HYDRA

A Desktop Application for Remote Sensing Research and Education

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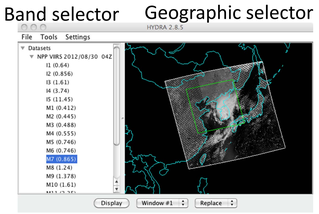
Examples from SSEC/CIMSS Remote Sensing Theory Bootcamp

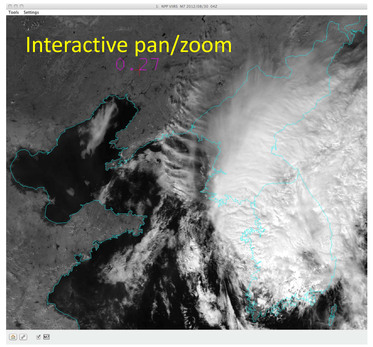
VIIRS and MODIS

Data Browser (Main Window)

Band selector Geographic selector



Consecutive granules can be opened together. User sees multiple files as one continuous granule.

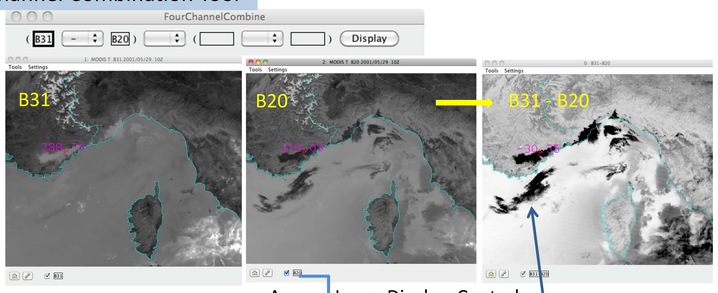


Works with:

- VIIRS, ATMS, CrIS SDR (SSEC PEATE and Direct Broadcast, CLASS)
- MODIS L1B 1km, hkm, qkm
- Selected MODIS L2 products
- IASI L1C (HDF5)
- AIRS L1B and Retrieval

Built-in support for HDF5/4, NetCDF3/4 but is extendable to other file formats and instruments.

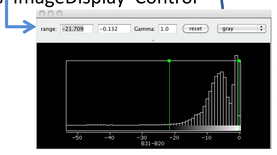
Channel Combination Tool



Use of channel combinations to emphasize unique channel attributes. Here, the reflected solar contribution to the MODIS 4µm (B20) from low, warm clouds (enhanced black).

Access ImageDisplay Control

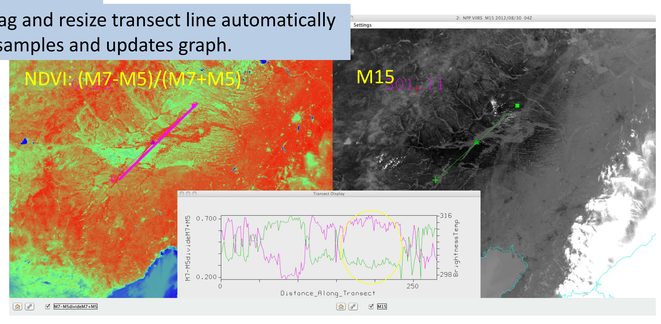
Window size, image display zoom and translation can be linked(default) or modified independently.



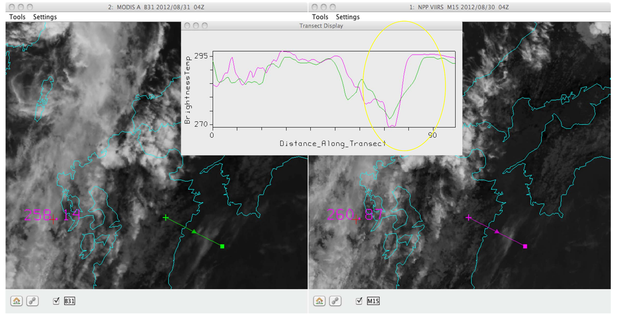
Controls the Data value to Color value mapping. Scene value histogram is provided for reference.

Transect Tool

Drag and resize transect line automatically resamples and updates graph.

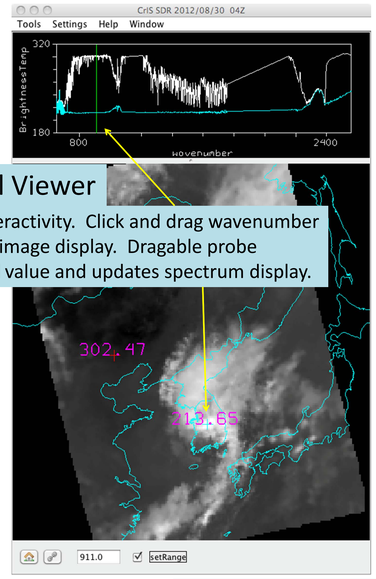


Surface cooling effect of vegetation shown by simultaneous interrogation of NDVI and M15 (11µm).



Now, use transect to interrogate MODIS (left) and VIIRS (right) simultaneously to examine spatial and spectral resolution differences. The analyst will note the steeper and deeper response of the VIIRS 11µm (magenta) channel across the coastline along the transect.

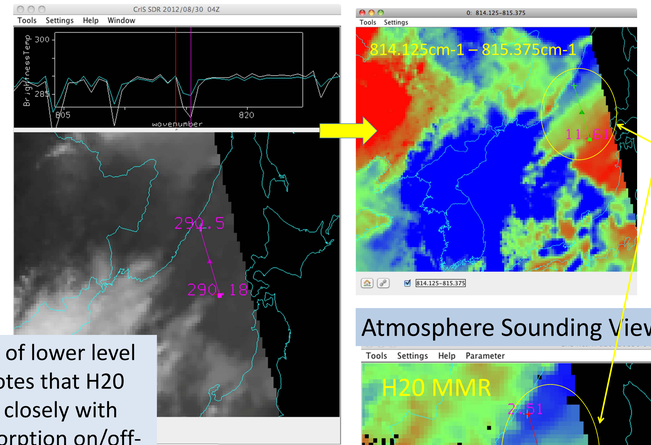
Hyperspectral (CrIS)



Single FOV Spectral brightness temperature signature comparison: Land, ocean, high thick cloud can be determined interactively. Analysts compare spectra at different FOVs and try to understand differences. For example, in the cyan spectrum, what is the bump in the ozone absorption region (over-shooting cloud top into the stratosphere).

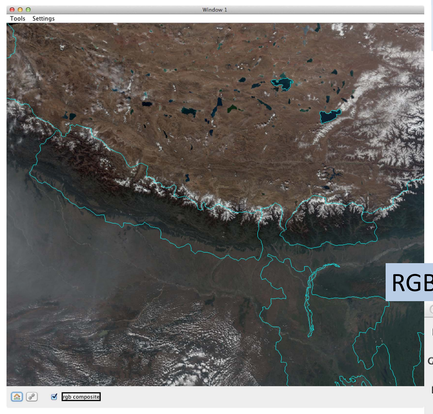
Zoom into individual aborption lines.

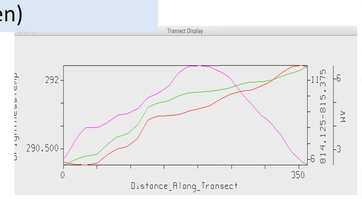
Online – Offline spectral difference image.



Images enhanced to highlight lower level moisture gradient

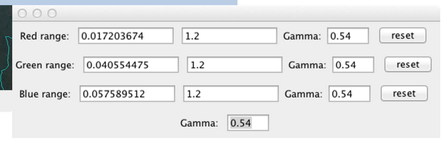
Transect over region of lower level moisture: analyst notes that H20 retrieval (red) tracks closely with the water vapor absorption on/off-line difference (green)





Atmosphere Sounding Viewer

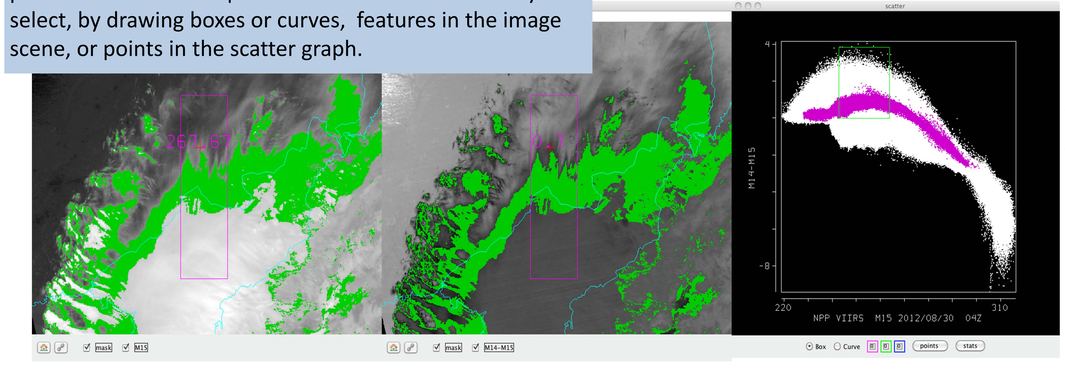
RGBComposite Tool



Controls the Data value to color value mapping for each color channel which can be non-linear via gamma on each channel between user defined range.

Scatter Analysis Tool

Scene analysis: analyze relationships between channels, psuedo-channels and products. User can interactively select, by drawing boxes or curves, features in the image scene, or points in the scatter graph.



Isolated thin cirrus can be discriminated by scatter of M15 vs M14-M15 (8.5µm – 11µm). Analyst sees the effect of absorption in the 8.5µm by ice crystals. The graph can be interrogated to explain the maximum.