Animation Window

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Columbus Technologies and Services, Inc.
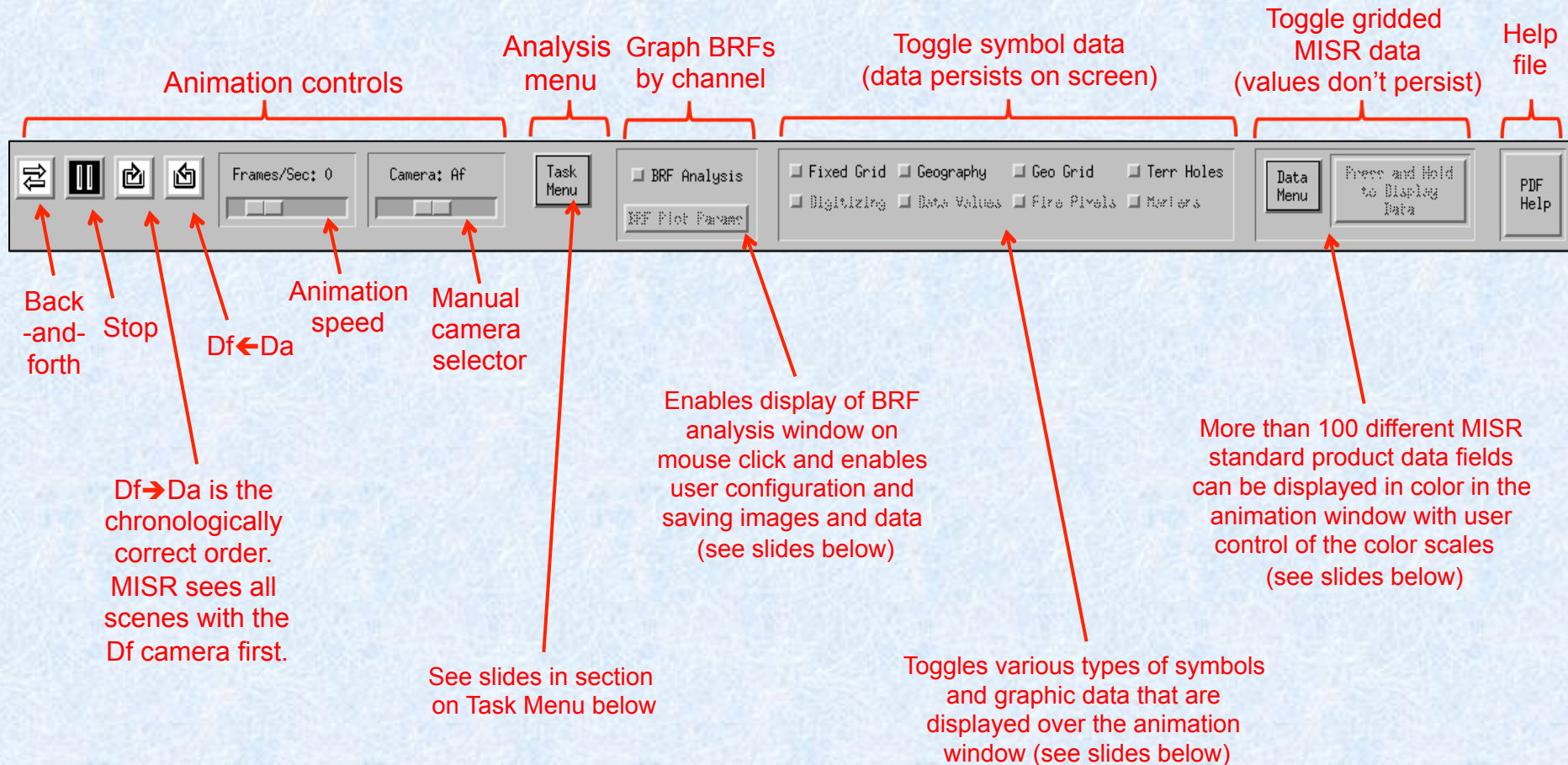**Raytheon Company**
Jet Propulsion Laboratory, NASA
California Institute of Technology

Upper Task Bar

Animation controls

Analysis menu

Graph BRFs by channel

Toggle symbol data (data persists on screen)

Toggle gridded MISR data (values don't persist)

Help file

| ⇄ | ▮▮ | ⬆ | ⬇ | Frames/Sec: 0 | Camera: Af | Task Menu | ☐ BRF Analysis BRF Plot Params | ☐ Fixed Grid ☐ Digitizing | ☐ Geography ☐ Data Values | ☐ Geo Grid ☐ Fire Pixels | ☐ Terr Holes ☐ Markers | Data Menu | Press and Hold to Display Data | PDF Help |

Back-and-forth

Stop

Df←Da

Animation speed

Manual camera selector

Df→Da is the chronologically correct order. MISR sees all scenes with the Df camera first.

See slides in section on Task Menu below

Enables display of BRF analysis window on mouse click and enables user configuration and saving images and data (see slides below)

Toggles various types of symbols and graphic data that are displayed over the animation window (see slides below)

More than 100 different MISR standard product data fields can be displayed in color in the animation window with user control of the color scales (see slides below)
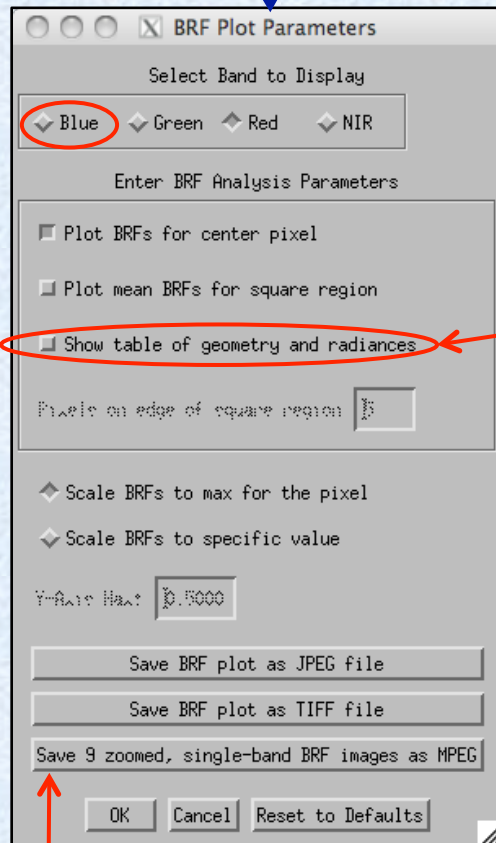
BRF Analysis

(Bidirectional Reflectance Factor)

When BRF Analysis button is checked and user clicks in the animation window, this plot and zoomed image are shown.

Zoomed image is scaled to data ranges in zoom window allowing subtle features, such as ship wakes at sea, to be seen.
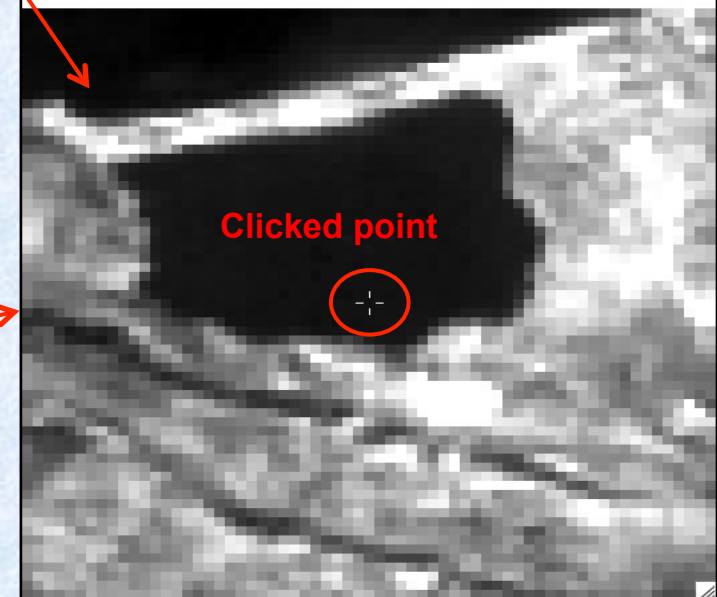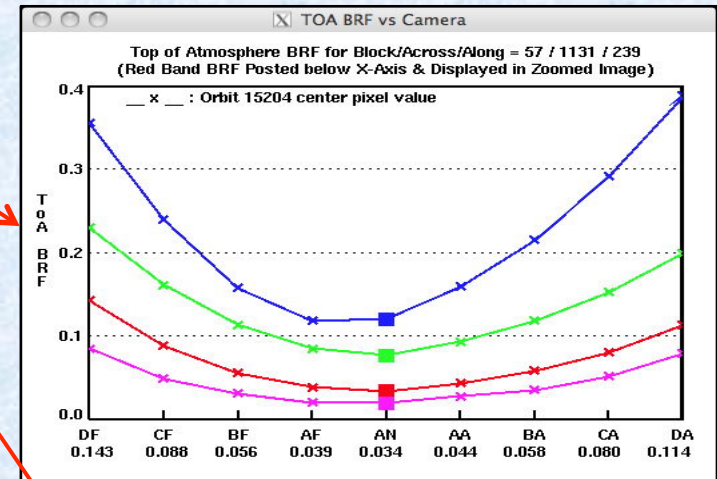
ASCII table of sun and camera angles and radiances, equivalent reflectances and BRFs for clicked point can be saved to file.

Top-of-Atmosphere BRF .vs. camera for clicked point (or mean for region)

Image of graph and zoomed window can be saved to file. IDL license is required for MPG.

Scene showing 64x64 pixel square centered on point clicked by user
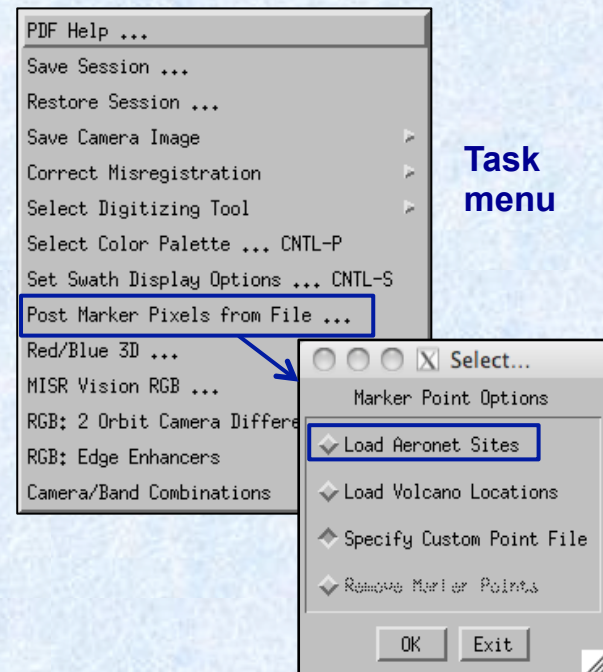
8x zoomed image of white square is displayed in band selected in dialog box

3

Toggle Symbol Data - 1
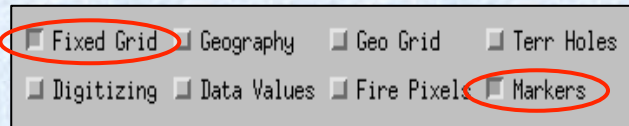
Fire scene SE of Los Angeles in 2007 showing yellow "Fixed Grid" '+' symbols and cyan "Markers" 'x' symbols that identify Aeronet sites.

Task menu

```
PDF Help ...
Save Session ...
Restore Session ...
Save Camera Image              ▷
Correct Misregistration        ▷
Select Digitizing Tool         ▷
Select Color Palette ... CNTL-P
Set Swath Display Options ... CNTL-S
Post Marker Pixels from File ...
Red/Blue 3D ...
MISR Vision RGB ...
RGB: 2 Orbit Camera Differe
RGB: Edge Enhancers
Camera/Band Combinations
```

```
○ ○ ○  X  Select...
        Marker Point Options
  ◇ Load Aeronet Sites
  ◇ Load Volcano Locations
  ◆ Specify Custom Point File
  ◇ Remove Marker Points
        [ OK ]   [ Exit ]
```

- **Symbols remain on screen until toggled off – they persist.**

- **Yellow "Fixed grid" points are stationary and uniformly spaced and are useful for judging relative motion during animation.**

- **"Markers" selected from the Task menu are read from files and include 3 options: 1195 Aeronet sites, 1543 volcanos or a user-defined list of points.**

Toggle Symbol Data - 2
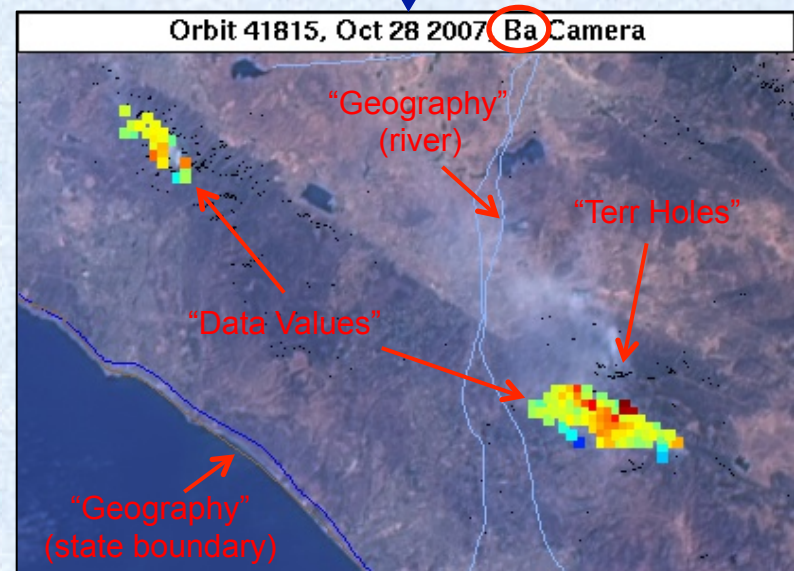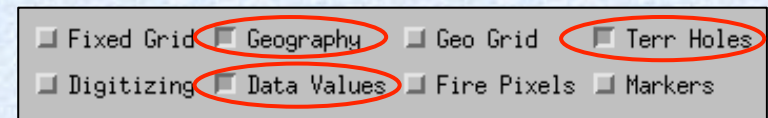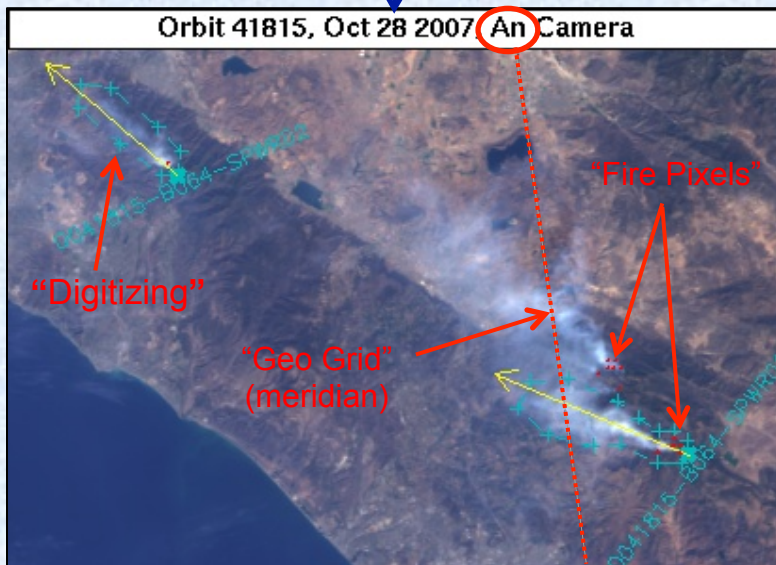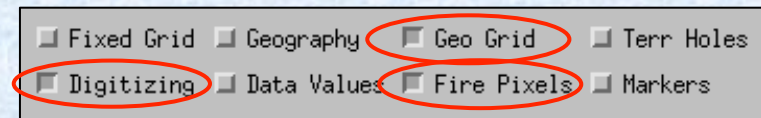
- **"Geography" includes IDL's database of country and state boundaries, coastlines, rivers, lakes etc.**
- **"Geo Grid" is a latitude-longitude grid that can be overlain on the image for location and NS reference .**
- **"Terrain Holes" refers to black, no-data areas seen only on oblique-looking cameras where the projection of level 1 Ellipsoid data to create Terrain data has hidden the surface behind steep terrain features like mountains.**
- **"Digitizing" symbols created by the user include outline of polygon, direction arrow and plume name.**
- **"Data Values" are posted after retrieval of heights inside the polygon digitized by user. Other data types and display options can be selected in the "Select Data Overlay Options…" dialog box in the Task Menu.**
- **"Fire Pixels" are generated from MODIS data using the "Plume Utilities" option on the MINX Main Menu.**
- **"Markers" (volcanos, Aeronet sites or custom markers) are loaded from the Task Menu.**

Data menu - Toggle Gridded Data

2-level dropdown list box

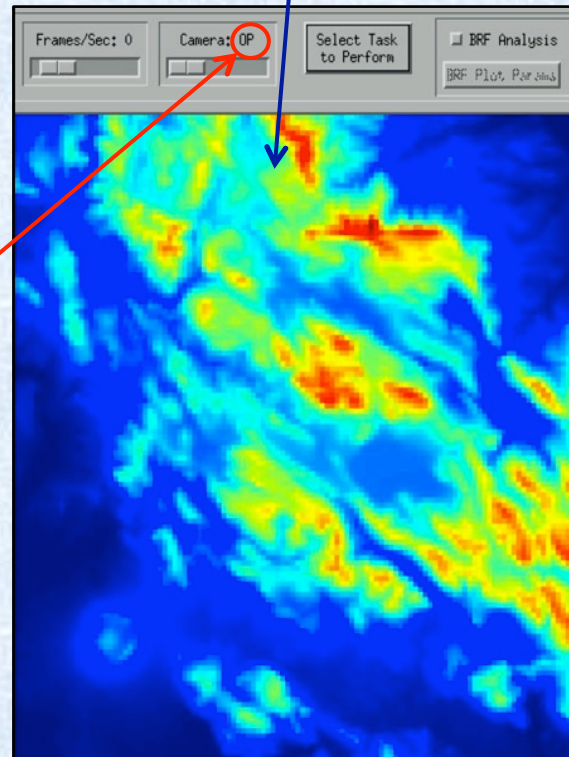**Dropdown list (Terrain height menu):**
- Terrain height
- Land-Water mask
- Biome class map
- Sun angles ►
- Camera zenith angle ►
- Camera azimuth angle ►
- Camera scatter angle ►
- Camera glitter angle ►
- Aerosol optical depth ►
- Aerosol SS albedo ►
- Aer: angstr exp best est ►
- Aer: angstr exp low resid ►
- Aerosol size fraction ►
- Aerosol shape fraction ►
- Land surface ►
- TC Stereo ►
- TC Cloud ►
- SVM Scene classifier ►
- TOA Local albedo ►
- TOA Restrictive albedo ►
- TOA Expansive albedo ►

Secondary dropdown:
- STER: Zero-wind hts
- STER: Wind-corr hts
- STER: Windspeed cross
- STER: Windspeed along
- STER: CloudMask

Controls:
- Data Menu
- Press and Hold to Display "Terrain height"
- Frames/Sec: 0
- Camera: OP
- Select Task to Perform
- ☐ BRF Analysis
- BRF Plot Params

When a data product is selected from the Data Menu list, the user is asked to select the file containing the chosen MISR gridded data if not already loaded.

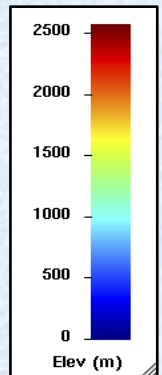Toggle button for displaying data. Text changes to reflect the data type selected in the dropdown list.

When "Press and Hold" is pressed:

- Data are copied into the OP window.
- The view switches to the OP window.
- A color bar is displayed either on the image or in a separate window and is updated if not already present and current.

When "Press and Hold" is released:

- The view switches back to the original window.
- Data remain in the OP window and are manually accessible with the "Camera:" slider .
- The color bar window remains until another operation is selected or it may be hidden behind another window.

Color bar: 2500, 2000, 1500, 1000, 500, 0 — Elev (m)

- **Gridded data refers to MISR standard data products that are pixelated to cover most of the area of the animation window.**

- **Gridded data are shown in an "extra", zero[th] camera window called OP (for OPerations) located on the far left end of the "Camera:" slider control.**

- **By rapidly pressing and releasing the "Press and Hold" button, a visual correlation between gridded data and MISR level 1 BRF data can be made.**

Portion of animation window showing color-coded terrain heights displayed while "Press and Hold…" button is depressed

Color bar parameters can be modified from a dialog box as described in slides below in the section on the Task Menu

Lower Task Bar

Color controls

Coordinate display is updated whenever user clicks in the Animation window.
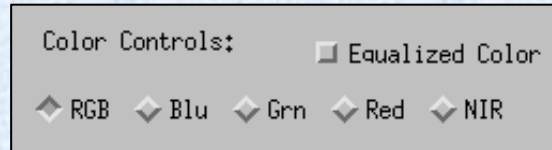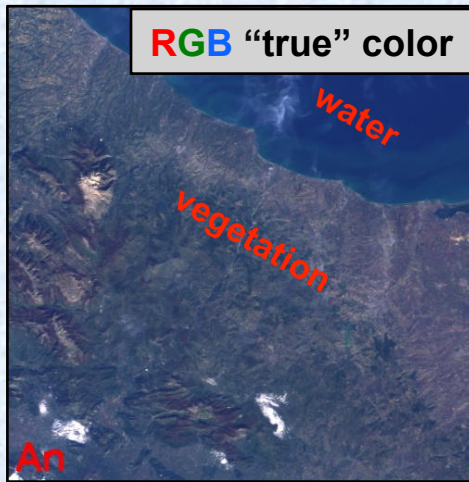

Besides the default RGB display, any band can be displayed alone in gray scale.

BRF values are shown for MISR's 4 bands: red, green, blue, NIR.

Clicking here returns user to the Animate cameras dialog to select another orbit.

- **"Equalized color" = OFF (default) maps radiance (BRF) data to a color scale for each of MISR's 36 channels based on that channel's range of values. This enables better feature discrimination.**

- **"Equalized color" = ON maps BRF data to a single color scale for all 36 channels. This allows the display of "truer" relative brightness between cameras. The difference between ON and OFF may vary widely between orbits, depending on their color content.**

- **"Brightness" and "Contrast" sliders provide a means to control the display's color quality.**

- **"Pixel x/y:" uses a single coordinate system for the entire animation window based on 275 m pixels with origin [0,0] at the <u>lower left</u> corner of the window. Use these coordinates to specify an image rectangle when saving images to file.**

- **"Block/Across/Along:" uses a separate coordinate system for each MISR block based on 275 m pixels with origin [0,0] at the <u>upper left</u> corner of each block. Coordinates at left and right image edges can range outside the normal values of 0 to 2047.**

Display Single Bands

RGB "true" color

water

vegetation

An

Color Controls: ☐ Equalized Color
◇ RGB   ◇ Blu   ◇ Grn   ◇ Red   ◇ NIR

NIR

An

- **Water absorbs NIR and Red light and reflects Blue and green.**
- **Vegetation absorbs Red light and reflects NIR and Green.**
- **Blue light is most strongly scattered by many aerosols.**
- **White features (clouds, snow, …) scatter all wavelengths equally.**

Blue

An

Green

An

Red

An