Using the McIDAS-V Scripting API for Daily Research Tasks

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Including work of

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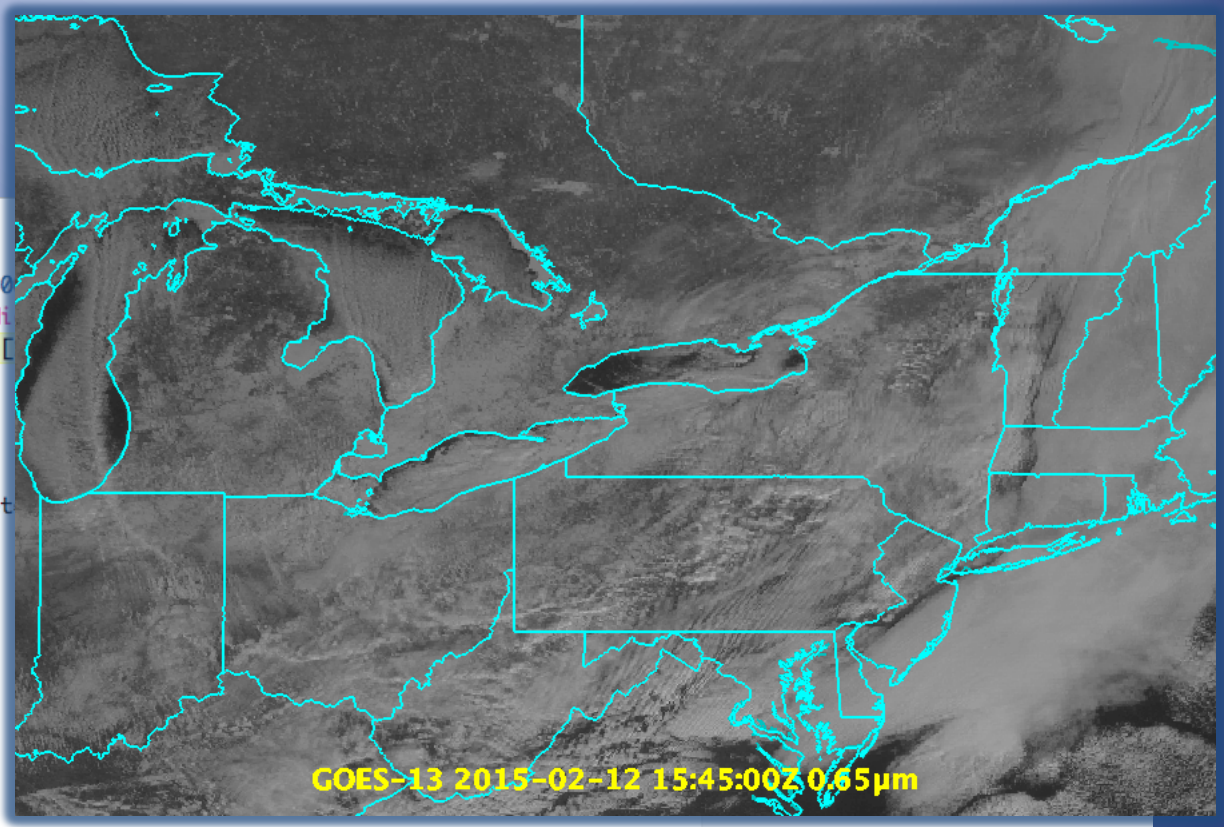
Martin Setvák (Czech Hydormeteorlogical Institute)

8-11 June 2015: McIDAS User's Group Meeting

McIDAS-V Scripting API

- McIDAS-V Scripting API uses the jython programming language. Core python commands are available (Great help on web!)
- McIDAS-V Scripting API provides the ability to access ADDE data, load netCDF/hdf files, control display layers, capture movies/images
- McIDAS-V Scripting API is under active development. Added capabilities are expected




```
location=(42.9, -79)

panel1=buildWindow(height=600,width=90
panel1.setProjection('US>States>A-M>Mi
panel1.setCenter(location[0],location[

day=('2015-02-12')
times=('14:00','20:00')

lesDataSet = getLocalADDEEntry(dataset

addeParms = dict(
        localEntry=lesDataSet,
        size=(520,972),
        unit='ALB',
        mag=(-2,-4),
        coordinateSystem=LATLON,
        place=CENTER,
        location=location
   )

dateTimeList=listADDEImageTimes(server='localhost', localEntry=lesDataSet, day=day, position='ALL', time=times, band=1)

lesSeq=[]
for dt in dateTimeList:
   imgDay=dt['day']
   imgTime=dt['time']
   print imgTime

   mdir,vis=getADDEImage(band=1, day=imgDay,time=imgTime, **addeParms)
   lesSeq.append(vis)

lesLayer=panel1.createLayer('Image Sequence Display', lesSeq)
lesLayer.setEnhancement('Square Root Visible Enhancement',range=(0,70))
label1=lesLayer.setLayerLabel('GOES-13 %timestamp% 0.65µm', size=16, color='Yellow', font='SansSerif',style='bold')
```

Possible Applications for McIDAS-V in Lake Effect Snow Project

- Currently create scatter plots/density plots in IDL
- These plots compare radar snowfall rate observations to satellite derived observations over many cases
- Employ the geospatial aspect of the HYDRA scatter analysis, and select points either geographically or on the scatter analysis and accumulate those points over time.

Possible Applications for McIDAS-V in Lake Effect Snow Project (continued)

- Keep the selected points of lat/lon time, value for the satellite point, and value for the radar point in a data object which can be written to a netCDF file when complete.

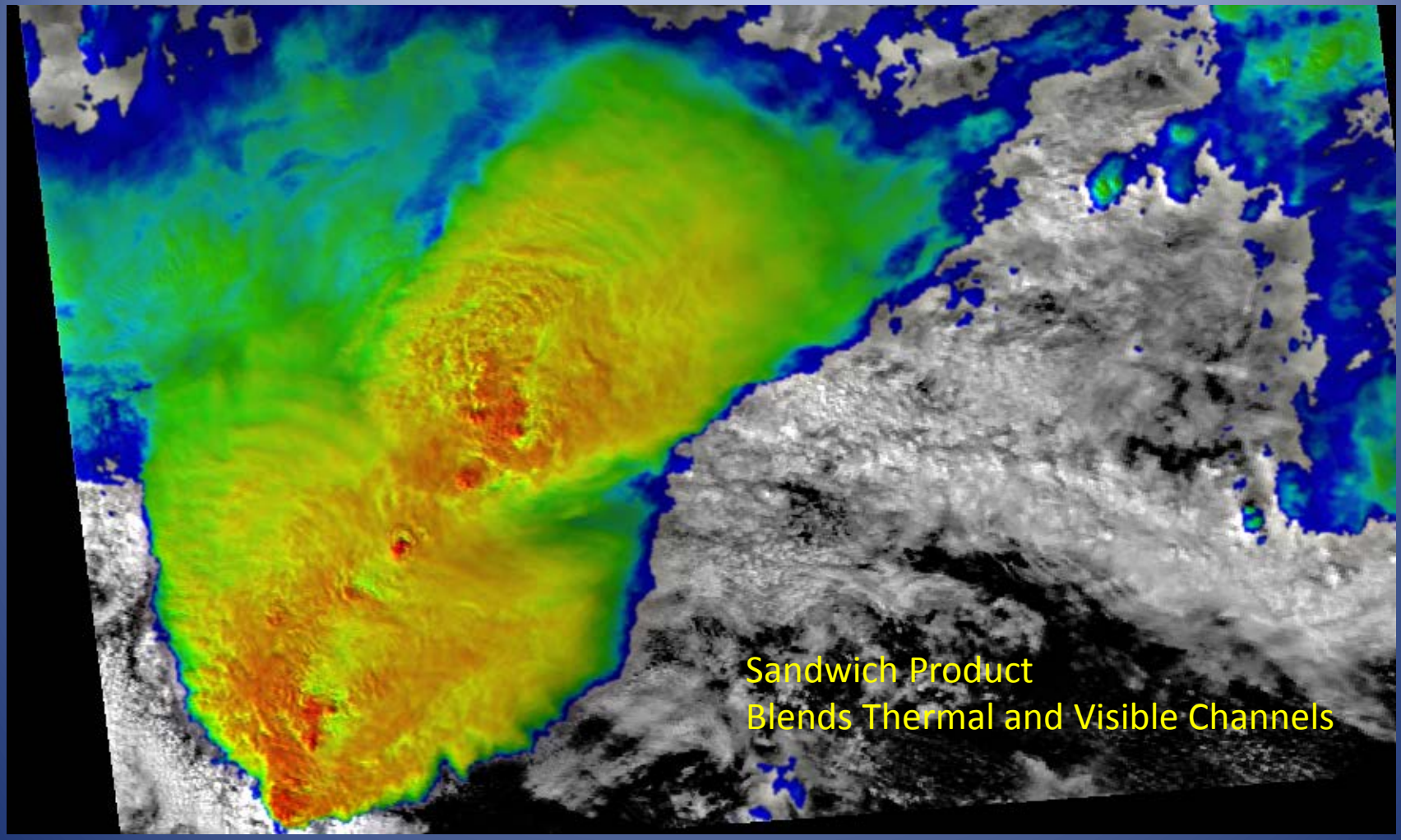
- Generate statistics on the fly with multiple fields. Use ground data as a first order evaluation, radar and satellite. Use McIDAS-V to view all the data as a whole before creating/altering satellite derived LES algorithm.

- Radar data can be extremely hard to read into software such as IDL. The user has to know the data structure well. McIDAS makes displaying radar data easier.

Stray light contamination is

- Easy to see in shortwave (swir) – longwave (lwir) IR animations
- Easy to see in (swir – lwir) histograms
- Difficult to identify by mean, percentage of swir-lwir pixels which fall in the extreme < -15 K or larger bin, or skewness alone.
- Detection in a time series analysis?

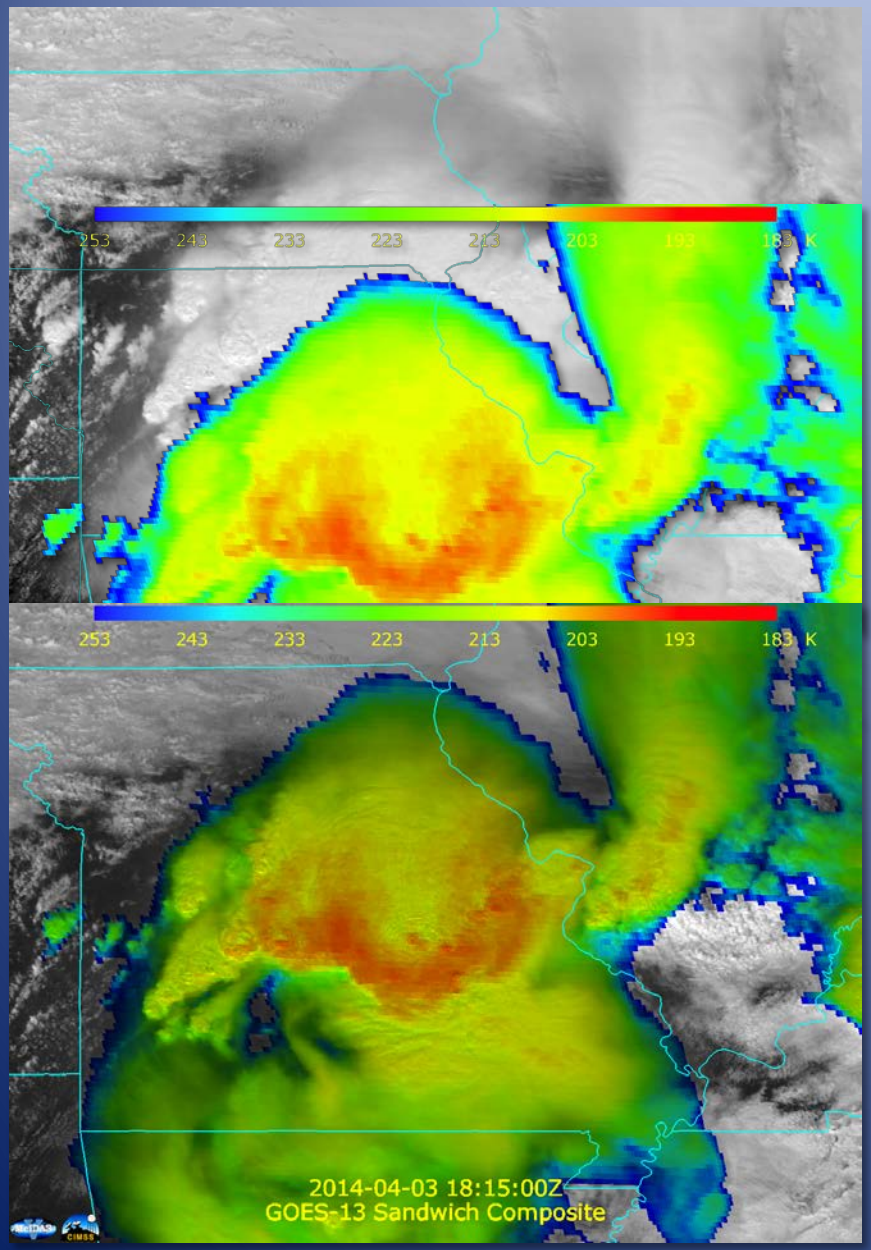
Visualization Examples

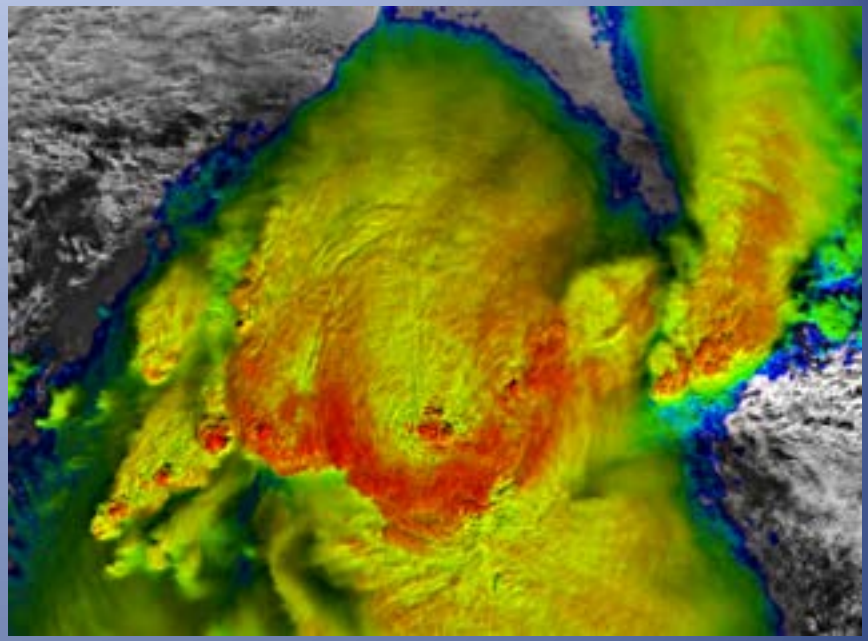


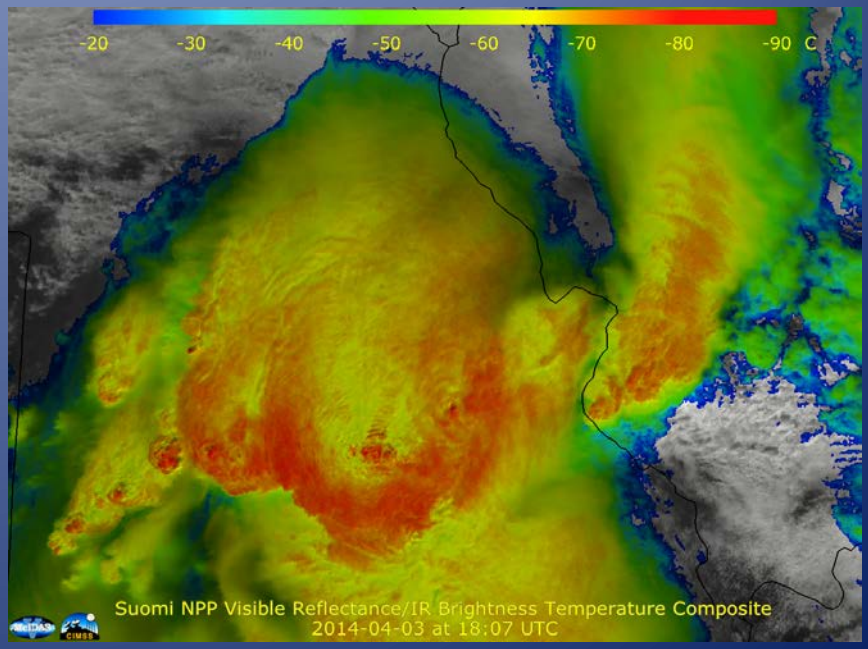
Sandwich Product by Martin Setvák
(Czech Hydormeteorlogical Institute)

Convection Working Group: http://essl.org/cwg/?p=417

Visualization Examples





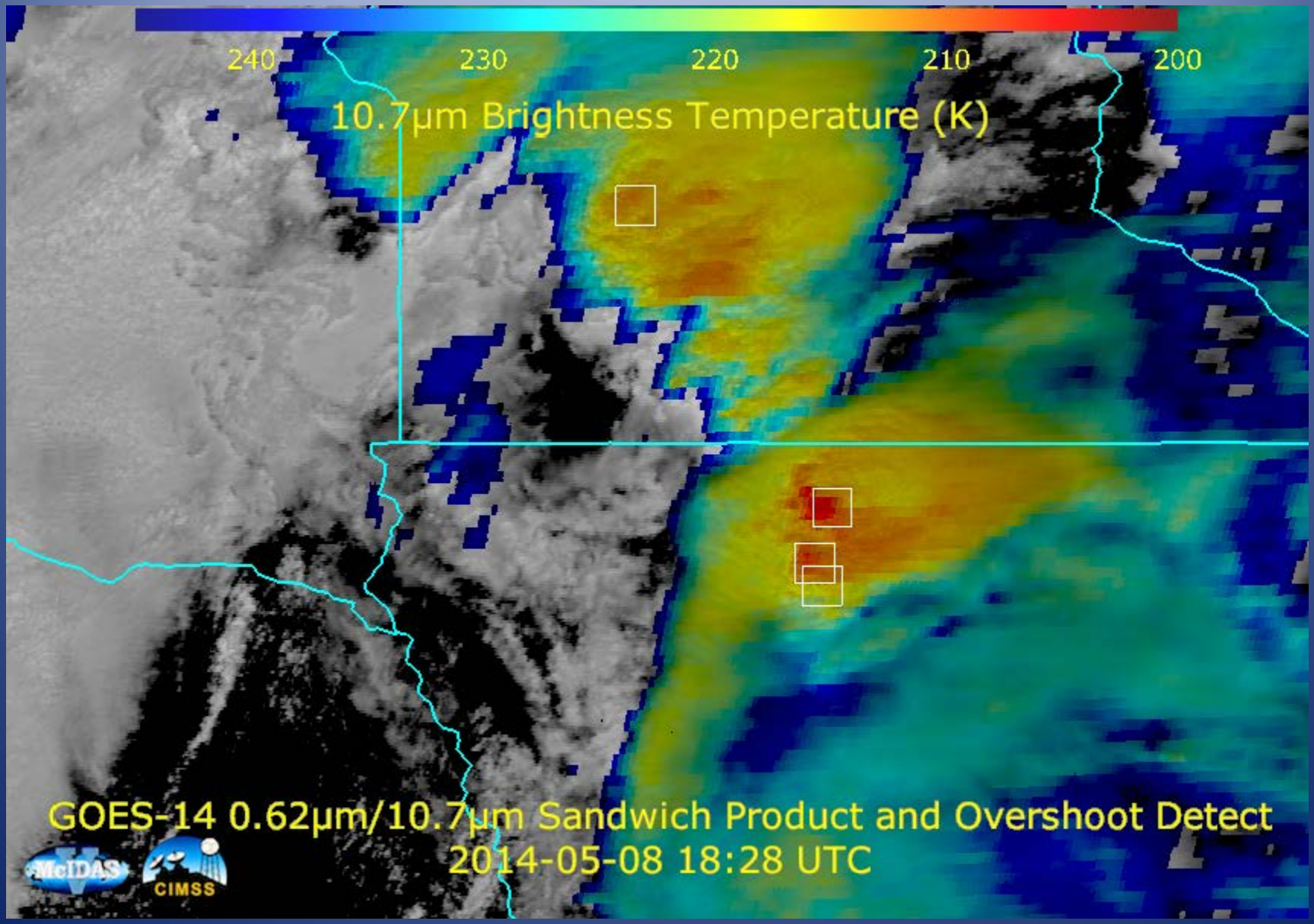


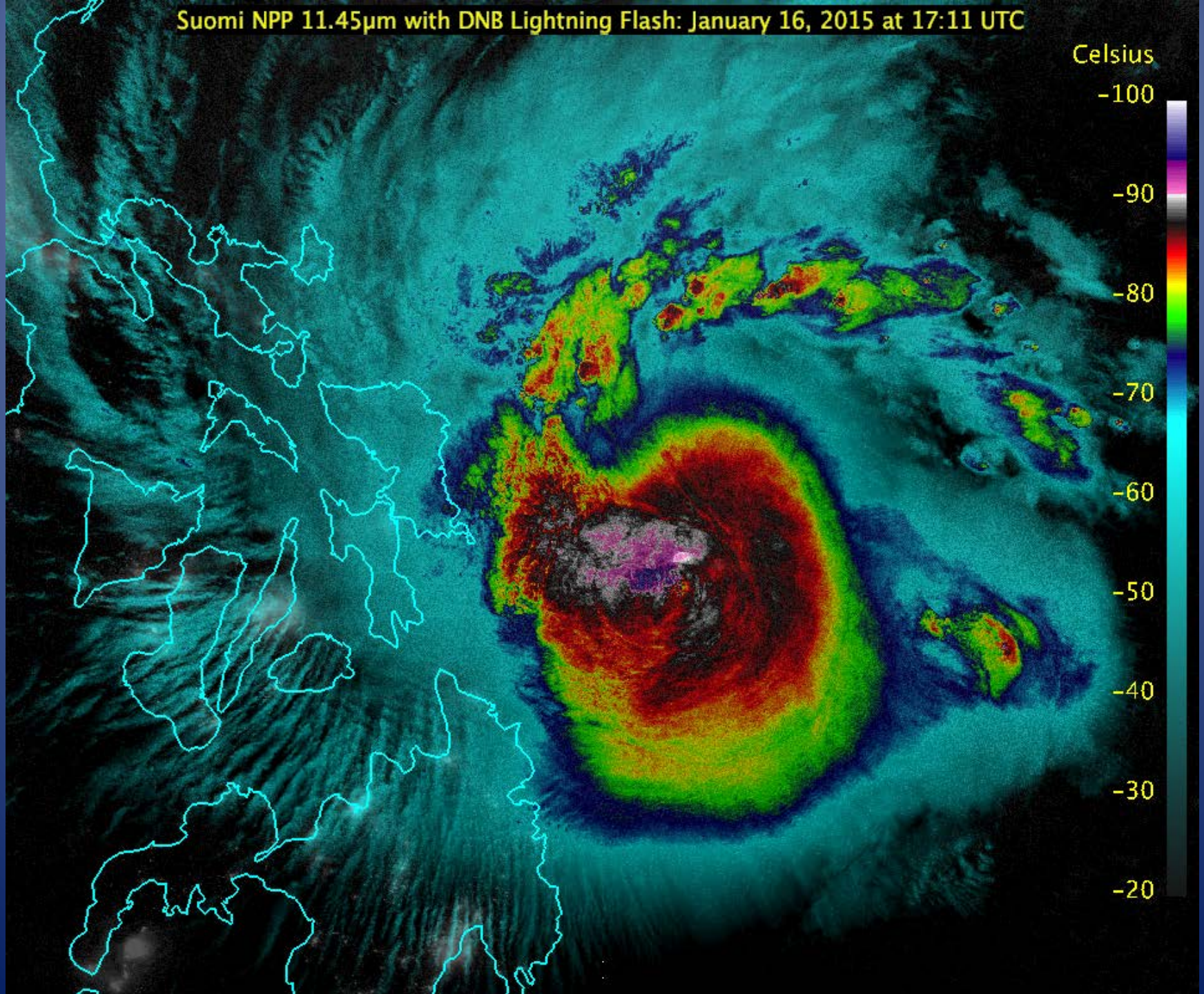
Better Sandwich Product in McIDAS-V

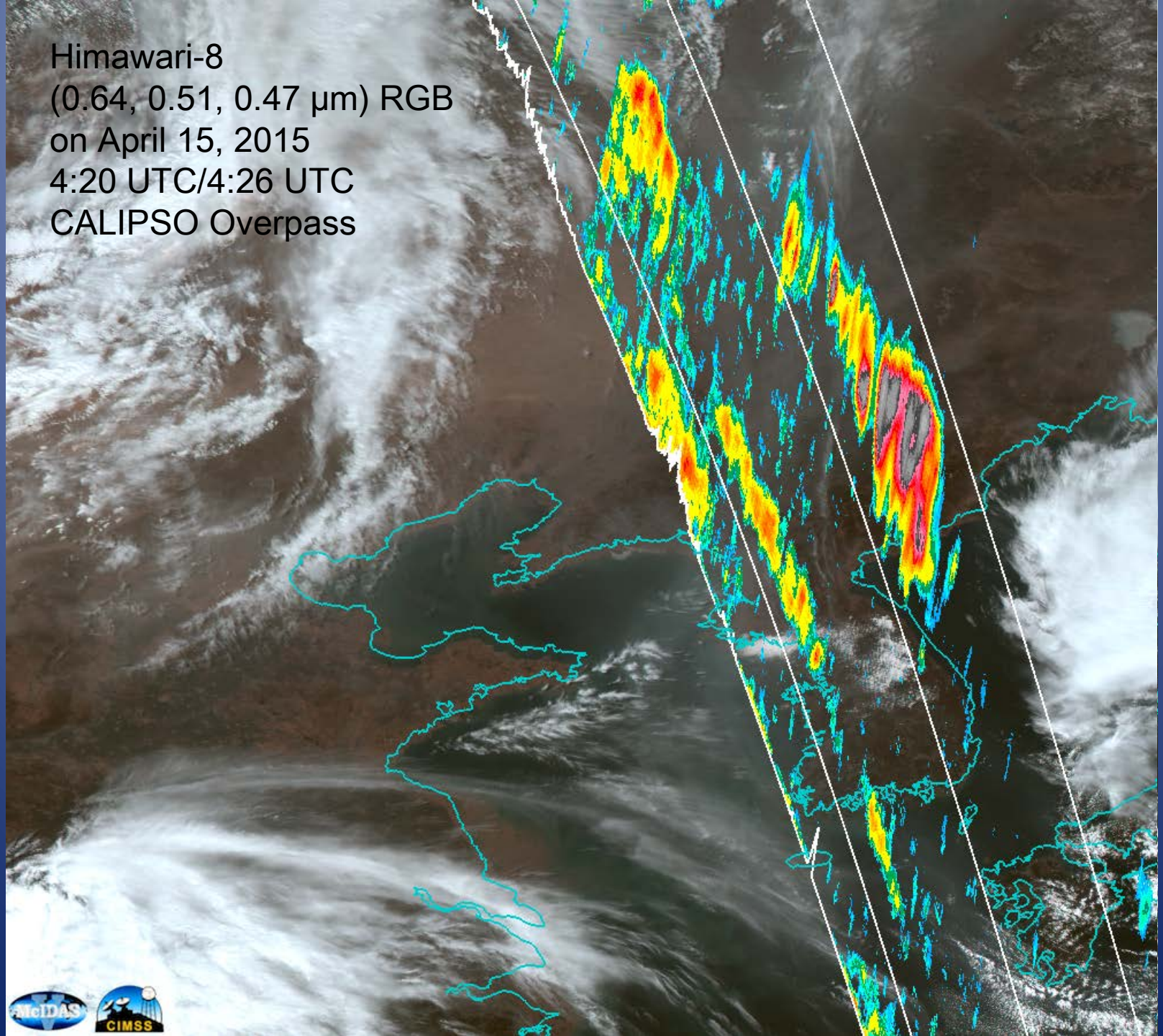
- Look forward to GOES-R that promises higher spatial resolution in the longwave IR window.

- In an ideal case, the thermal sensor spatial resolution matches the visible sensor.

Why script this?




Suomi NPP 11.45μm with DNB Lightning Flash: January 16, 2015 at 17:11 UTC
Celsius
-100
-90
-80
-70
-60
-50
-40
-30
-20


Himawari-8
(0.64, 0.51, 0.47 μm) RGB
on April 15, 2015
4:20 UTC/4:26 UTC
CALIPSO Overpass
McIDAS
CIMSS

Profile-Along Track Display for CALIPSO Data

- Useful for diagnosing proper height assignment to set particle trajectories (trajectories could also be visualized in McIDAS-V)
- Best practice for aligning the data probe with features of interest?
- More control over height labeling, and placement of the major and minor increments for the height lines

Conclusion

- Stability, repeatability and speed has significantly improved. Even more improvement might be necessary for the many McIDAS-X users who are accustomed to running multiple processes with minimal bugs or down-time.
- Scripting API has made some tasks as easy in McIDAS-V as they are in McIDAS-X
- Using a jython interface provides a very readable language. Since jython is the java implementation of python, there are multiple resources for reference on the web.

Conclusion

- The 3-D capabilities, layering, and advance sensor support, geospatial flexibility make McIDAS-V a nice tool for meteorological data visualization.

- Try it! Ask questions on the forum. Complain/Search for answers/Request additional capabilities on the forum. This drives development!