



Visualizing new-generation geostationary satellite imagery with SIFT

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The Satellite Information Familiarization Tool (SIFT)

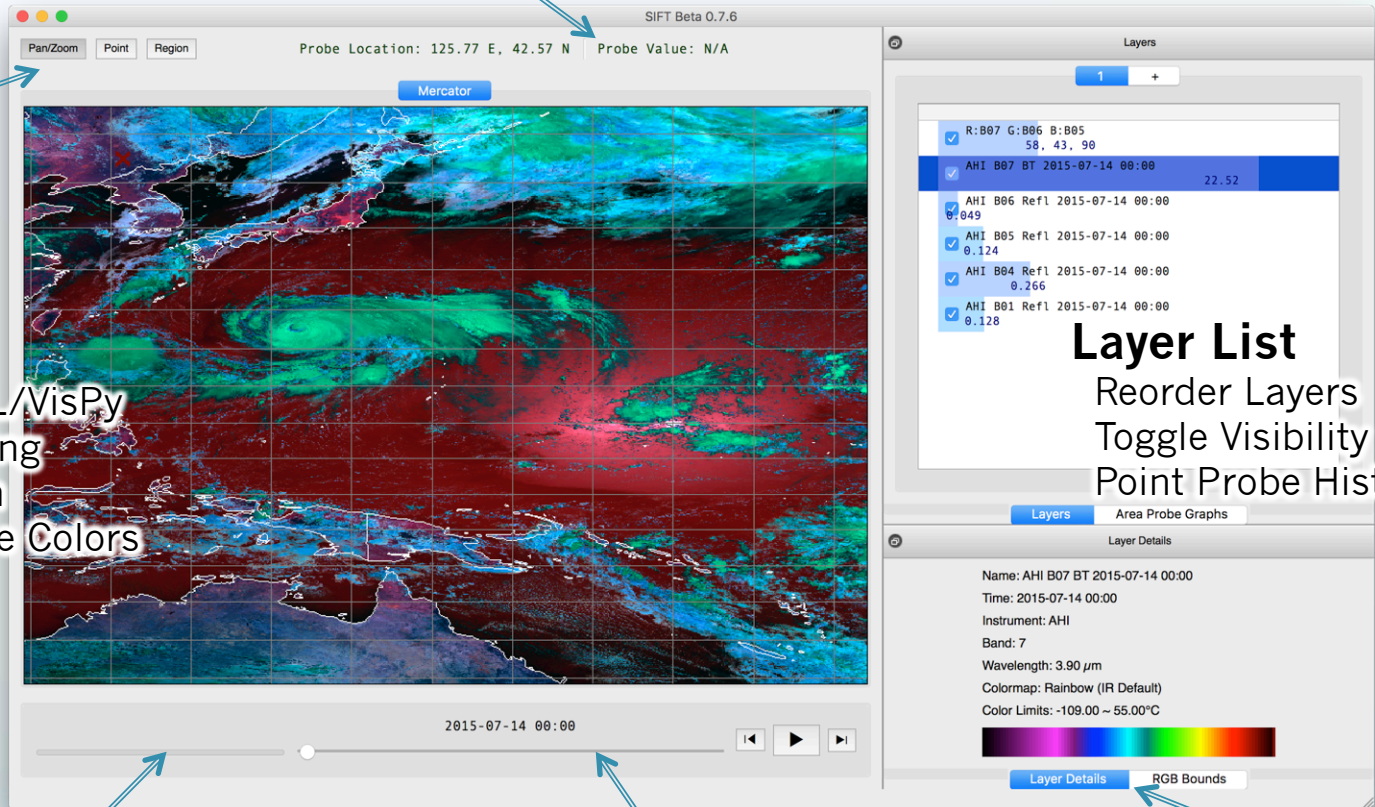
- Developed in Python using the PyQt Toolkit
- Cross-platform (Windows, Mac, and Linux) graphical user interface (no command line)
- Loads GeoTIFFs of archived Himawari-8 imagery stored locally (SSD recommended)
- Available to download for free (GPLv3 license)
- Development of the software and expansion of the capabilities is ongoing

Motivation for SIFT

- Basic, modern, and standalone software to display, loop, and allow for the manipulation of new-generation geostationary satellite imagery was not available
- The intended users are scientists, students, and operational meteorologists
- It is a tool for both training and discovery
- SIFT is part of the United States National Weather Service forecaster training program

SIFT Features and Functions

Point Probe Results



Tools

- Pan/Zoom
- Point Probe
- Area Selector

Map Display

- Powered by OpenGL/VisPy
- Panning and Zooming
- Dynamic Resolution
- Configurable Outline Colors

Layer List

- Reorder Layers
- Toggle Visibility
- Point Probe Histogram

Background Task Status

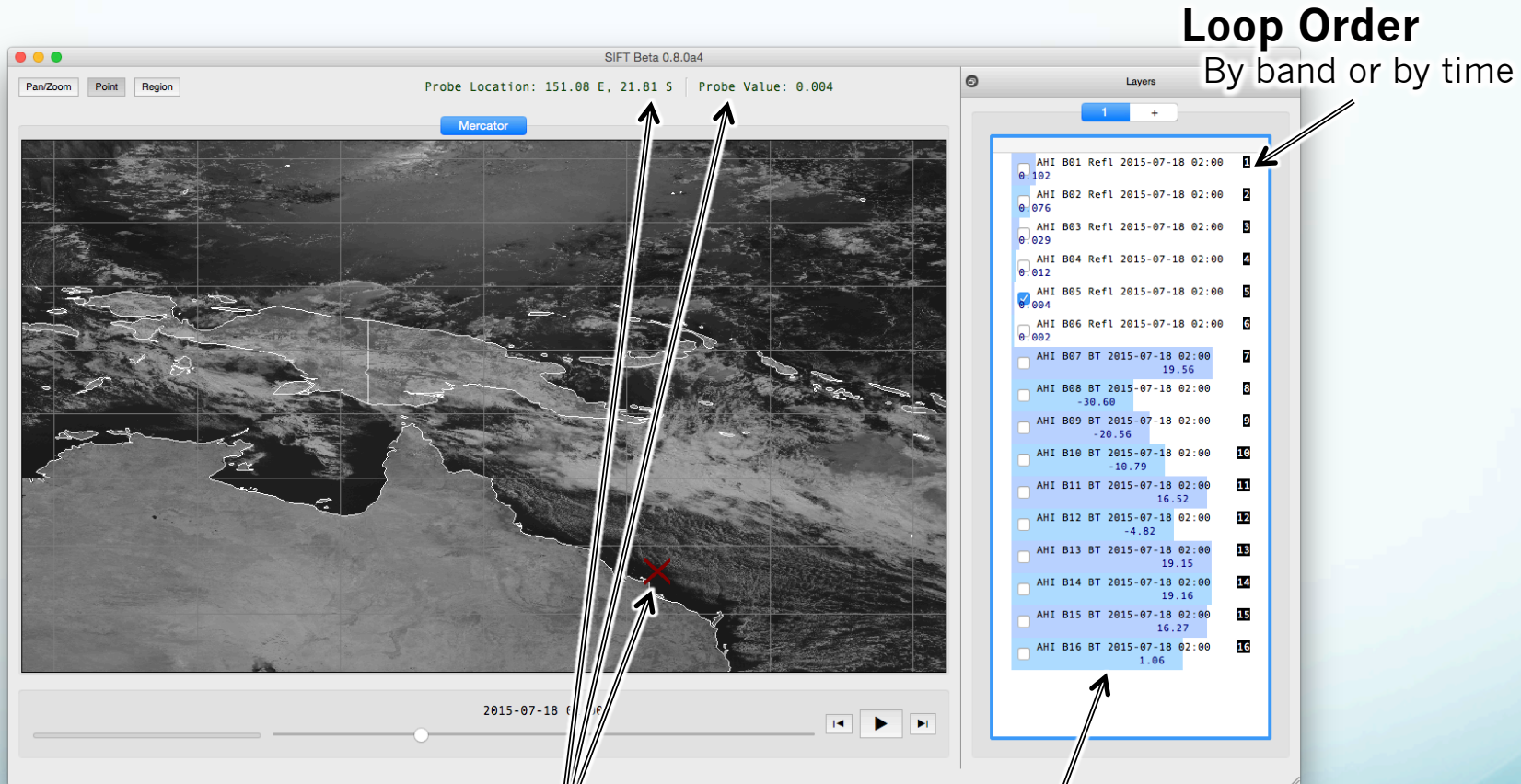
Animation Control

- Step-through or Autoplay
- Adjustable Speed Control

Layer Metadata

- Band Information
- Color Bar and Limits

SIFT Point Probe Feature

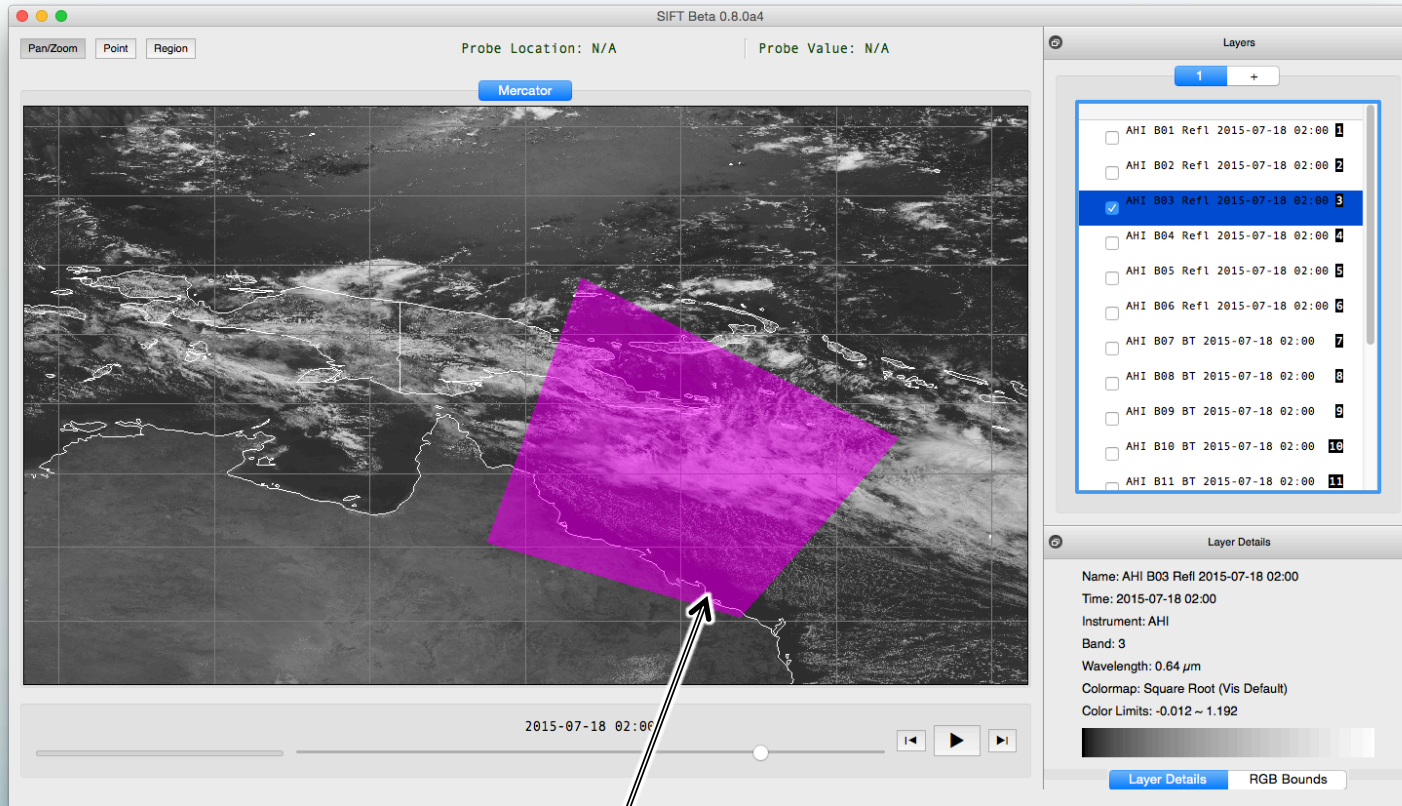


Loop Order
By band or by time

Point Probe
Denoted on map display
Coordinates and value shown

Layer List
Probe value shown for all
other loaded layers

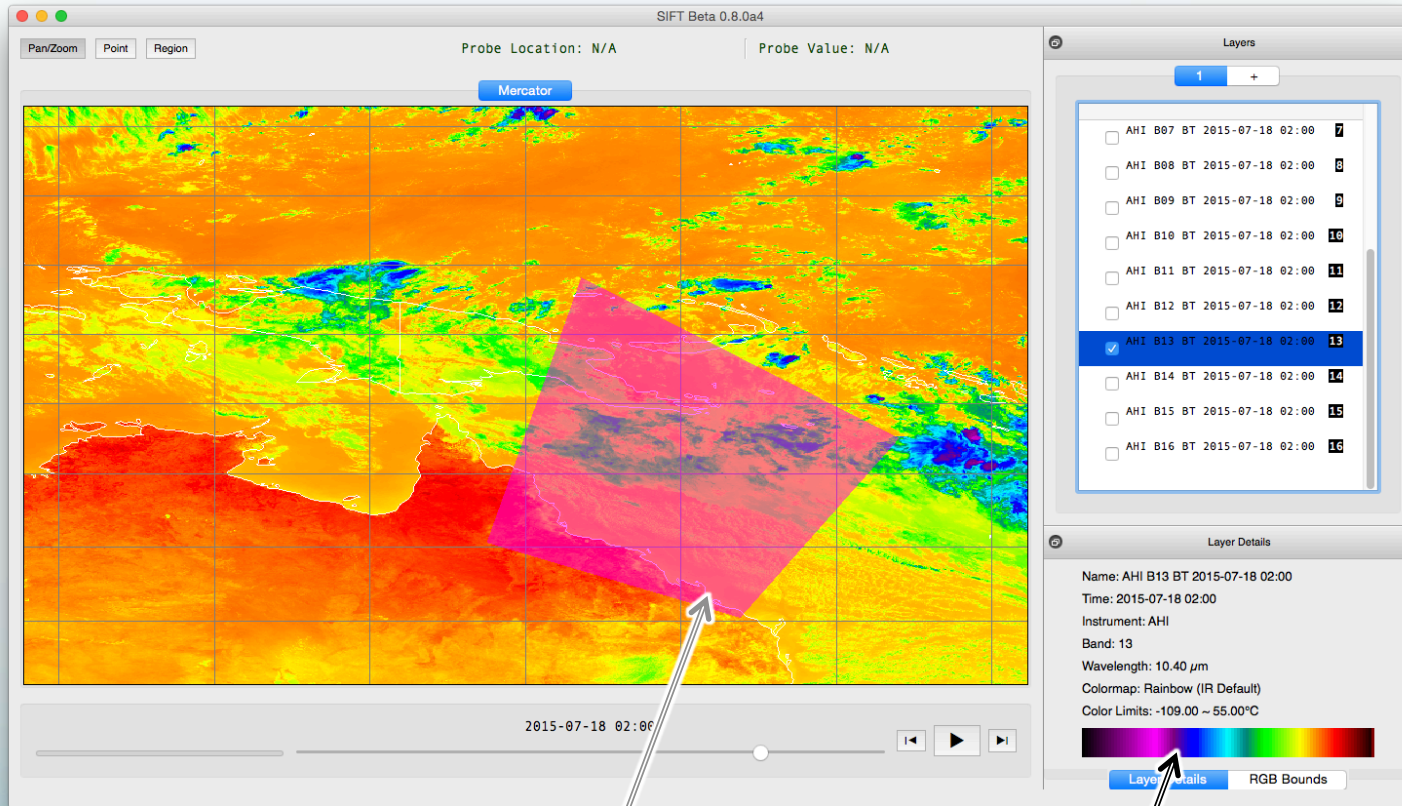
SIFT Region Selection Feature



Region Selection

Denoted on map display
Semi-transparent

SIFT Region Selection Feature

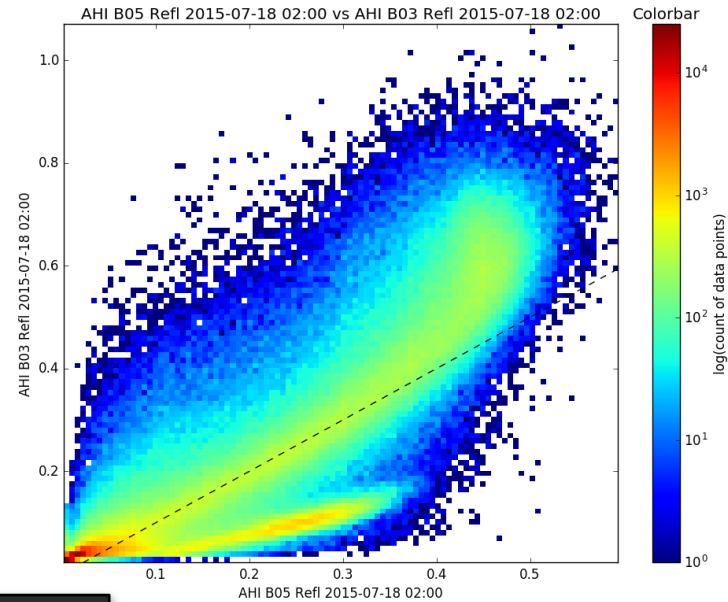
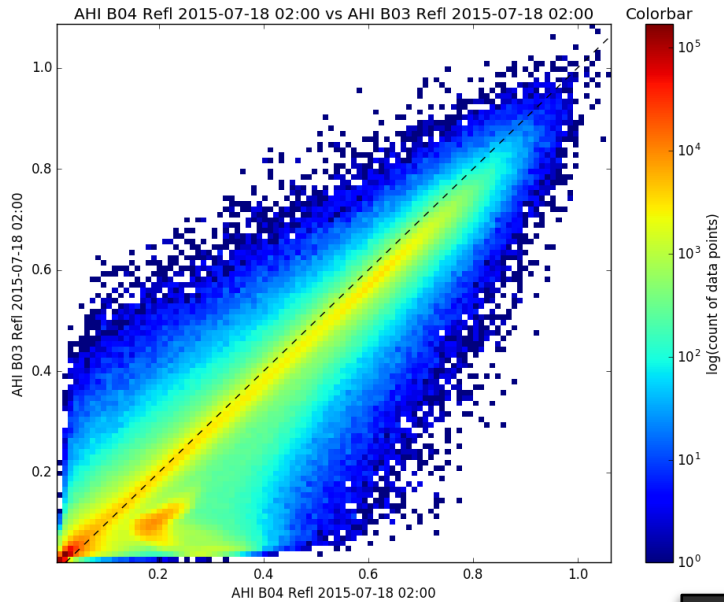


Region Selection

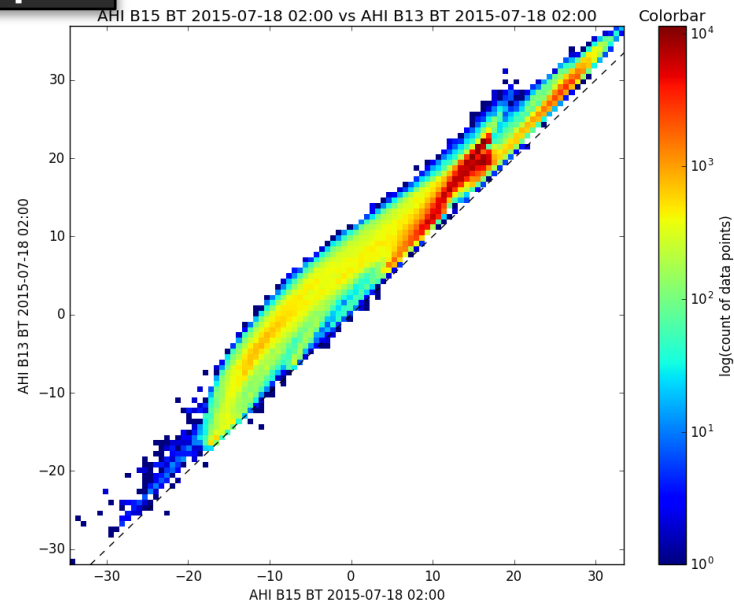
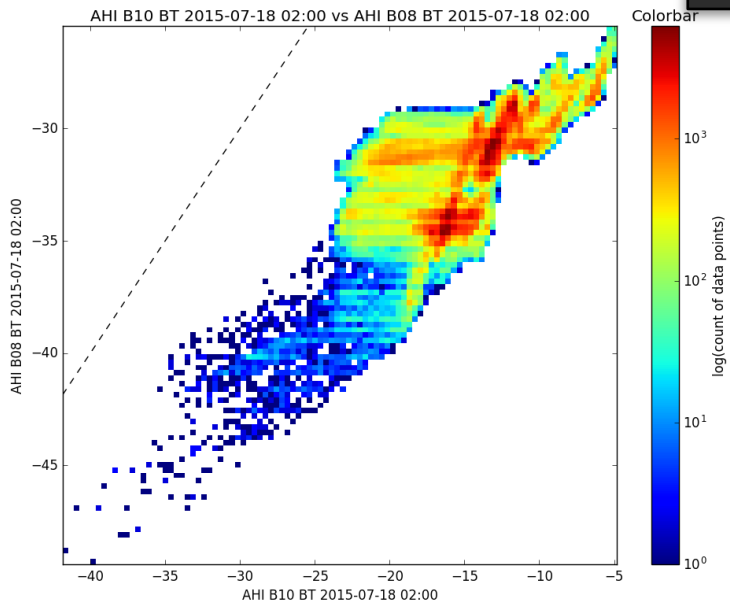
Denoted on map display
Semi-transparent

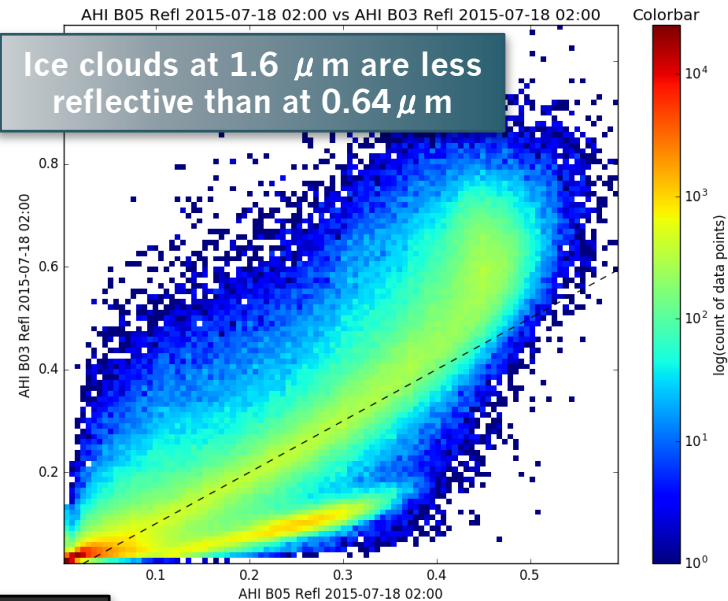
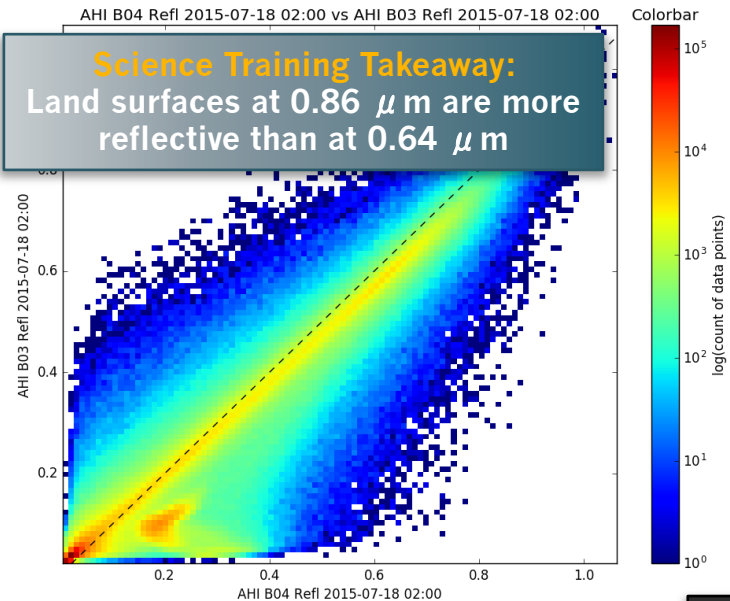
Layer Details

Change based on selected
layer in the list

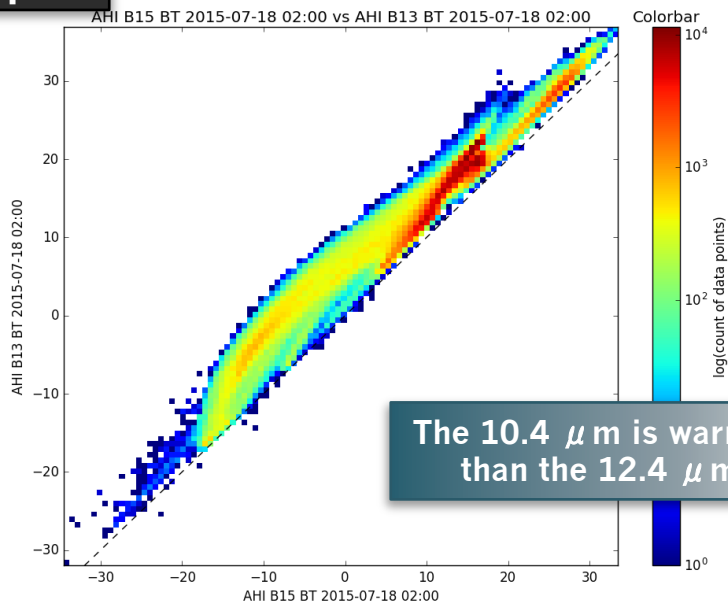
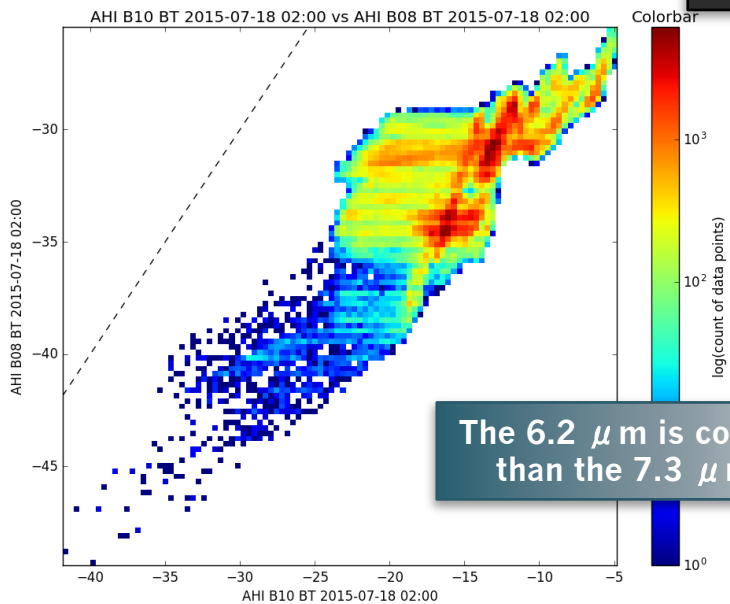


SIFT Area Probe Graphs





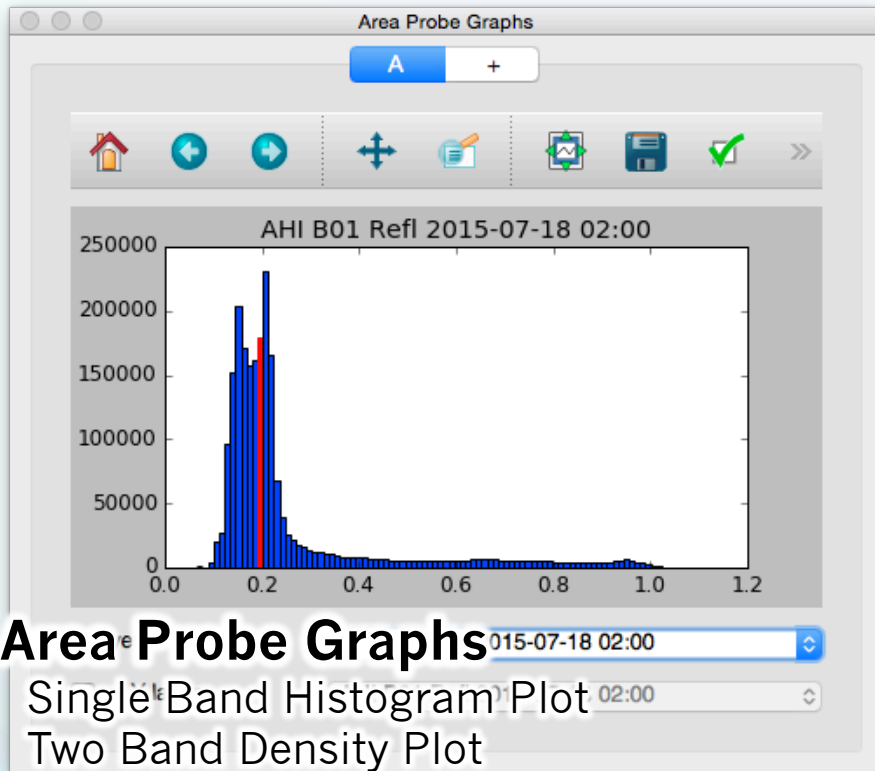
SIFT Area Probe Graphs



Applying Science Training

| Science Training Takeaway | Prospective Application |
|---|---|
| Land surfaces at 0.86 μm are more reflective than at 0.64 μm | River flooding is more easily identified, but contrast between clouds and land is reduced in the 0.86 μm |
| Ice clouds at 1.6 μm are less reflective than at 0.64 μm | Thick glaciated clouds can be indicative of thunderstorms |
| The 6.2 μm is cooler than the 7.3 μm | The water vapor channels can be used to assess the depth of certain tropospheric features |
| The 10.4 μm is warmer than the 12.4 μm | The difference in brightness temperature for clear fields of view is related to low-level water vapor concentration |

SIFT Features and Functions



Area Probe Graphs

Single Band Histogram Plot

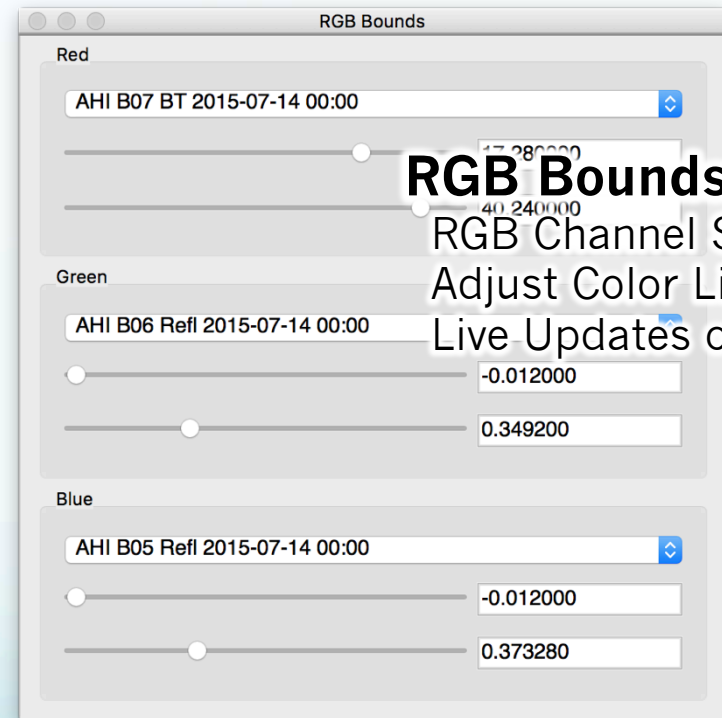
Two Band Density Plot

Point Probe Indicator

Save Graph Image

Pan/Zoom Graph Image

Publication Ready



RGB Bounds

RGB Channel Selection
Adjust Color Limits
Live Updates on Display

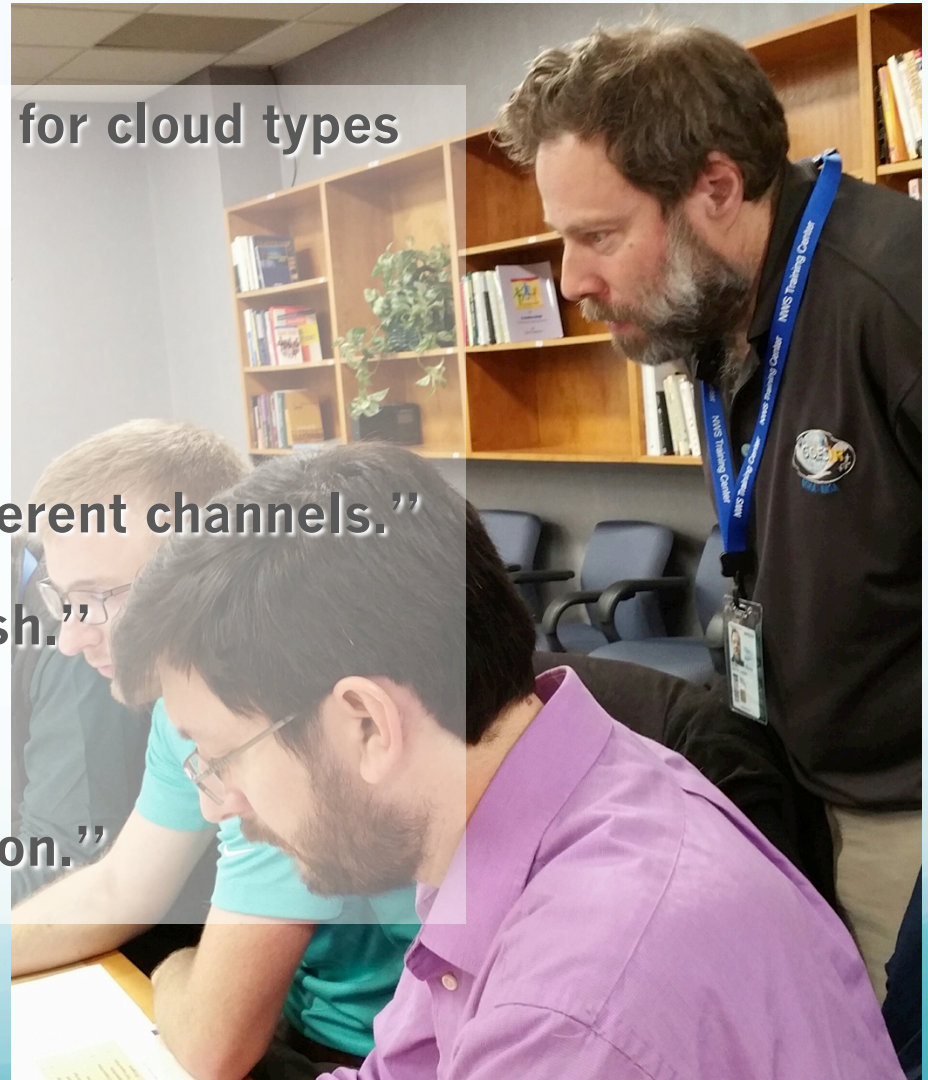
Future Enhancements to SIFT

- A selection window for users to load a given time range and subset of bands instead of individual files
- Additional projections (Lambert Conformal and Polar Stereographic)
- Better performance
- Display and handling for derived products created with the geostationary satellite variant of the Community Satellite Processing Package
- Improved experience for looping and selecting layers
- Support for GOES-R imagery

SIFT Accolades from Users

- “A very interesting way to look for cloud types and layers.”
- “All seemed fine to me.”
- “Great training tool overall.”
- “Nice tool to look at many different channels.”
- “SIFT is fast and does not crash.”
- “Stable software.”
- “Very quick. Excellent resolution.”

Excerpts from written survey results following Honolulu forecast office training workshop



Download SIFT and Case Data



SIFT



Case Data

- SIFT:
<ftp://ftp.ssec.wisc.edu/pub/jordang/pg/sift/>
 - Windows 7+ (118 MB)
 - 64-bit CentOS/RedHat Linux (278 MB)
- Case Data:
ftp://ftp.ssec.wisc.edu/ABI/sift_data/AHI/

Satellite Foundational Course for GOES-R (SatFC-G)

- Access to training resources developed for operational meteorologists in the United States is available
- Sections include:
 - Introduction to the spectral bands, operating mode, and baseline products
 - Lightning mapper
 - Evaluating convection and mesoscale features
 - Monitoring synoptic scale features
 - Numerical weather prediction



<http://bit.ly/2ey7IIY>

Create RGB Composites Online

Combine Three Images into One... x +

cimss.ssec.wisc.edu/goes/webapps/satrgb/satrgb_AHI_realtime_wp.html

Real-Time Imagery from Himawari-8 over western Pacific Ocean

Select images: 1.6 μm 6.9 μm 9.6 μm

Set Scale Factor: 1.0 1.0 1.0

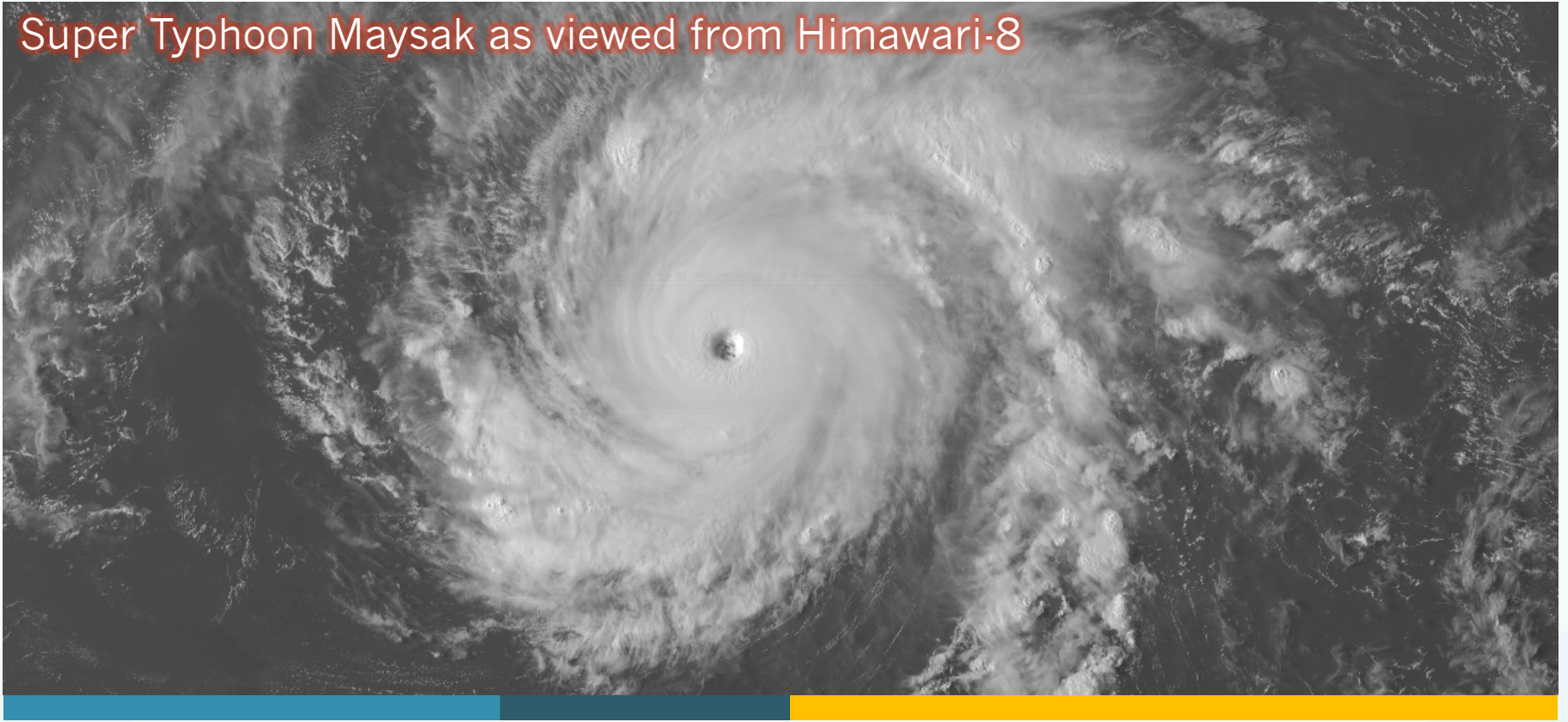
Set Gamma Factor: 1.0 1.0 1.0

Invert Image Invert Image Invert Image

Reset Combine Channels

<http://bit.ly/2e5KrCY>

Super Typhoon Maysak as viewed from Himawari-8



Questions? Comments?

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