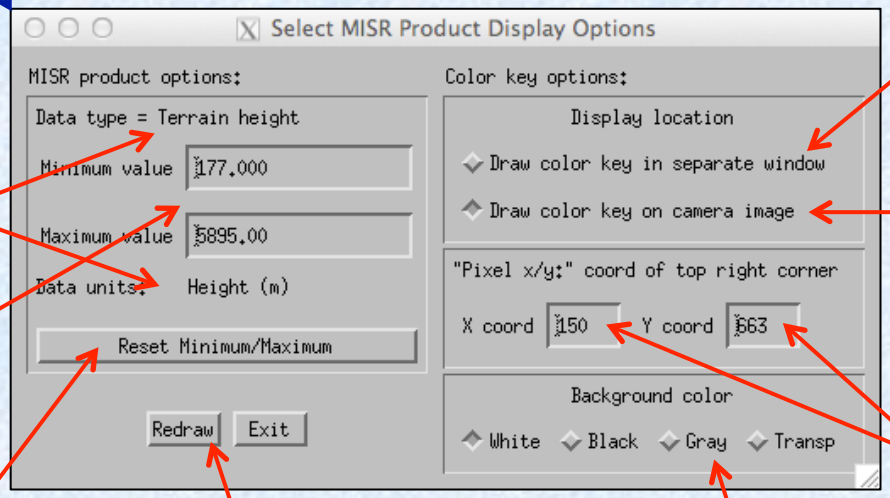
- Simply selecting one of the standard palettes is adequate for most purposes.
- You can use the other controls to modify a palette if you have special requirements.

- "Select Color Palette" lets you select and/or modify a color palette from the IDL standard set that will be used to draw all polygon color fill for digitized plume regions as well as for all MISR product swath images selected from the "Data Menu" on the animation window. *Note the keyboard shortcut.*
- Colors that define the MISR camera BRF images are not affected – their pixels are colored by directly scaling their RGB data channels and mapping them into your display's RGB channels.
- A palette that highlights relevant features and that displays continuous color and intensity variation is often best to use. Good choices for this purpose, where darker colors are at the low end, are palettes numbered 0, 1, 3, 7, 8, 9, 19 and 21. For palettes where brighter colors are at the low end, you can use numbers 20, 22 and 49-65.

Swath Display Options



- **This option allows you to select parameters that modify the display of MISR standard product data fields in the animation window, e.g. rescaling the colors, displaying a color key, etc. *Note the keyboard shortcut.***
- **The dialog parameters pertain to the currently selected MISR data type that was selected from the "Data Menu" button.**
- **When a new MISR data type is selected, the dialog will disappear, so you'll need to load it again for the new data, either from the Task Menu of by using the keyboard shortcut.**



The current data type and its units are displayed.

You can reset the minimum and maximum values for the current data type in these edit boxes. They will take effect when you depress the redraw button.

Click reset to restore the actual minimum and maximum values of the data in the edit boxes.

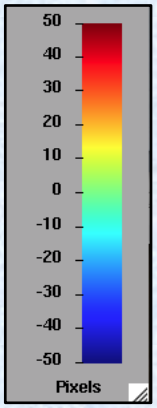
The "Redraw" button should be pressed to update the display state for any changes that were made, as well as to duplicate the functionality of the "Press and Hold" button on the animation window.

The background color can be chosen for the color bar. Gray is shown in the example at right.

For routine use, draw the color key in a separate window for convenience.

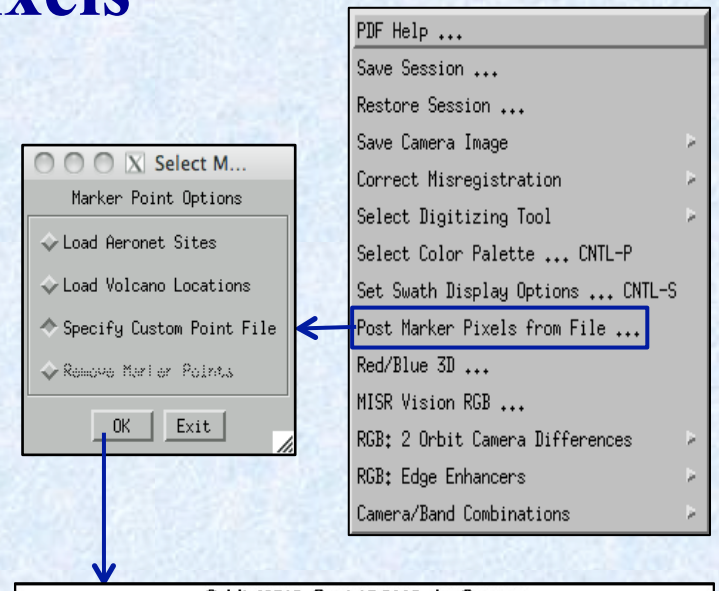
If you're saving an image for presentation, you can overlay the color key on the image so it will be captured. This button enables entering data in the X/Y coordinate boxes below it.

Use Pixel x/y: coordinates at the bottom of the animation window to set the location for the upper right corner of color key if it's drawn on the image.



Post Marker Pixels

- **Marker points form symbols and lines that can be drawn over an image at precise geographic locations. They can be assigned symbol types, colors and names.**
- **Two classes of marker points are hard-wired into MINX: volcanos are displayed in green with a "+" symbol, the volcano name and its summit elevation; Aeronet sun photometer sites are shown in cyan with an "x" symbol, the site name and its elevation.**
- **A third class of marker point is user-defined and can be displayed as lines as well as points. These markers are read from a user-created text file whose format is described below, and for which you are prompted.**
- **Any one of these types of markers can be displayed at a time. To display another type, you must first remove any existing marker points using the "Remove Marker Points" option.**



File Format

1) Line 1 – an arbitrary, descriptive text string.
2) Line 2 – the number of points and/or lines in the file to follow.
3) Line 3 – four items describing this marker in this order: number of points; symbol name; color name; and marker name (spaces OK).
4) Line 4 to N – decimal longitude and latitude, one point in item's list per line.
5) Repeat 3) and 4) as required by line 2.

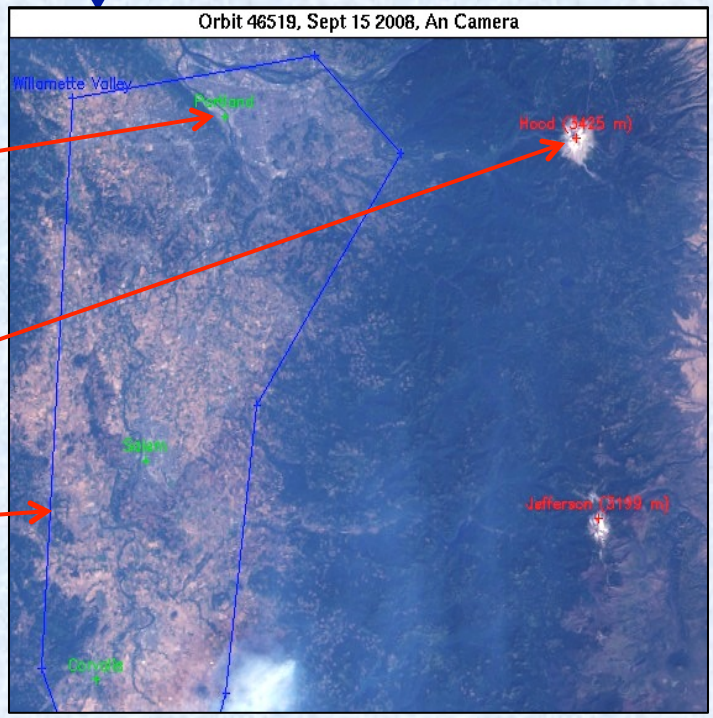
Valid Names

Symbols: +, ×, *, square, triangle, diamond

Colors: red, green, magenta, blue, yellow, aqua, white, pink, lt_blue, lt_green, gray, blue2, purple, brown, black

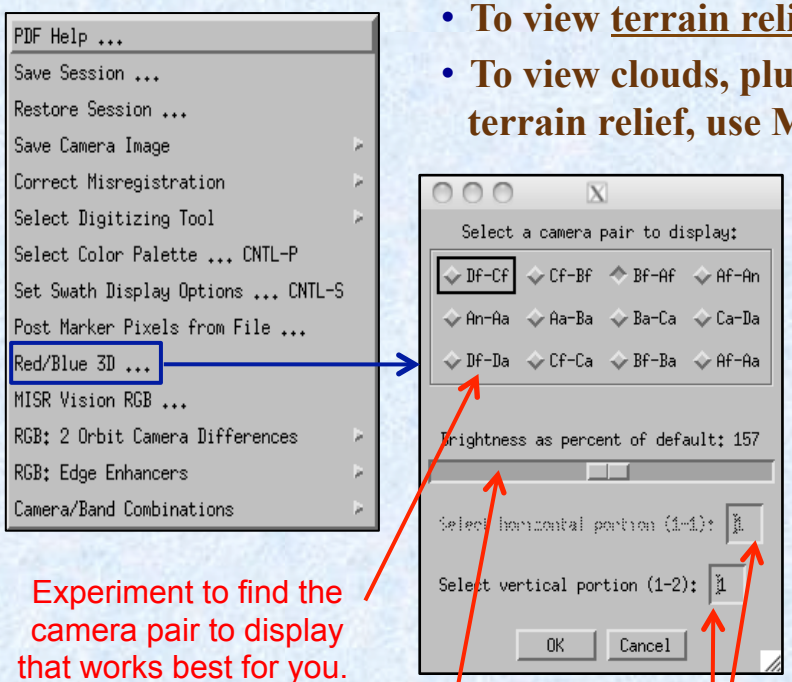
File that created markers on image of NW Oregon, USA

```
Example of custom marker file.
9
1 + green Portland
   -122.677    45.522
1 X green Salem
   -123.033    44.938
1 + green Corvalis
   -123.254    44.563
1 + green Eugene
   -123.085    44.050
1 + green Bend
   -121.310    44.052
1 + red Hood (3425 m)
   -121.70     45.37
1 + red Jefferson (3199 m)
   -121.80     44.69
1 + red South Sister (3157 m)
   -121.77     44.11
8 + blue Willamette Valley
  -123.1       45.6
  -123.4       44.6
  -123.2       44.0
  -122.9       44.5
  -122.7       45.0
  -122.2       45.4
  -122.4       45.6
  -123.1       45.6
```



Red/Blue 3D Images

- MISR images can be displayed in the OP window and viewed in 3D with special red/blue glasses.
- Images are rotated 90 degrees counterclockwise so they can be viewed on the screen.

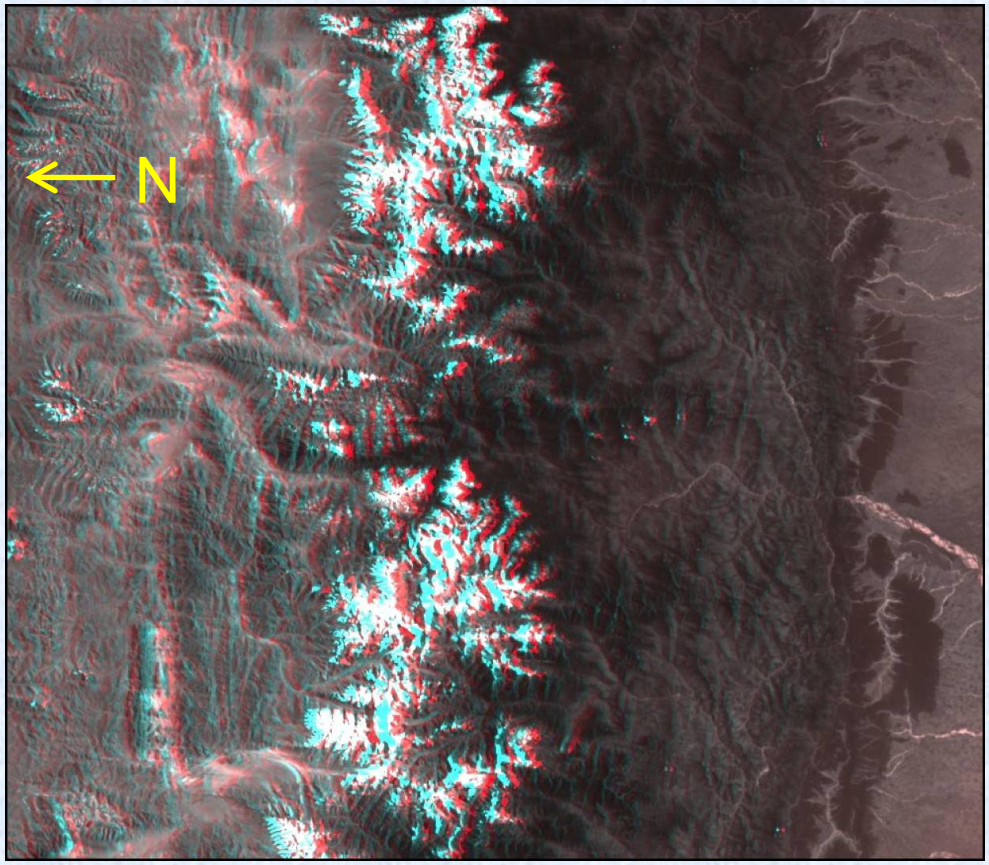


- To view <u>terrain relief</u> in 3D, you must load MISR GRP_ELLIPSOID products.
- To view clouds, plumes and other above-terrain features in 3D without any 3D terrain relief, use MISR GRP_TERRAIN products.

Experiment to find the camera pair to display that works best for you.

Adjust image brightness with this slider.

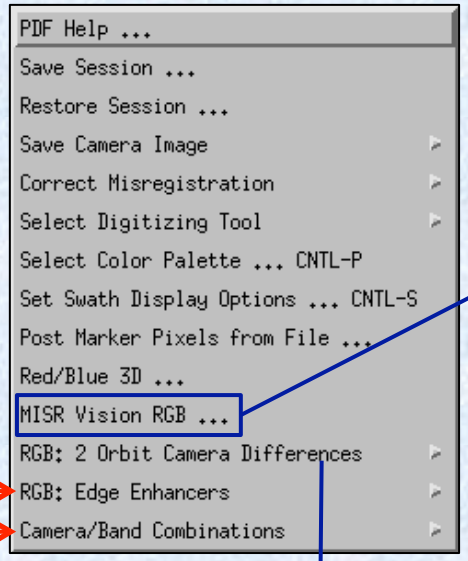
Because the image must be rotated 90 degrees, it may not fit in the OP window. If there are fewer than 4 blocks loaded, it will be too wide for the available vertical window size. If there are more than 4 blocks loaded, it will be too long for the available horizontal window size. Use these edit boxes to specify which portion of the image to display. Or better, load 4 blocks.

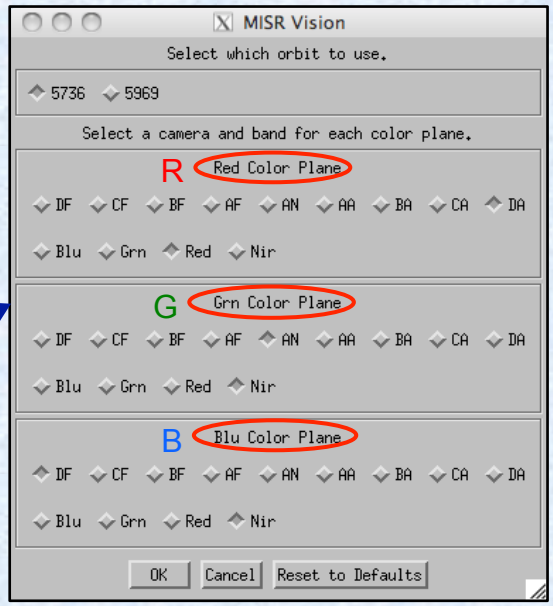


Nepalese Himalayas and Tibetan Plateau (reduced ~ 1.5X)

MISR Vision & 2 Orbit Camera Differences

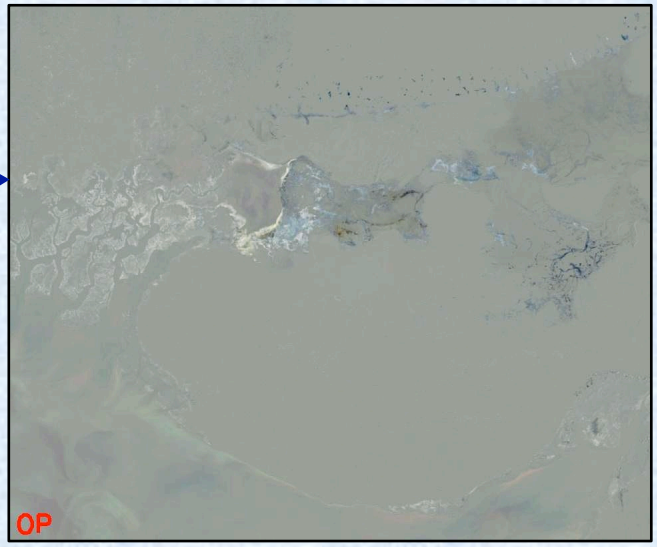
These create new images in the OP window and are not discussed further. Experiment freely.





- **This option differences the images for 2 orbits from the <u>same path</u> using the selected cameras and displays the results in the OP window.**

- **It is most useful to difference orbits in order to inspect changes in land surface.**

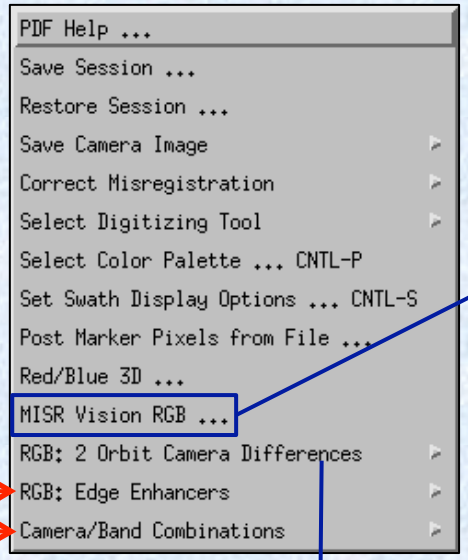


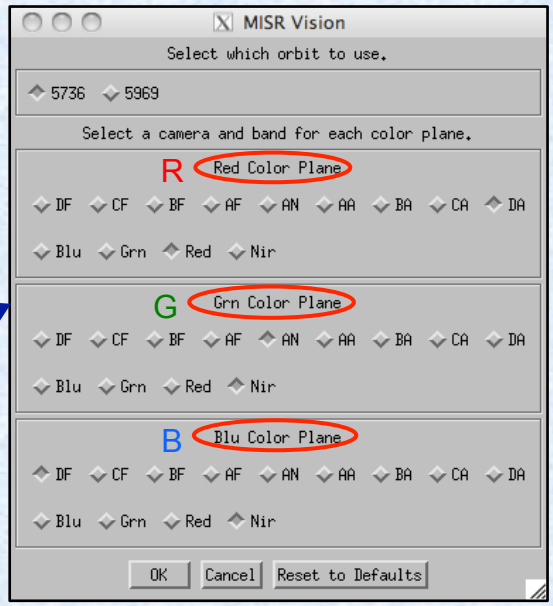
- **MISR Vision creates a new camera image in the OP window whose RGB components represent the selected MISR channels.**
- **This permits MINX to perform <u>multi-angle</u> compositing as well as <u>multi-spectral</u> compositing.**
- **The capability highlights features that are sensitive to view angle, such as rough ice vs. smooth ice or shallow surface water present before and after an earthquake (see next slide).**

This is the result of subtracting the Jan. 15 An camera image from the Jan. 31 An image for the same 2 Bhuj, India orbits shown in the next slide. It illustrates a 2nd method for highlighting the areas where water was expelled by the Bhuj earthquake.

MISR Vision & 2 Orbit Camera Differences

These create new images in the OP window. Experiment freely.





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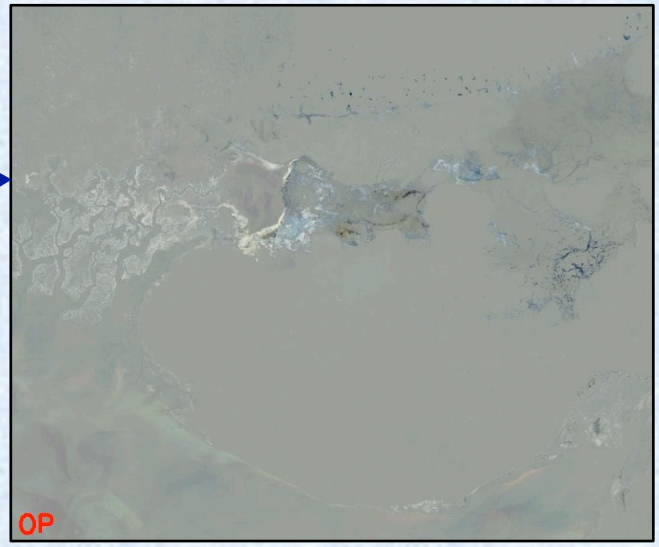

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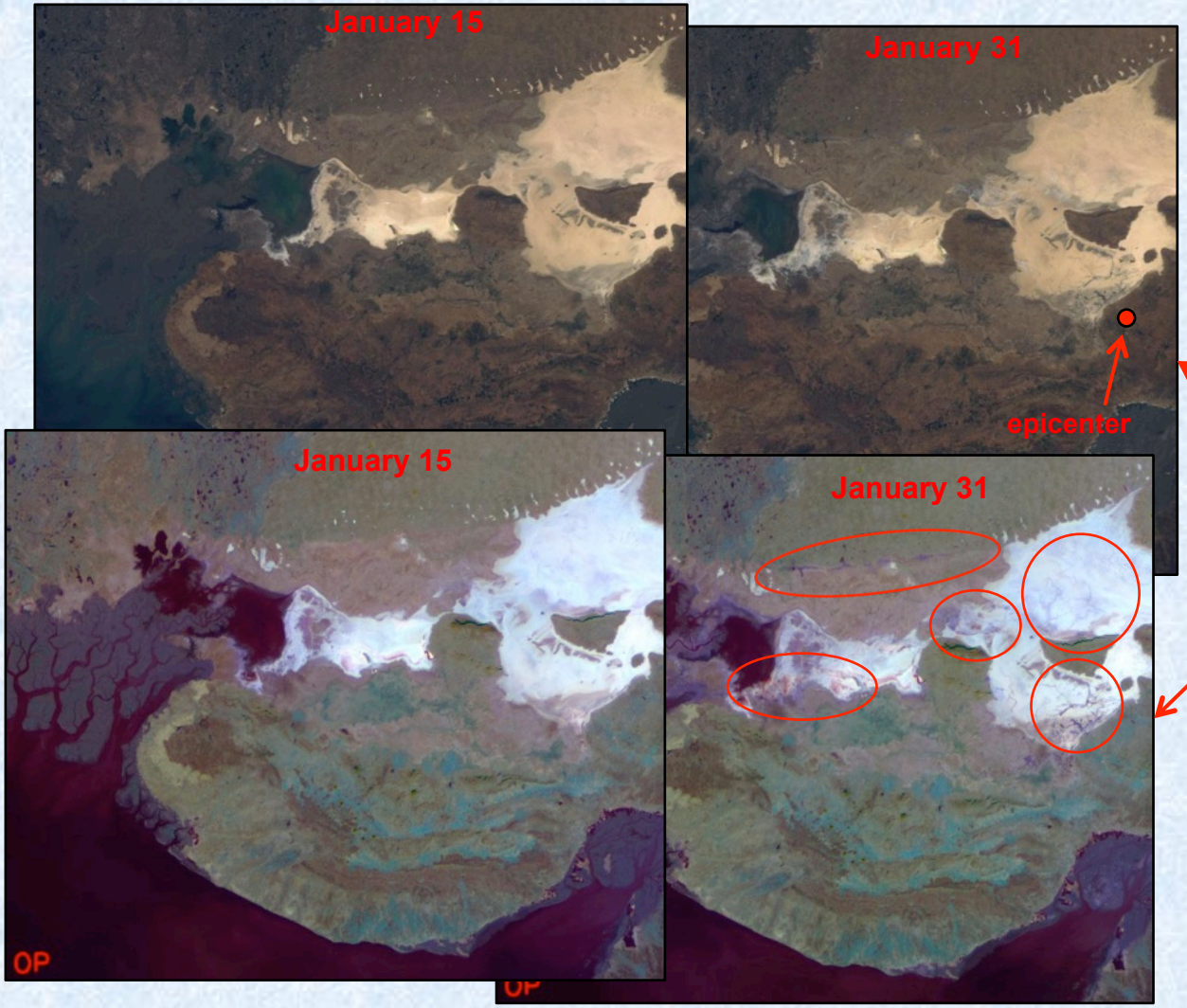
- **The capability highlights features that are sensitive to view angle, such as rough ice vs. smooth ice or shallow surface water present before and after an earthquake (see next slide).**

This is the result of subtracting the Jan. 15 An camera image from the Jan. 31 An image for the same 2 Bhuj, India orbits shown in the next slide. It illustrates a 2nd method for highlighting the areas where water was expelled by the Bhuj earthquake.

MISR Vision and Bhuj Earthquake Effects



- Before and after images of the area where, on January 26, 2001, a magnitude 7.7 earthquake struck in Gujarat Province of northwestern India.
- 20,000 people were killed and extensive damage was incurred.
- **Upper images**: Standard MISR RGB image (An camera) before (Jan 15) and after (Jan 31) the earthquake.
- **Lower images**: Shows same data but in **false color** with Df NIR in red color plane, An NIR in green plane and Da red in blue plane.
- Pink/purple areas show new areas of water and dendritic drainages where liquefaction forced water to the surface.

Based on B. Pinty et al, EOS, February, 2003