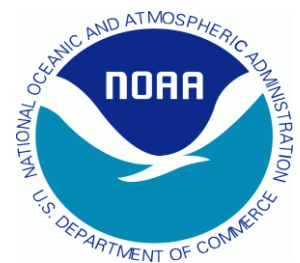




Marco Fulle - www.stromboli.net

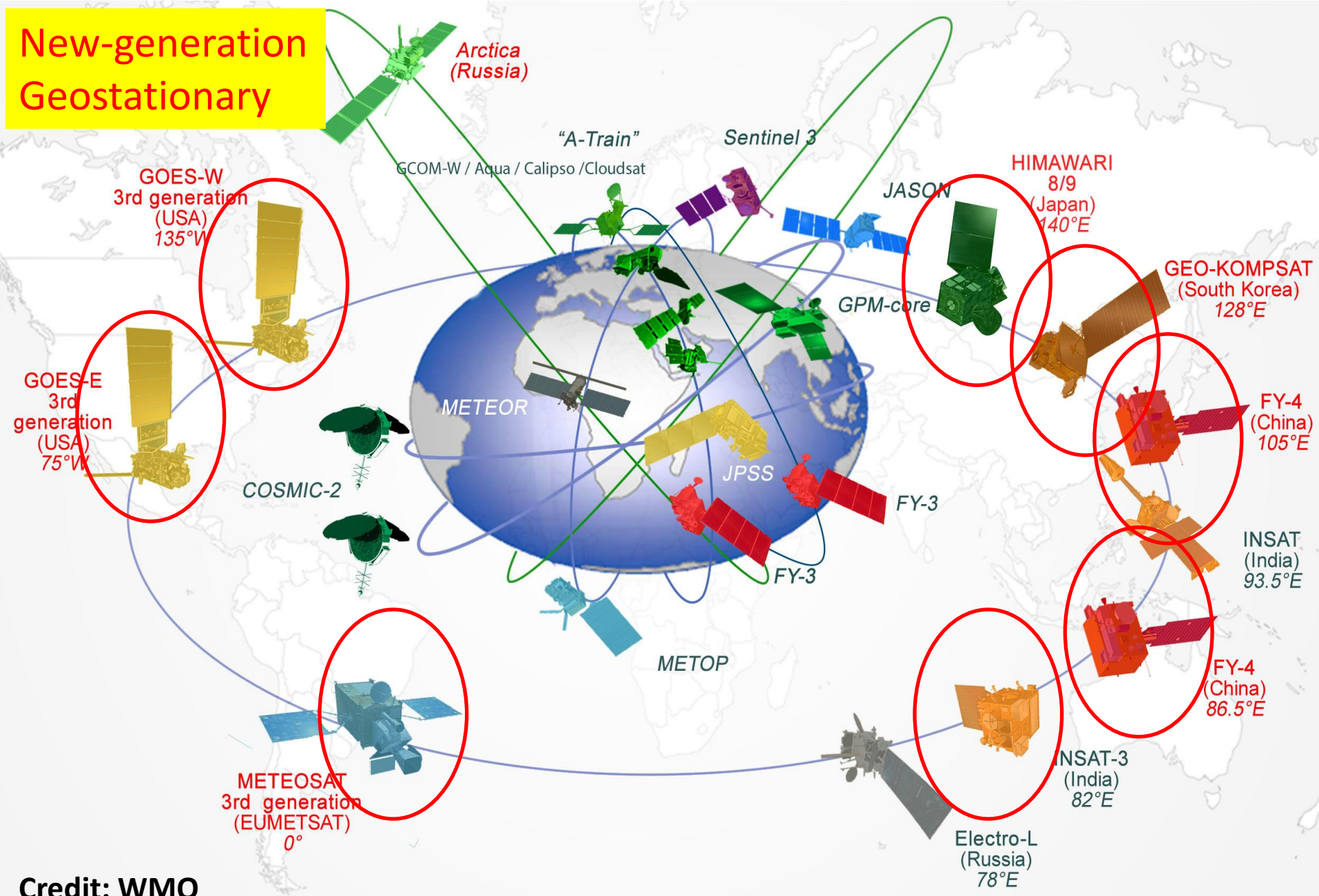
Potential Impacts and Challenges of the Next Generation of Meteorological Satellites

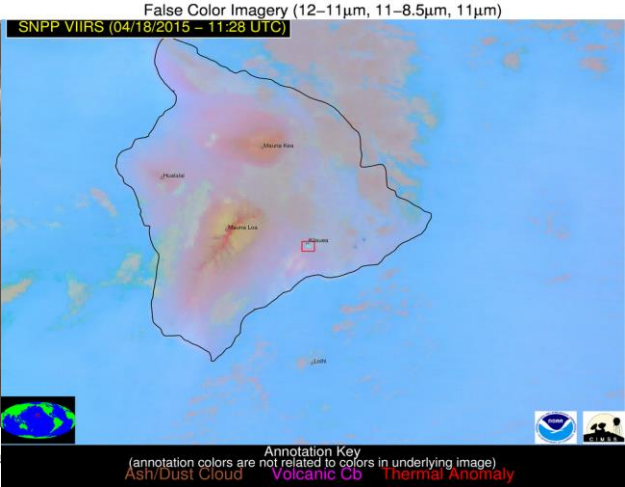
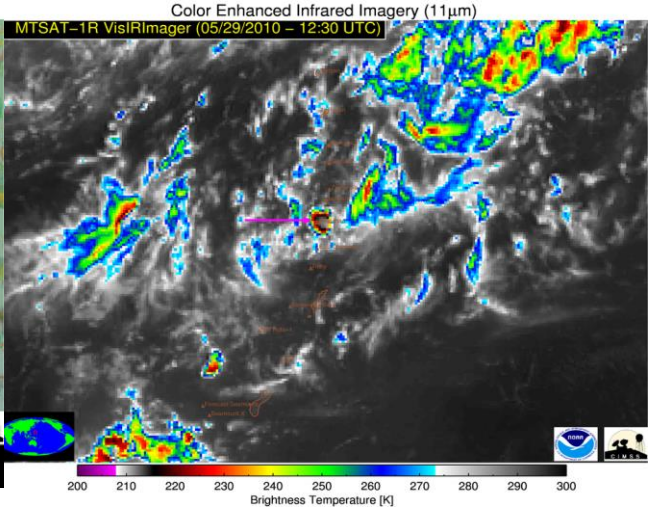
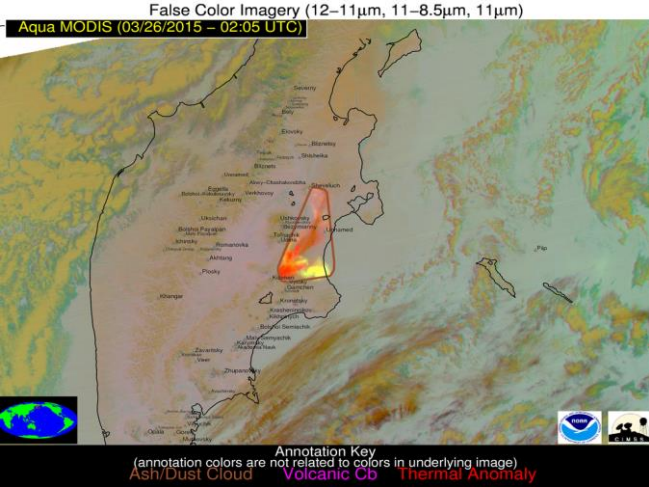
Mike Pavolonis
NOAA/NESDIS



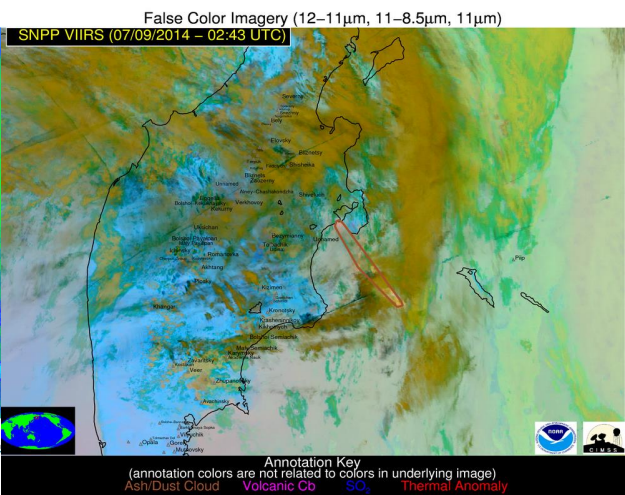
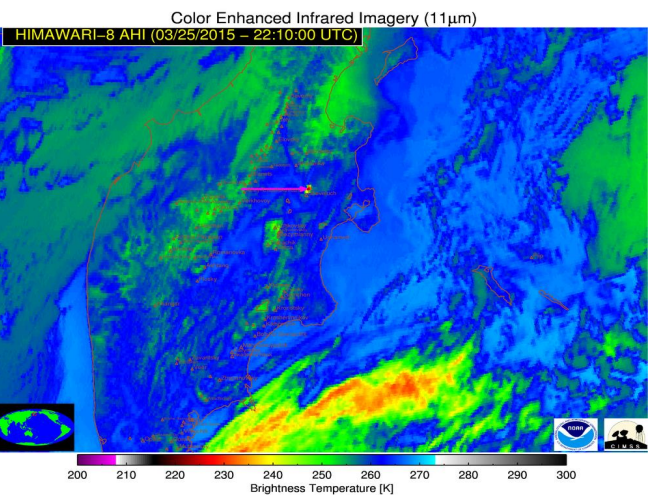
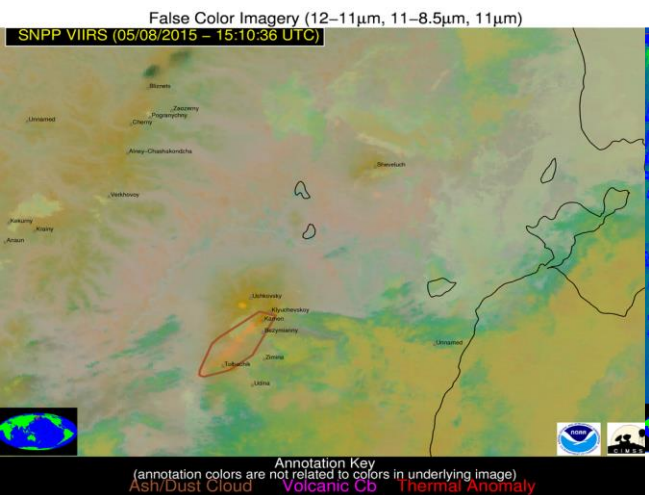
2015 - 2020

New-generation Geostationary



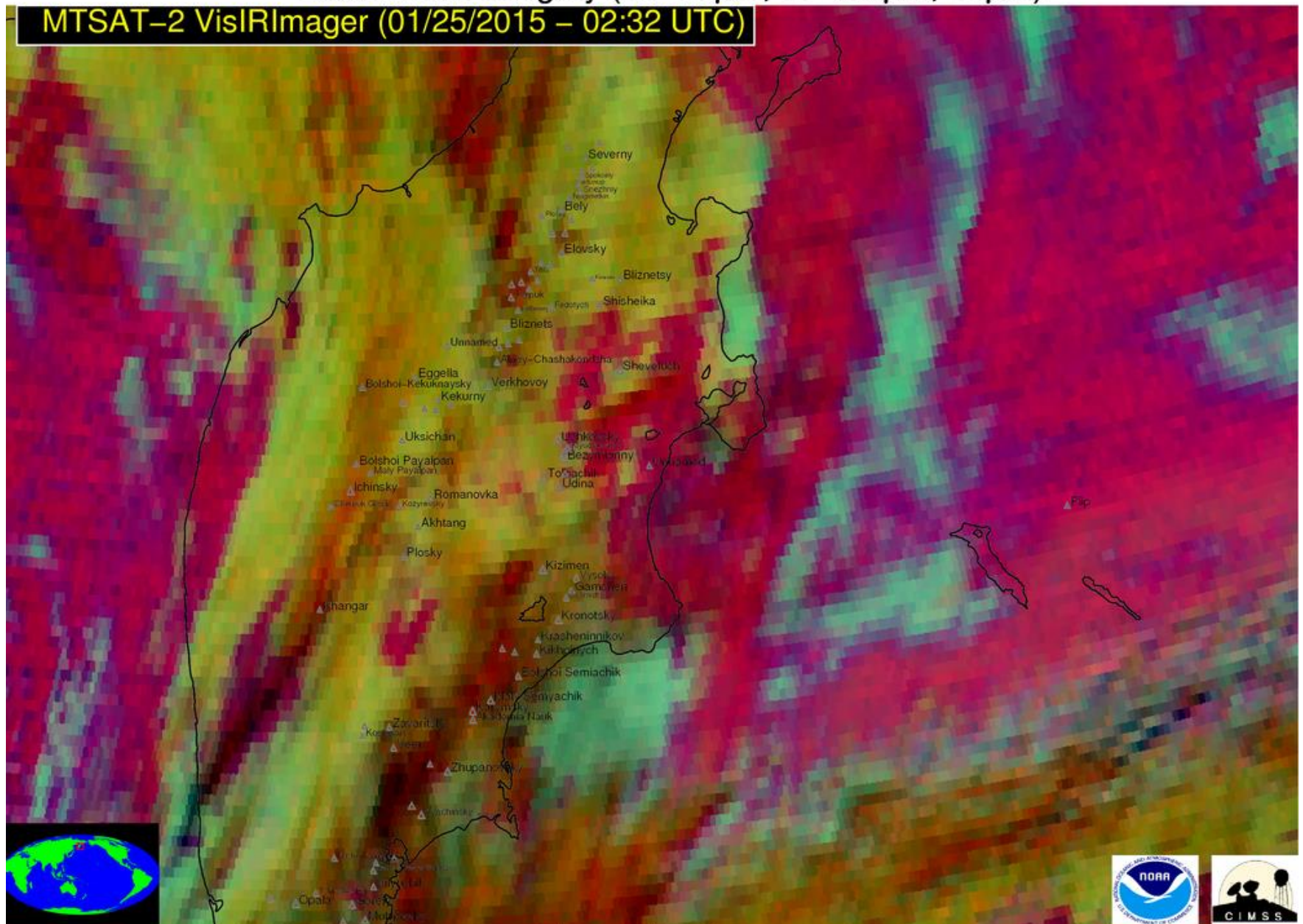


Major Impact 1: Improved identification of ash clouds near the source



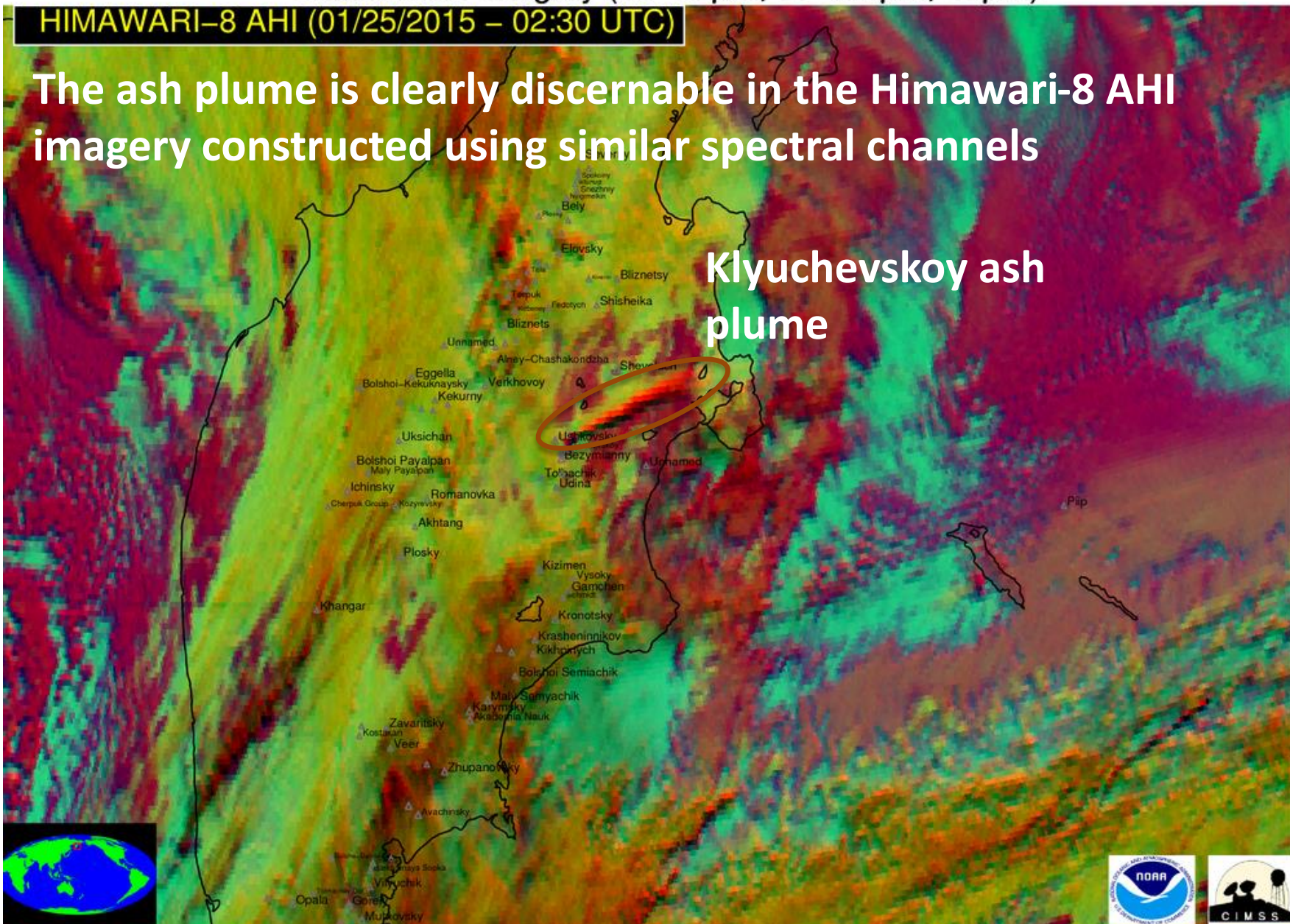
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

MTSAT-2 VisIRImager (01/25/2015 – 02:32 UTC)



The ash plume is clearly discernable in the Himawari-8 AHI imagery constructed using similar spectral channels

Klyuchevskoy ash plume



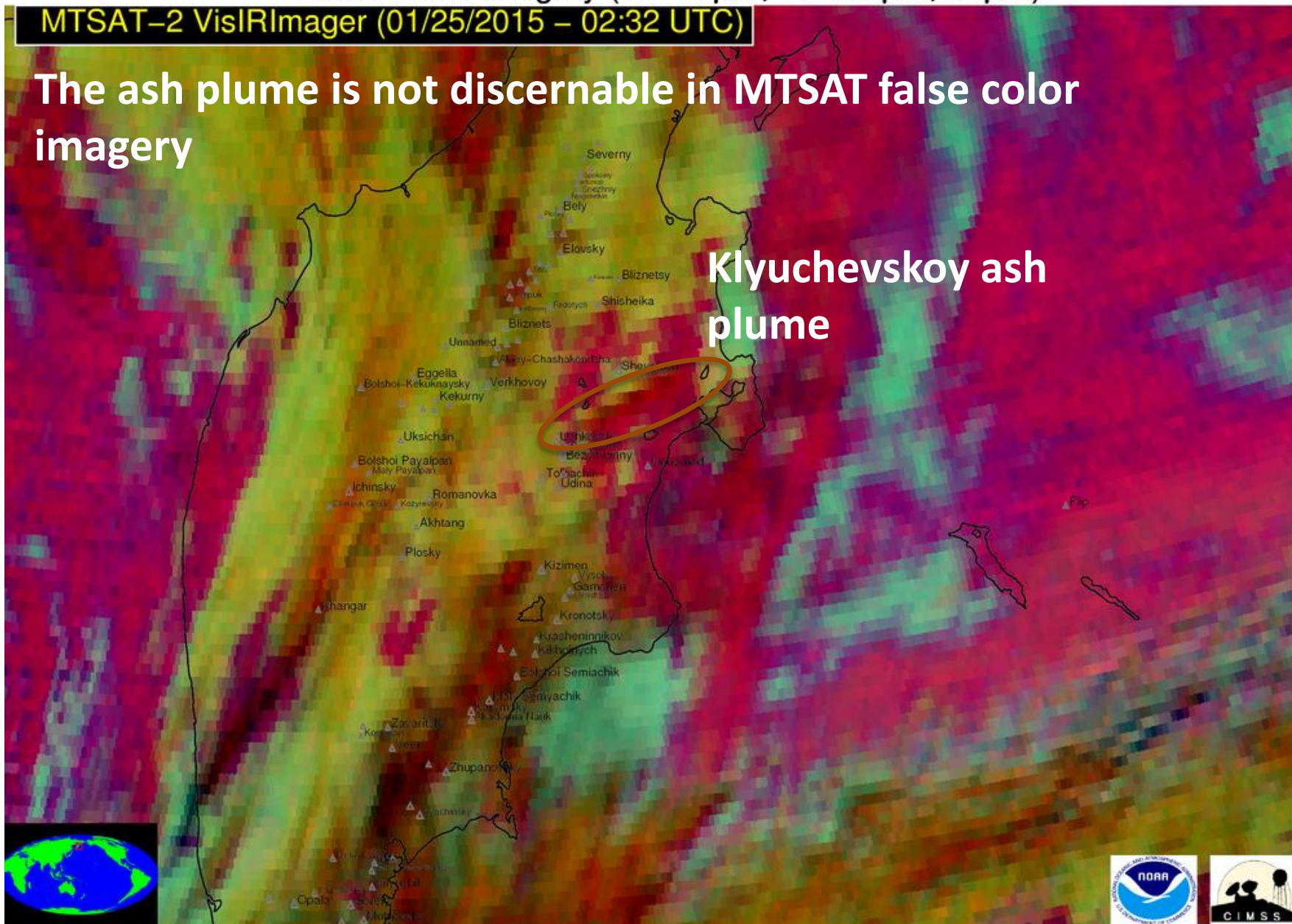
Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly

The ash plume is not discernible in MTSAT false color imagery

Klyuchevskoy ash plume



Annotation Key

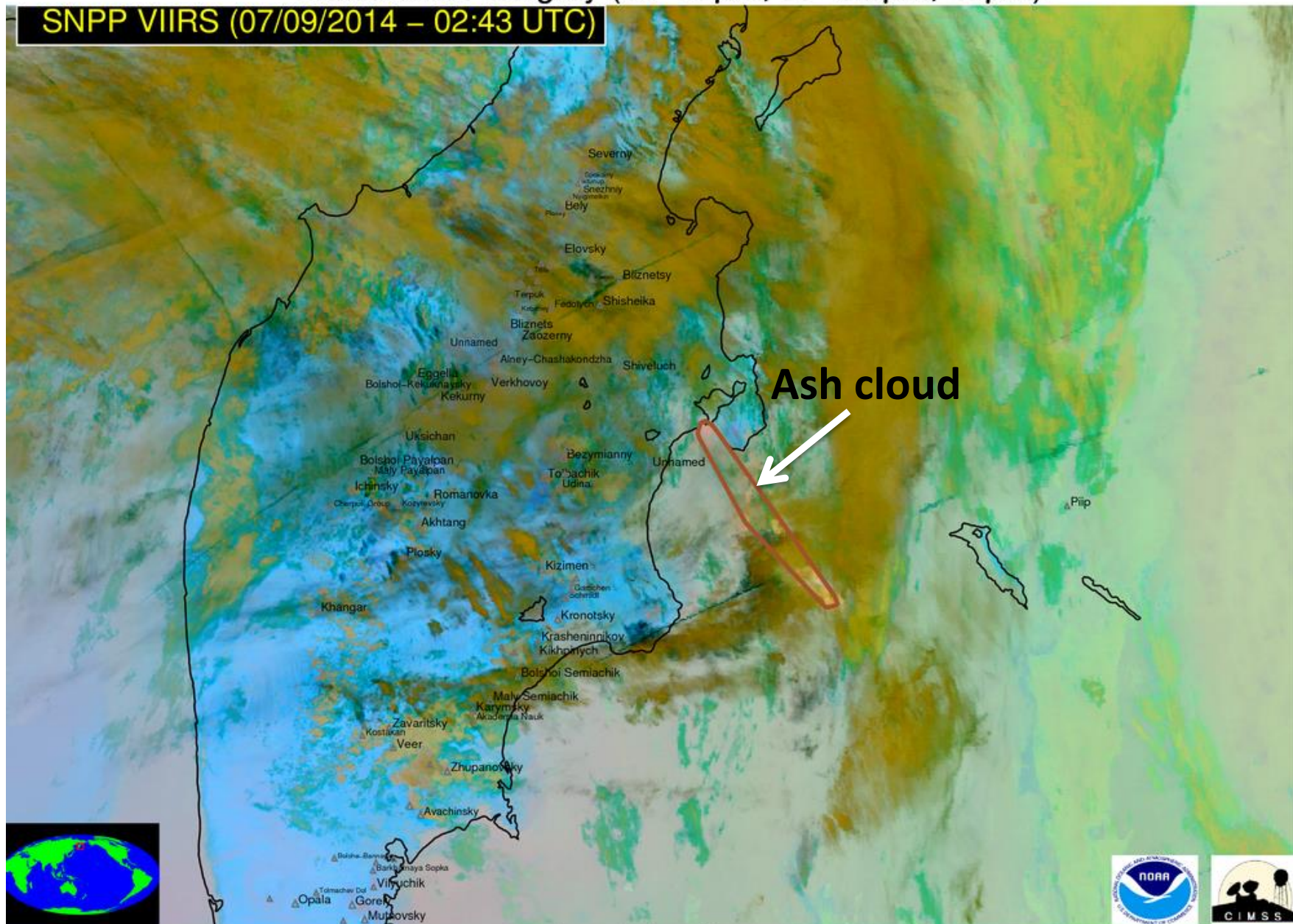
(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly



False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

SNPP VIIRS (07/09/2014 – 02:43 UTC)



Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud

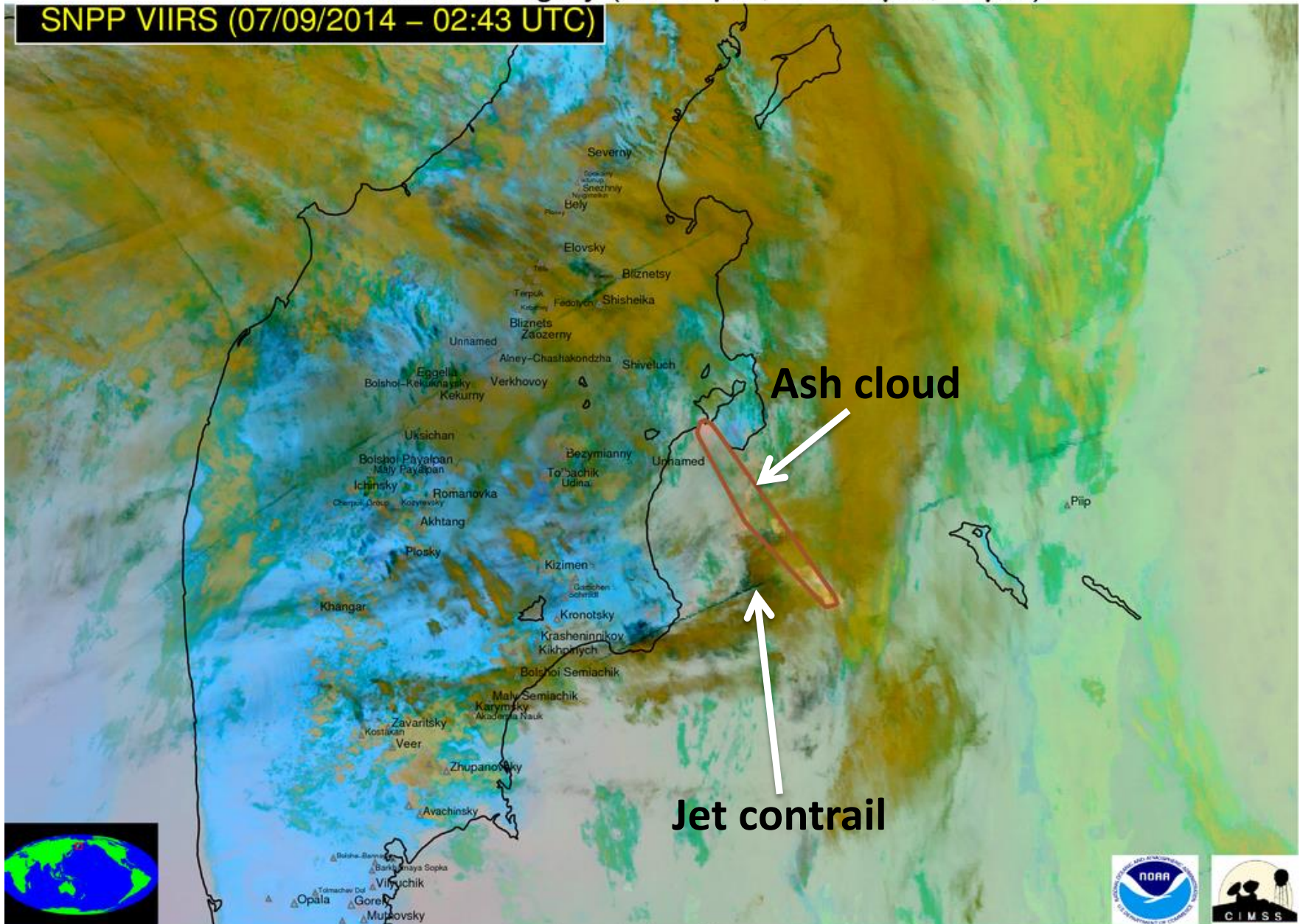
Volcanic Cb

SO₂

Thermal Anomaly

False Color Imagery (12–11μm, 11–8.5μm, 11μm)

SNPP VIIRS (07/09/2014 – 02:43 UTC)



Annotation Key

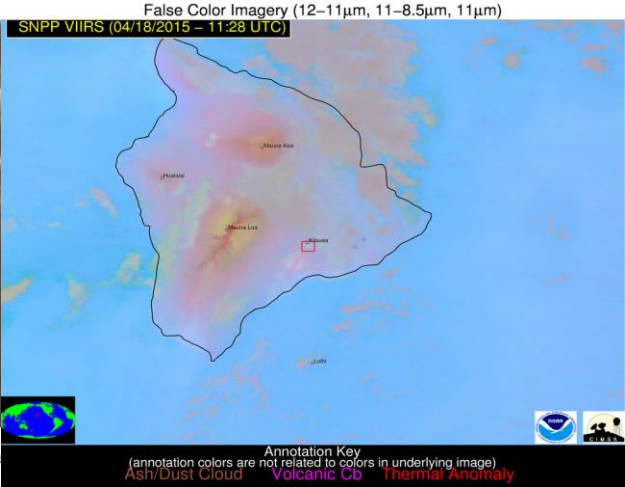
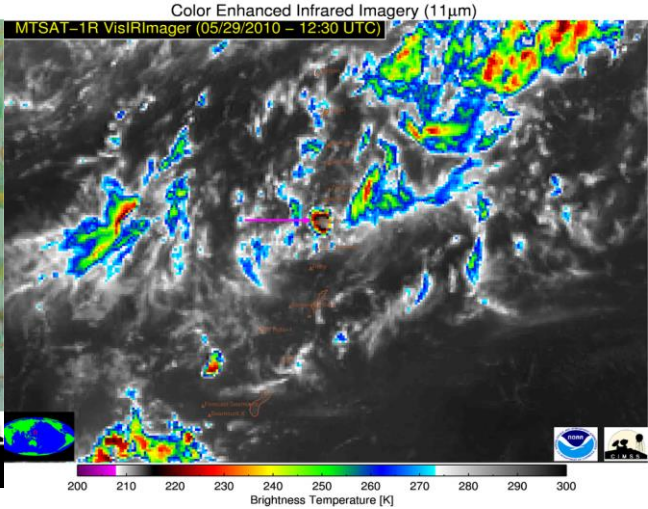
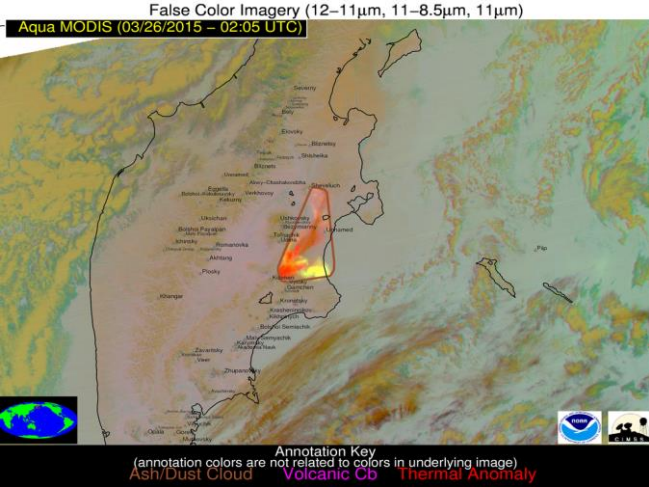
(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud

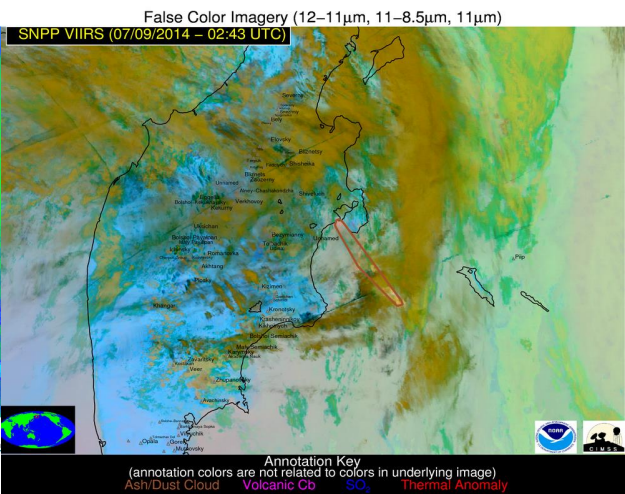
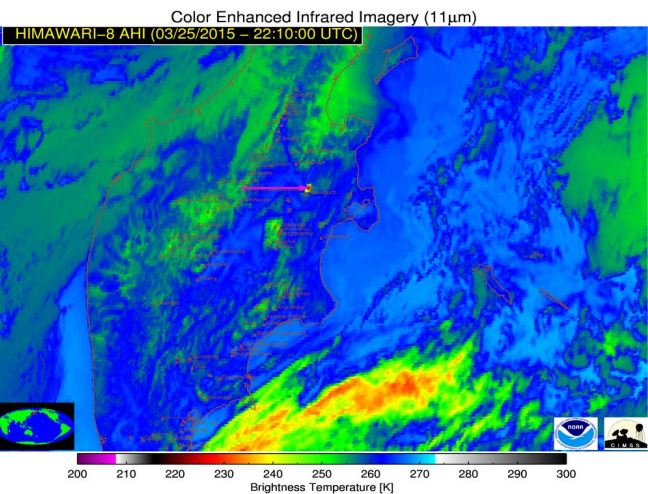
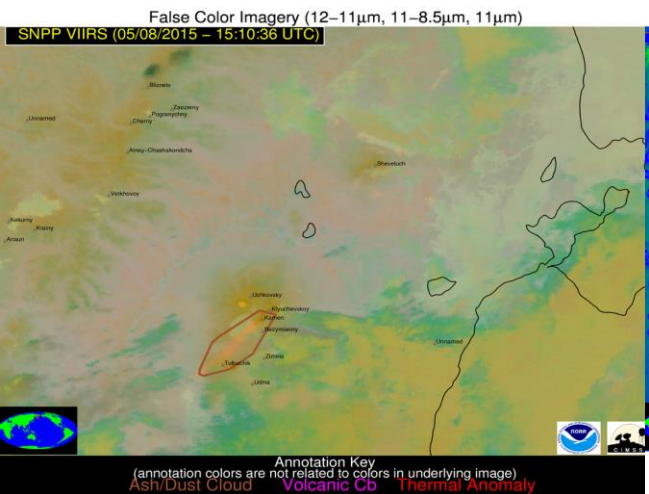
Volcanic Cb

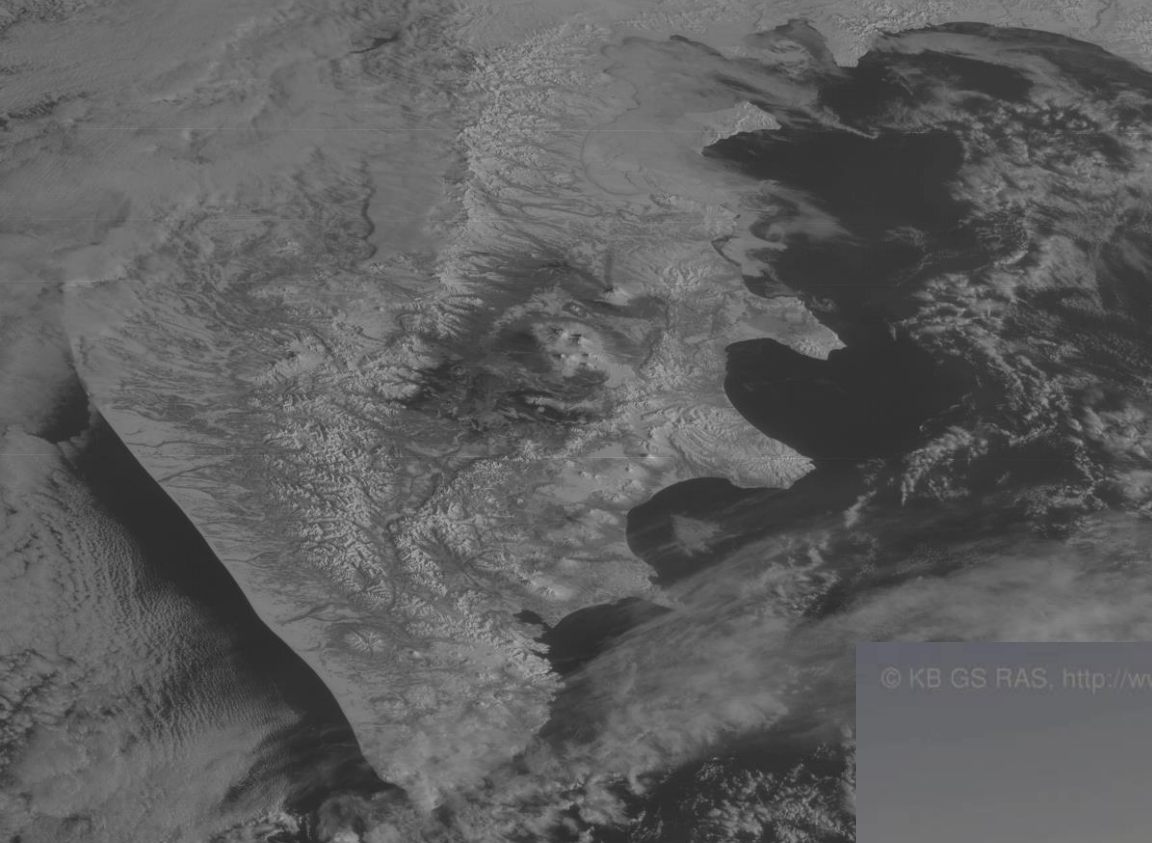
SO₂

Thermal Anomaly



Major Impact 2: More timely detection of explosive eruptions





Kamchatka, Russia

March 25, 2015

© KB GS RAS, http://www.emsd.ru/video/SHIVELUCH/img_1.jpg

10 HIMAWARI-8 @ 64 UM 25 MAR 15 22:00 UTC UM SSEC CIMSS



© KB GS RAS, Shiveluch volcano 2015-03-25 21:55:01

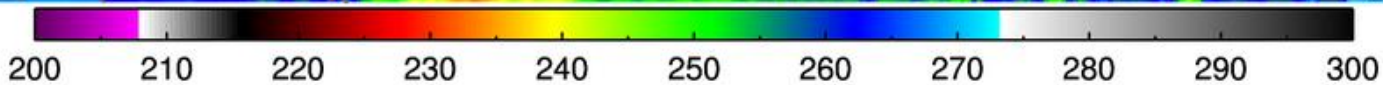
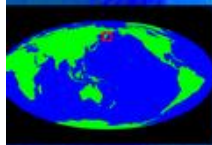
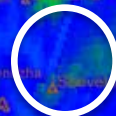
March 25, 2015 (22:03 UTC)



Color Enhanced Infrared Imagery (11 μ m)

HIMAWARI-8 AHI (03/25/2015 – 22:00:00 UTC)

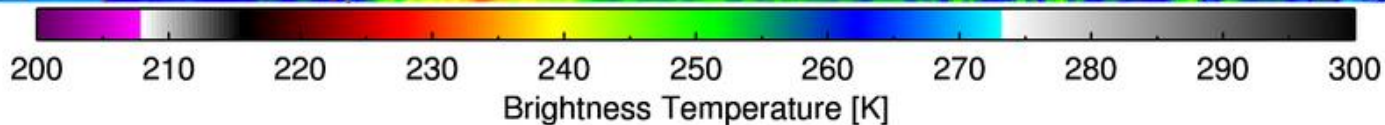
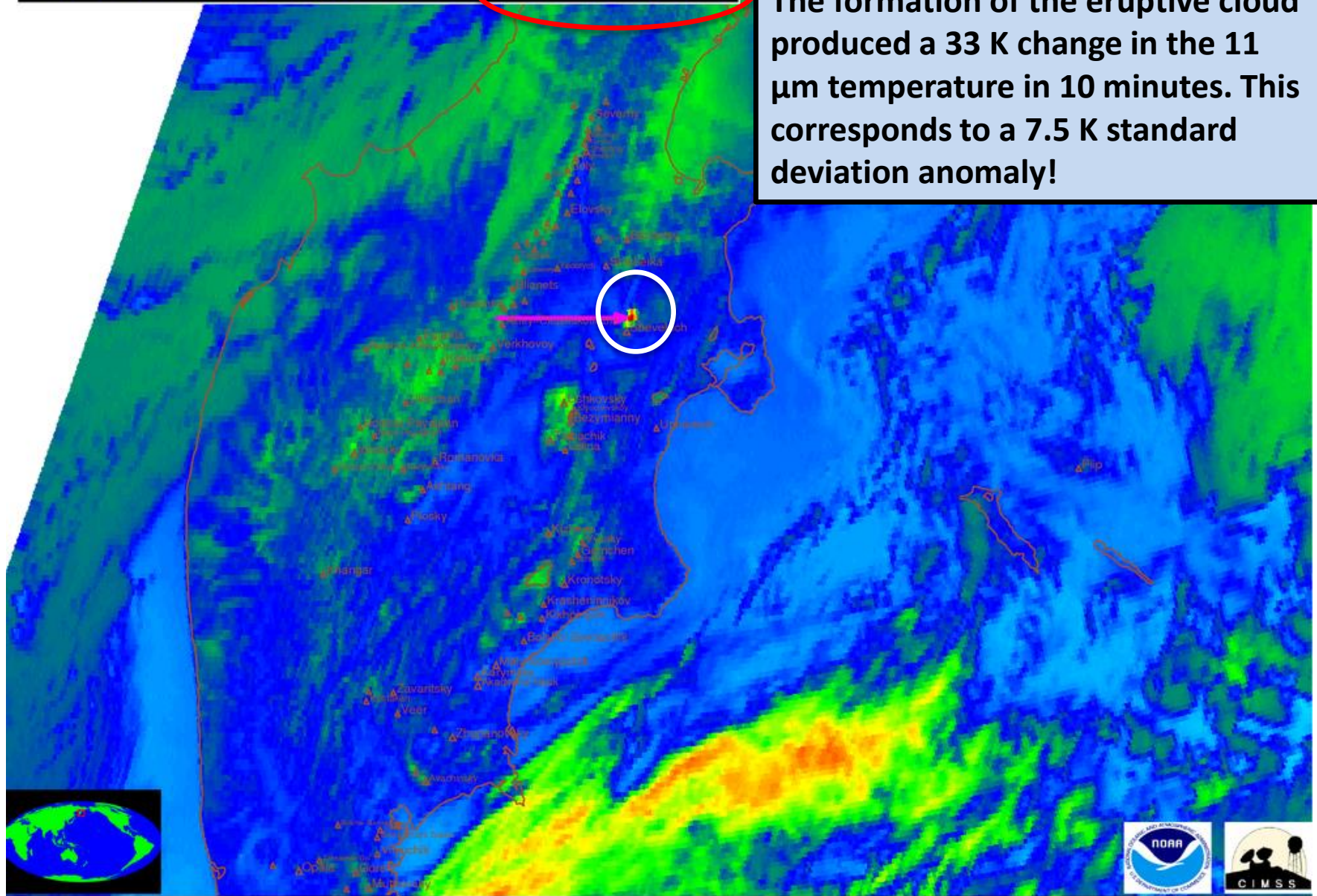
Kamchatka



Color Enhanced Infrared Imagery (11 μ m)

HIMAWARI-8 AHI (03/25/2015 – 22:10:00 UTC)

The formation of the eruptive cloud produced a 33 K change in the 11 μ m temperature in 10 minutes. This corresponds to a 7.5 K standard deviation anomaly!



@*****VOLCANIC ALERTS*****

STARTING DATE/TIME OF IMAGE: 2015-03-25 22:10:00 [UTC]

PRODUCTION DATE/TIME OF ALERT: 2015-04-20 22:26:26 [UTC]

PRIMARY INSTRUMENT: Himawari-8 AHI

WMO SPACECRAFT ID: 173

LOCATION/ORBIT: GEO

L1 FILE: HS_H08_20150325_2210_B14_FLDK

VOLCANO DATABASE: /data/common/VOLCAT_DATA/alerts/Volca

NUMBER OF ASH CLOUD ALERTS: 0

NUMBER OF VOLCANIC Cb ALERTS: 1

NUMBER OF VOLCANIC THERMAL ANOMALY ALERTS: 0

NUMBER OF SO2 CLOUD ALERTS: 0

POSSIBLE VOLCANIC ERUPTION DETECTED

Alert Status: New Alert Object

Alert Confidence: HIGH

Identification Method: Anomalous Growth Over Volcan

Latitude of Radiative Center: 56.62 [degrees]

Longitude of Radiative Center: 161.28 [degrees]

Mean Object Date/Time: 2015-03-25 22:10:17 [UTC]

Mean Viewing Angle: 67.6 [degrees]

Mean Solar Zenith Angle: 67.1 [degrees]

Nearby Volcanoes (meeting alert criteria):

Sheveluch(1.3 km)

Maximum Height [AMSL]: 11.3 [km] (37065 [ft])

90th Percentile Height [AMSL]: 10.7 [km] (35095 [ft])

Mean Tropopause Height [AMSL]: 9.6 [km] (31343 [ft])

Trend in IR Brightness Temperature: -33.3 [K]

Vertical Growth Rate Time Interval: 10 [minutes]

Vertical Growth Rate Anomaly: 7.5 [number of stddev]

Total Area: 163.3 [km^2]

Country/Countries: Russia

Volcanic Region(s): Kamchatka and Mainland Asia

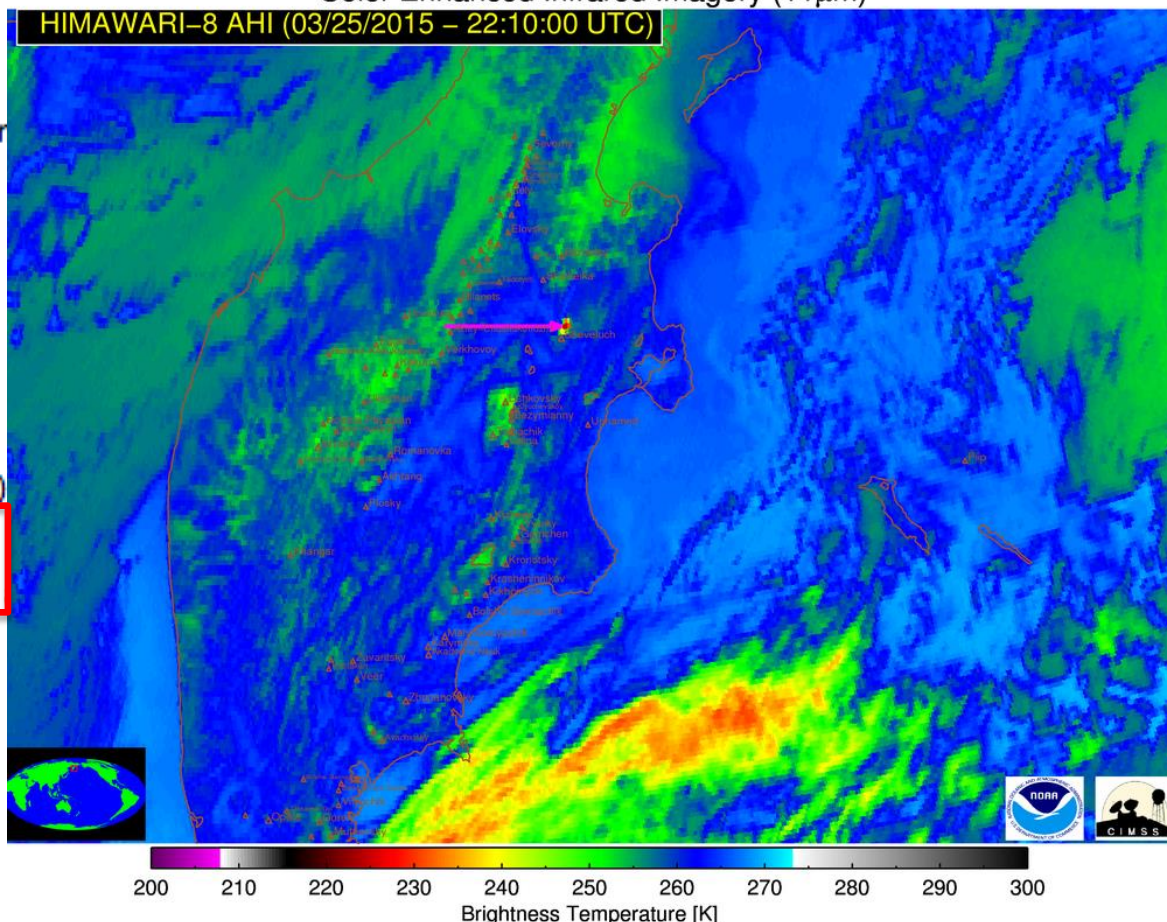
Volcanic Subregion(s): Kamchatka Peninsula

VAAC Region(s) of Nearby Volcanoes: Tokyo

FIR Region(s) of Nearby Volcanoes: Unknown

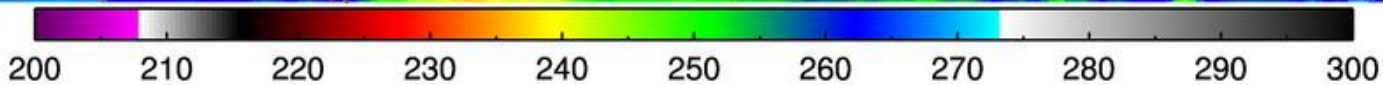
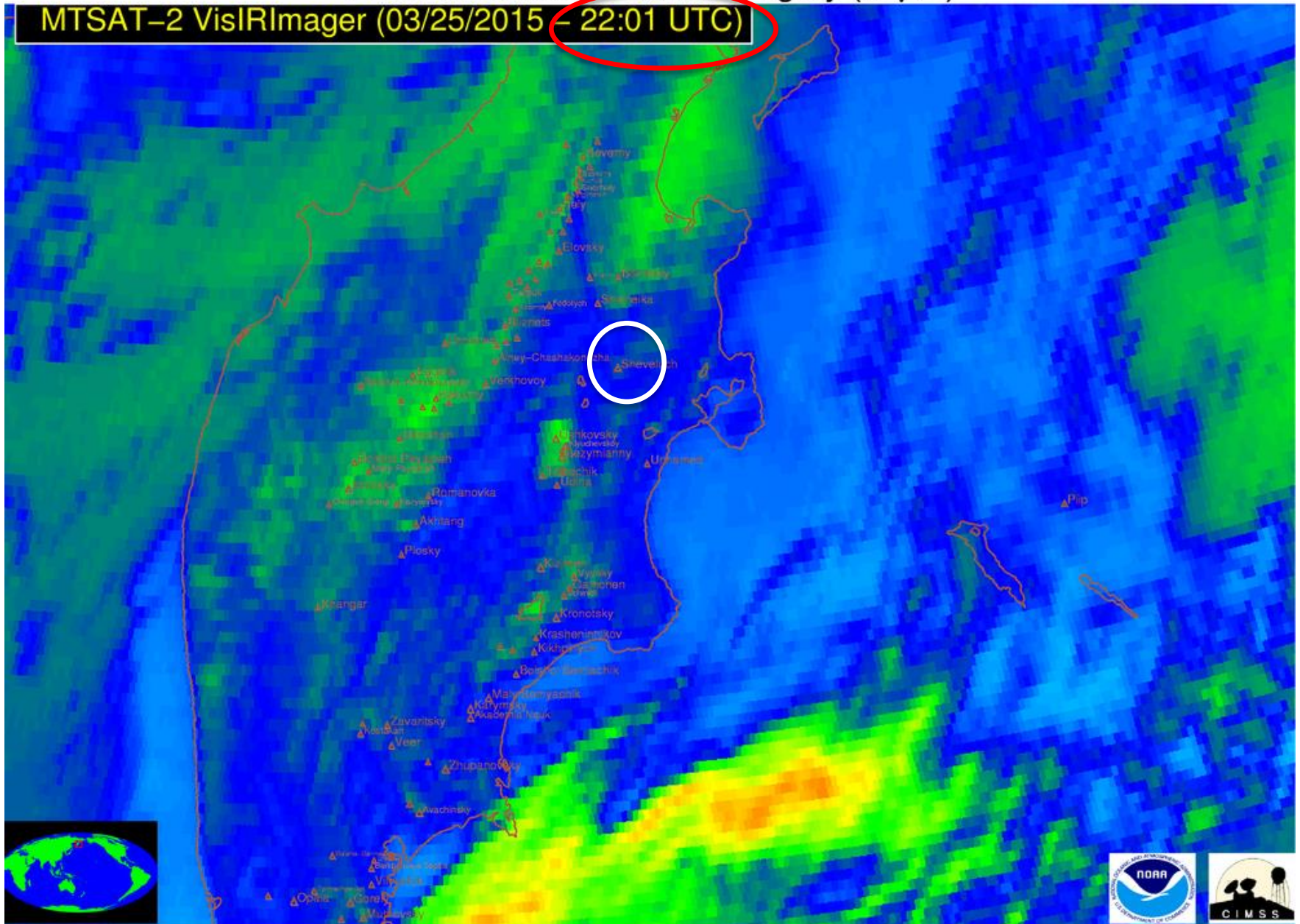
The formation of the eruptive cloud produced a 33 K change in the 11 μm temperature. This corresponds to a 7.5 K standard deviation anomaly, resulting in the generation of an alert.

Color Enhanced Infrared Imagery (11 μm)



Color Enhanced Infrared Imagery (11 μ m)

MTSAT-2 VisIRImager (03/25/2015 - 22:01 UTC)

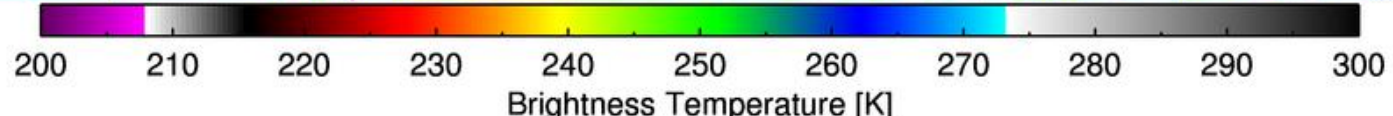
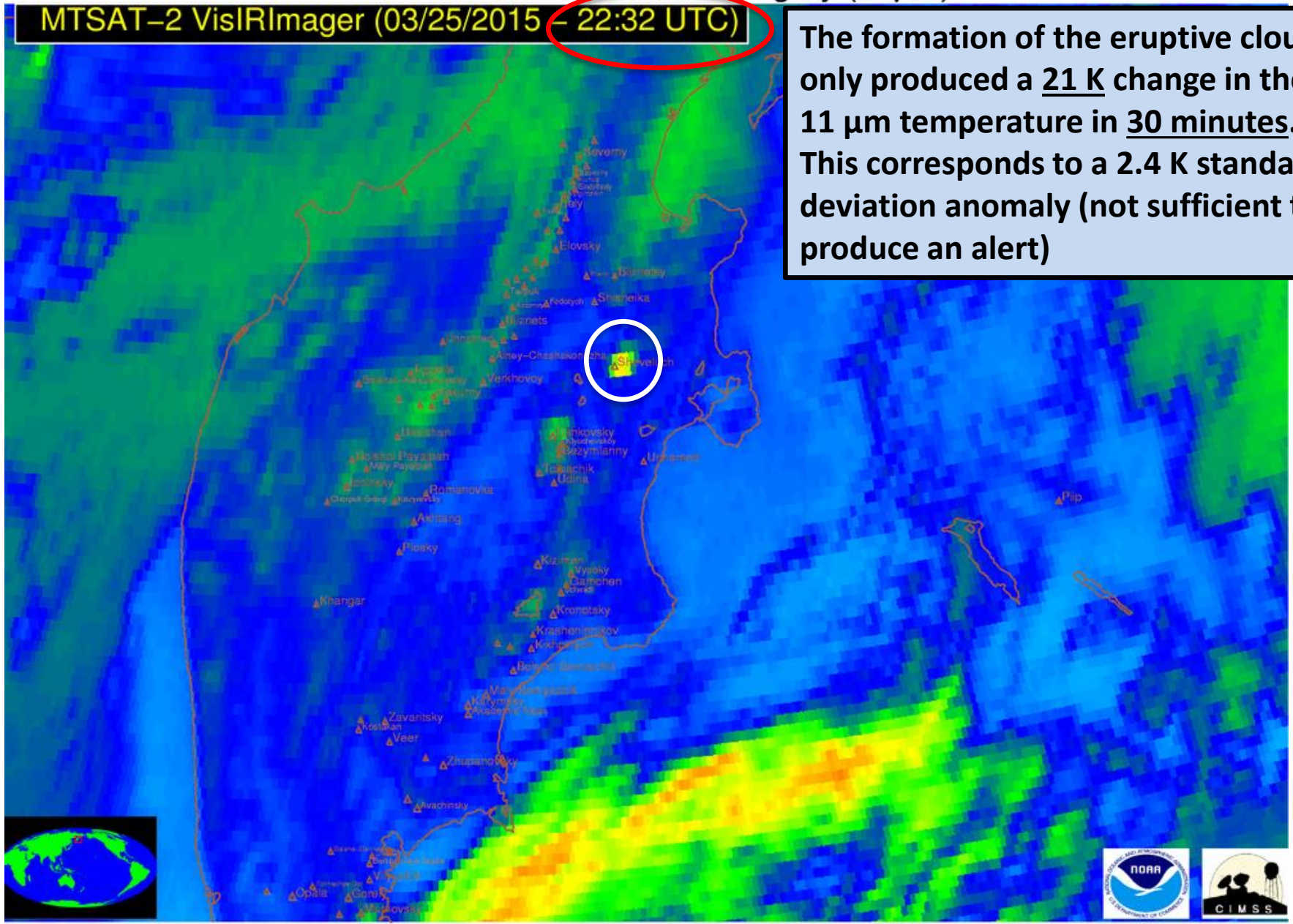


Brightness Temperature [K]

Color Enhanced Infrared Imagery (11 μ m)

MTSAT-2 VisIRImager (03/25/2015 - 22:32 UTC)

The formation of the eruptive cloud only produced a 21 K change in the 11 μ m temperature in 30 minutes. This corresponds to a 2.4 K standard deviation anomaly (not sufficient to produce an alert)



Early Detection of Explosive Volcanic Eruptions by Quantifying the Evolution of the Cloud in Time

July 31, 2015
Manam Volcano, PNG

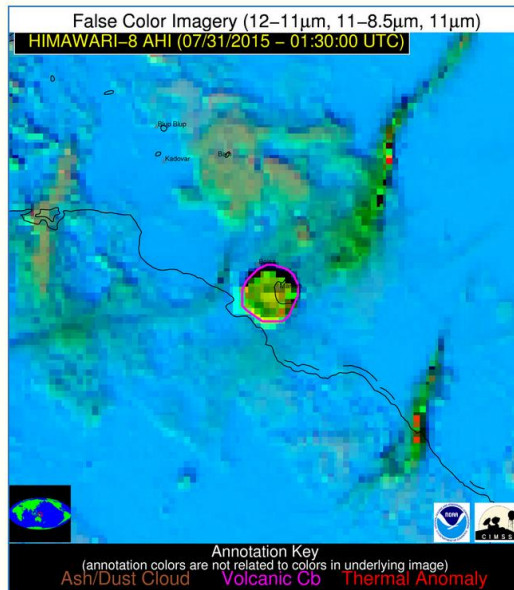
Actual near real-time results

Volcanic Cloud Alert Report

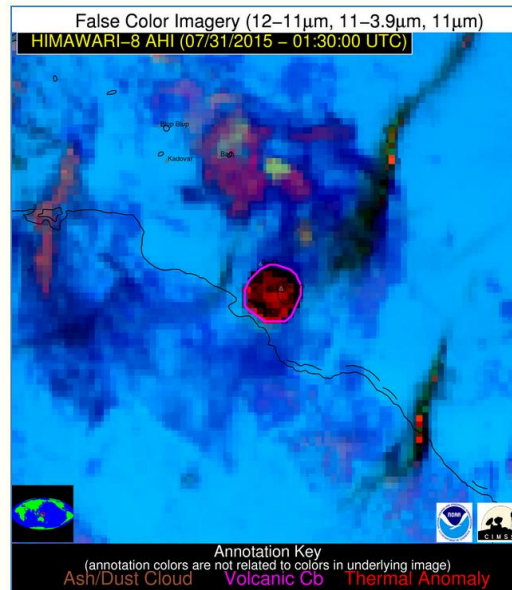
DATE:	2015-07-31
TIME:	01:30:00
Production Date and Time:	2015-07-31 02:01:32 UTC
PRIMARY INSTRUMENT:	Himawari-8 AHI

[More details ▼](#)

Possible Volcanic Cb



[False Color Image \(12-11, 11-8.5, 11\) \[zoomed-in\]](#)



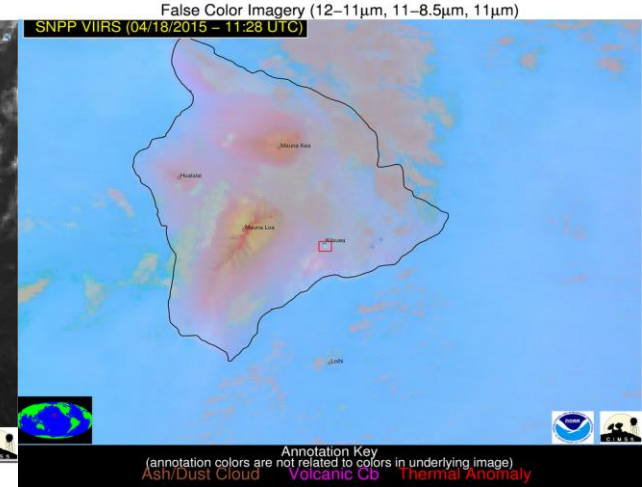
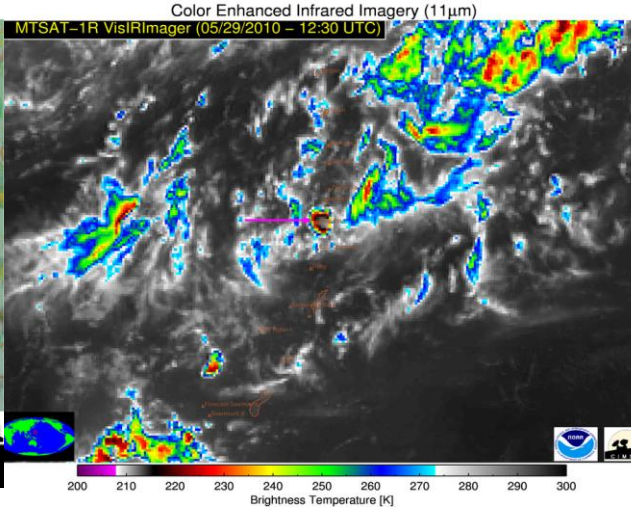
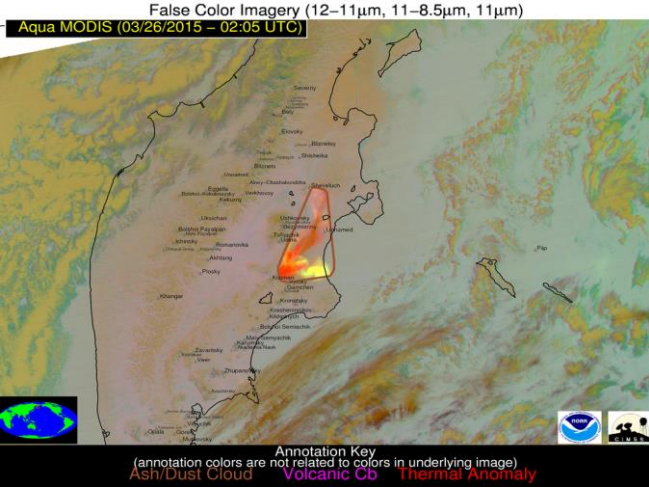
[False Color Image \(12-11, 11-3.9, 11\) \[zoomed-in\]](#)

Basic Information

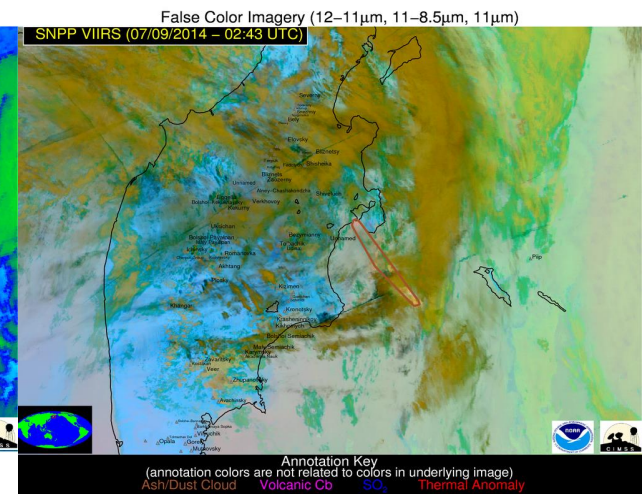
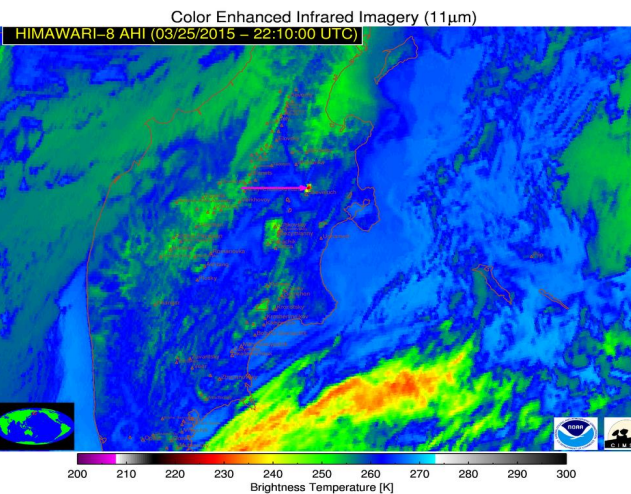
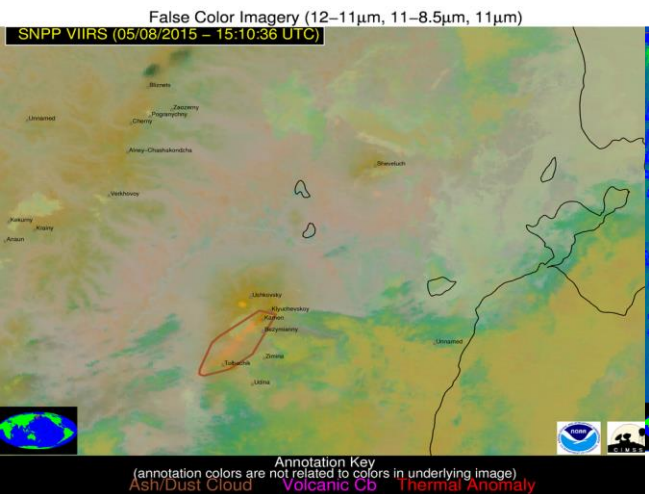
Volcanic Region(s)	Melanesia and Australia
Country/Countries	Papua New Guinea
Volcanic Subregion(s)	Northeast of New Guinea
VAAC Region(s) of Nearby Volcanoes	Darwin
Mean Object Date/Time	2015-07-31 01:35:14UTC
Radiative Center (Lat, Lon):	-4.080 °, 145.020 °
Nearby Volcanoes (meeting alert criteria):	Manam (0.60 km) Boisa (0.90 km)
Trend in IR Brightness Temperature	-62.10 °C
Vertical Growth Rate Time Interval	10 minutes
Vertical Growth Rate Anomaly	11.60 number of stddev above mean
Maximum Height [AMSL]	22.30 km; 73163 ft
90th Percentile Height [AMSL]	18.80 km; 61680 ft
Mean Tropopause Height [AMSL]	16.40 km; 53806 ft

[Show More ▲](#)

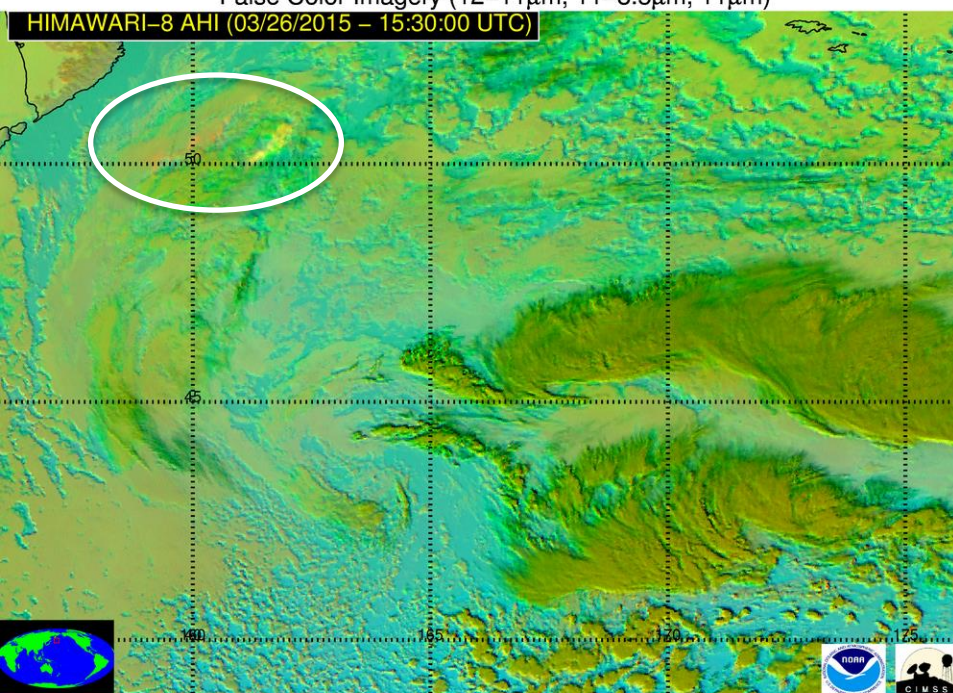
[View all event imagery ►](#)



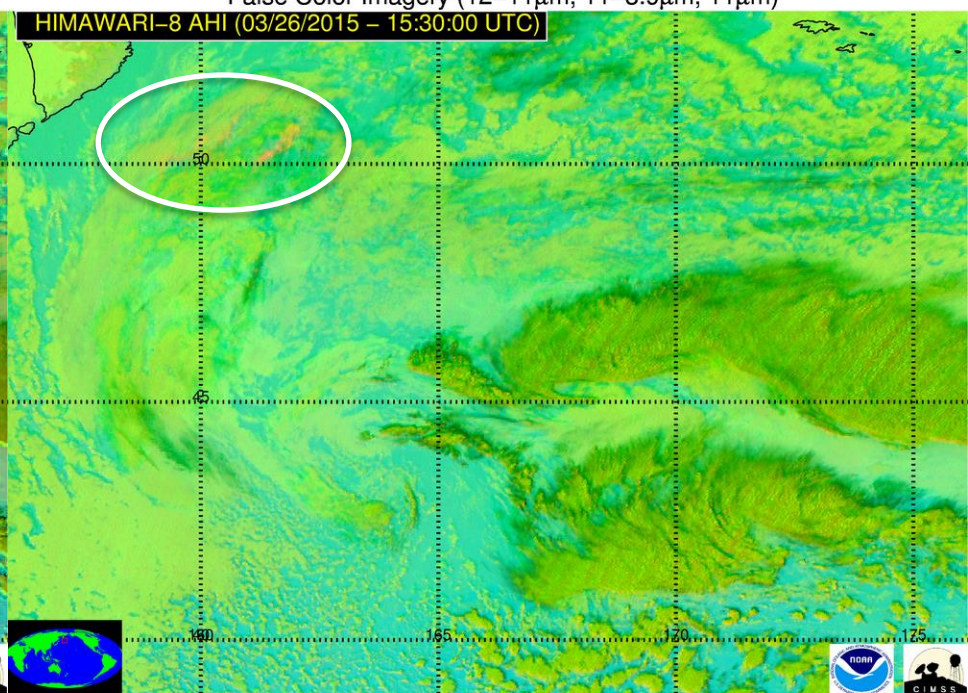
Major Impact 3: Ash cloud tracking



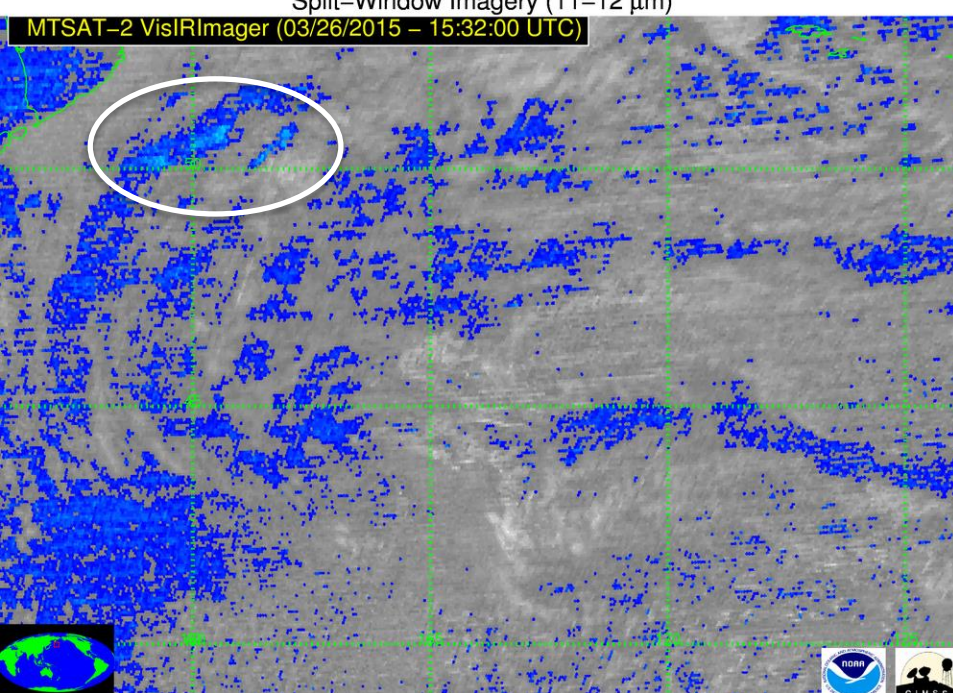
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



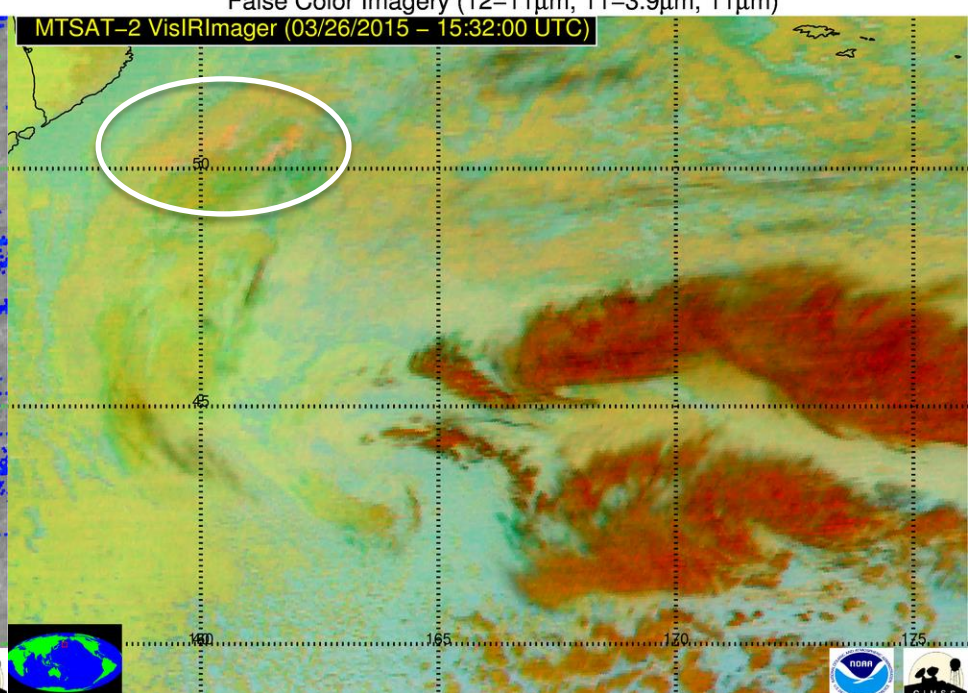
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



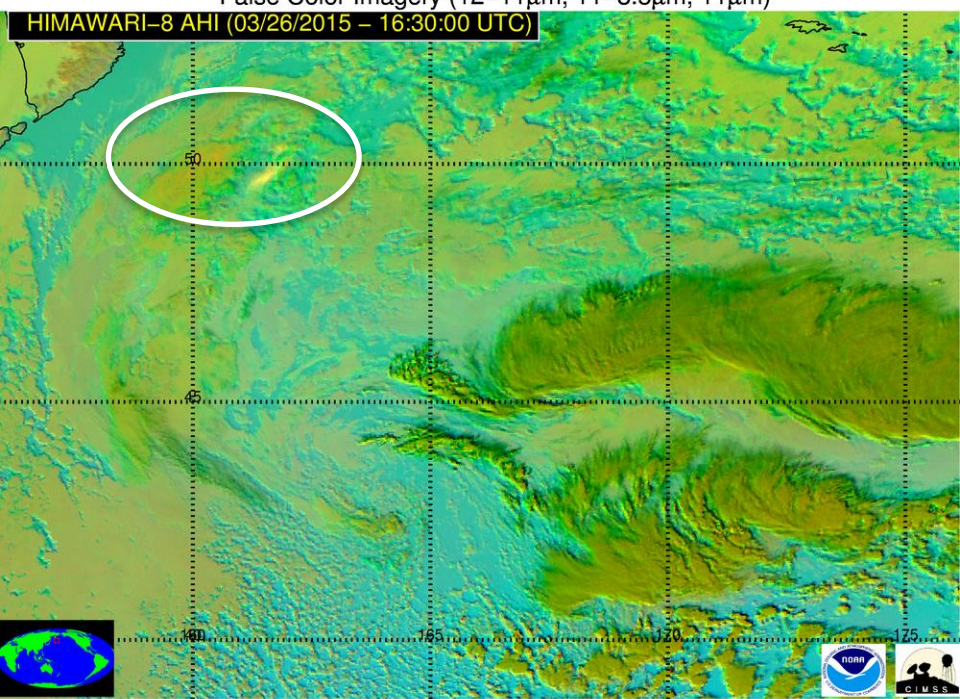
Split-Window Imagery (11–12 μ m)



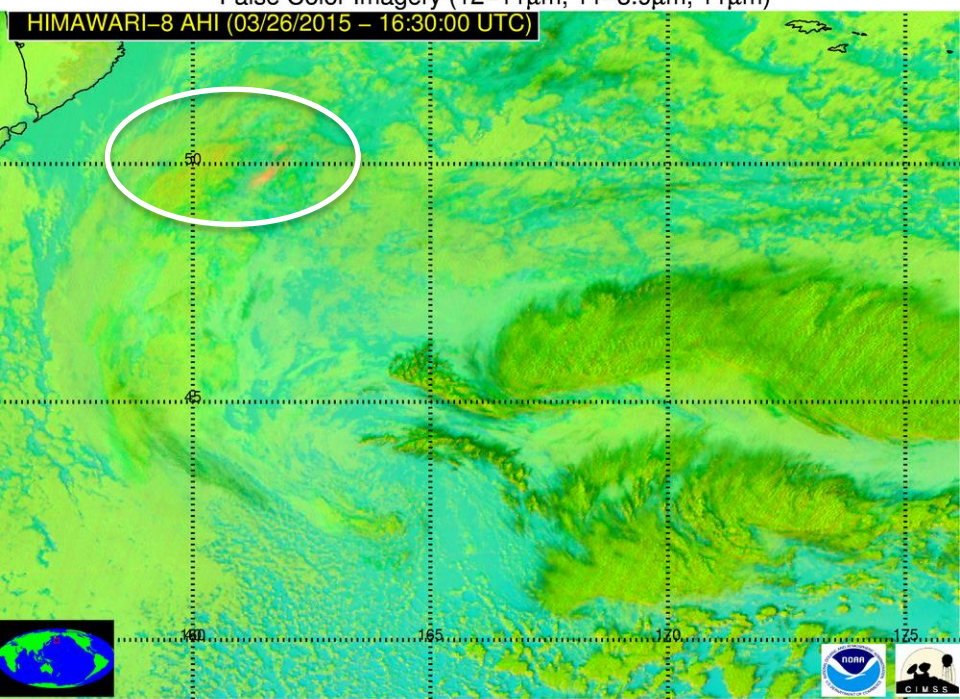
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



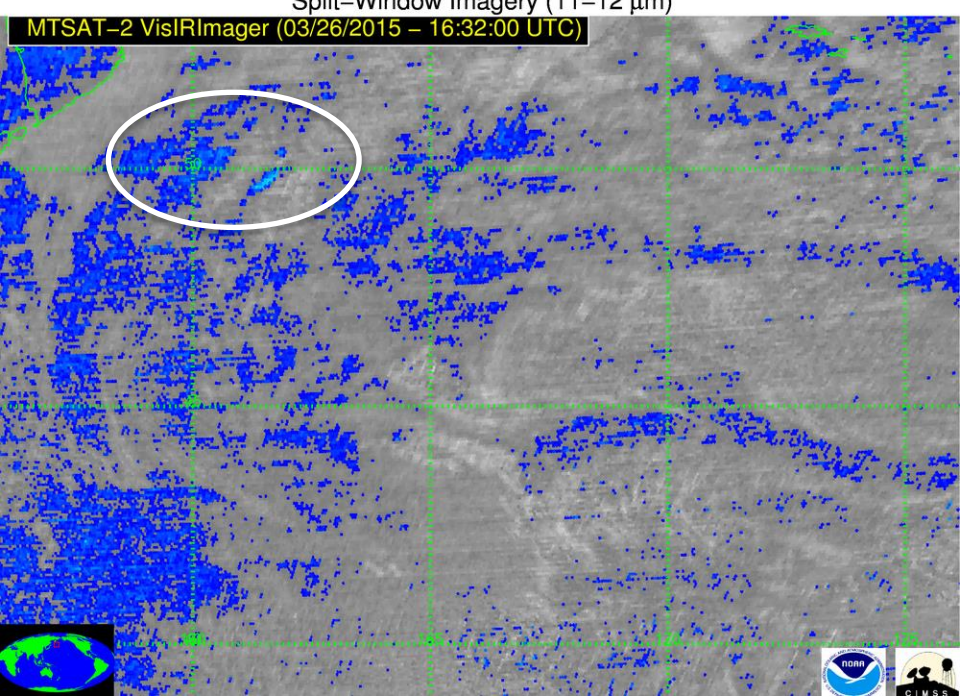
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



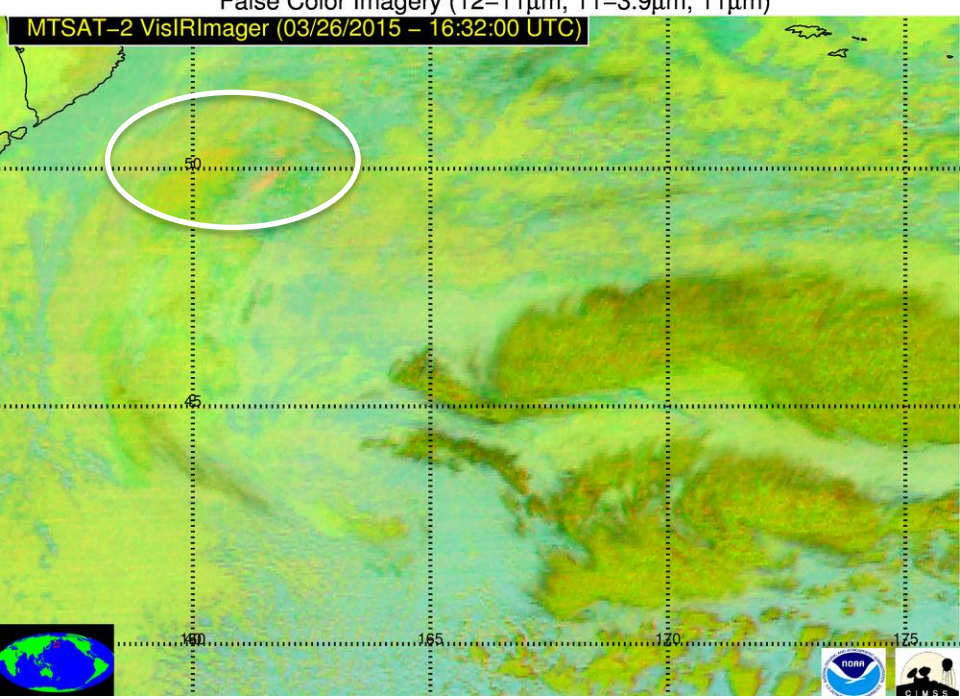
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



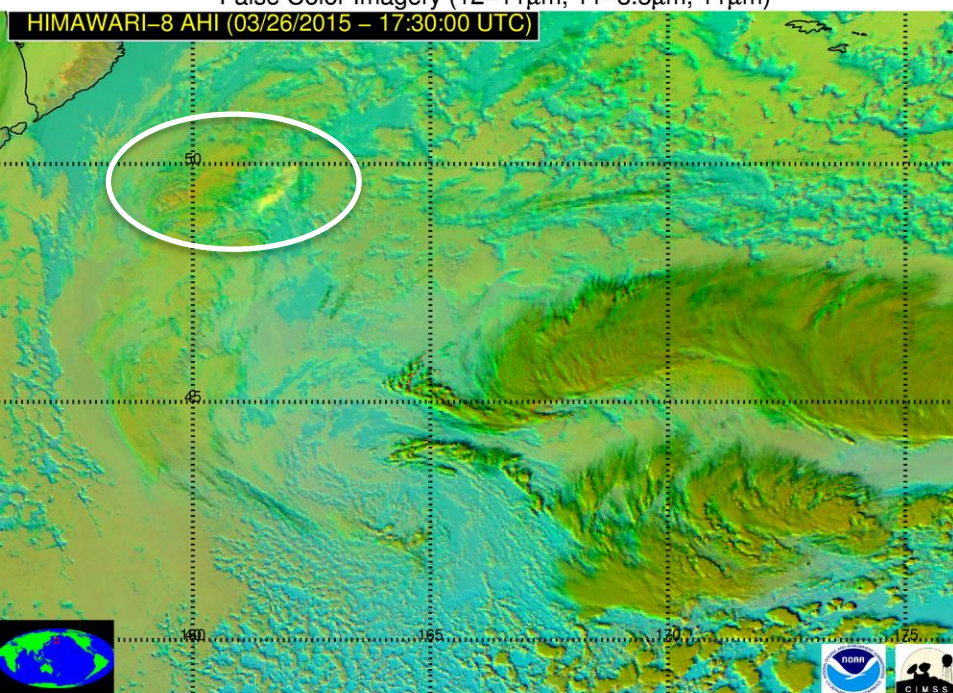
Split-Window Imagery (11–12 μ m)



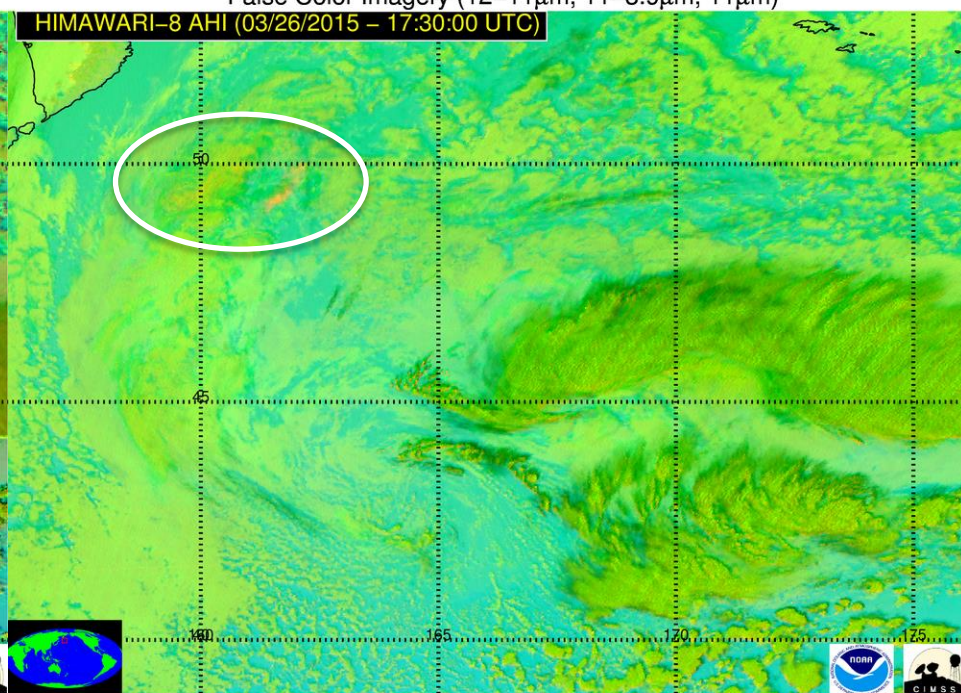
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



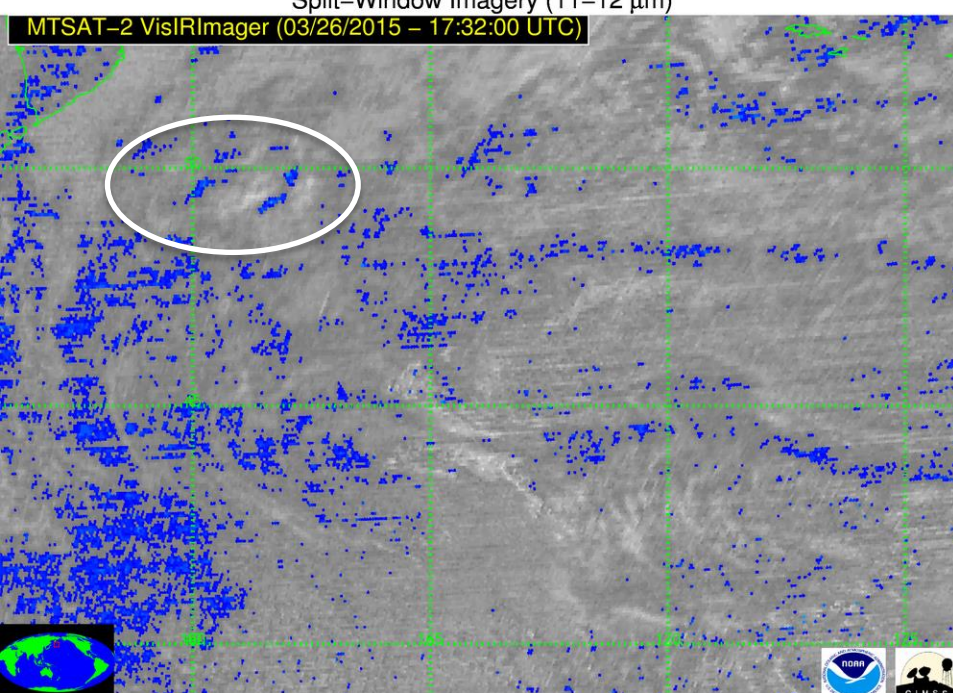
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



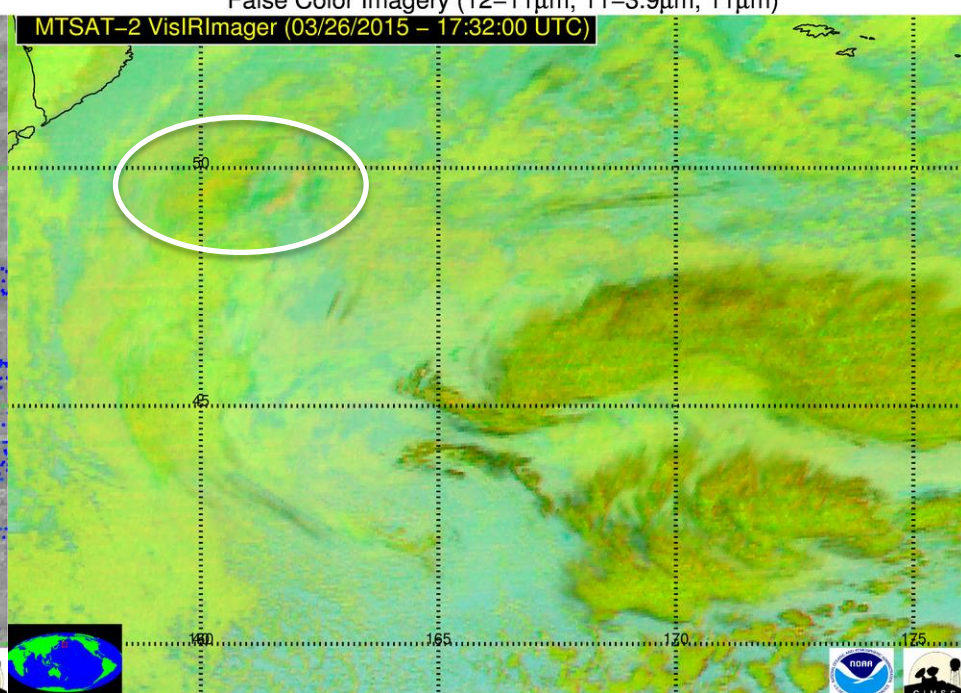
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



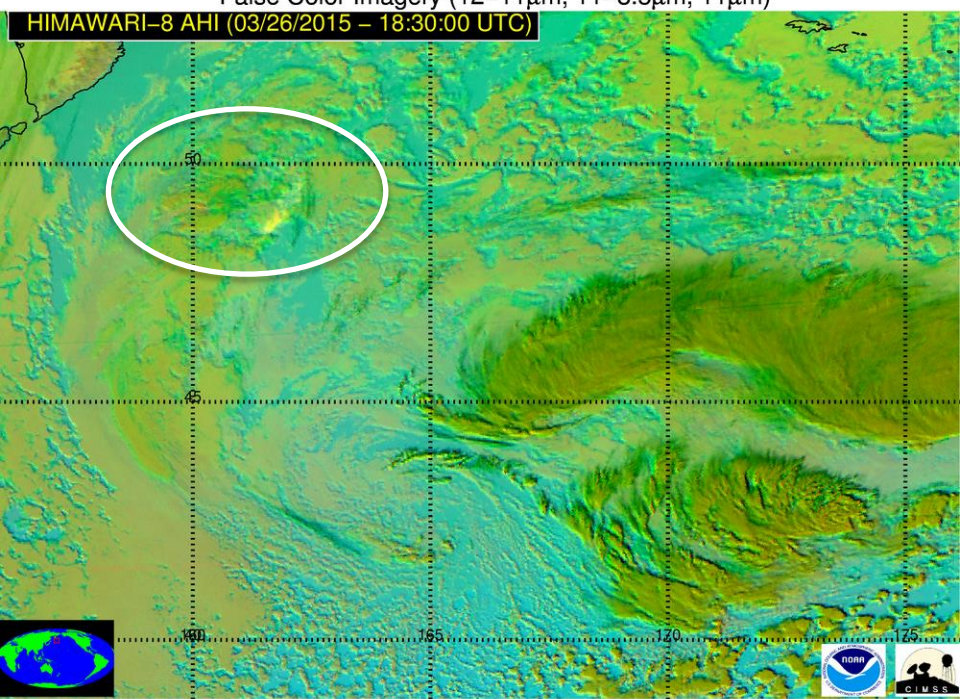
Split-Window Imagery (11–12 μ m)



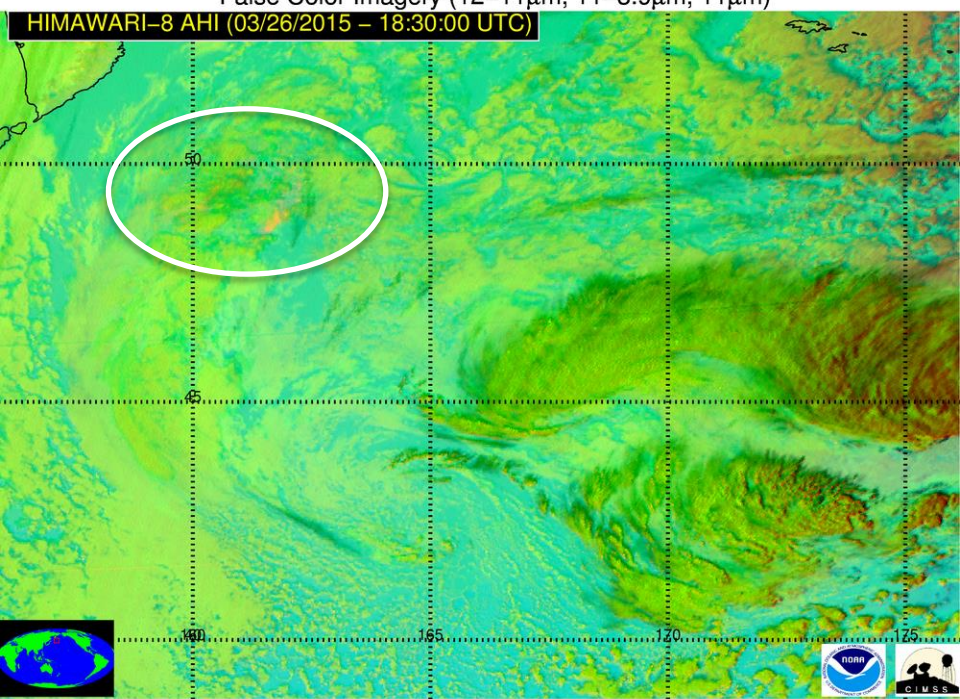
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



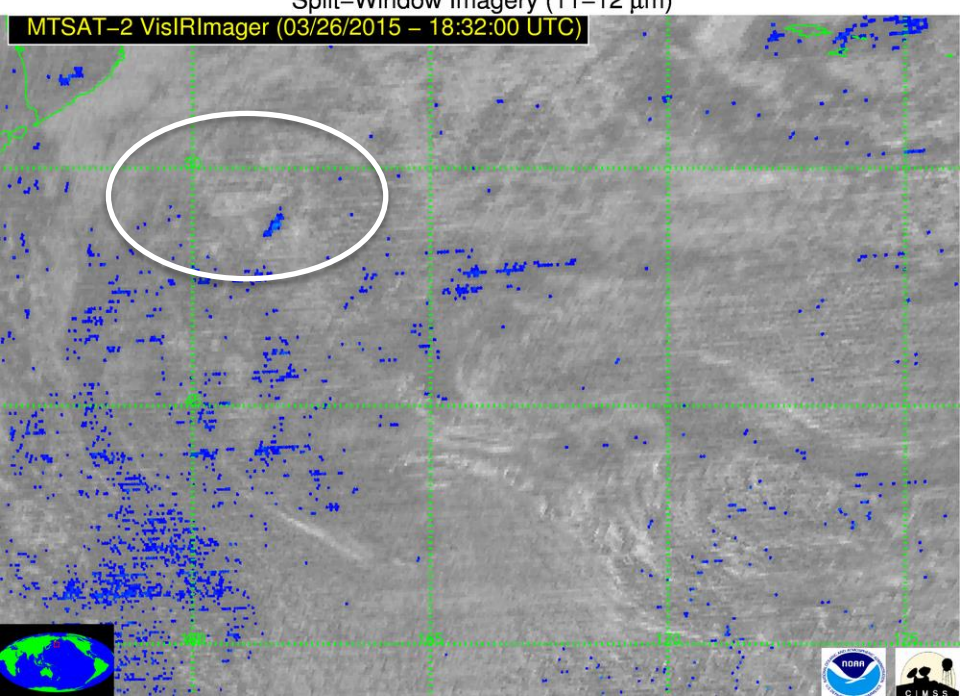
False Color Imagery (12–11 μm , 11–8.5 μm , 11 μm)



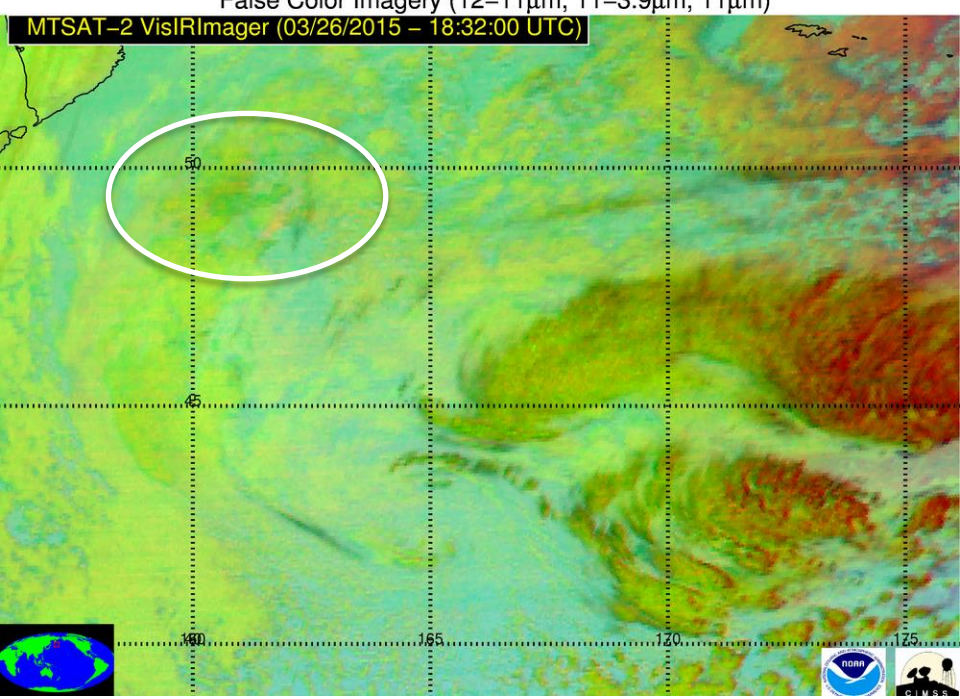
False Color Imagery (12–11 μm , 11–3.9 μm , 11 μm)



Split-Window Imagery (11–12 μm)

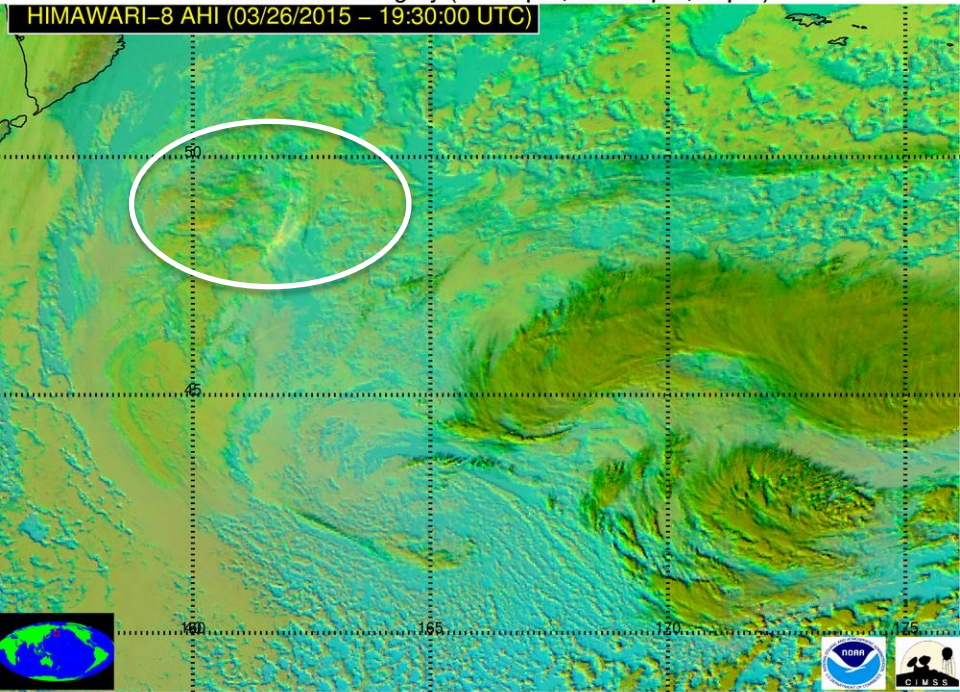


False Color Imagery (12–11 μm , 11–3.9 μm , 11 μm)



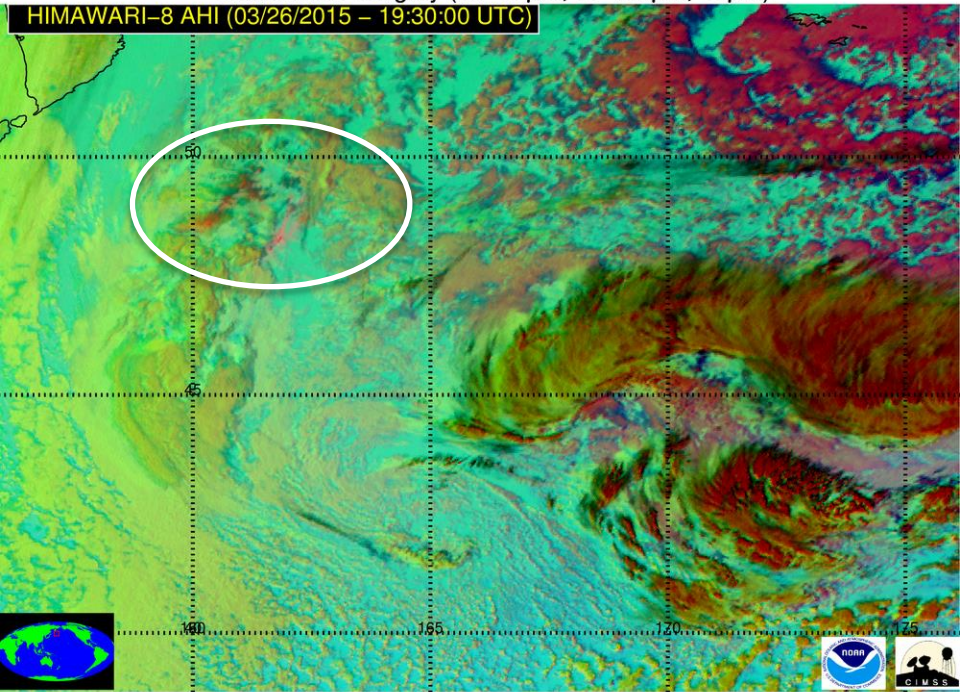
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

HIMAWARI-8 AHI (03/26/2015 – 19:30:00 UTC)



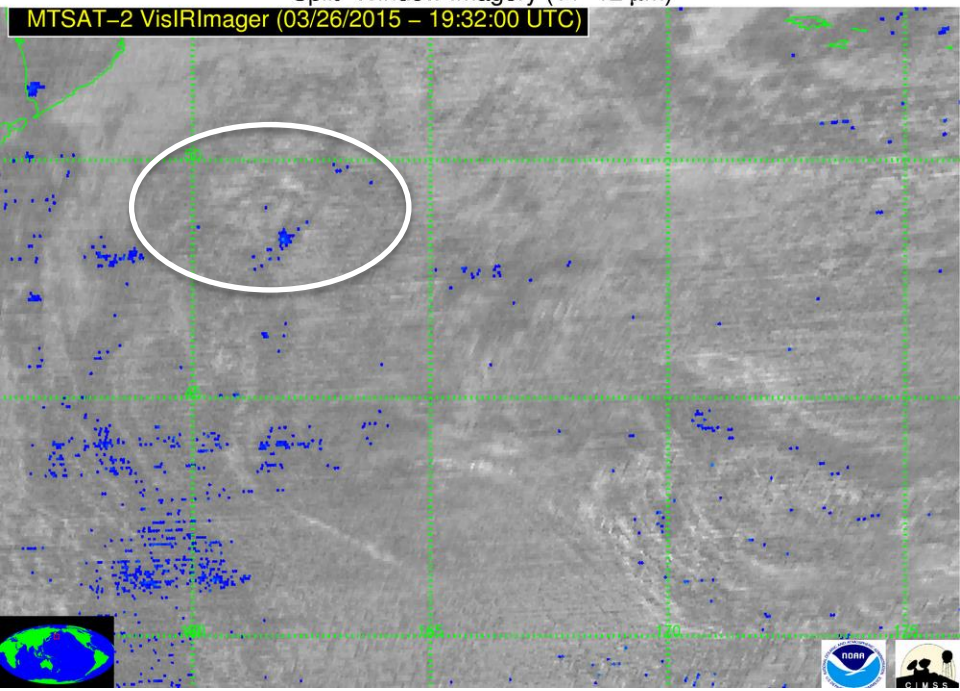
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

HIMAWARI-8 AHI (03/26/2015 – 19:30:00 UTC)



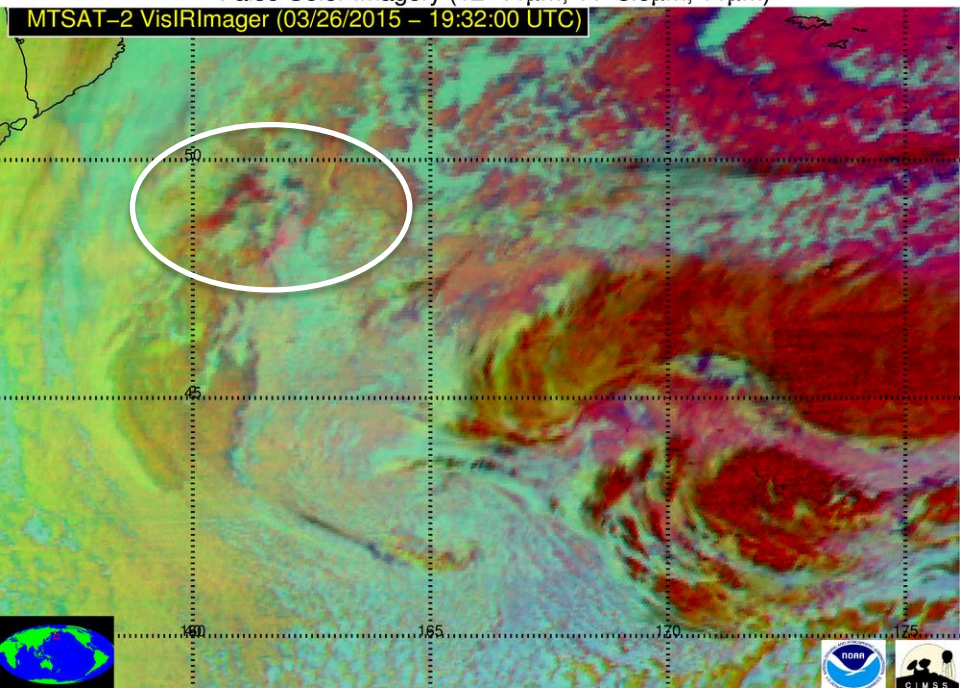
Split-Window Imagery (11–12 μ m)

MTSAT-2 VisIRImager (03/26/2015 – 19:32:00 UTC)

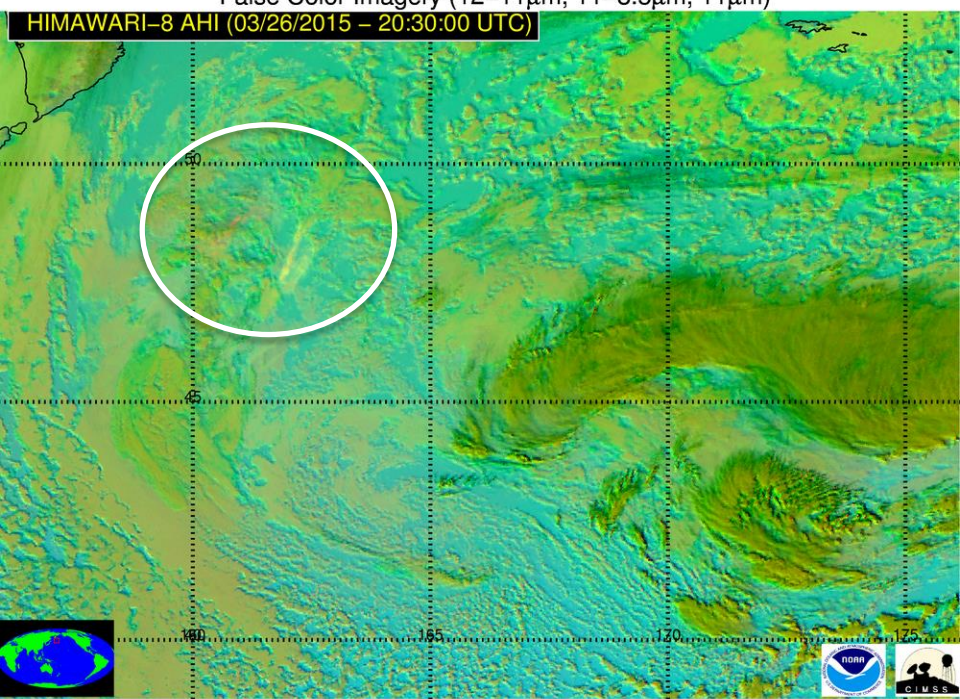


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

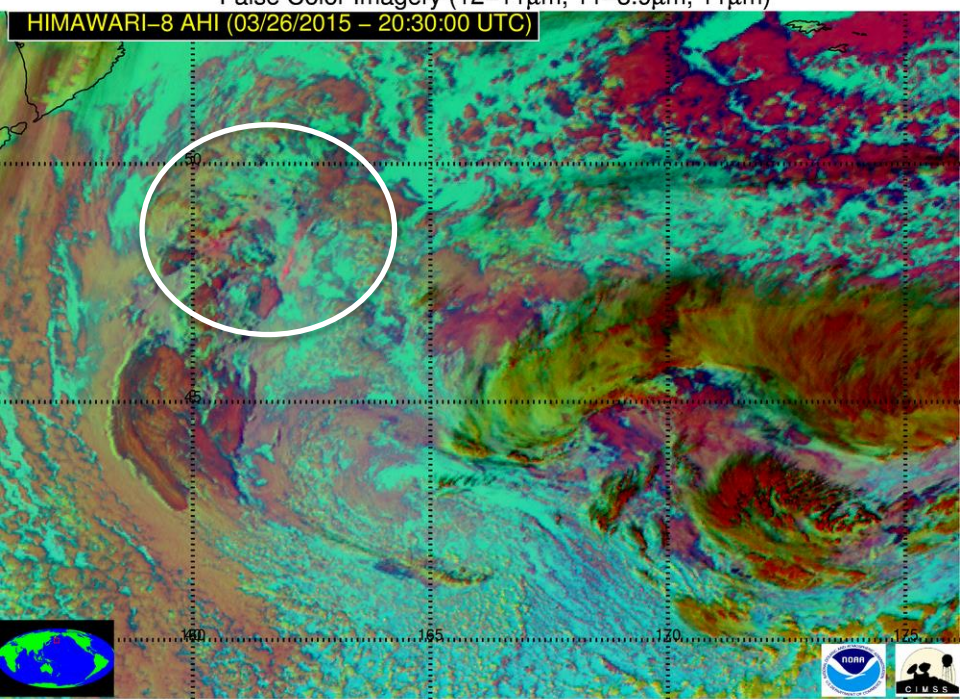
MTSAT-2 VisIRImager (03/26/2015 – 19:32:00 UTC)



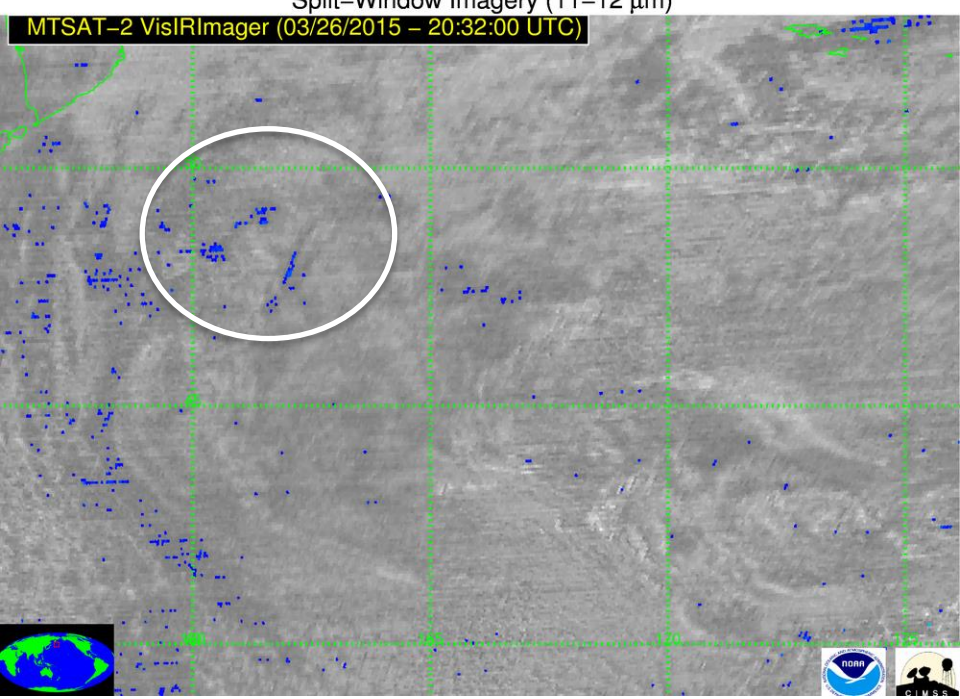
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



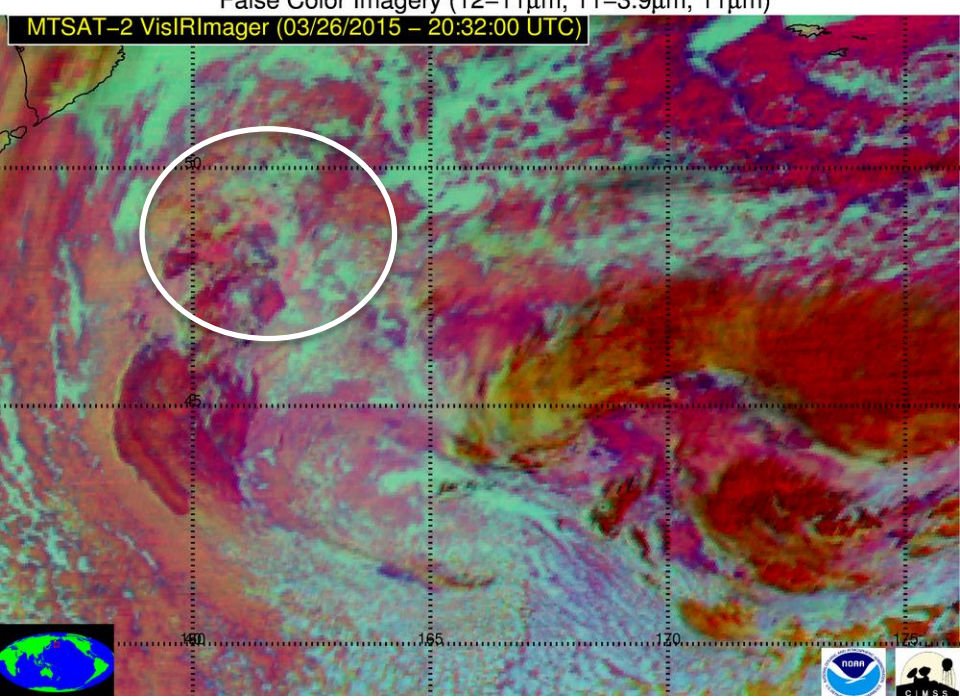
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



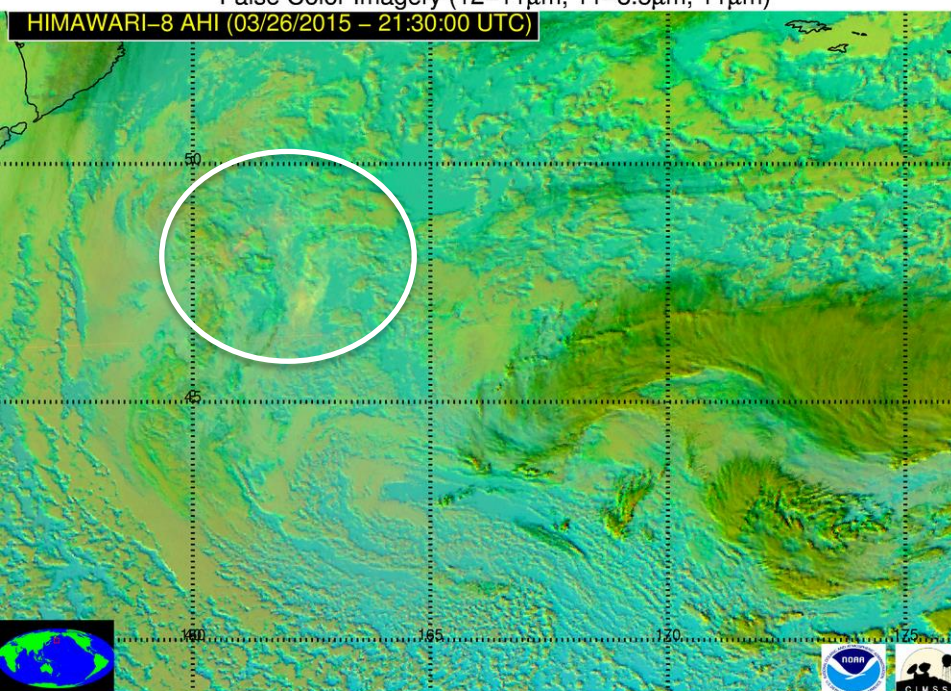
Split-Window Imagery (11–12 μ m)



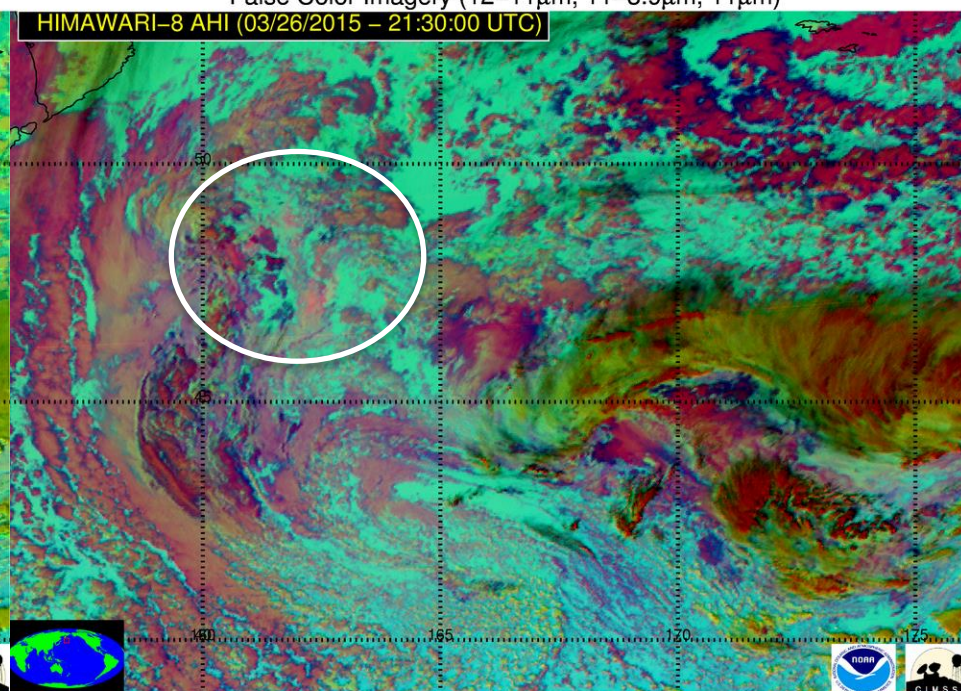
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



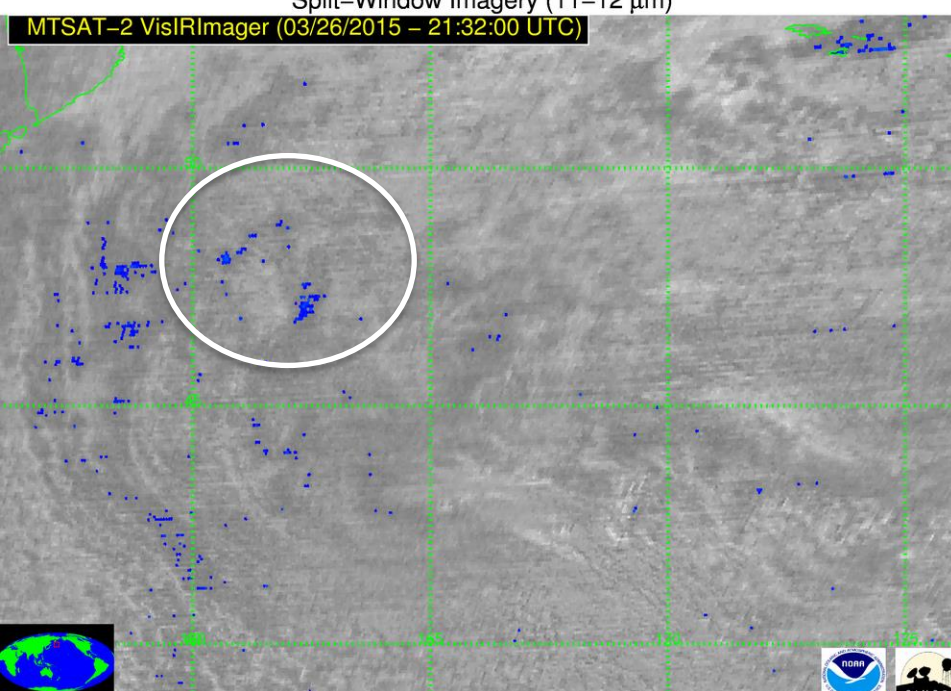
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



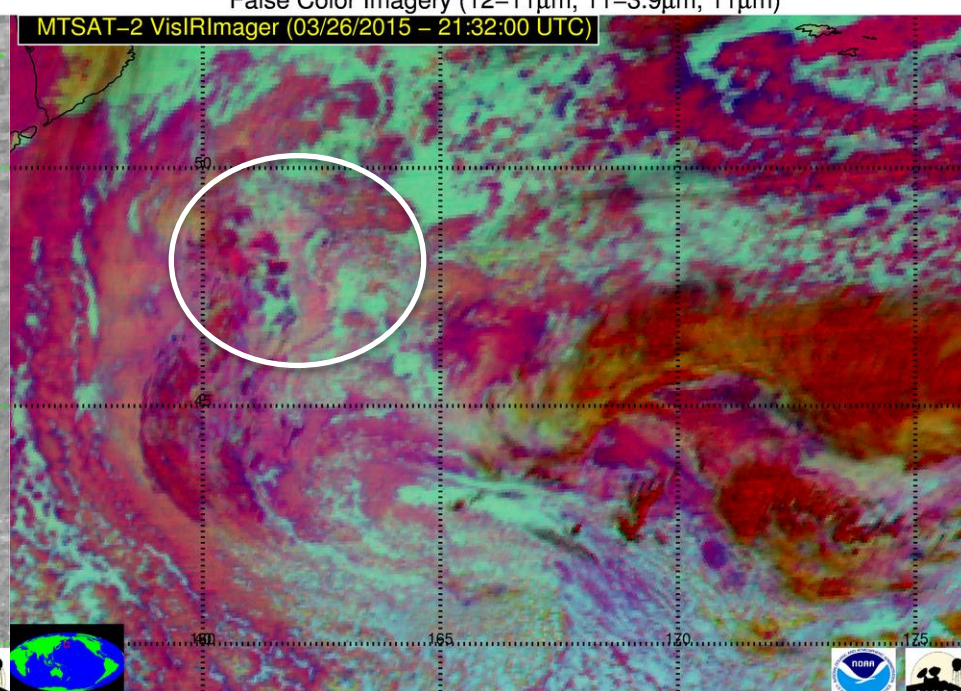
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



Split-Window Imagery (11–12 μ m)

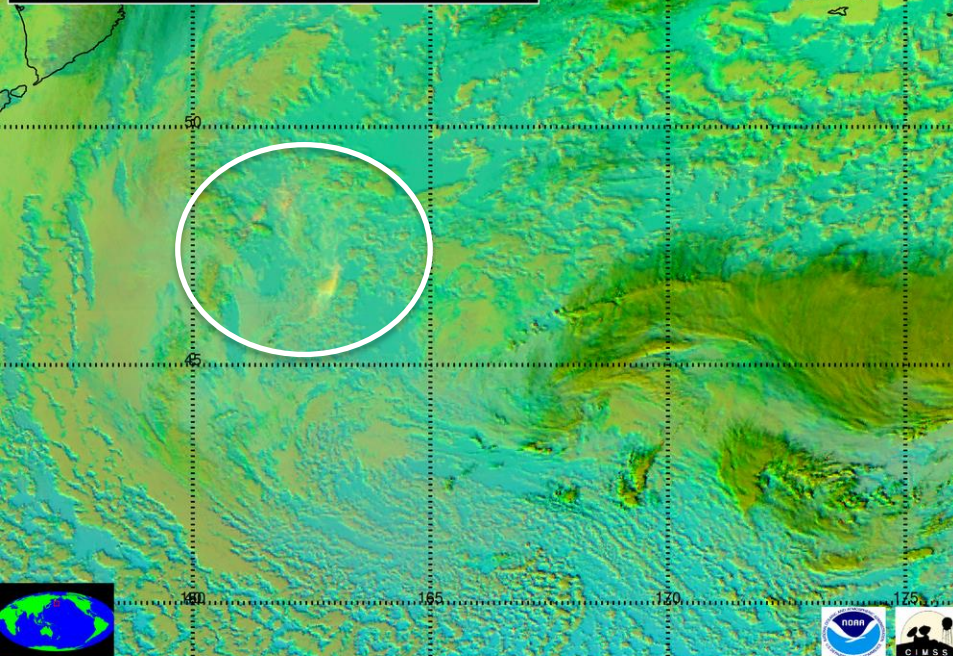


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



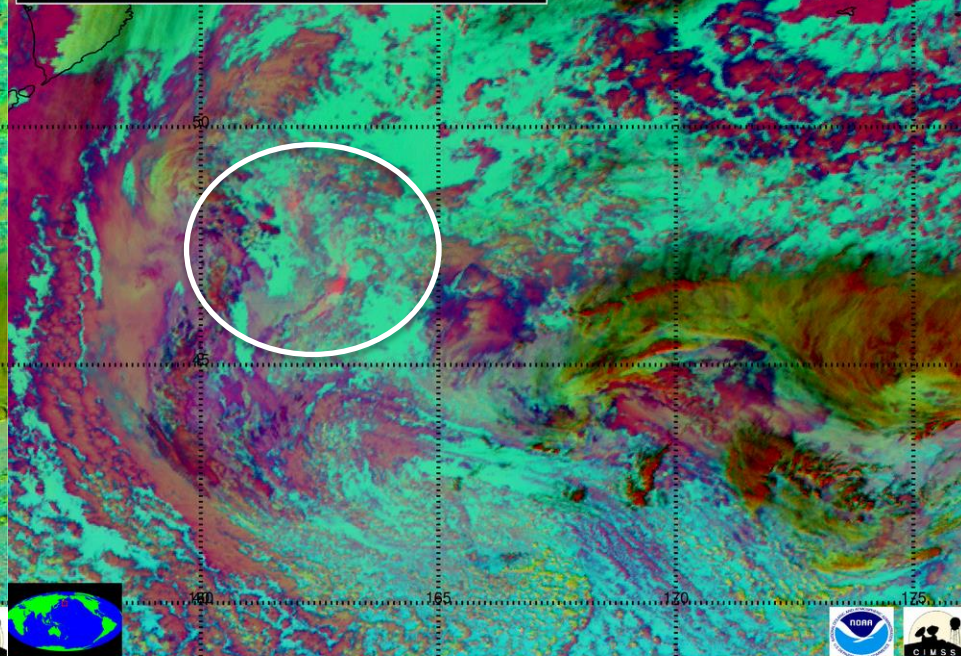
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

HIMAWARI-8 AHI (03/26/2015 – 22:30:00 UTC)



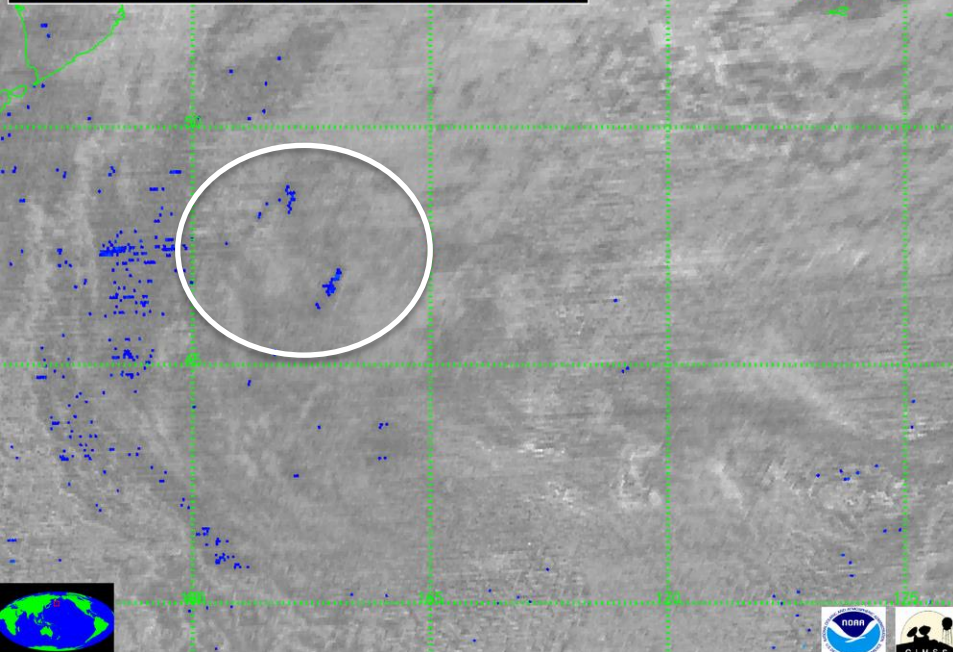
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

HIMAWARI-8 AHI (03/26/2015 – 22:30:00 UTC)



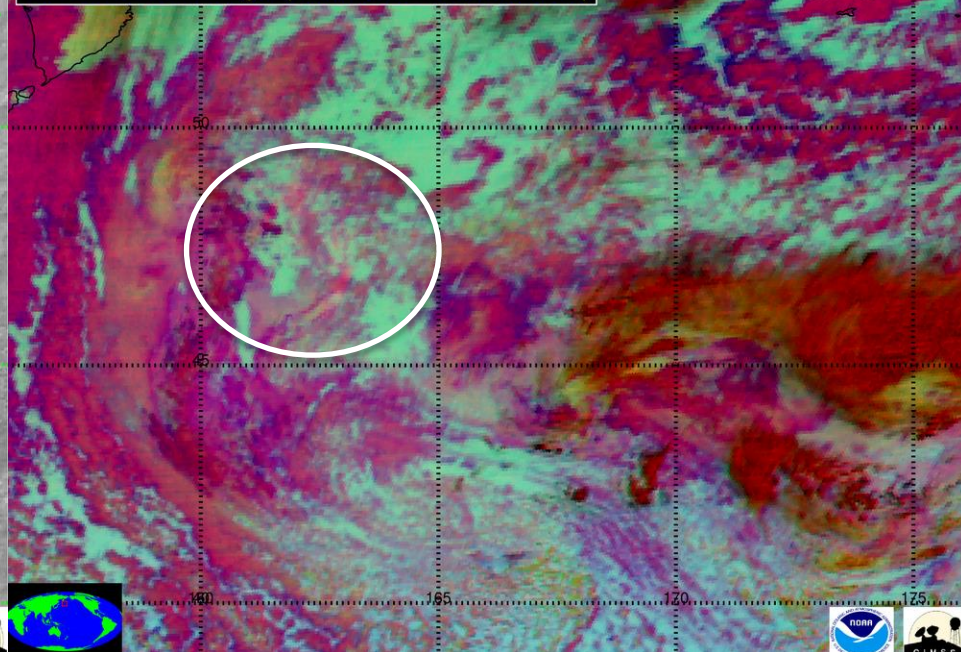
Split-Window Imagery (11–12 μ m)

MTSAT-2 VisIRImager (03/26/2015 – 22:32:00 UTC)

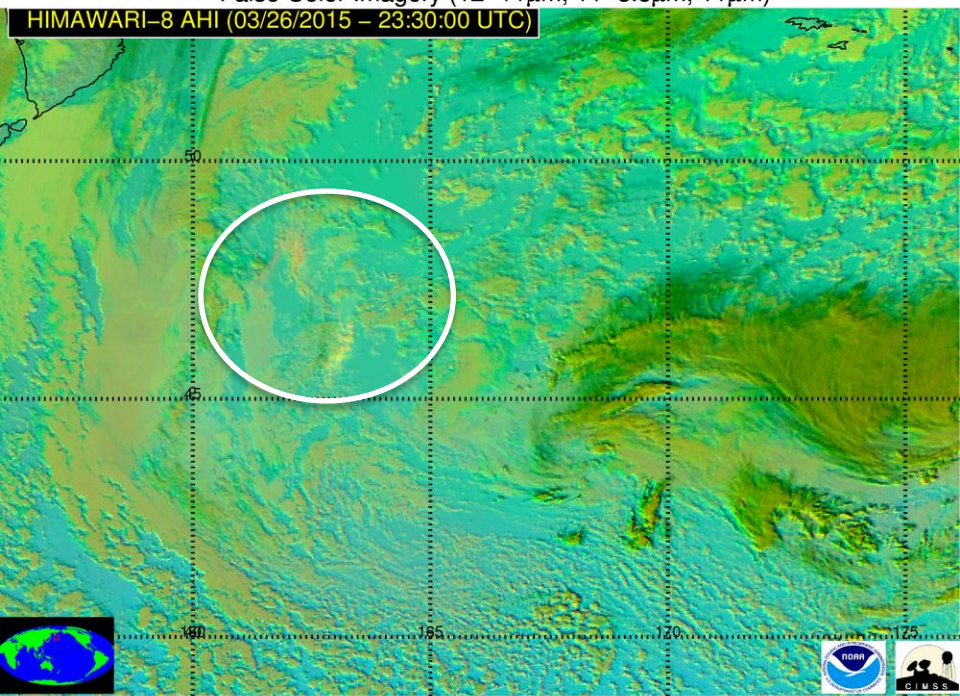


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

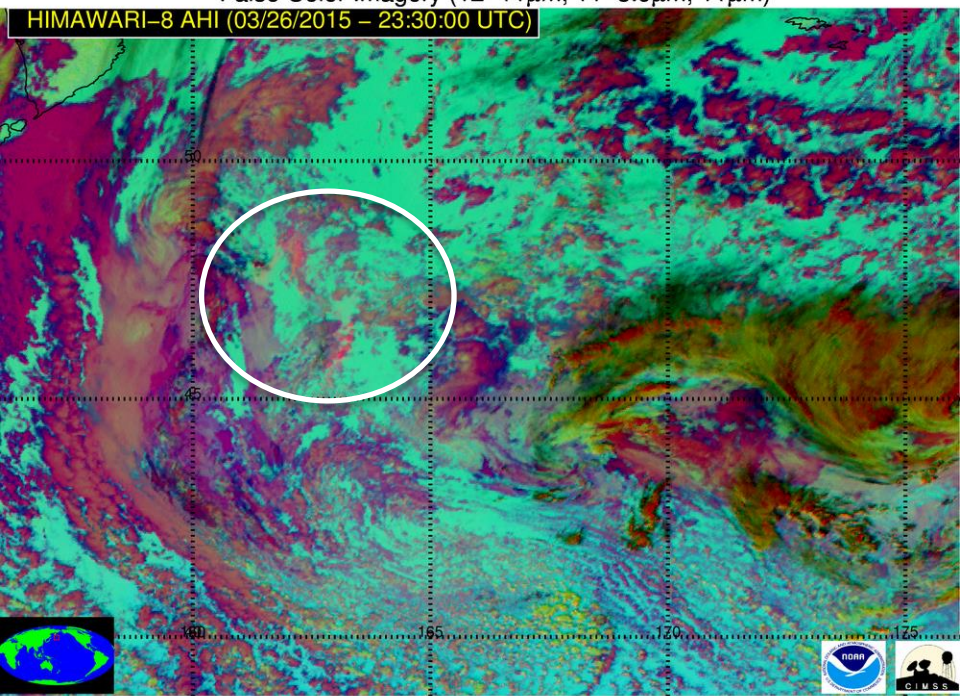
MTSAT-2 VisIRImager (03/26/2015 – 22:32:00 UTC)



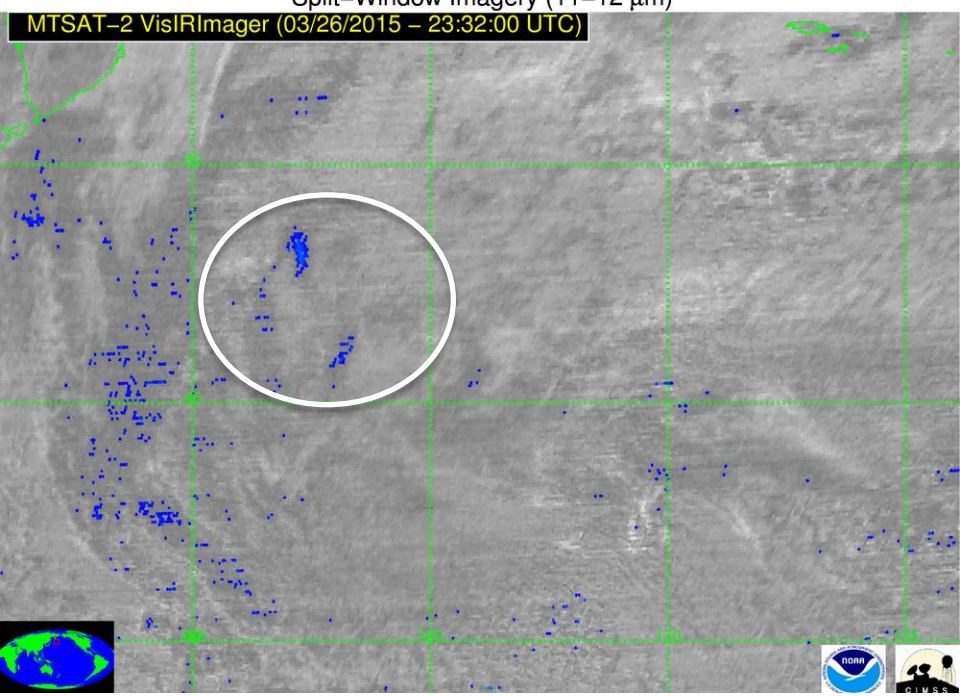
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



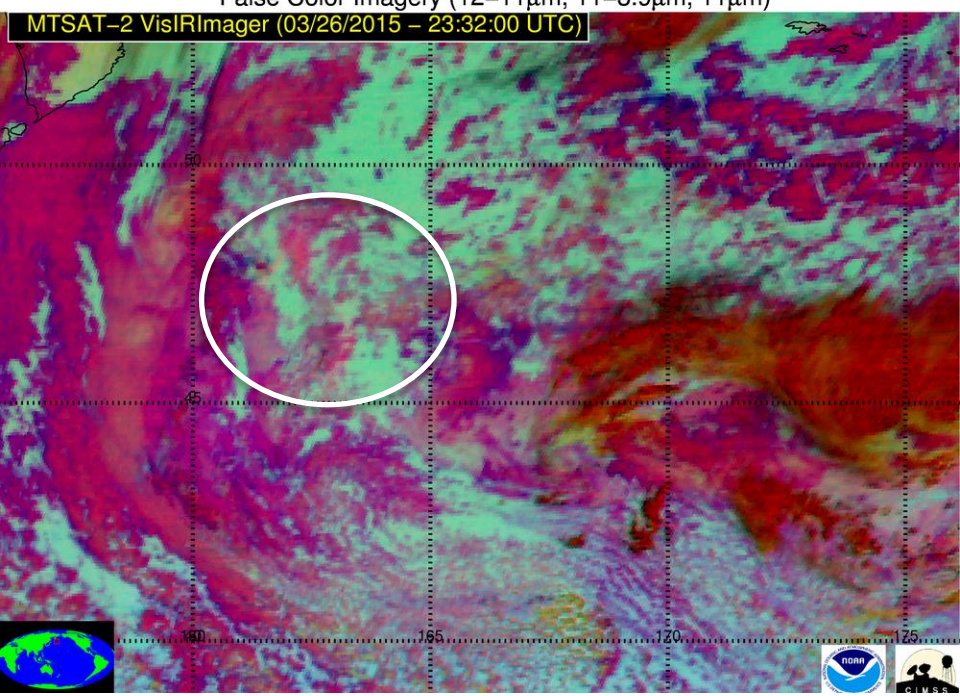
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



Split-Window Imagery (11–12 μ m)

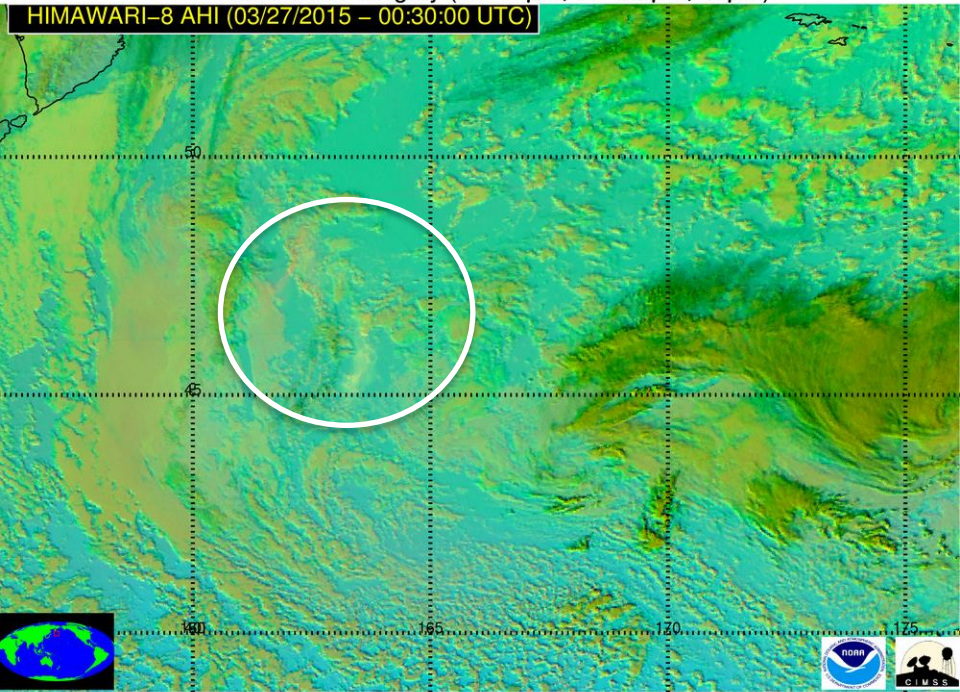


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



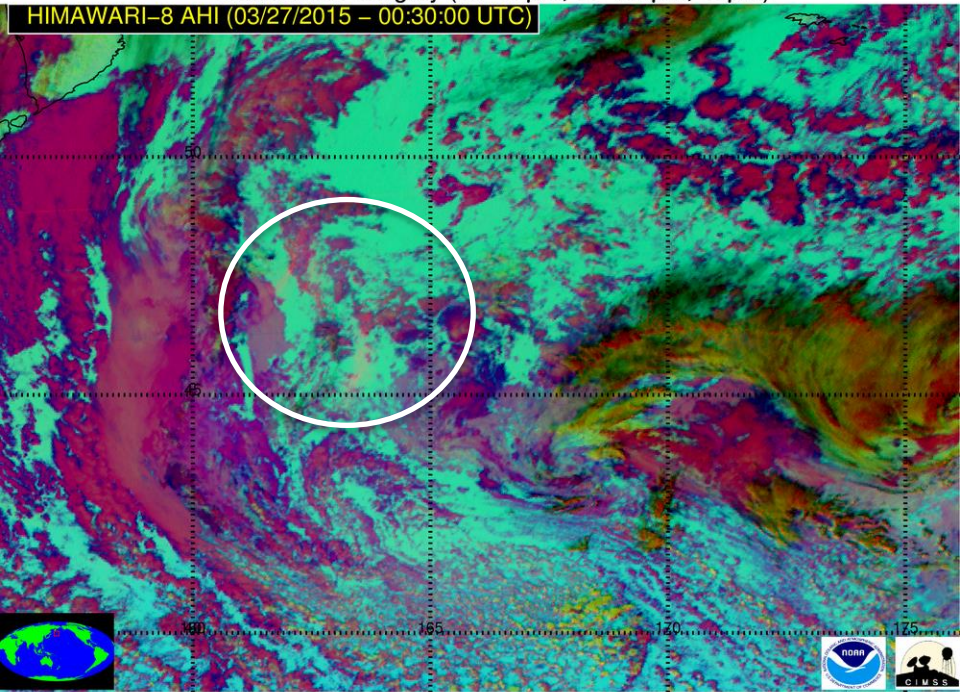
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

HIMAWARI-8 AHI (03/27/2015 – 00:30:00 UTC)



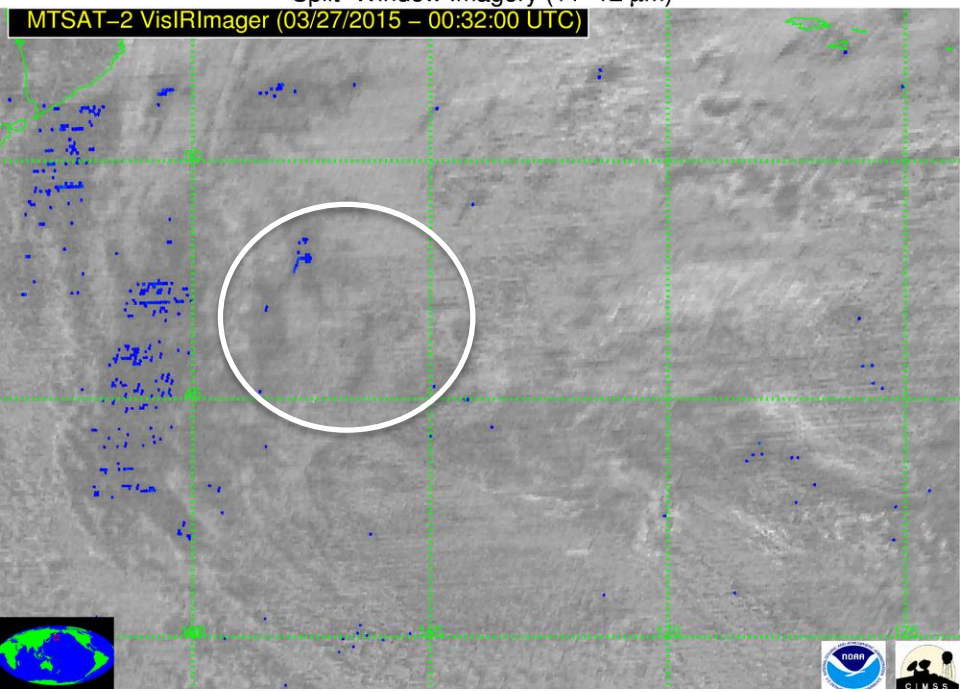
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

HIMAWARI-8 AHI (03/27/2015 – 00:30:00 UTC)



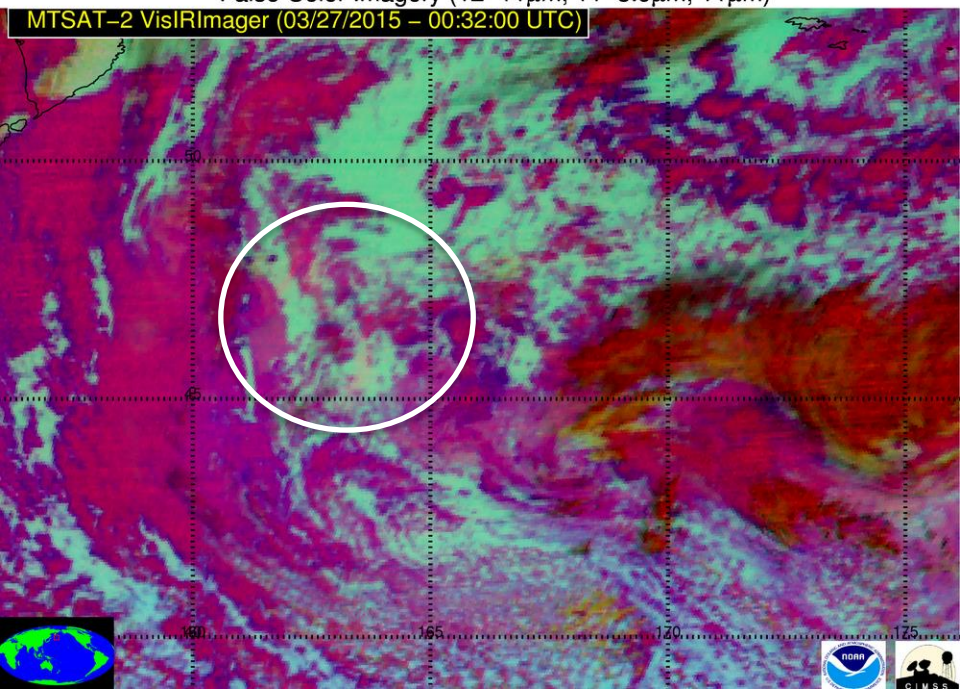
Split-Window Imagery (11–12 μ m)

MTSAT-2 VisIRImager (03/27/2015 – 00:32:00 UTC)

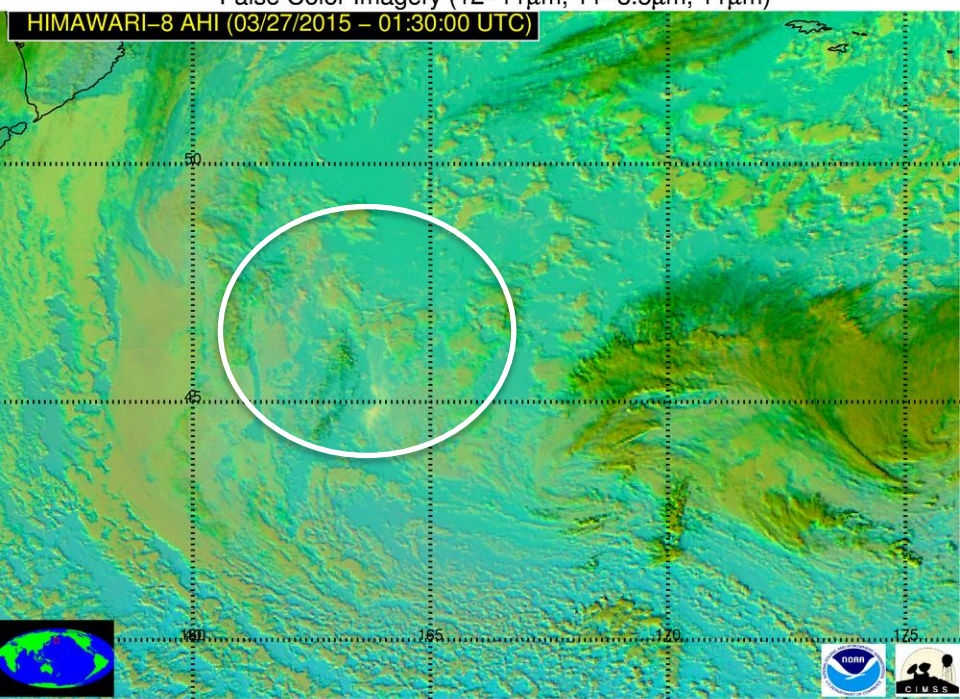


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

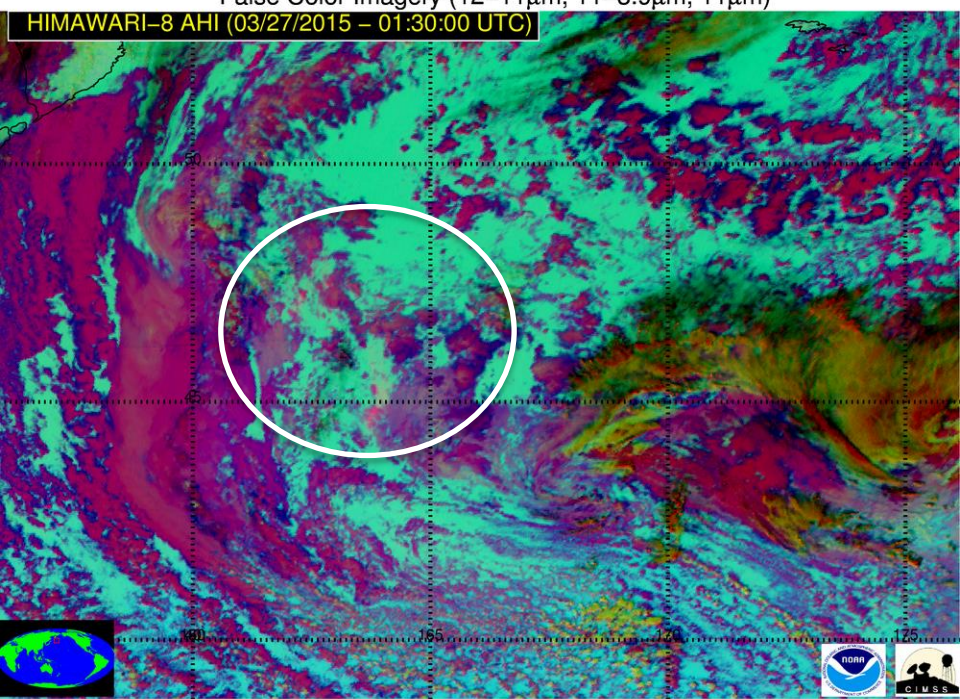
MTSAT-2 VisIRImager (03/27/2015 – 00:32:00 UTC)



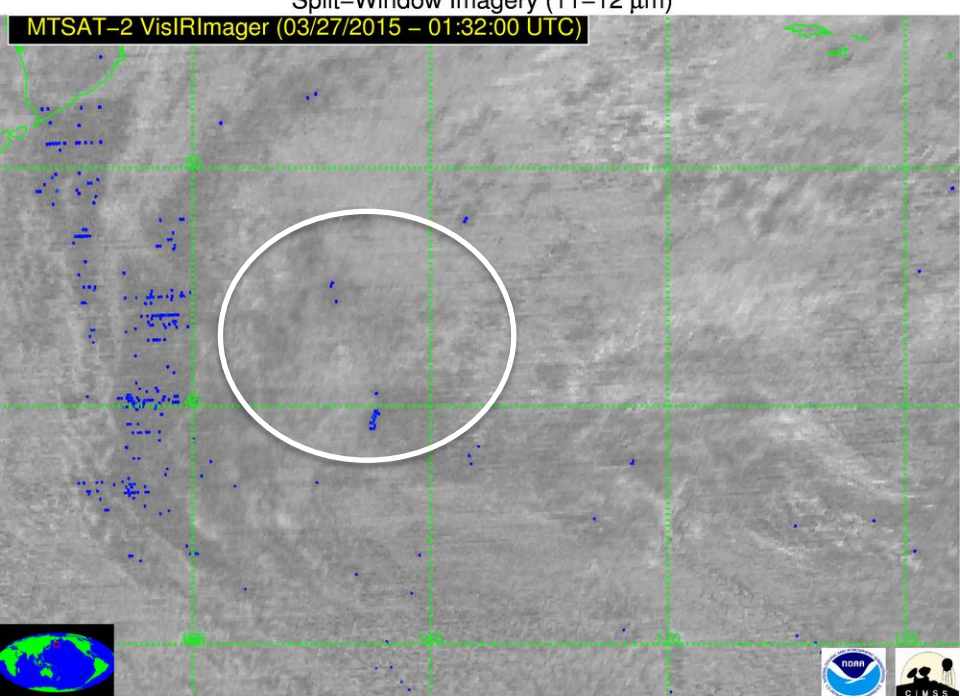
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



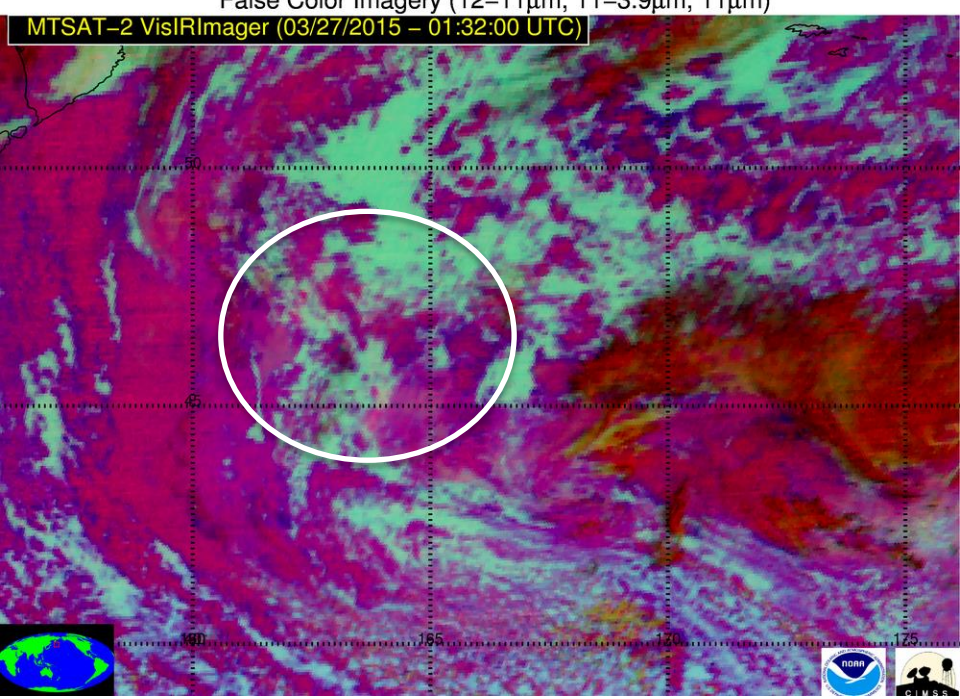
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



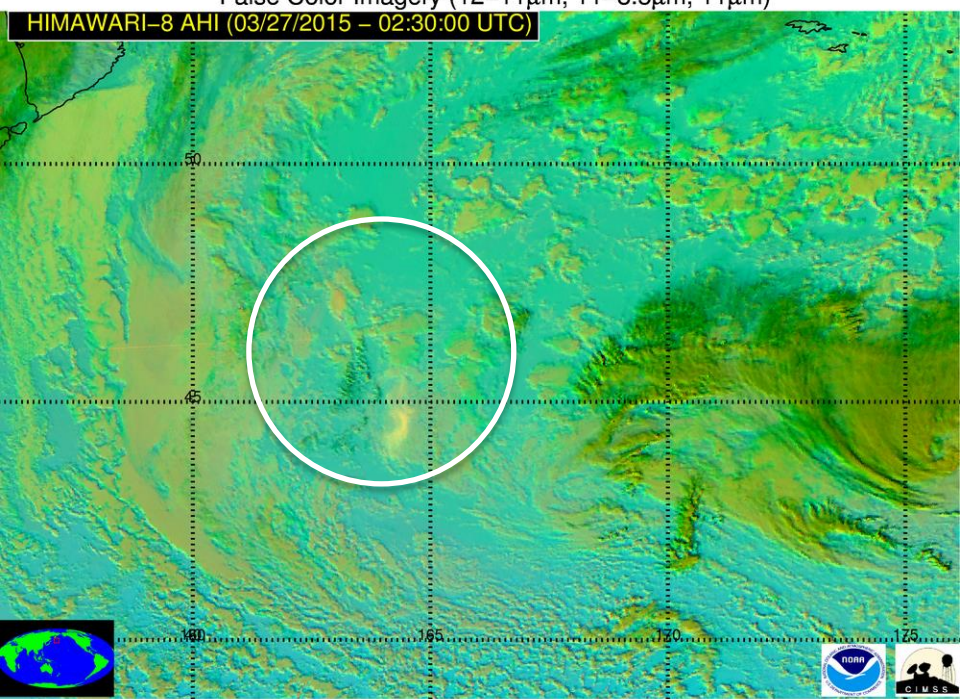
Split-Window Imagery (11–12 μ m)



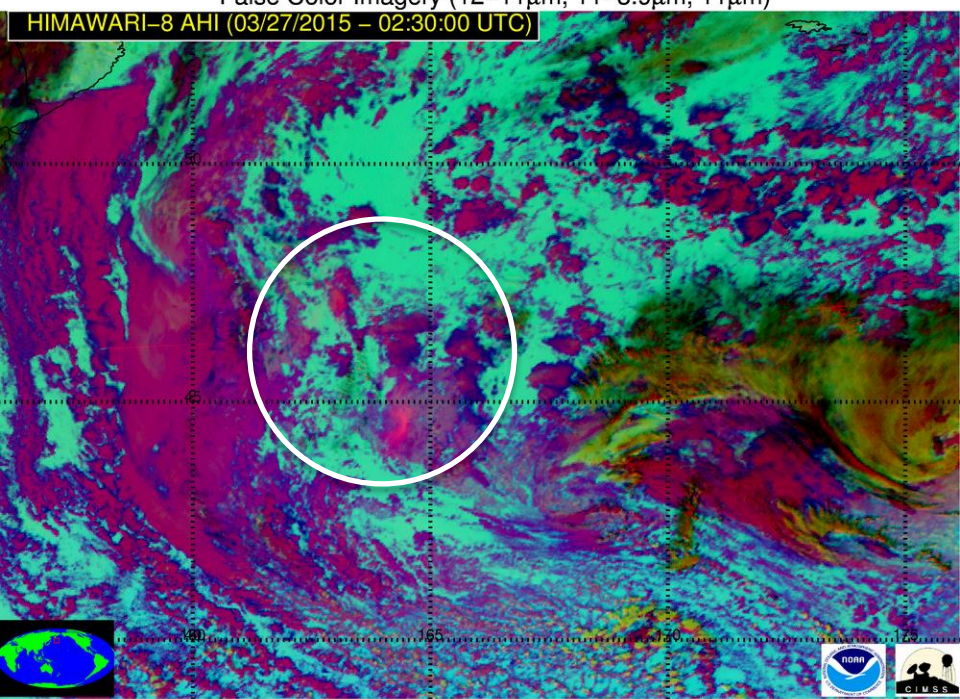
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



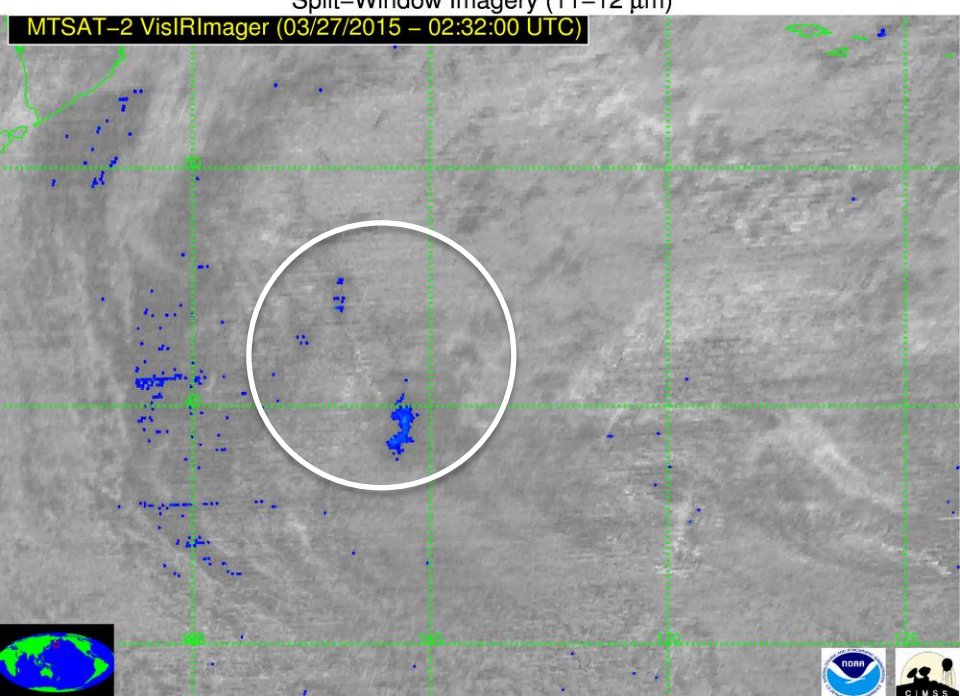
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



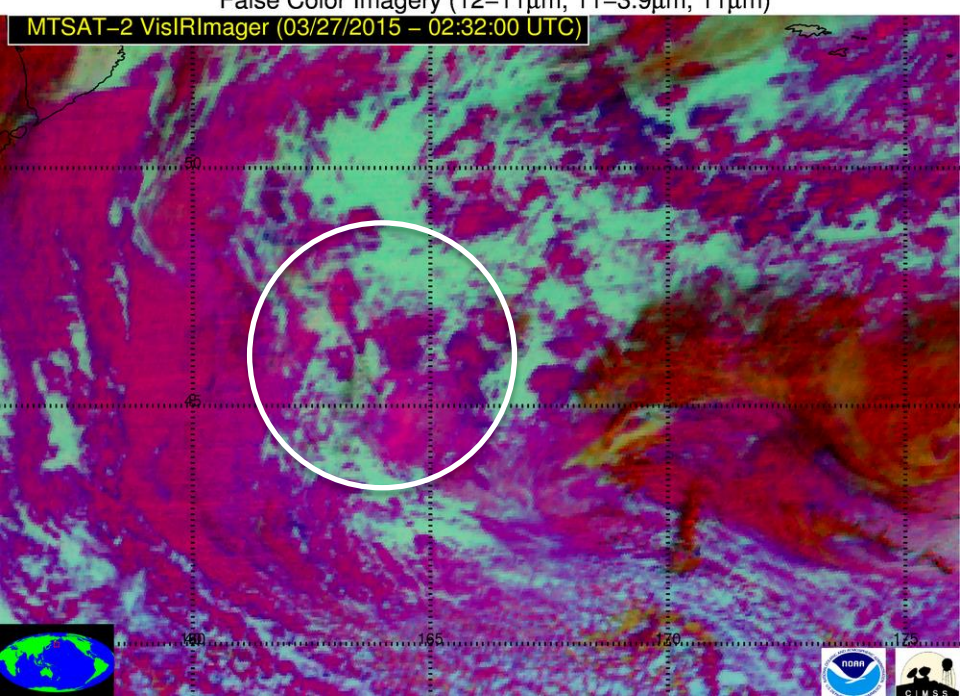
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



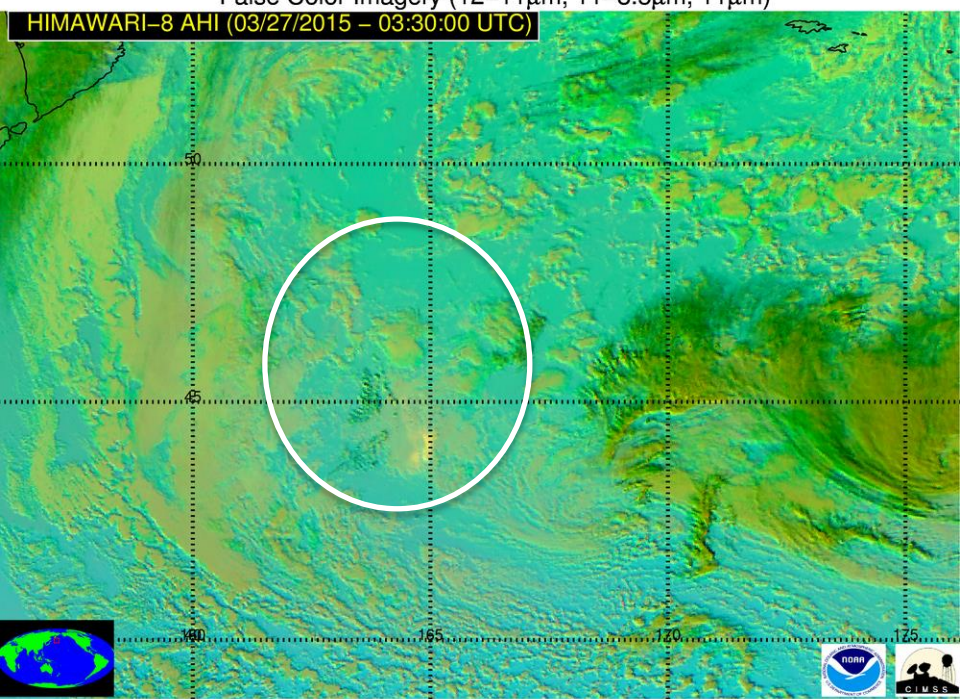
Split-Window Imagery (11–12 μ m)



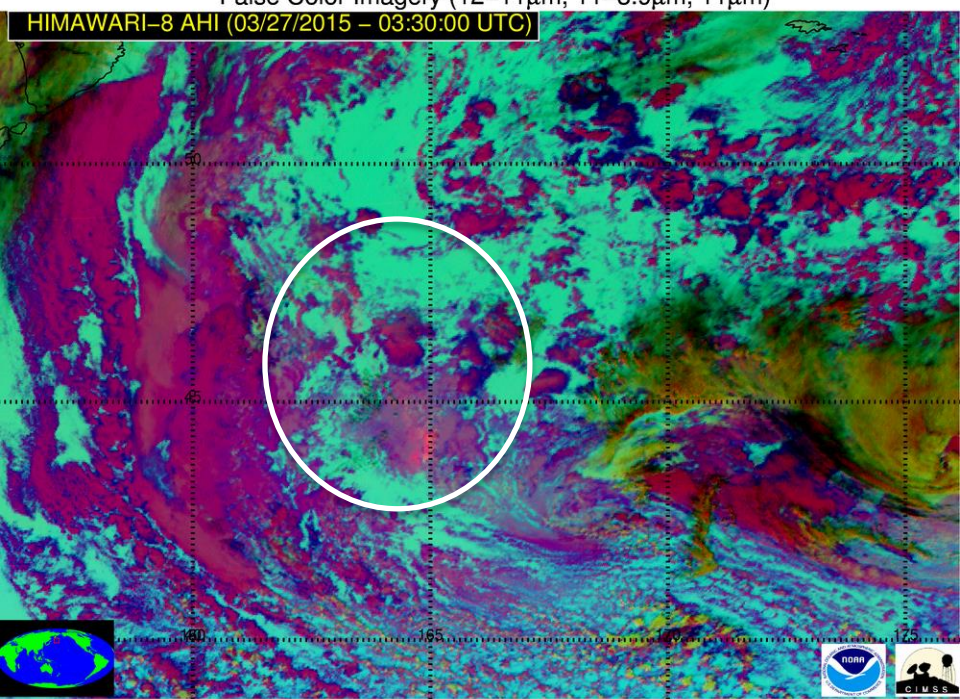
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



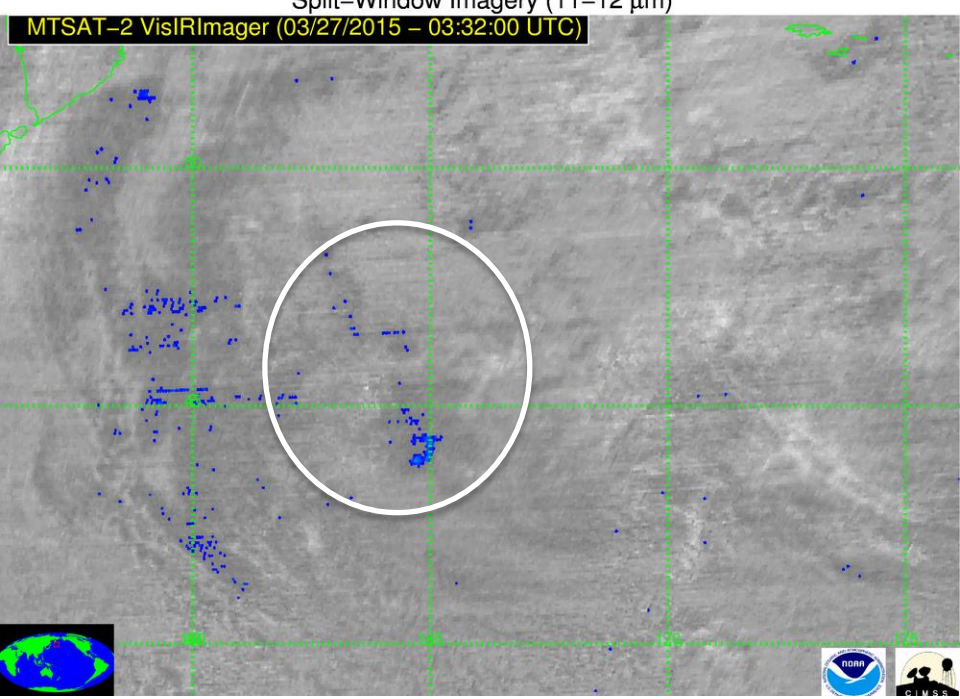
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



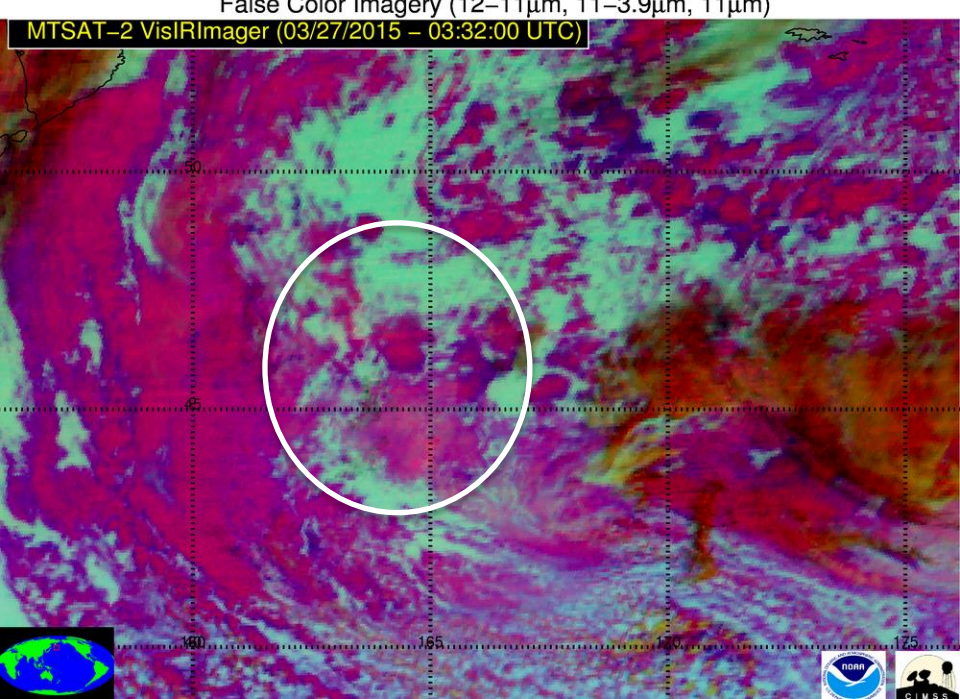
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



Split-Window Imagery (11–12 μ m)

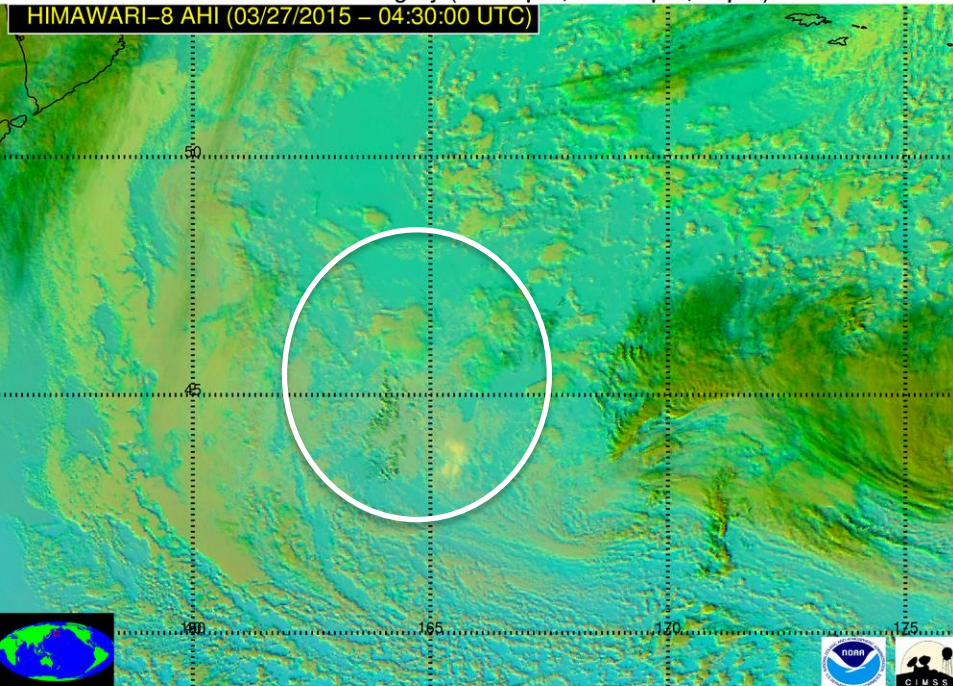


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



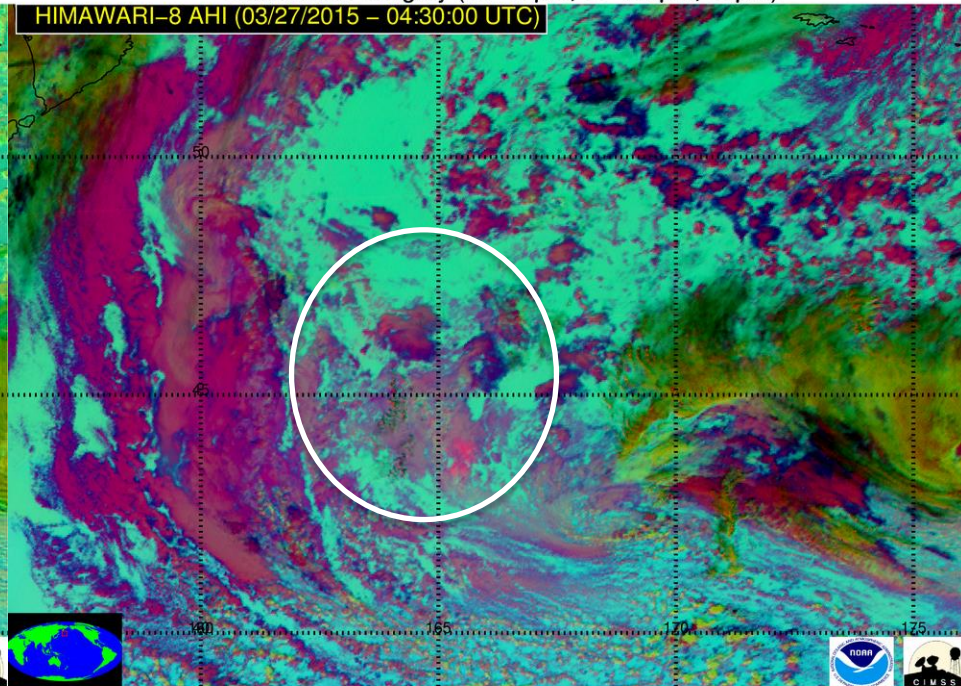
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

HIMAWARI-8 AHI (03/27/2015 – 04:30:00 UTC)



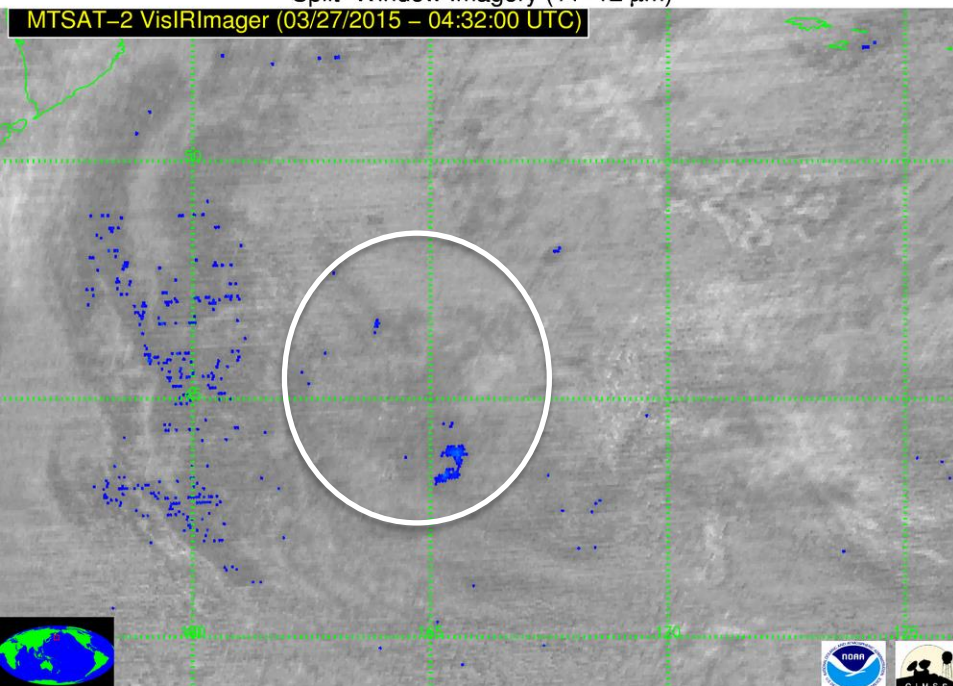
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

HIMAWARI-8 AHI (03/27/2015 – 04:30:00 UTC)



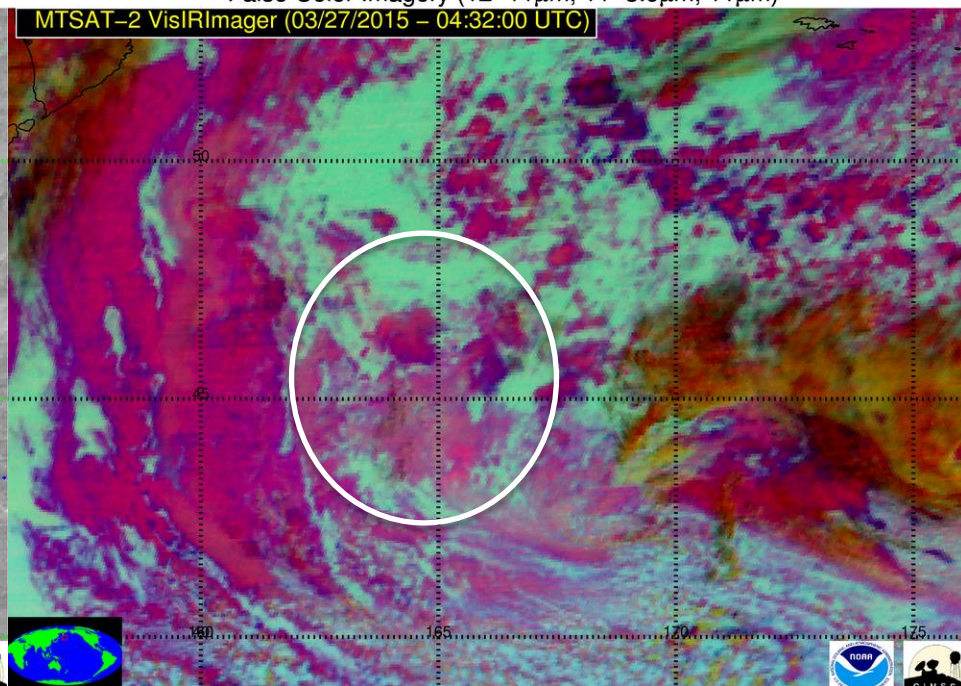
Split-Window Imagery (11–12 μ m)

MTSAT-2 VisIRImager (03/27/2015 – 04:32:00 UTC)

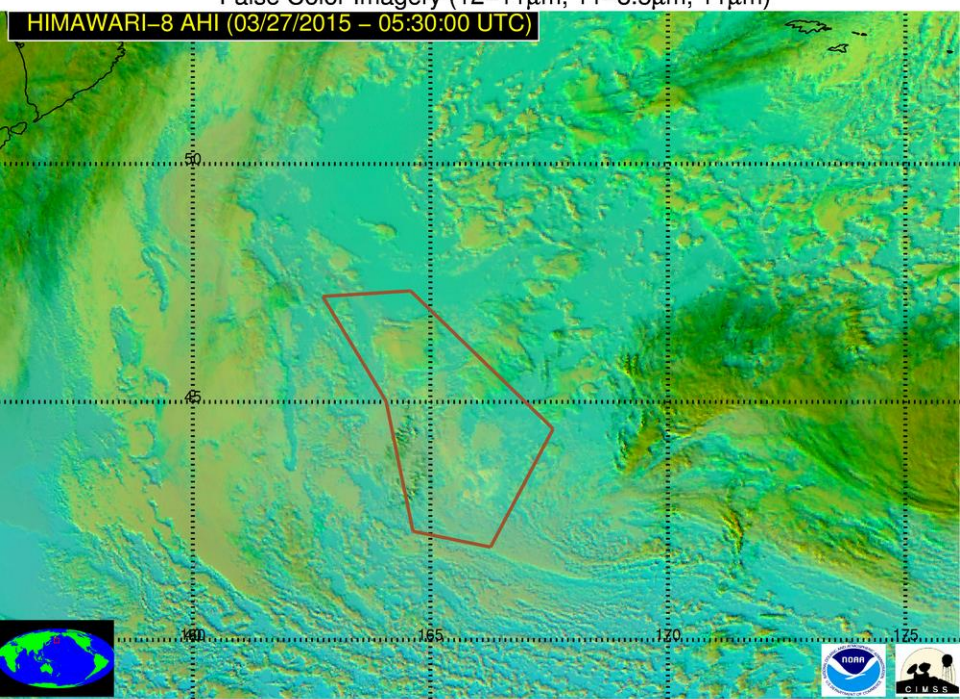


False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

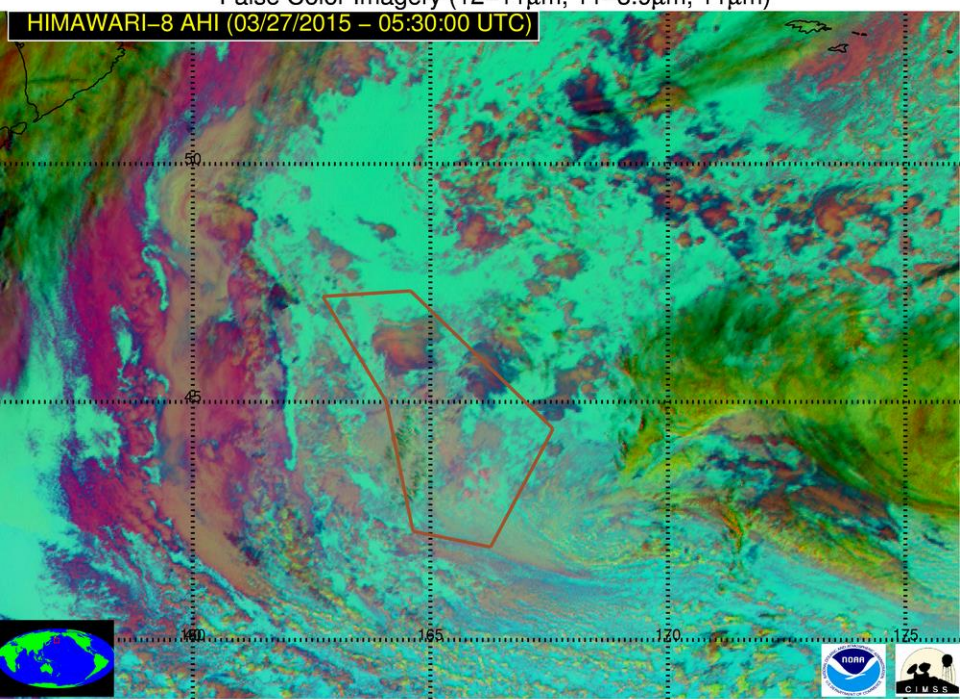
MTSAT-2 VisIRImager (03/27/2015 – 04:32:00 UTC)



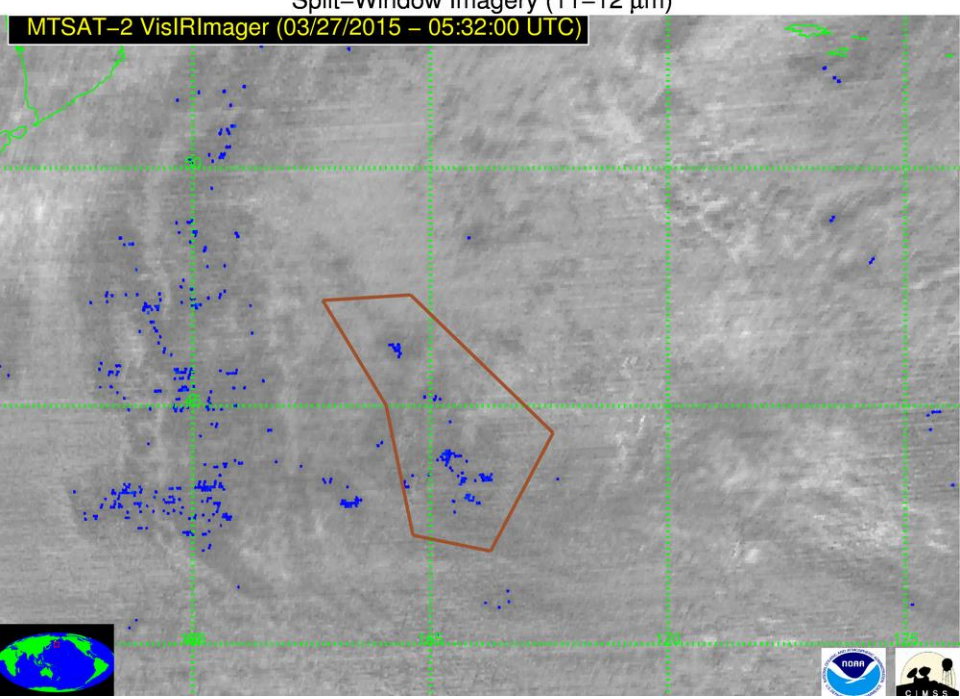
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



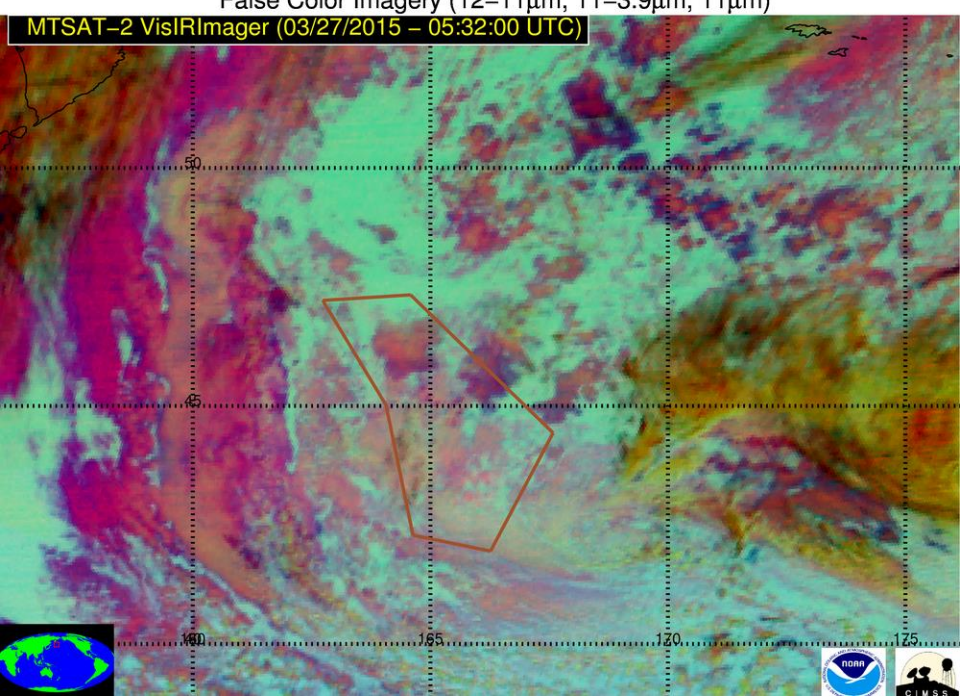
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



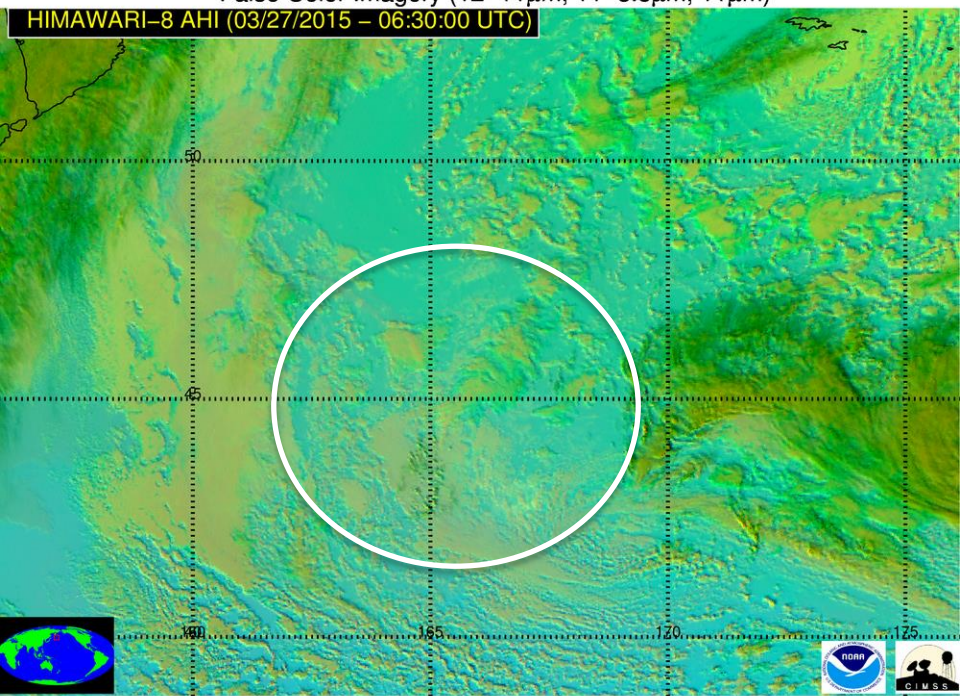
Split-Window Imagery (11–12 μ m)



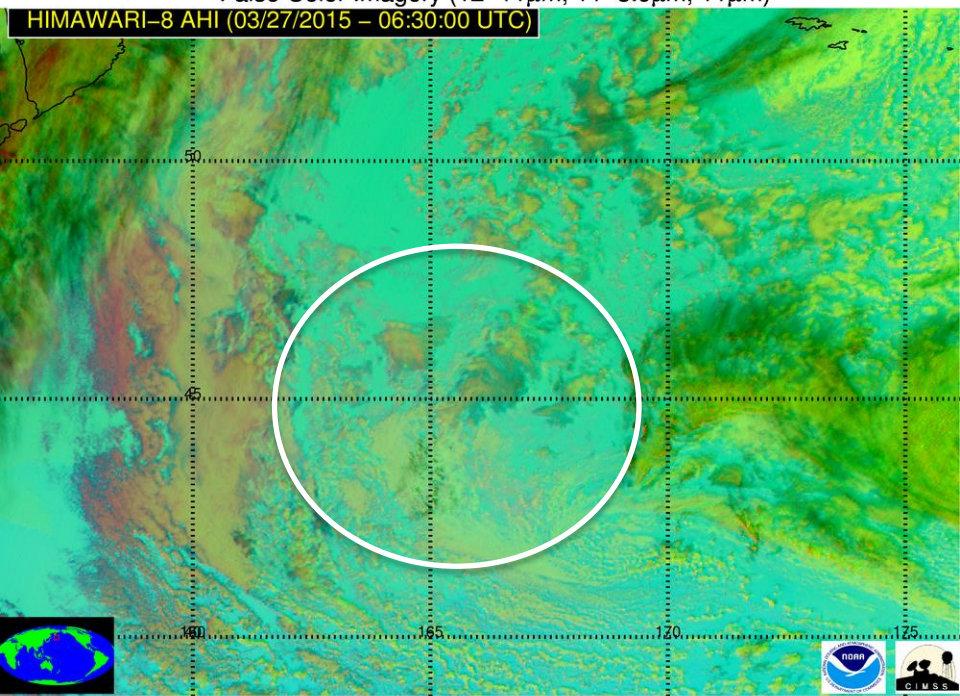
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



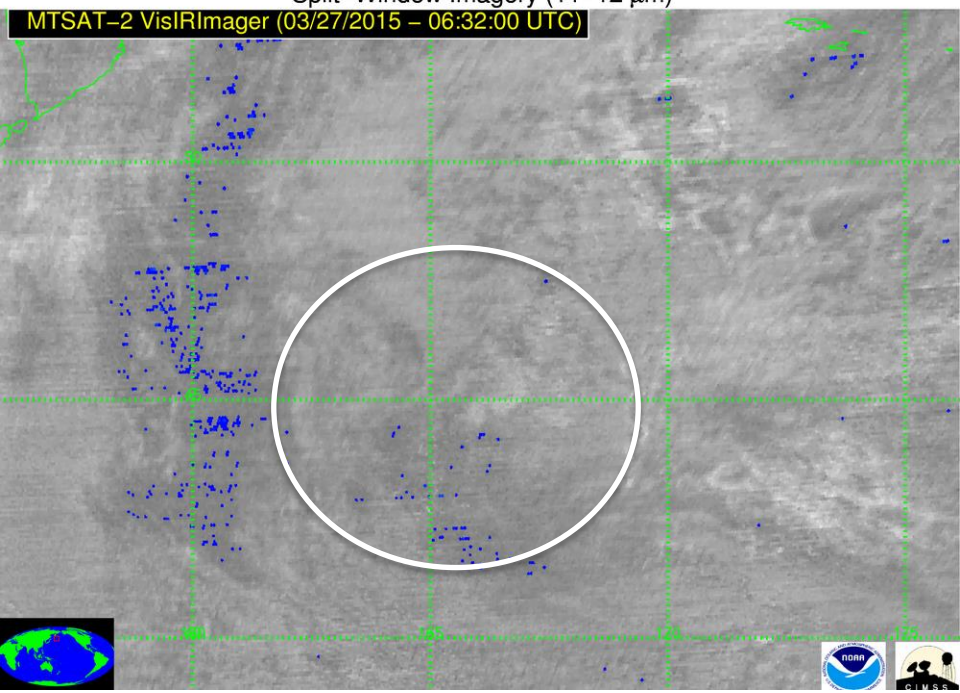
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



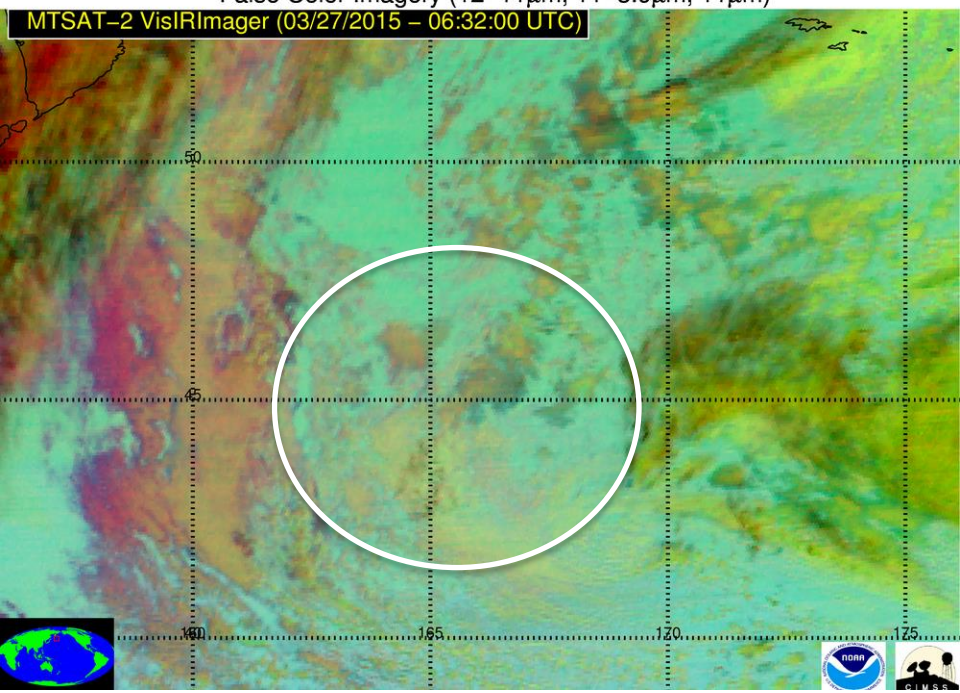
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



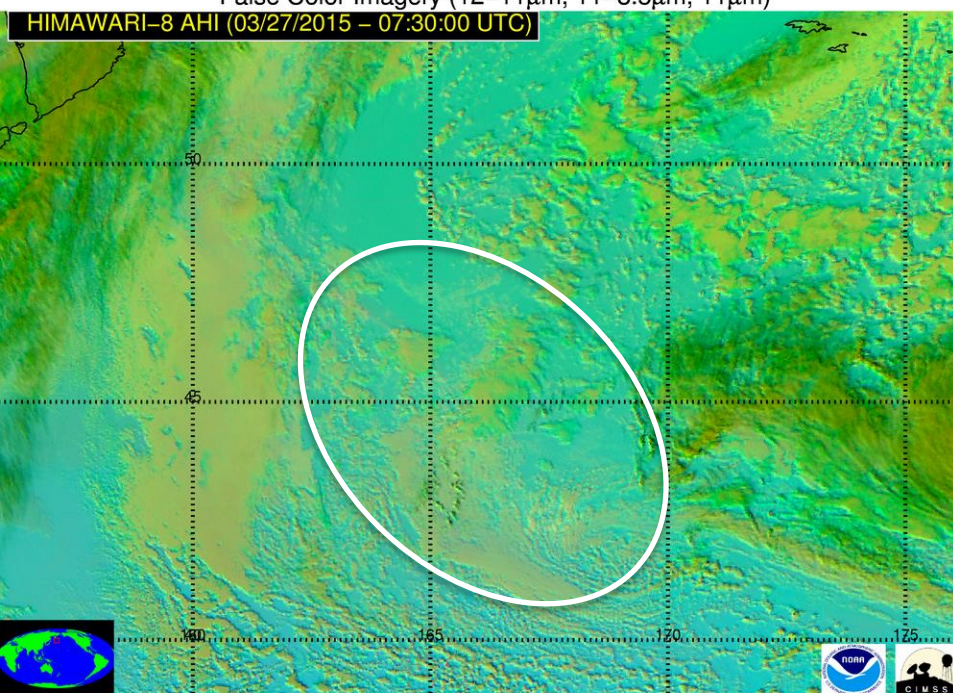
Split-Window Imagery (11–12 μ m)



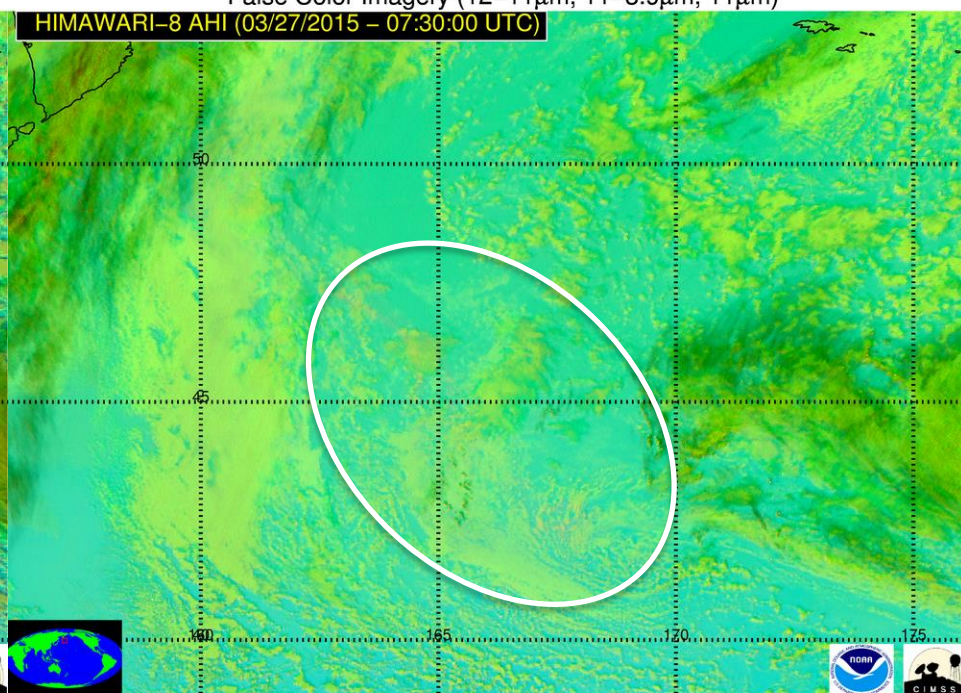
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



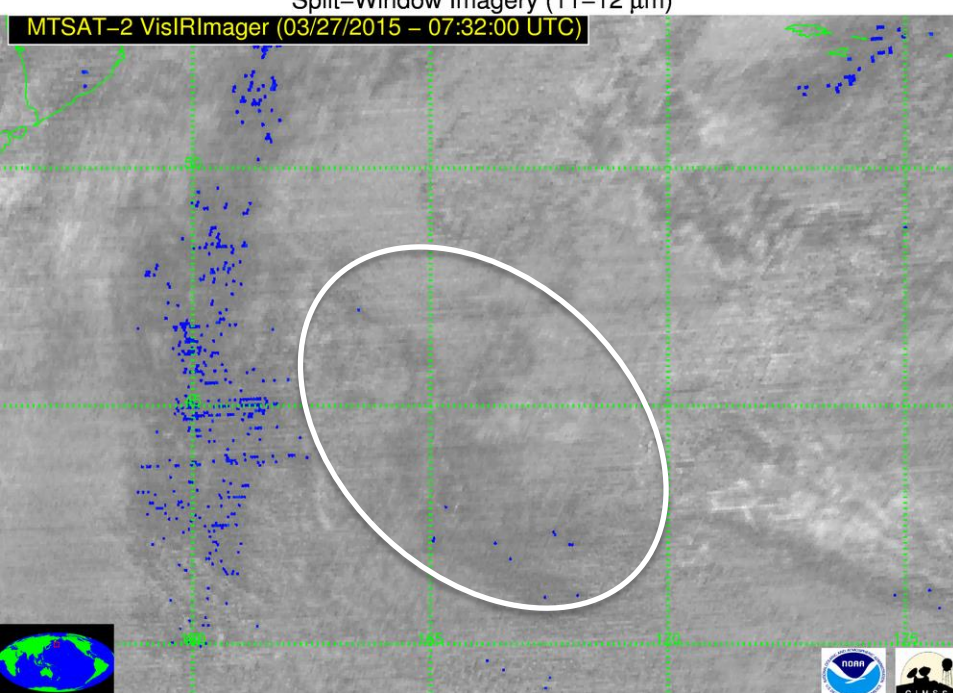
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



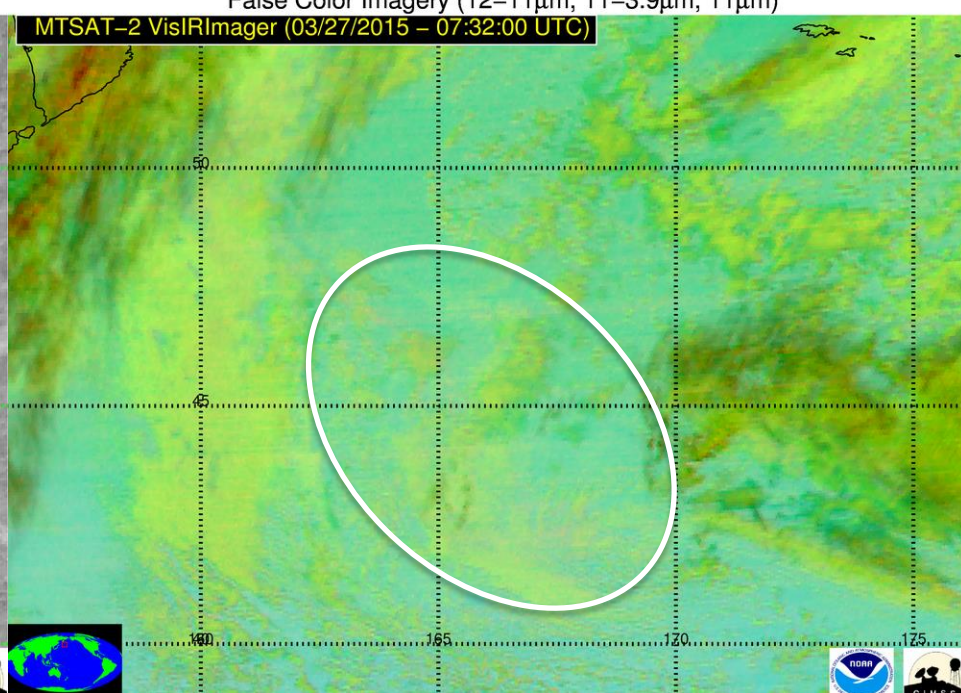
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



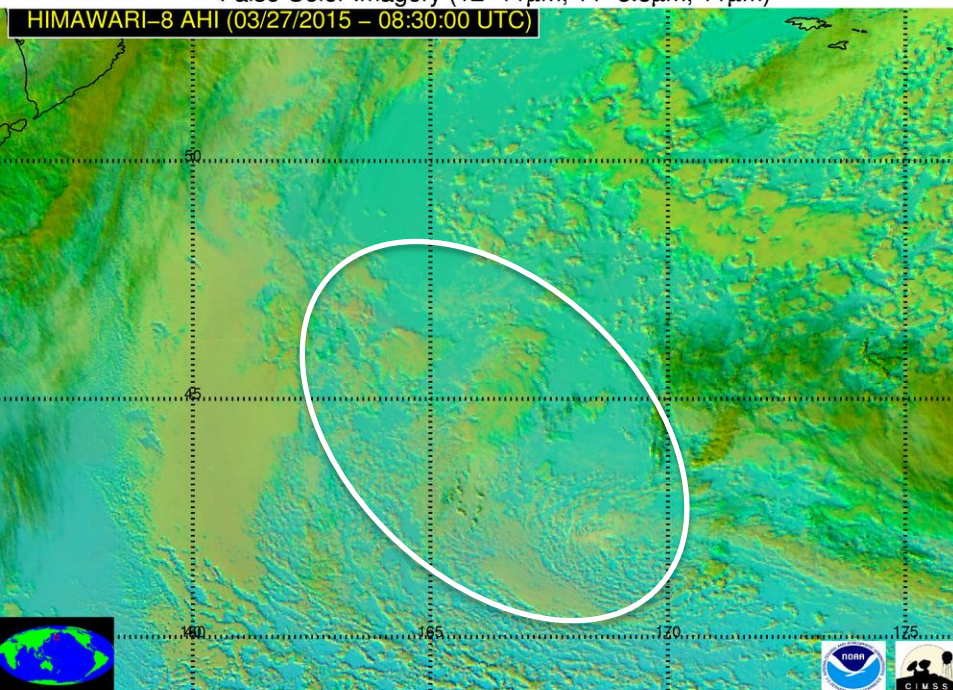
Split-Window Imagery (11–12 μ m)



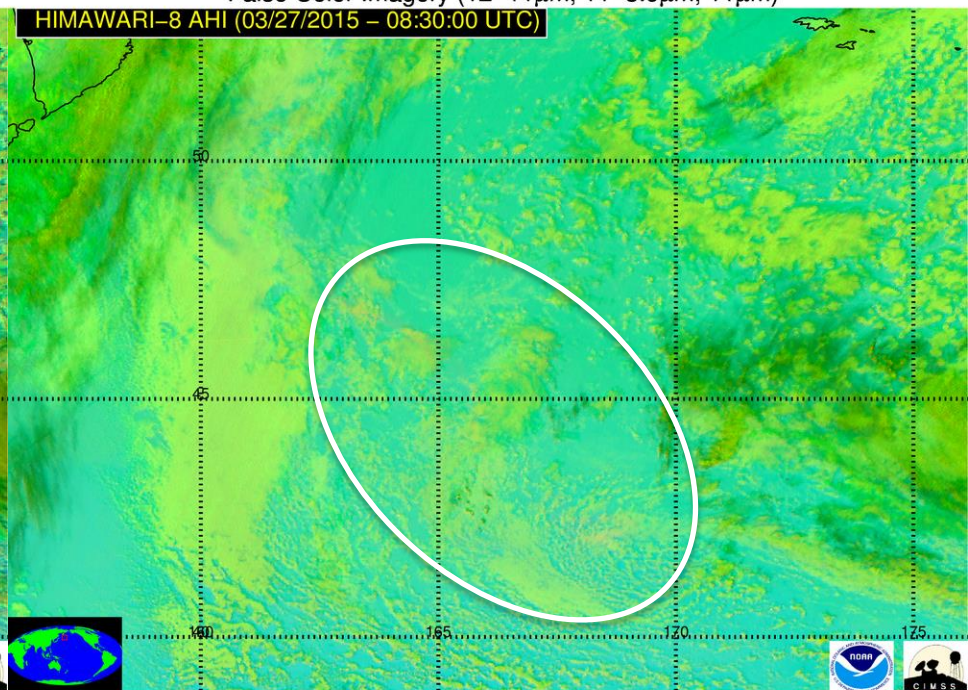
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



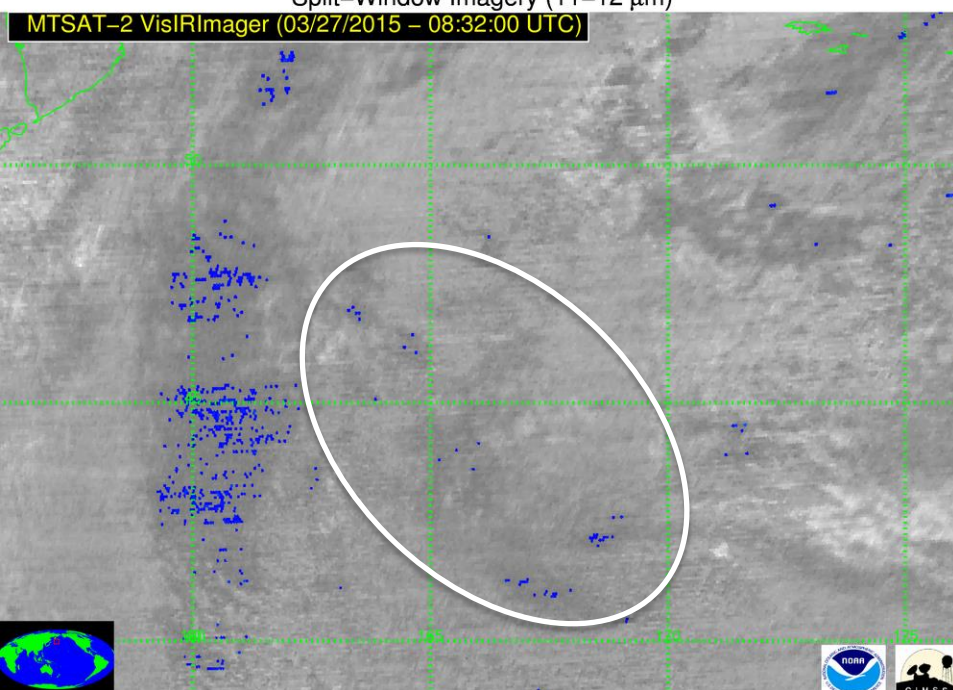
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



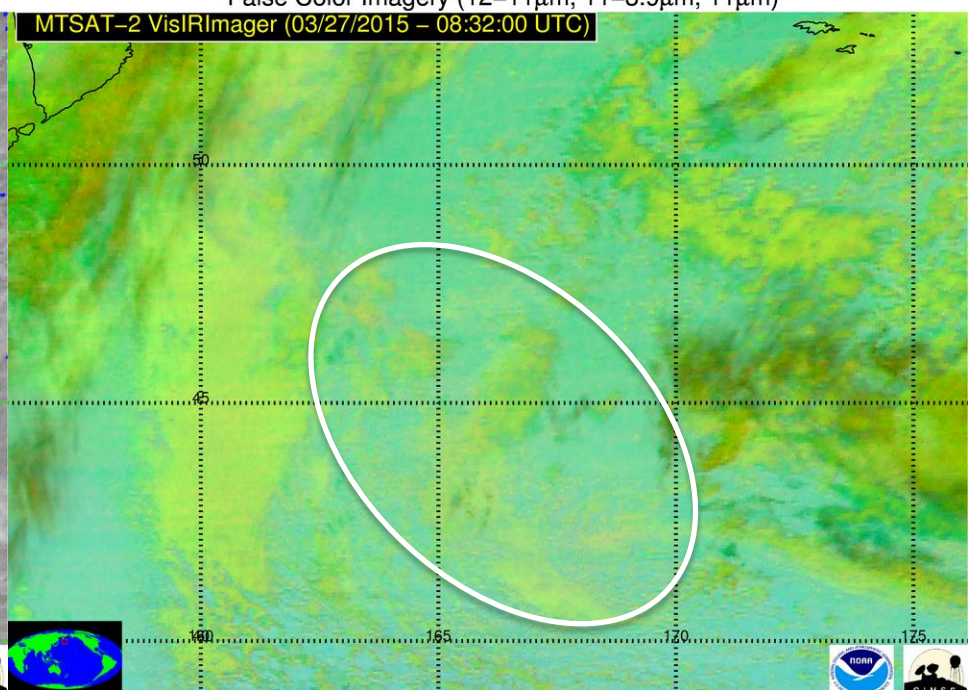
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



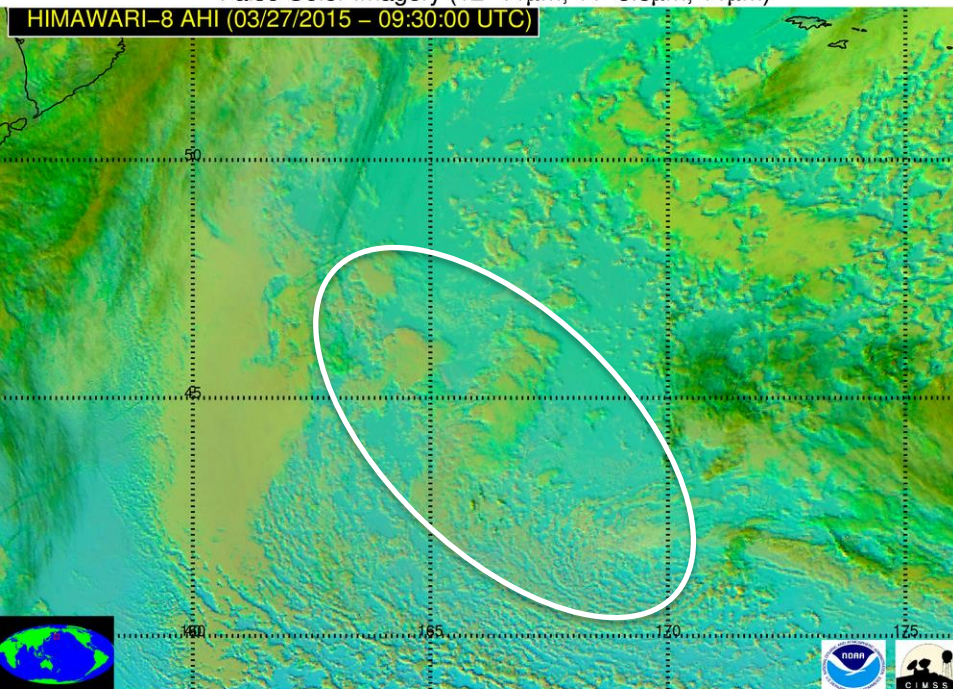
Split-Window Imagery (11–12 μ m)



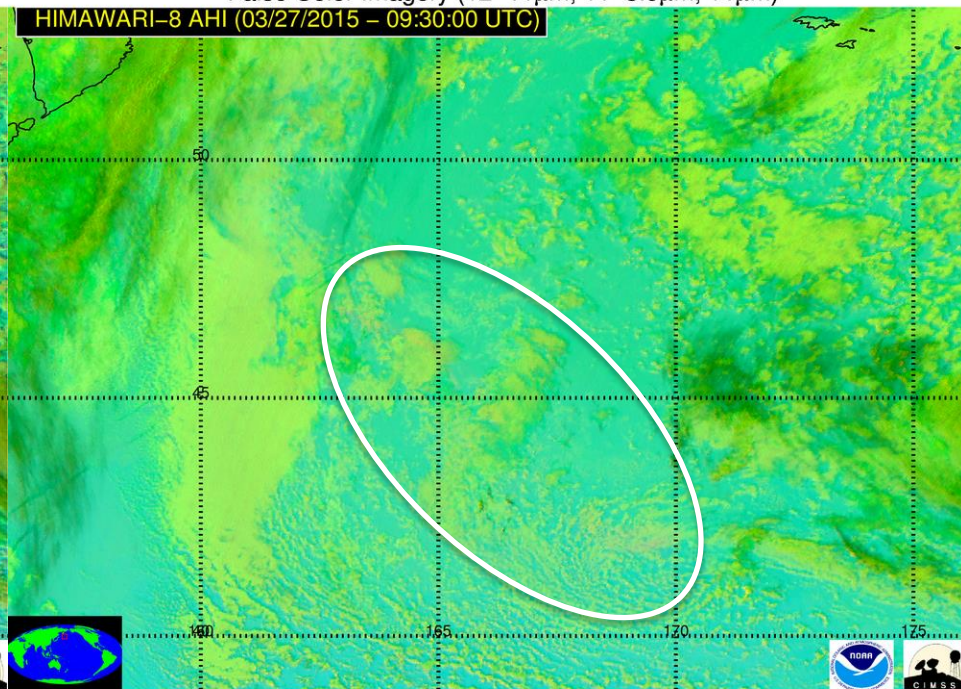
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



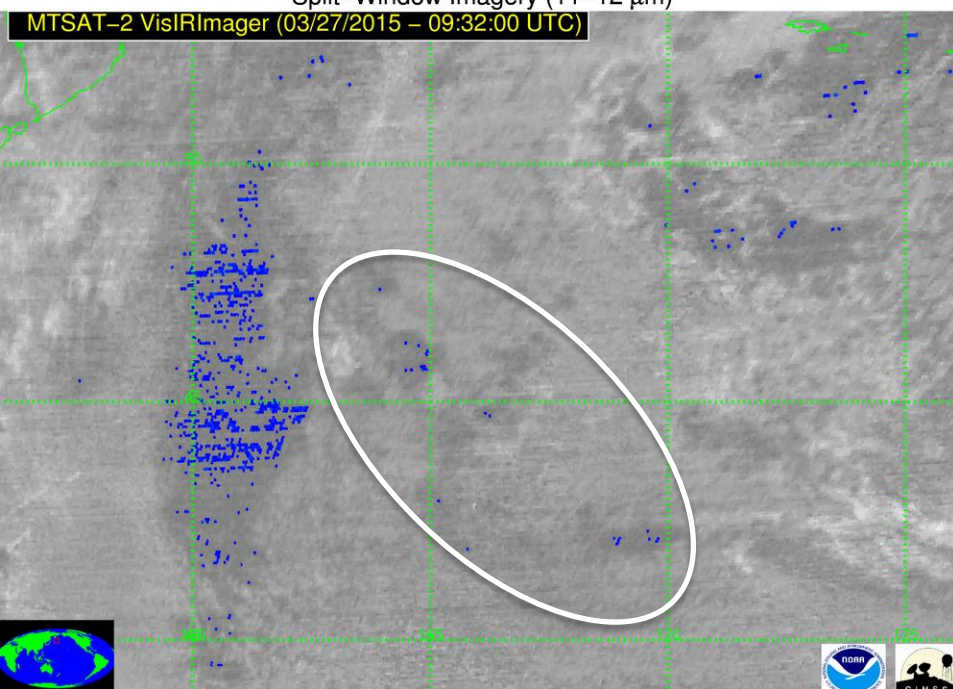
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



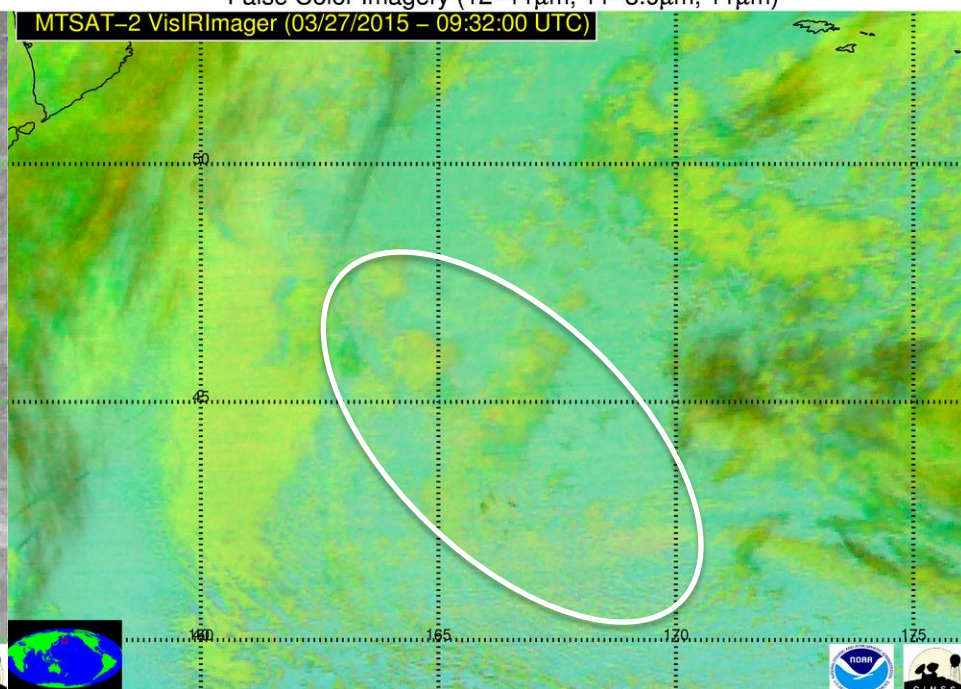
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



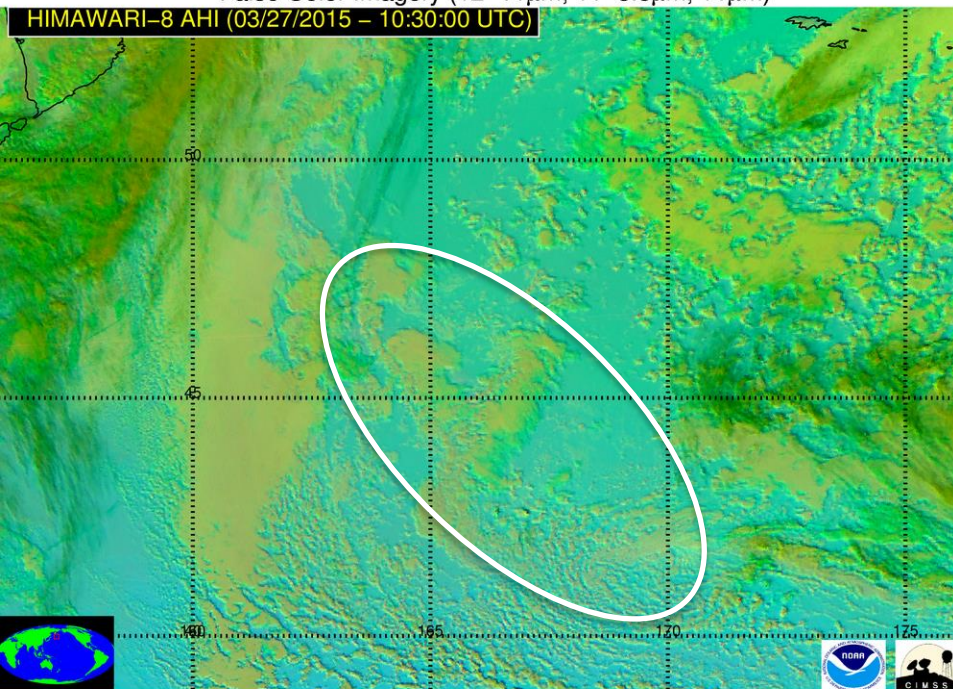
Split-Window Imagery (11–12 μ m)



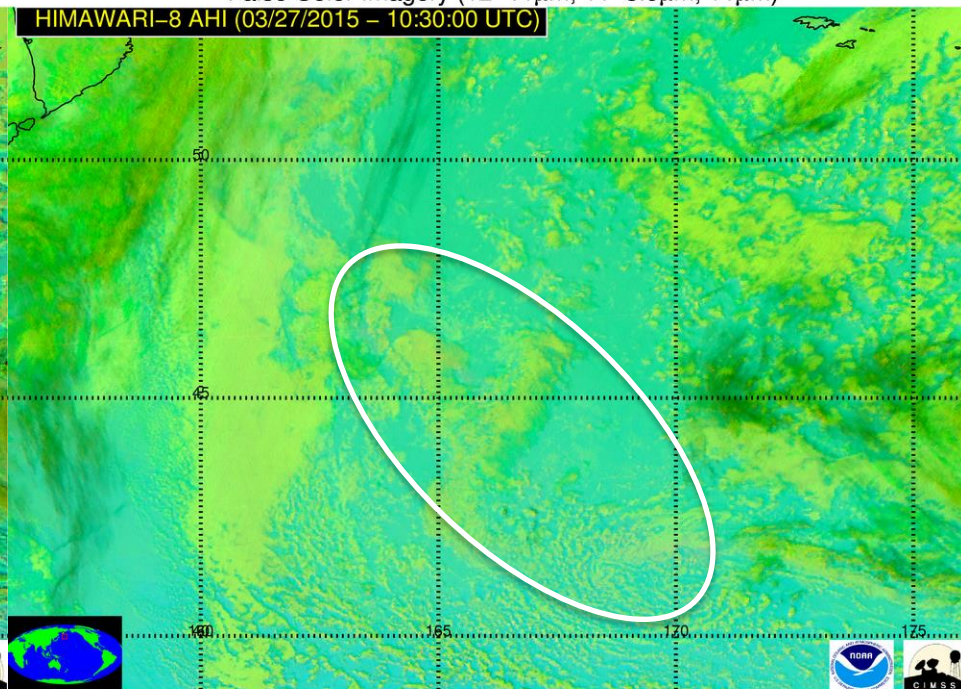
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



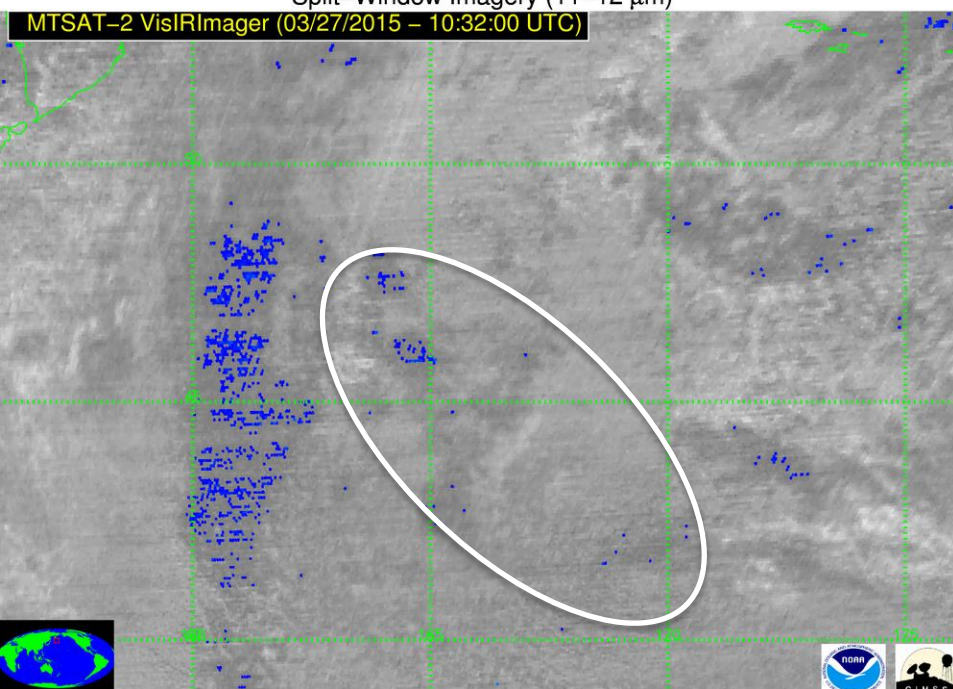
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



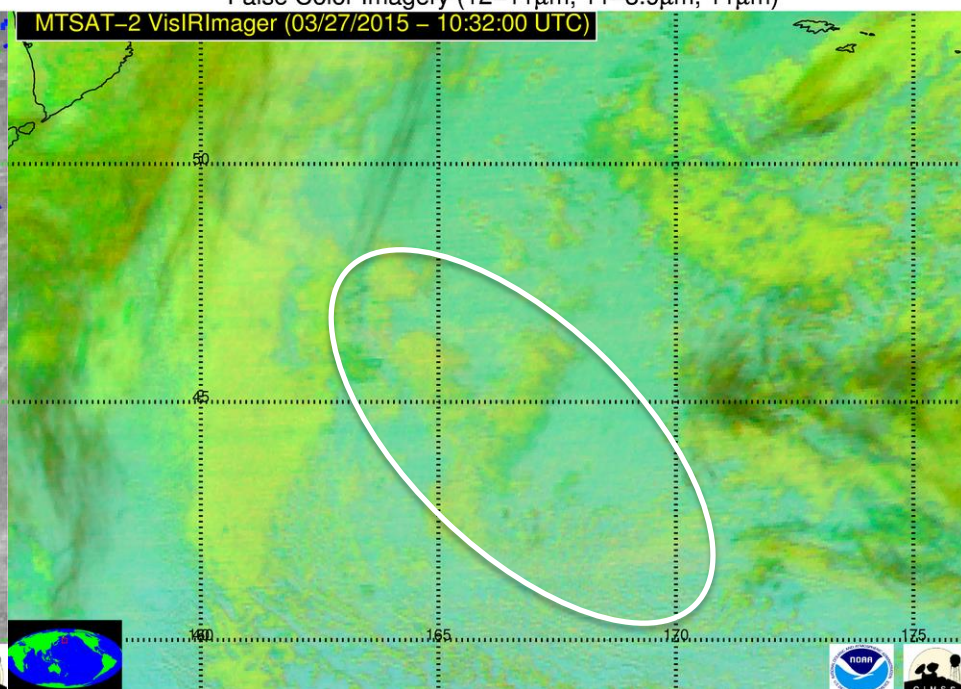
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



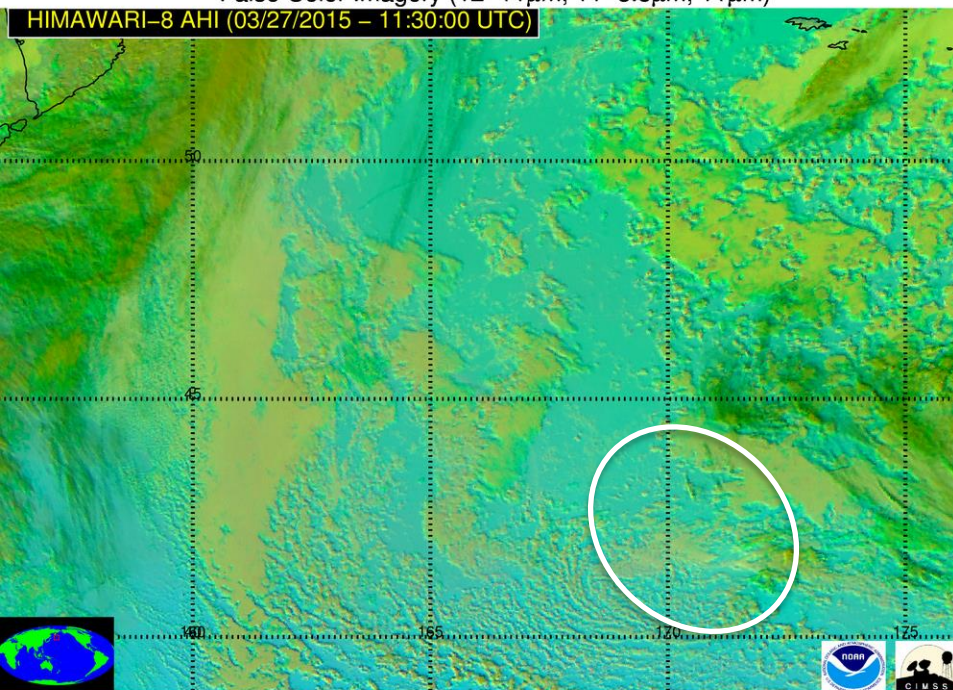
Split-Window Imagery (11–12 μ m)



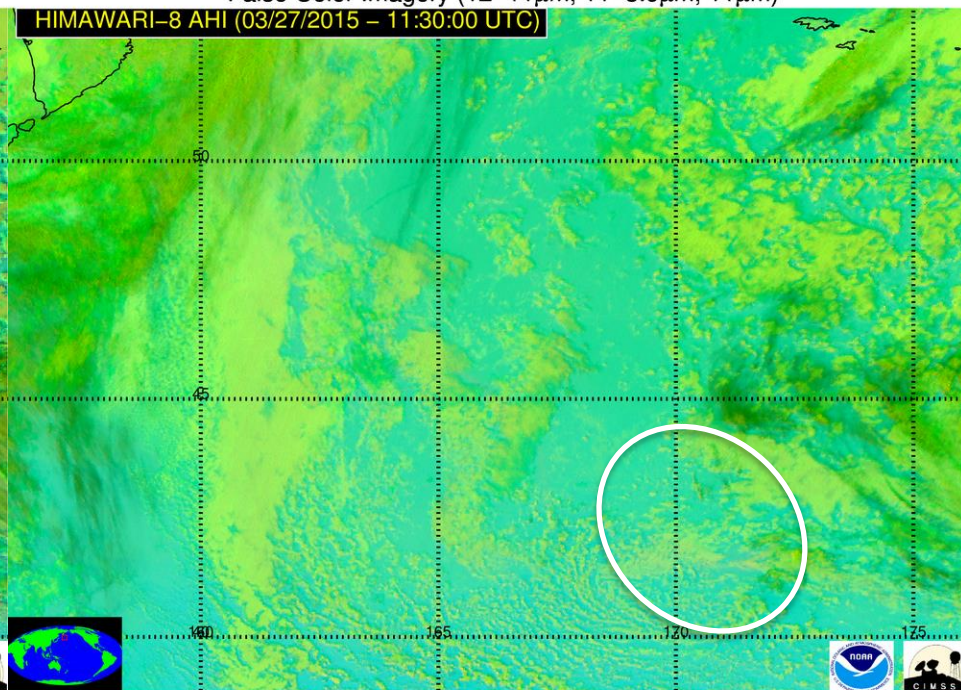
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



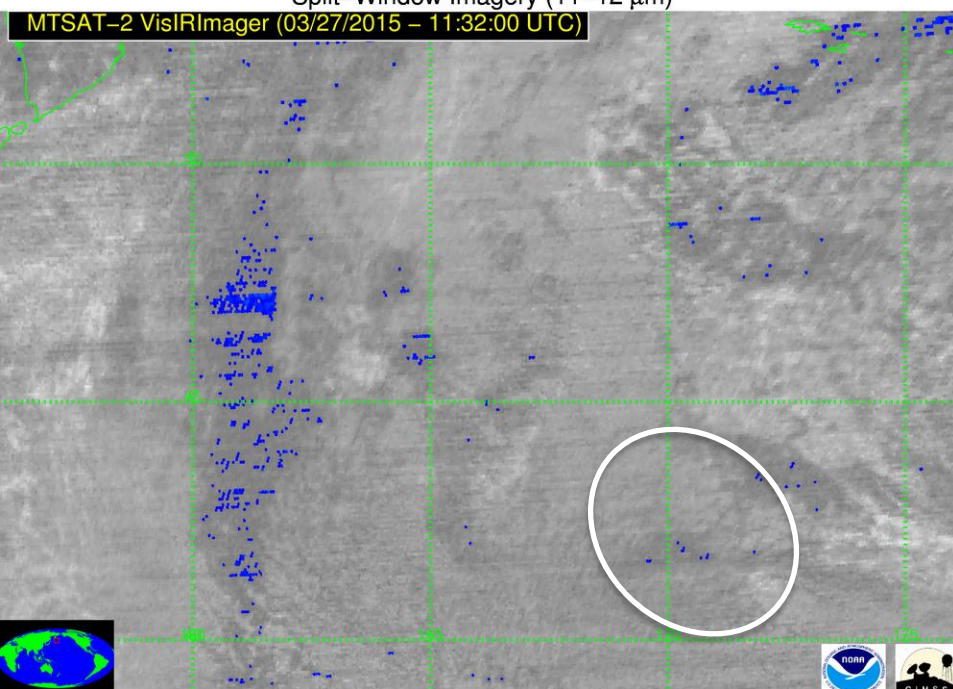
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



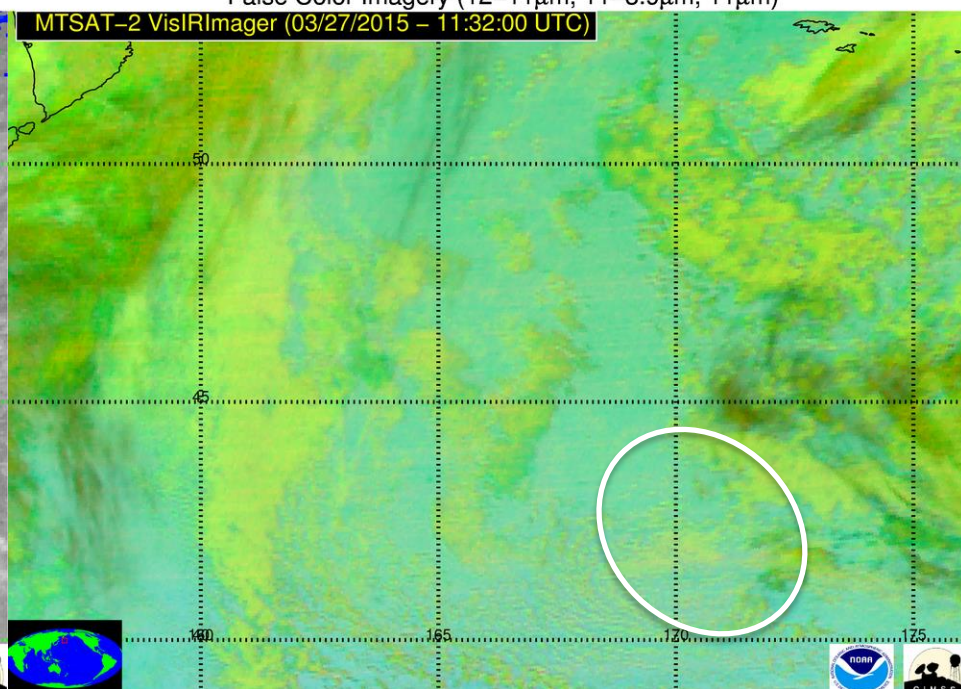
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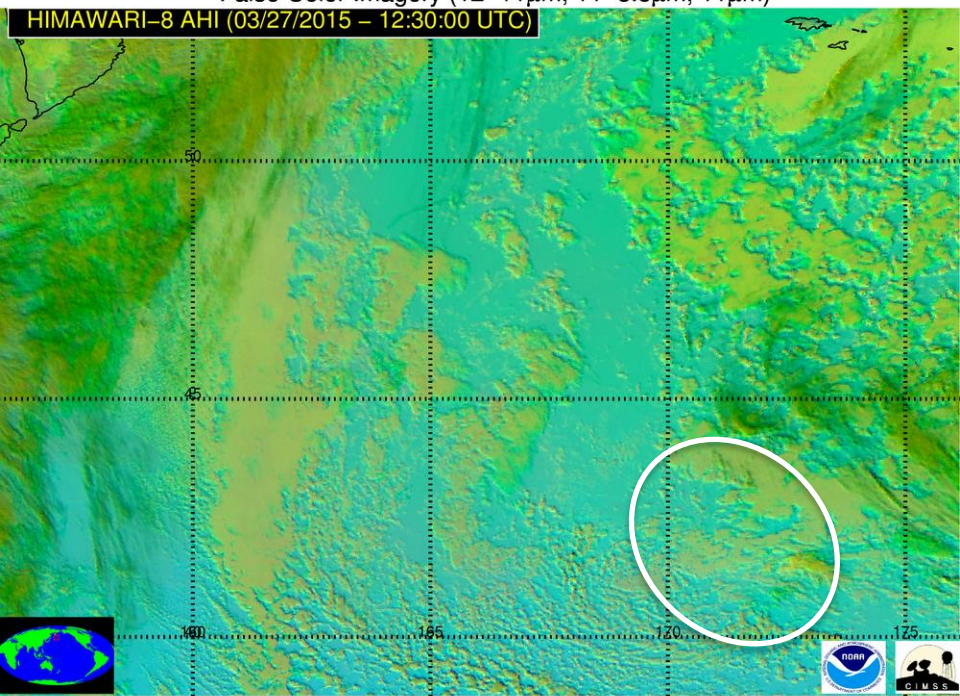
Split-Window Imagery (11–12 μ m)



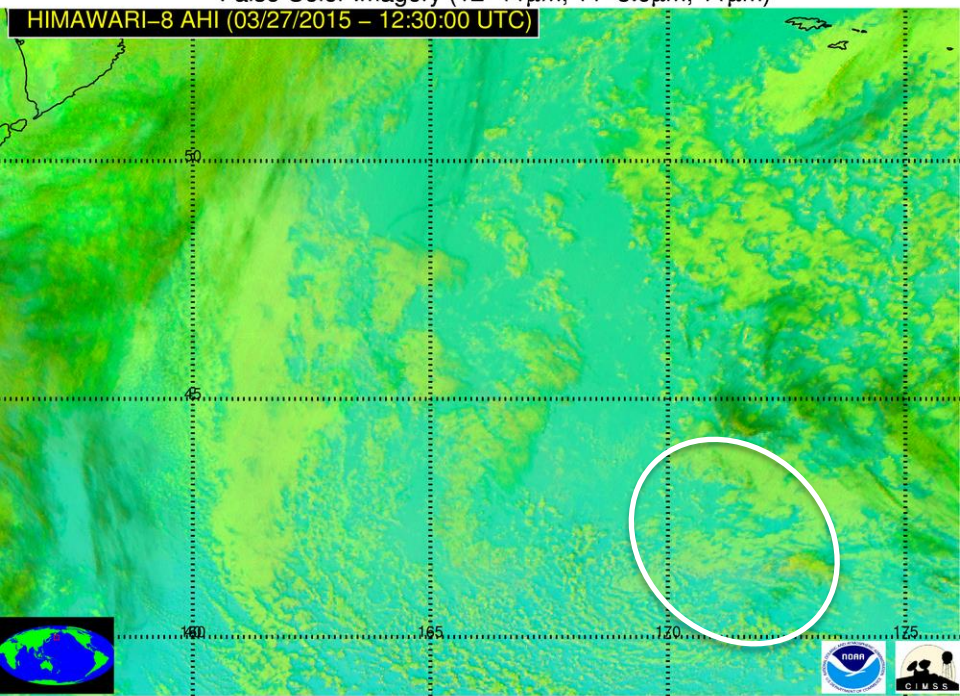
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



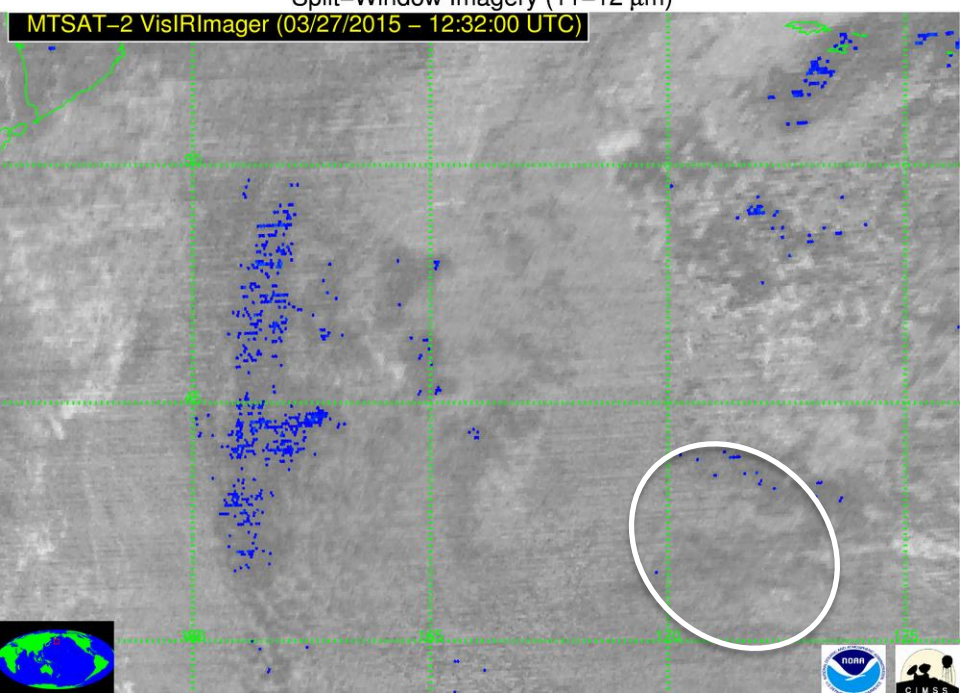
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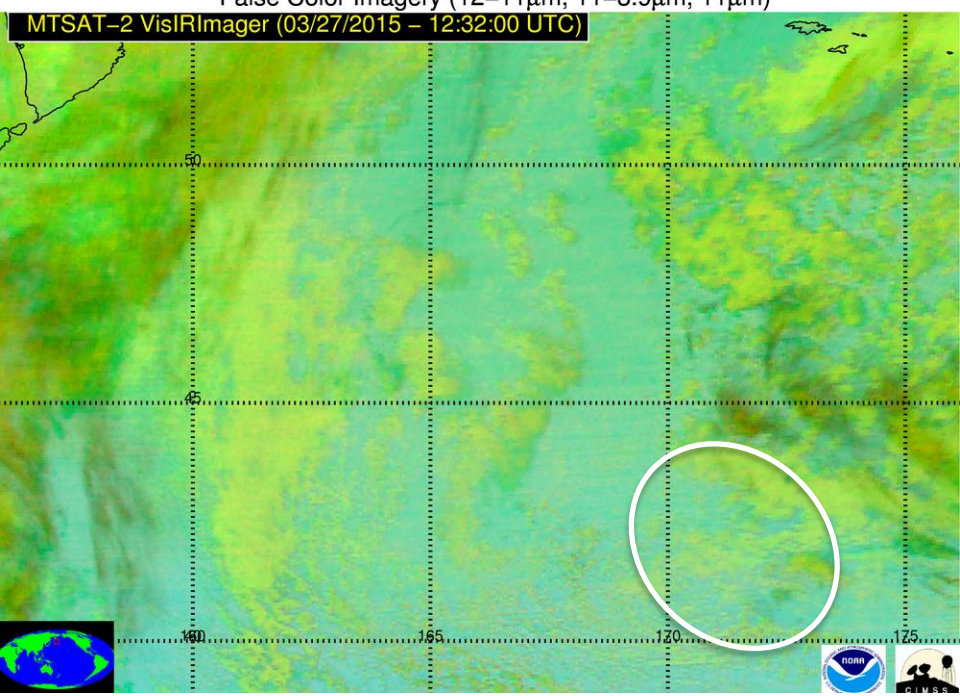
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



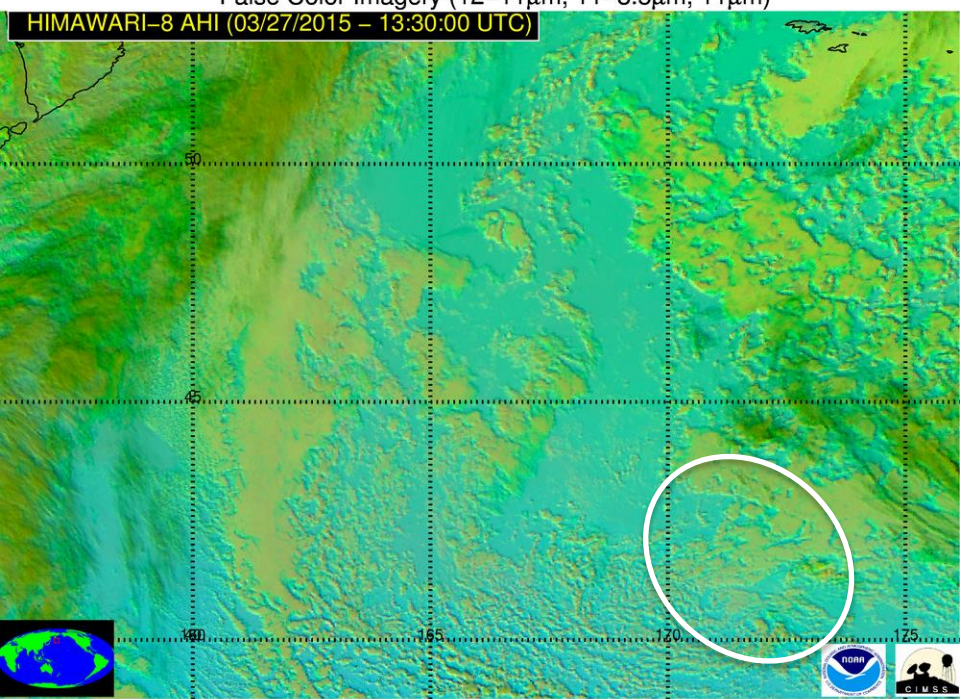
Split-Window Imagery (11–12 μ m)



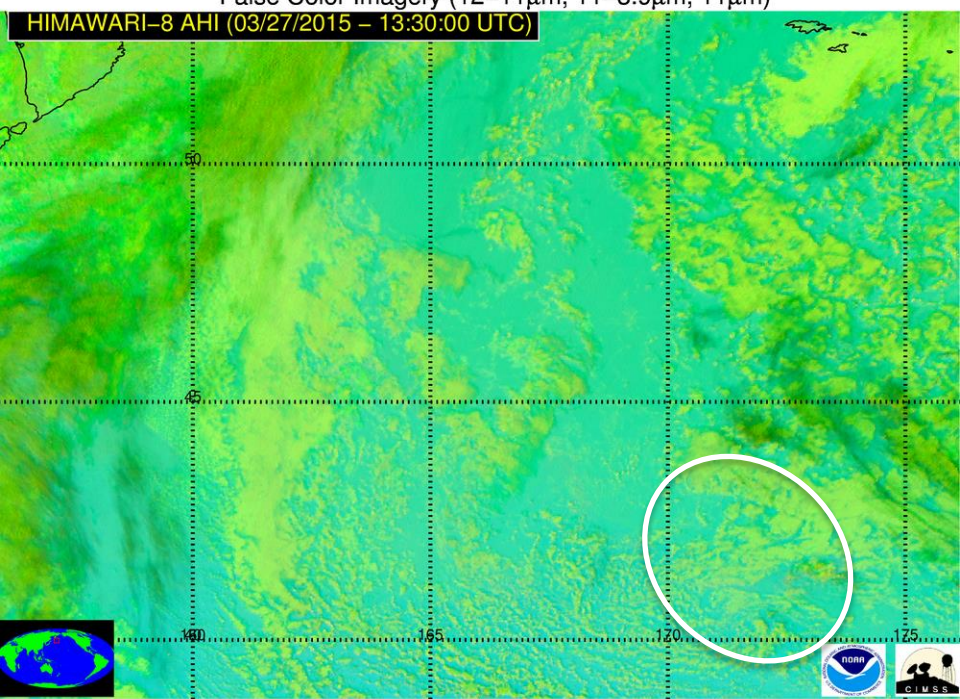
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



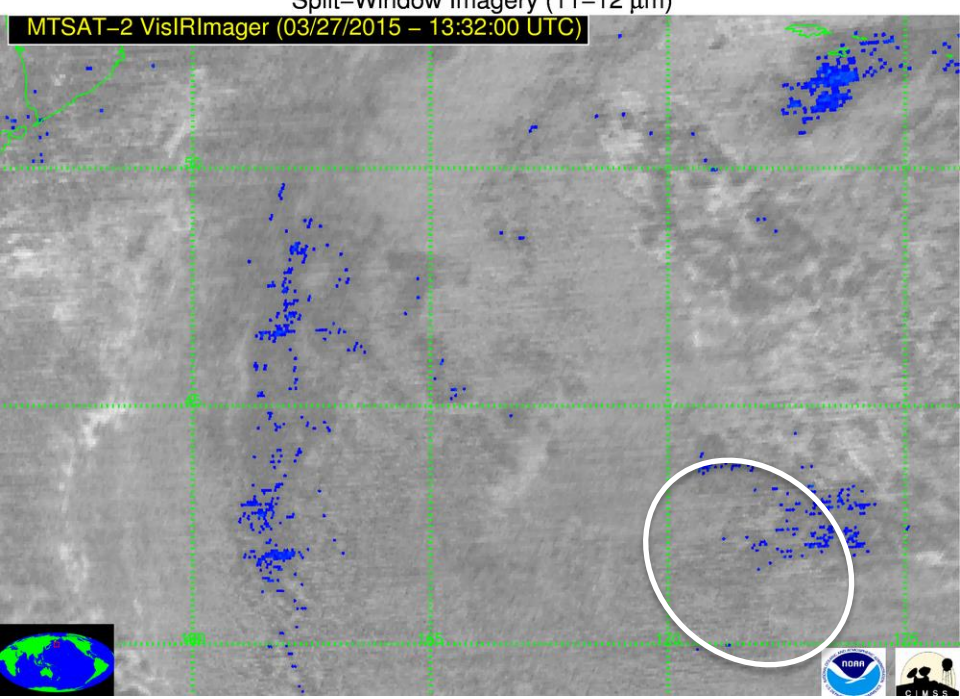
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)



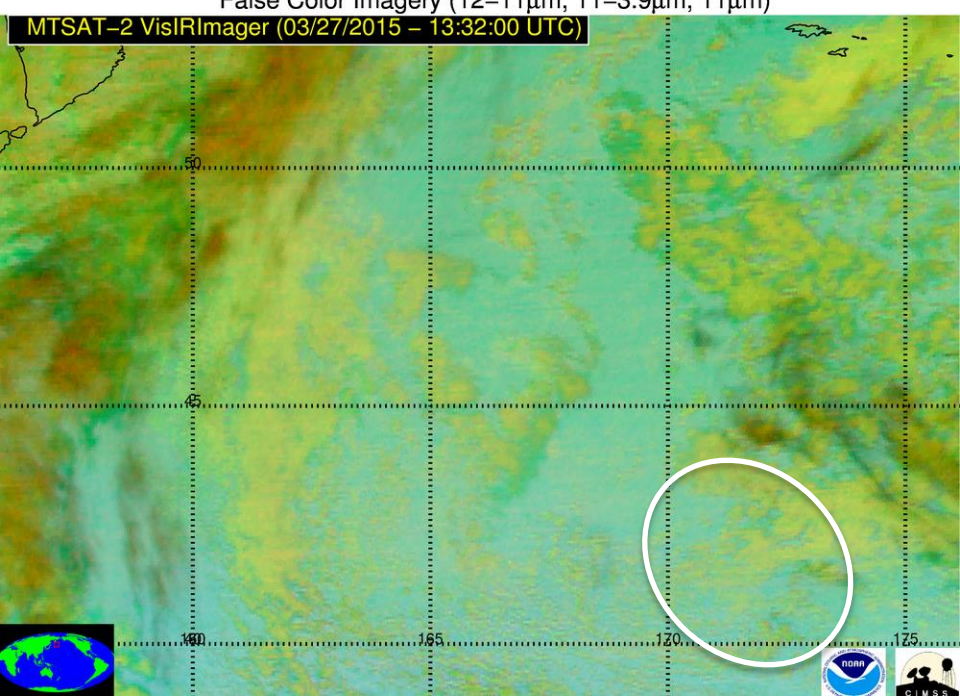
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



Split-Window Imagery (11–12 μ m)



False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)



FVXX23 KNES 271348
VA ADVISORY
DTG: 20150327/1348Z

VAAC: WASHINGTON

VOLCANO: SHEVELUCH 300270
PSN: N5638 E16121

AREA: KAMCHATKA

SUMMIT ELEV: 10771 FT (3283 M)

ADVISORY NR: 2015/024

INFO SOURCE: MTSAT.

ERUPTION DETAILS: VA FM ERUPTION AT 25/2200Z.

OBS VA DTG: 27/1232Z

OBS VA CLD: VA NOT IDENTIFIABLE FROM SATELLITE
DATA.

FCST VA CLD +6HR: 27/1830Z

FCST VA CLD +12HR: 28/0030Z

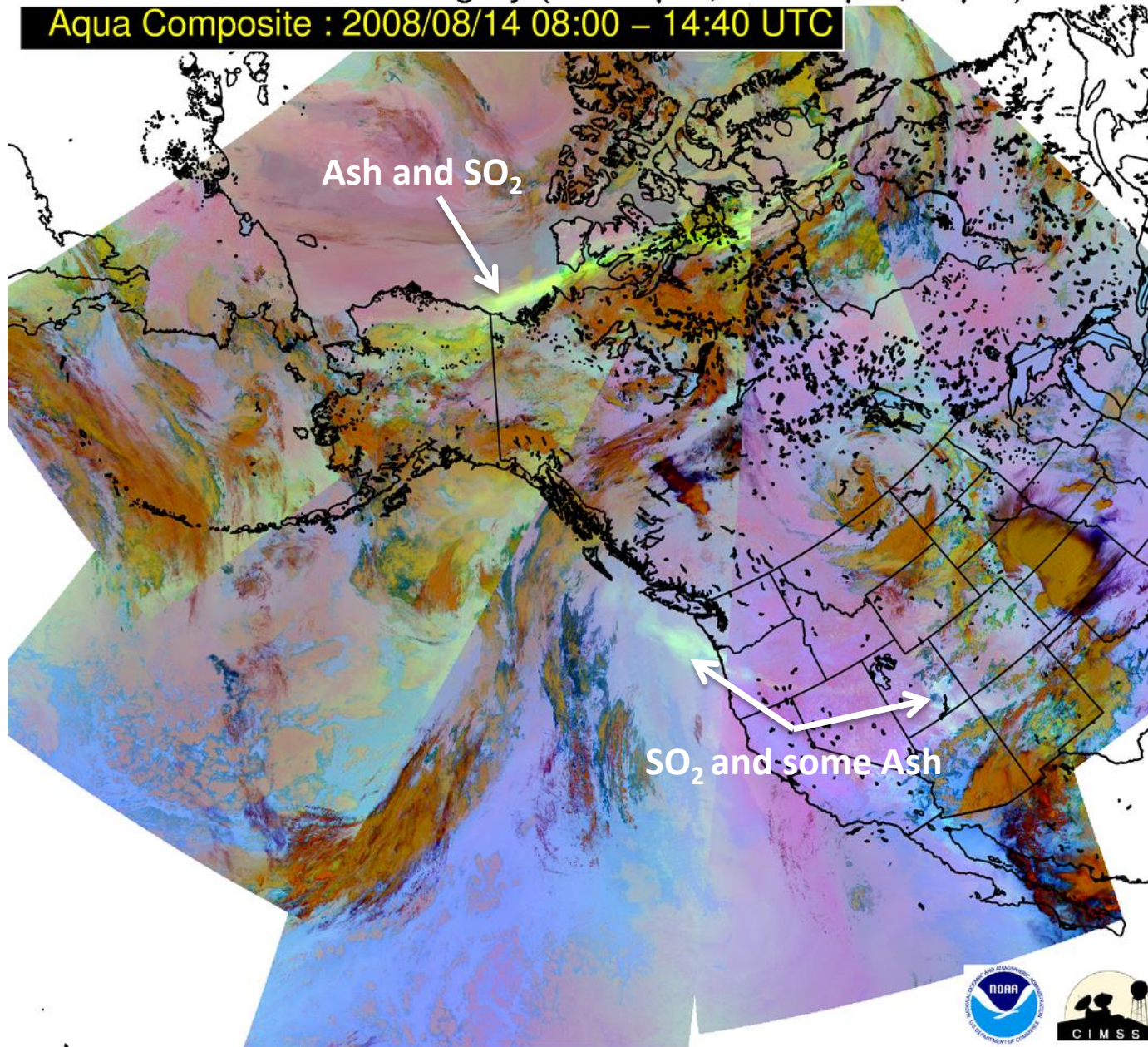
FCST VA CLD +18HR: 28/0630Z

RMK: THE VA NEAR 40N170E HAS BECOME TO DIFFUSE
AND DIFFICULT TO SEE. ...KIBLER

NXT ADVISORY: NO FURTHER ADVISORIES

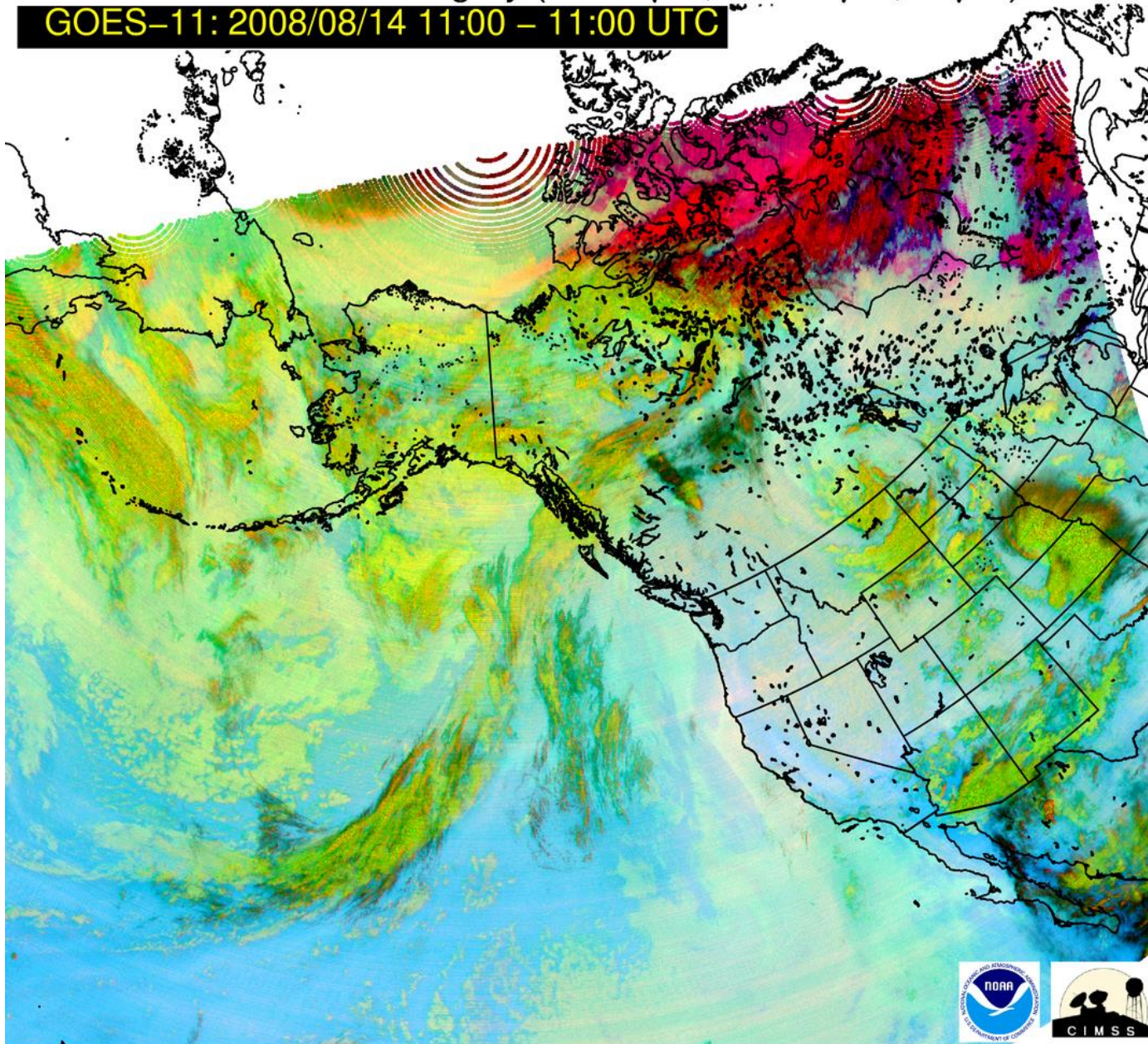
False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

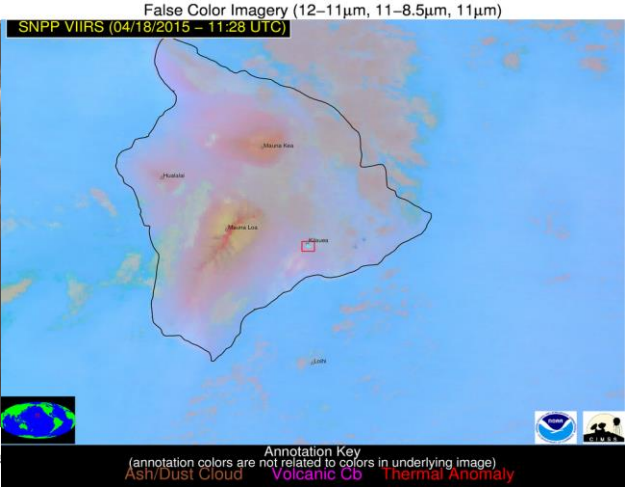
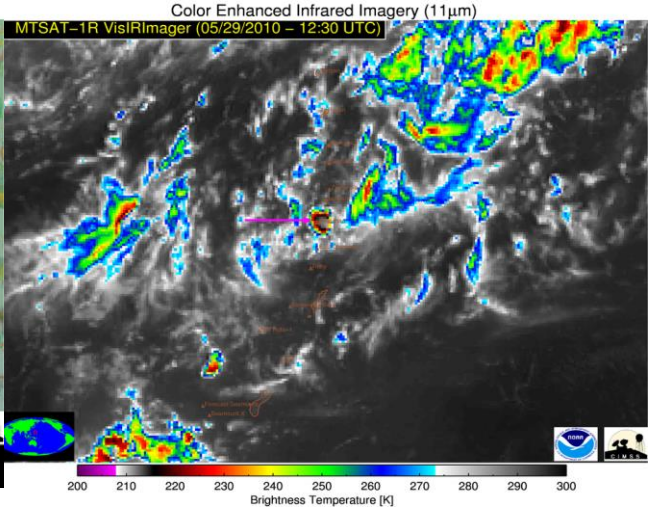
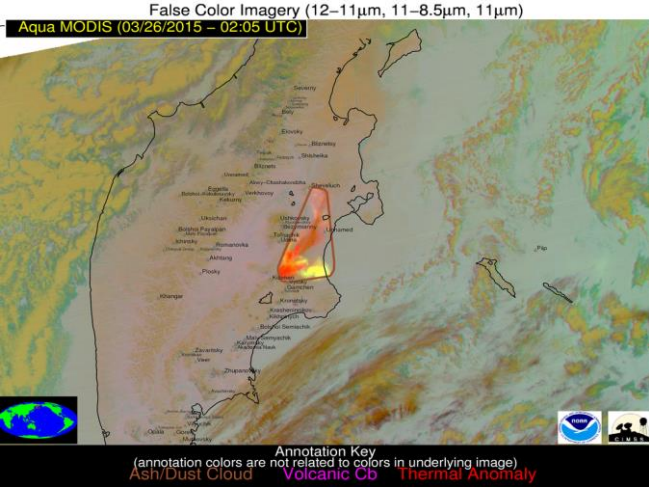
Aqua Composite : 2008/08/14 08:00 – 14:40 UTC



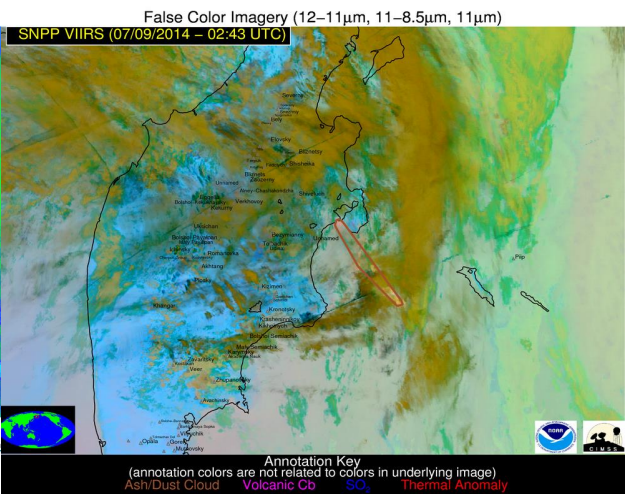
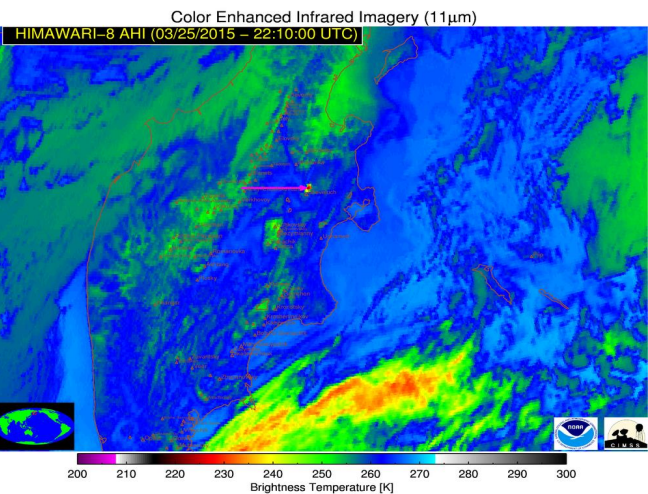
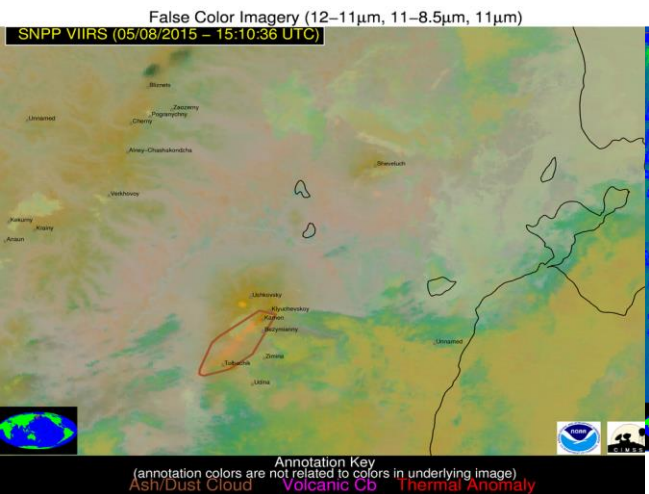
False Color Imagery (12-11 μ m, 11-3.9 μ m, 11 μ m)

GOES-11: 2008/08/14 11:00 - 11:00 UTC



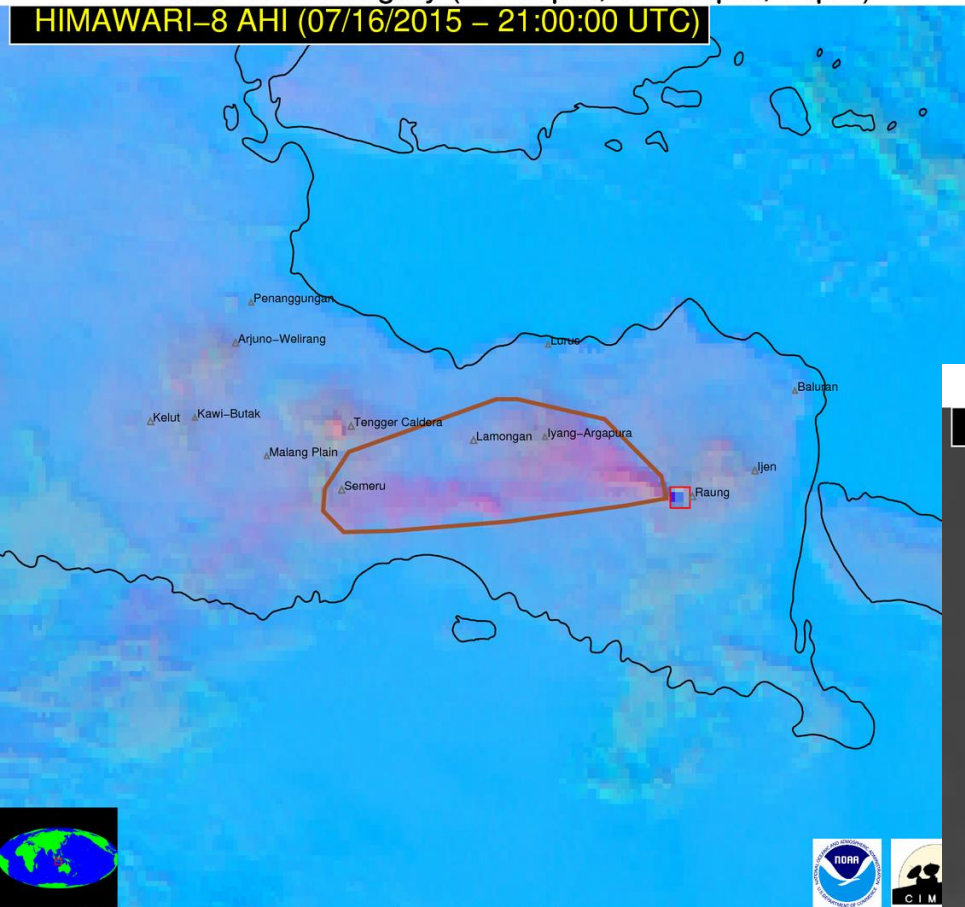


Major Impact 4: More Accurate Ash Cloud Properties



False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

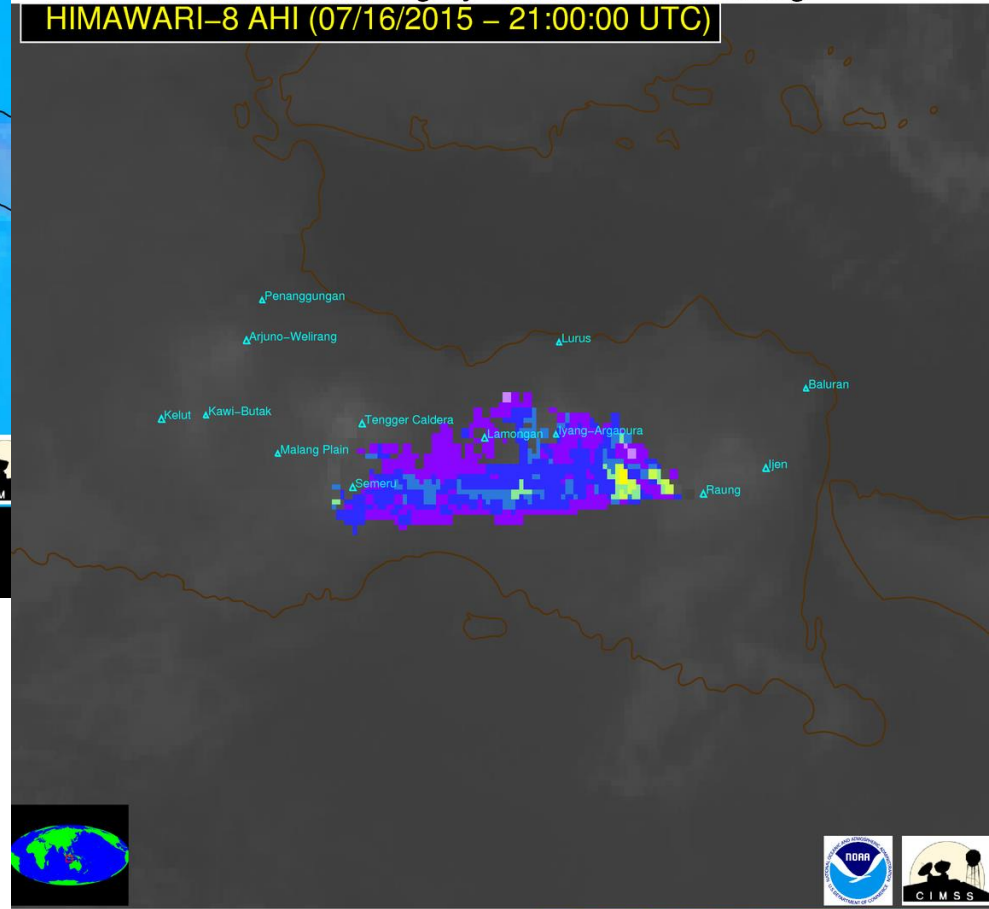
HIMAWARI-8 AHI (07/16/2015 – 21:00:00 UTC)



Actual near real-time results

IR Window Imagery and Ash/Dust Loading

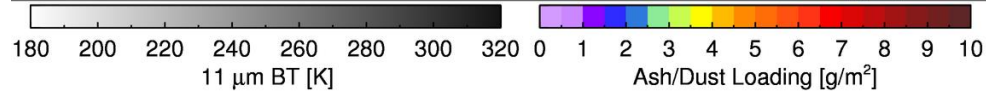
HIMAWARI-8 AHI (07/16/2015 – 21:00:00 UTC)

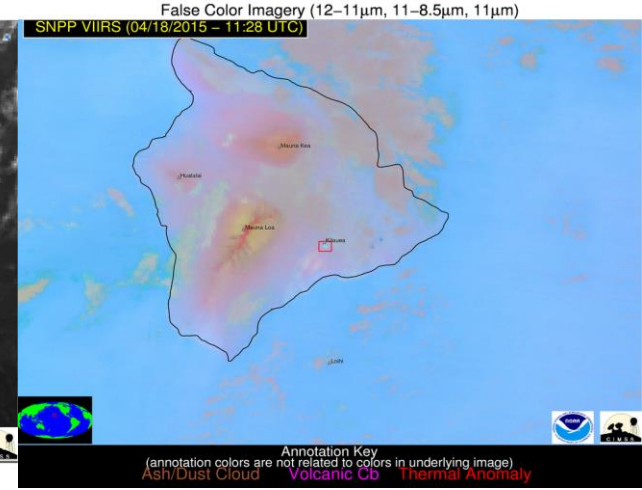
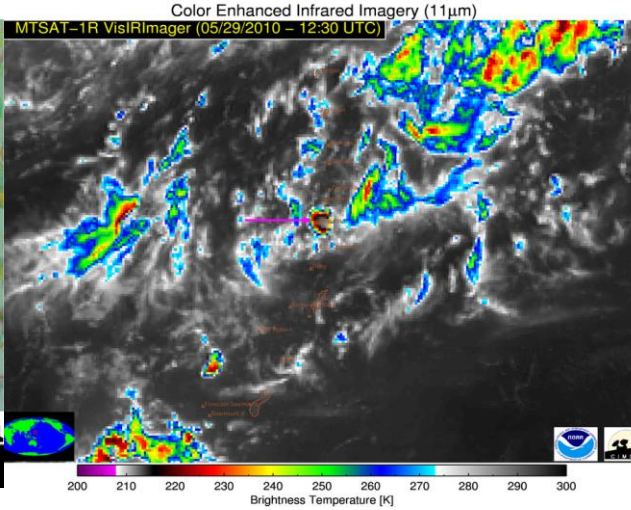
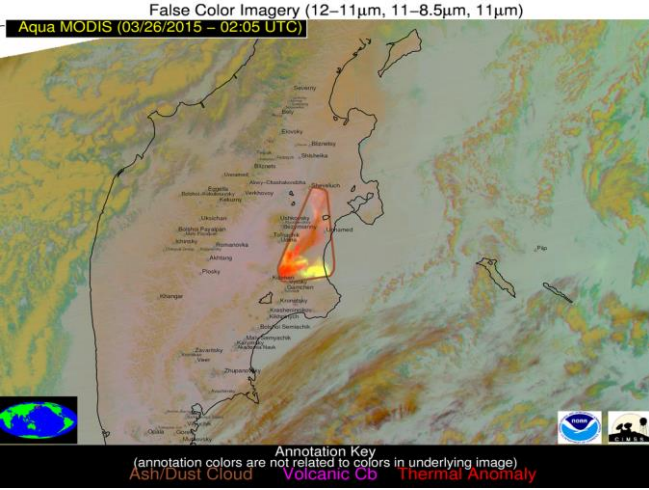


Annotation Key

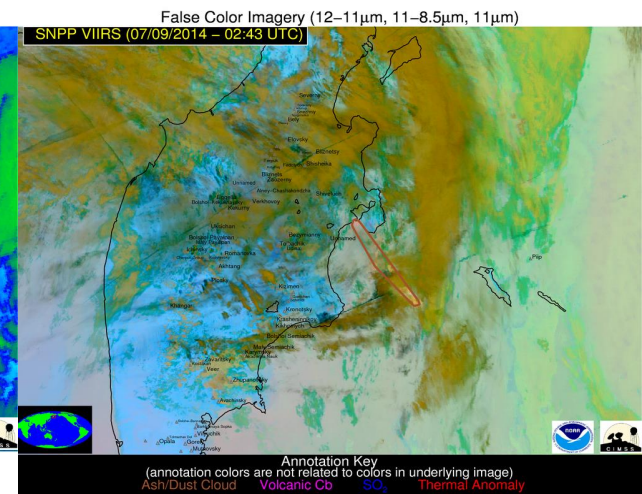
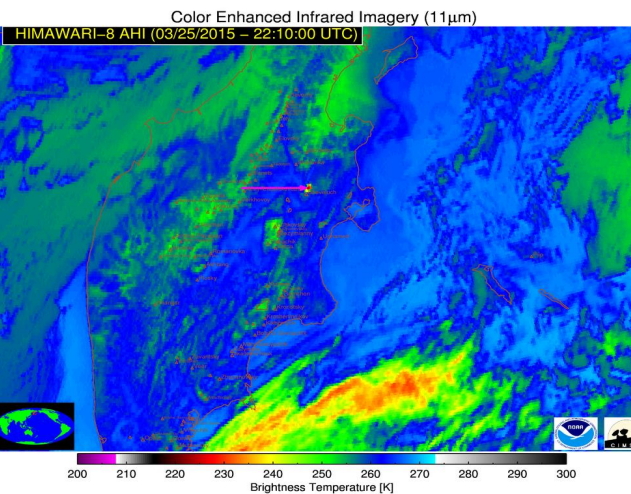
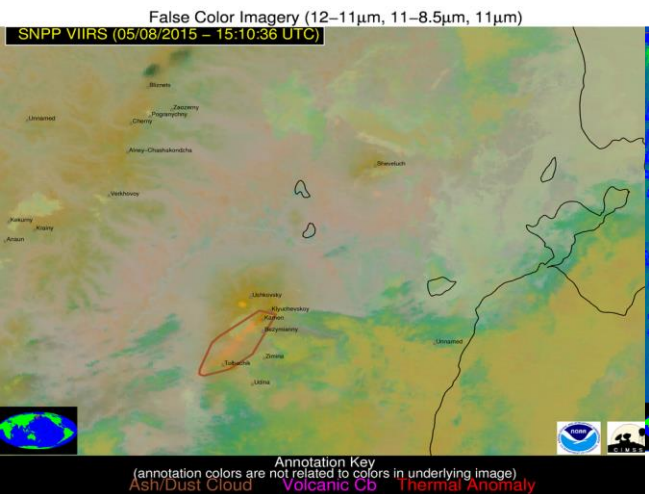
(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly





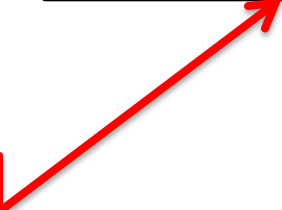
Challenge: User Readiness



Wave length (μm)	Himawari-8/9			MTSAT-1R/2	
	Band number				
0.47	1	●	1		
0.51	2	●	1		
0.64	3	●	0.5	●	1
0.86	4	●	1		
1.6	5	●	2		
2.3	6	●	2		
3.9	7	●	2	●	4
6.2	8	●	2	●	4
6.9	9	●	2		
7.3	10	●	2		
8.6	11	●	2		
9.6	12	●	2		
10.4	13	●	2	●	4
11.2	14	●	2		
12.4	15	●	2	●	4
13.3	16	●	2		JMA

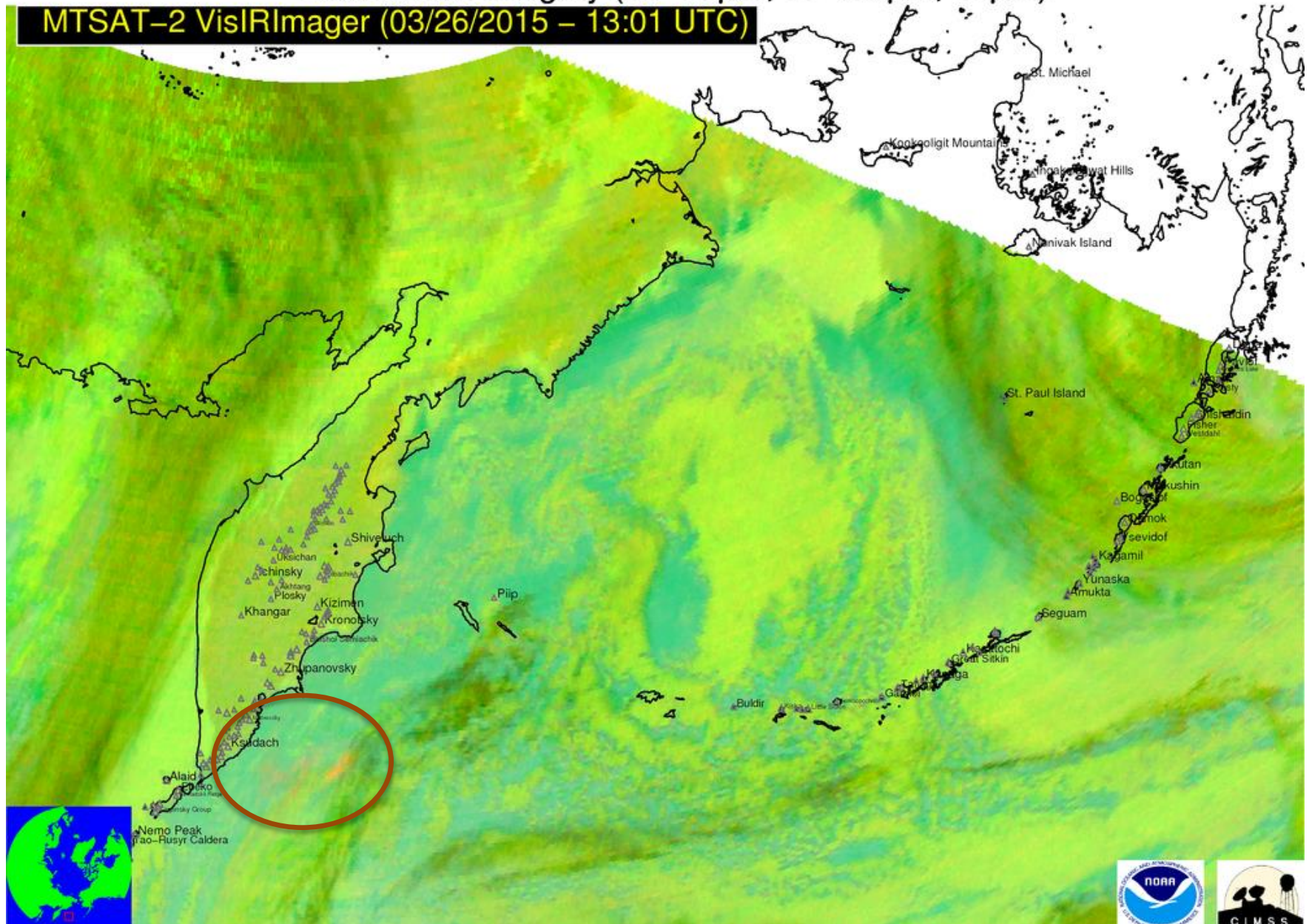
Which “split-window” BTD should be used for ash tracking?

The AHI (and ABI) have 3 channels in the “split-window” region



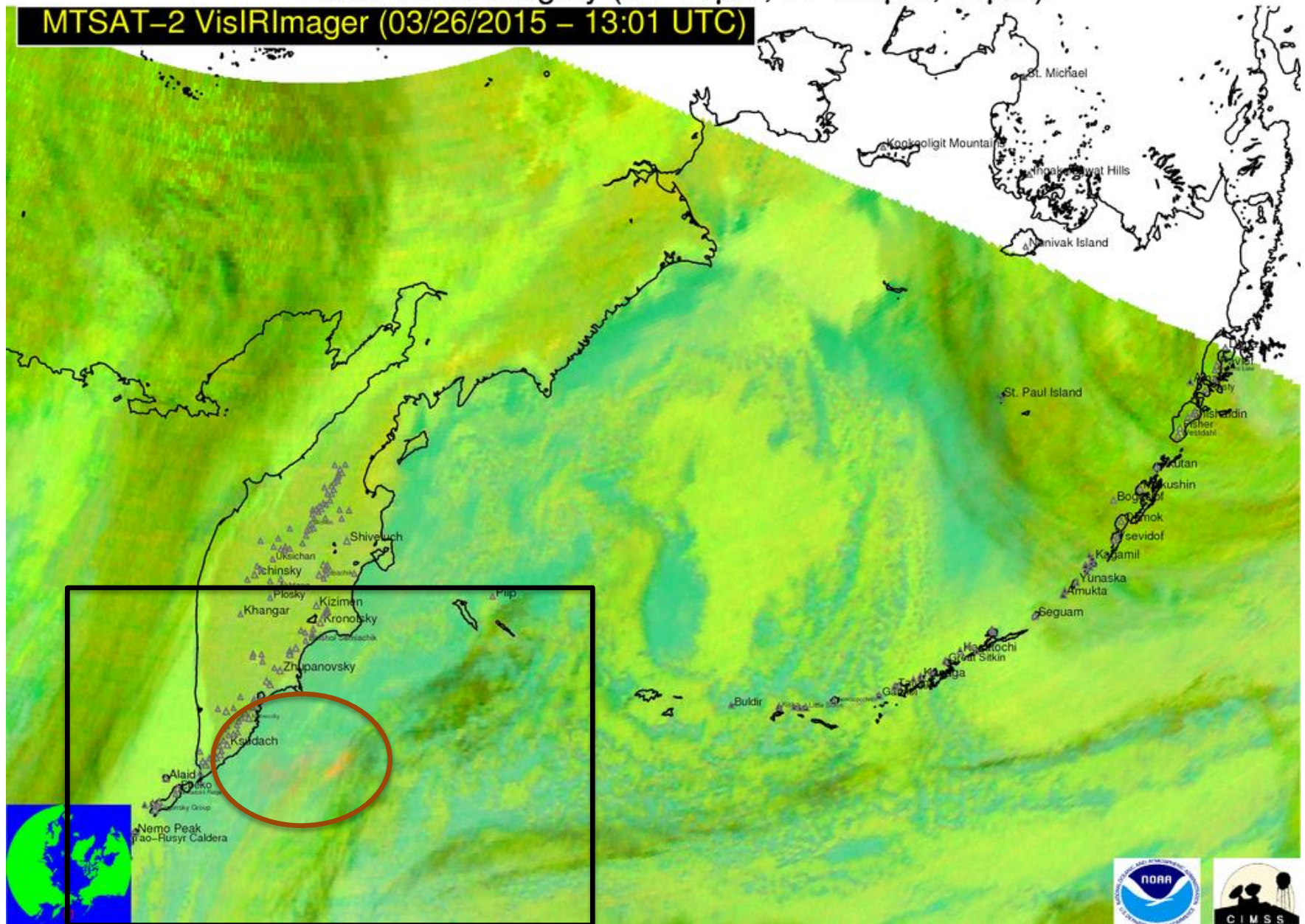
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

MTSAT-2 VisIRImager (03/26/2015 – 13:01 UTC)



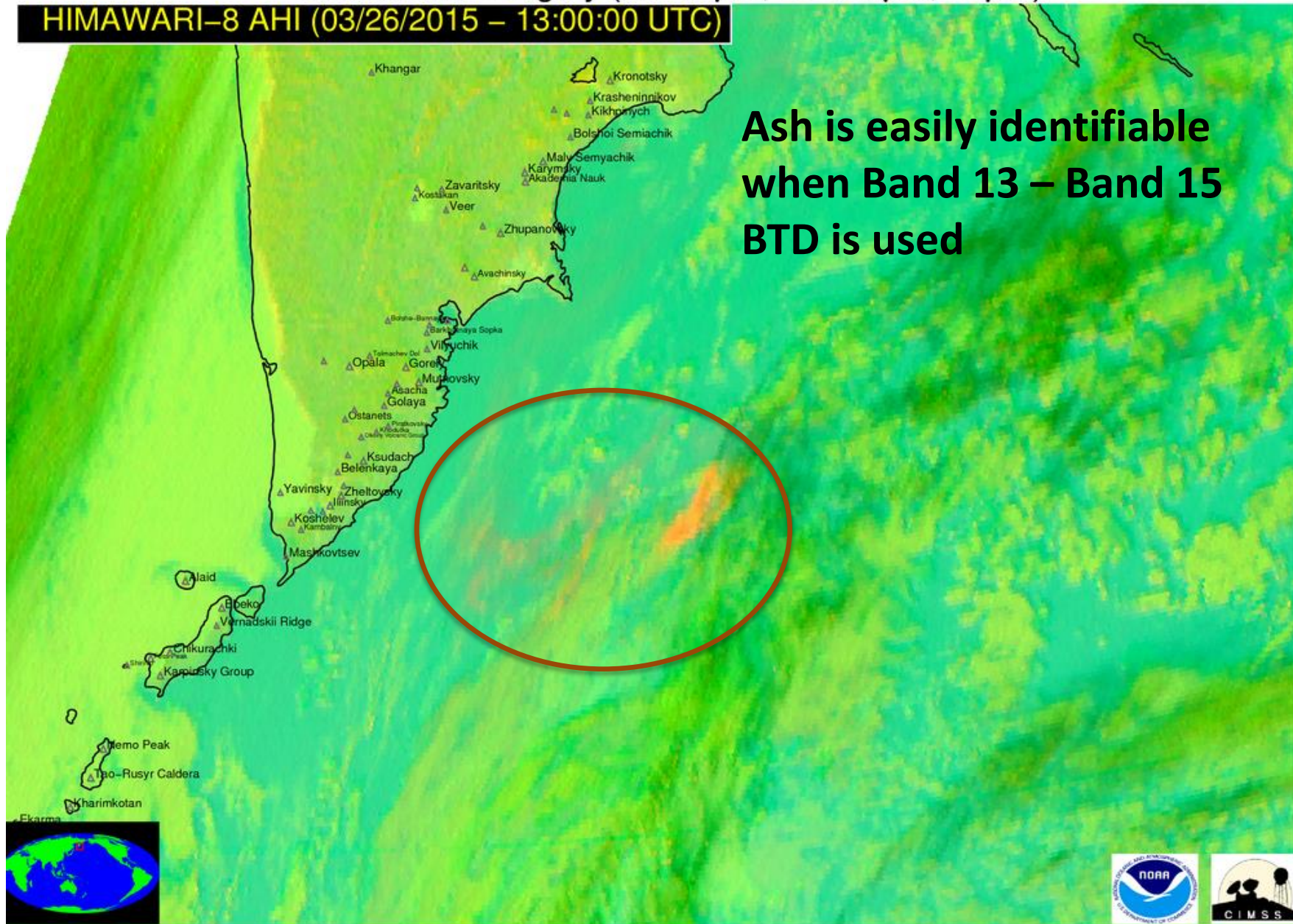
False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

MTSAT-2 VisIRImager (03/26/2015 – 13:01 UTC)



False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

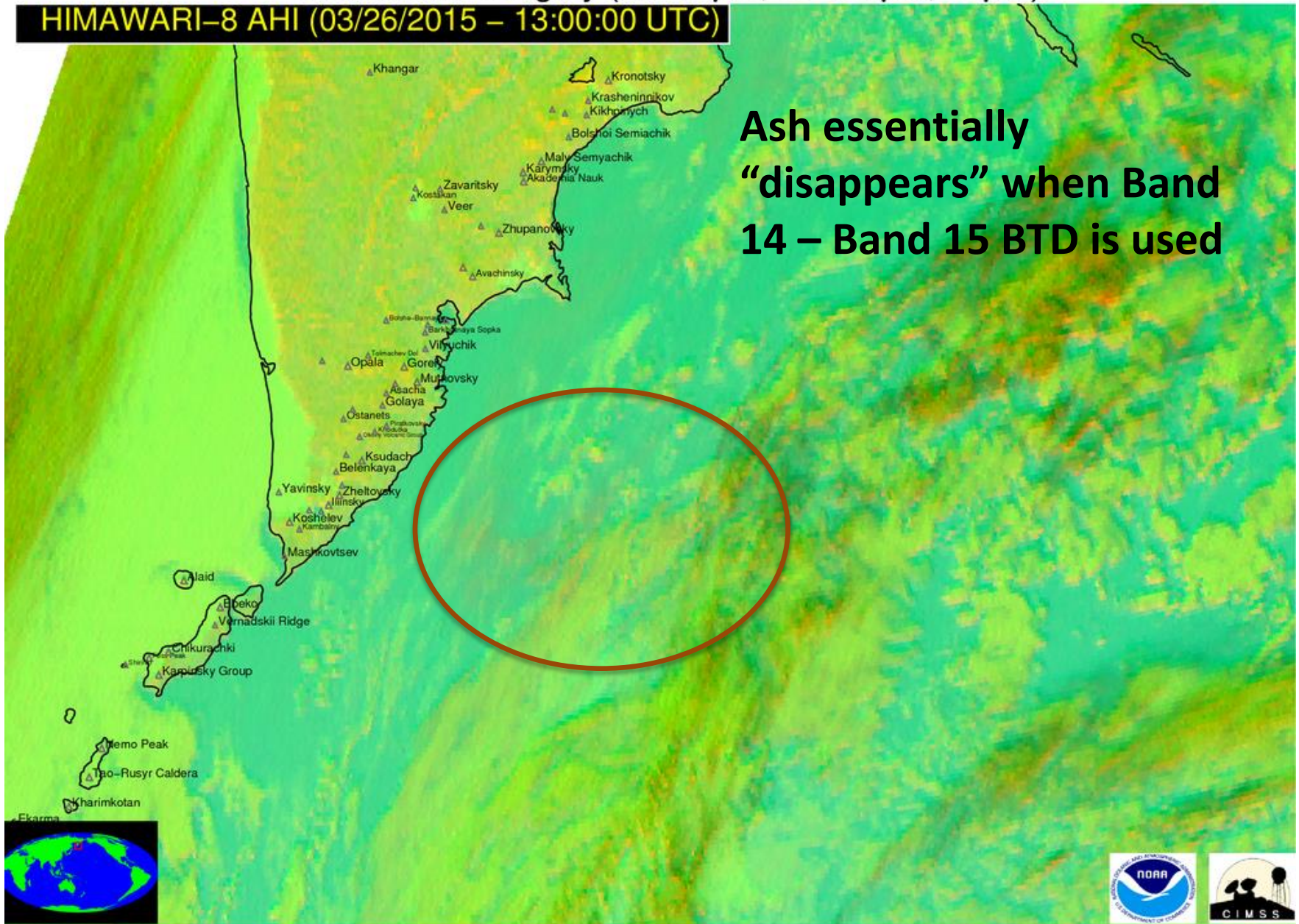
HIMAWARI-8 AHI (03/26/2015 – 13:00:00 UTC)



False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

HIMAWARI-8 AHI (03/26/2015 – 13:00:00 UTC)

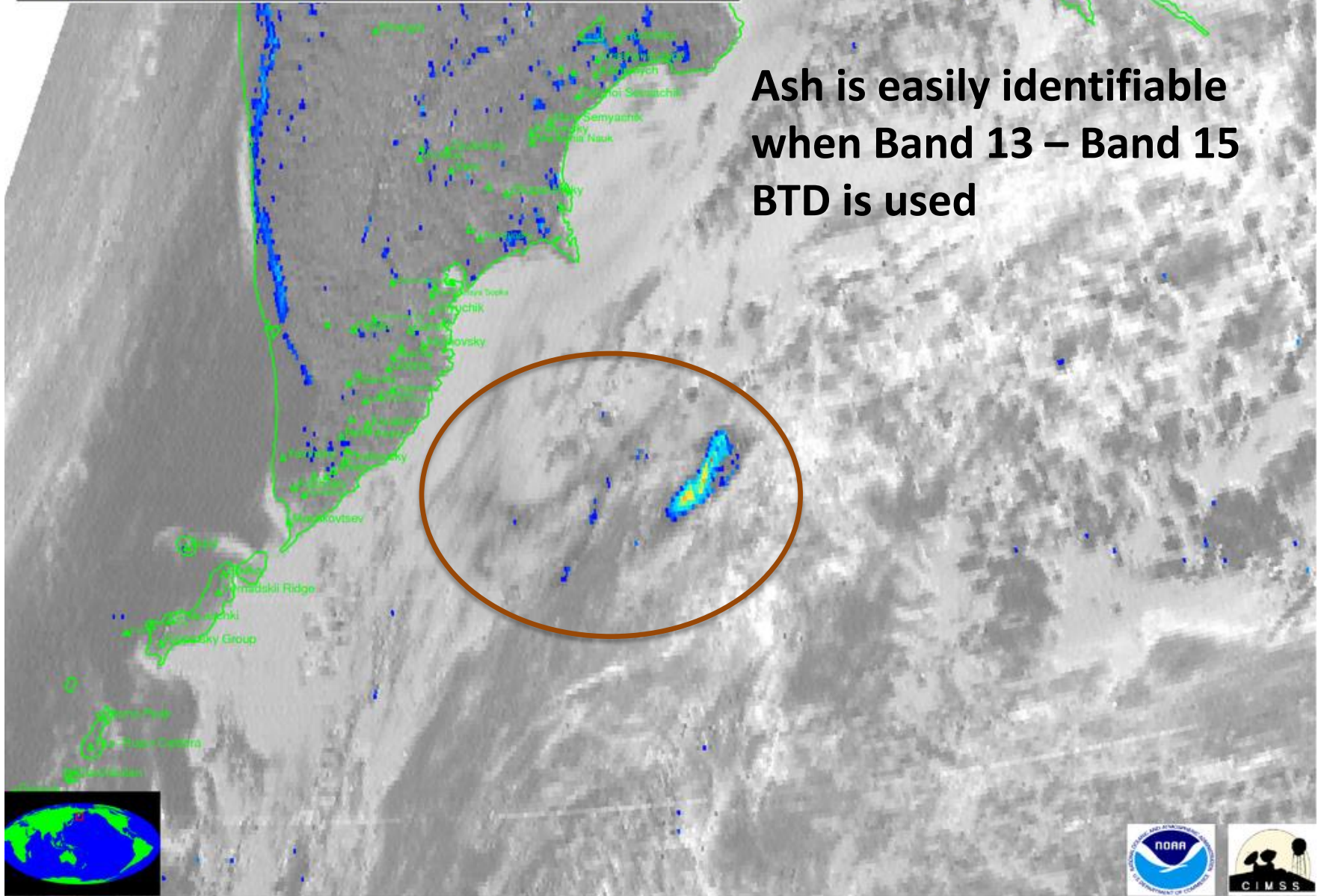
Ash essentially
“disappears” when Band
14 – Band 15 BTDR is used



Split-Window Imagery (11–12 μm)

HIMAWARI-8 AHI (03/26/2015 – 13:00:00 UTC)

Ash is easily identifiable when Band 13 – Band 15 BTD is used

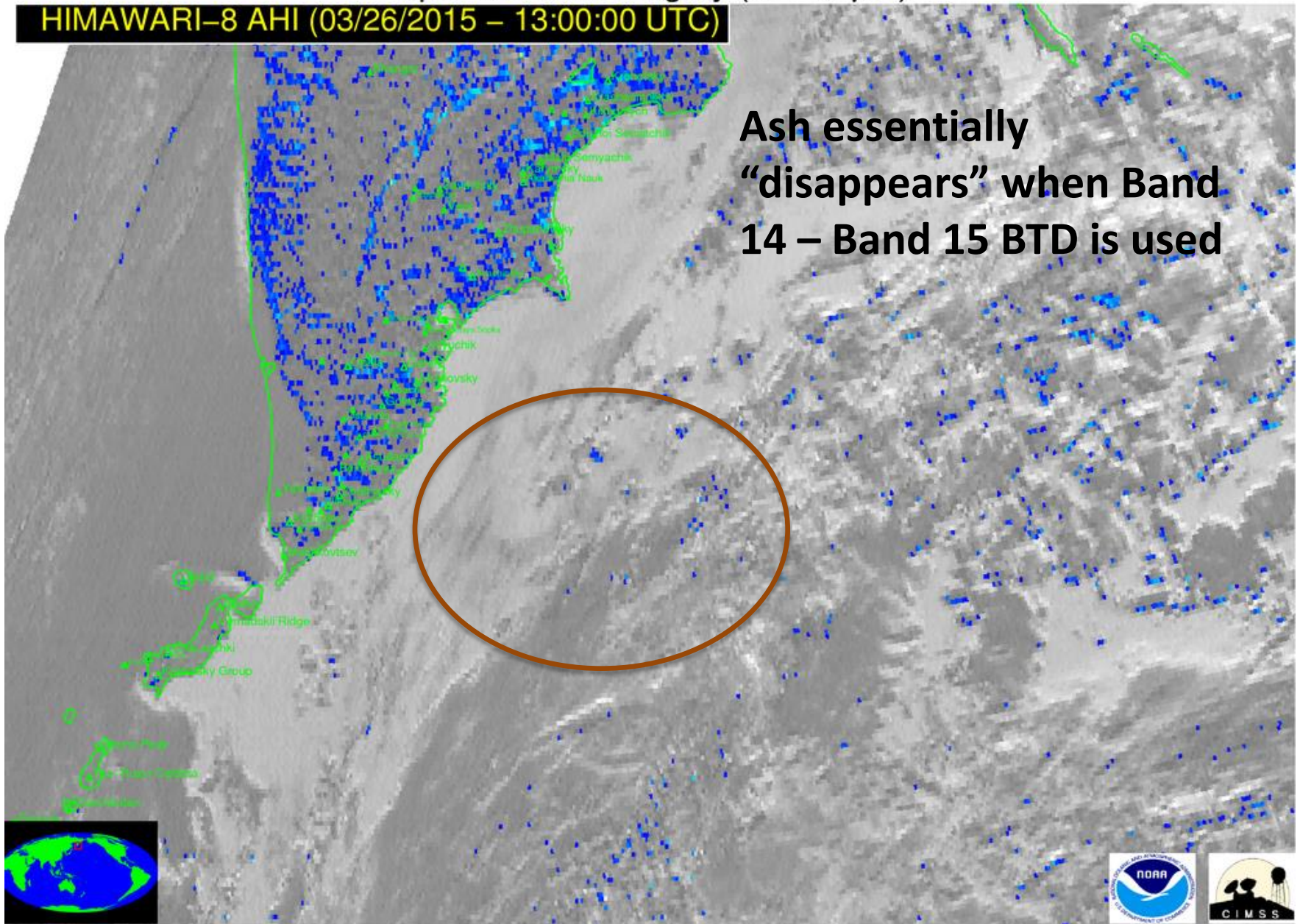


BTD[11–12 μm] [K]

Split-Window Imagery (11–12 μm)

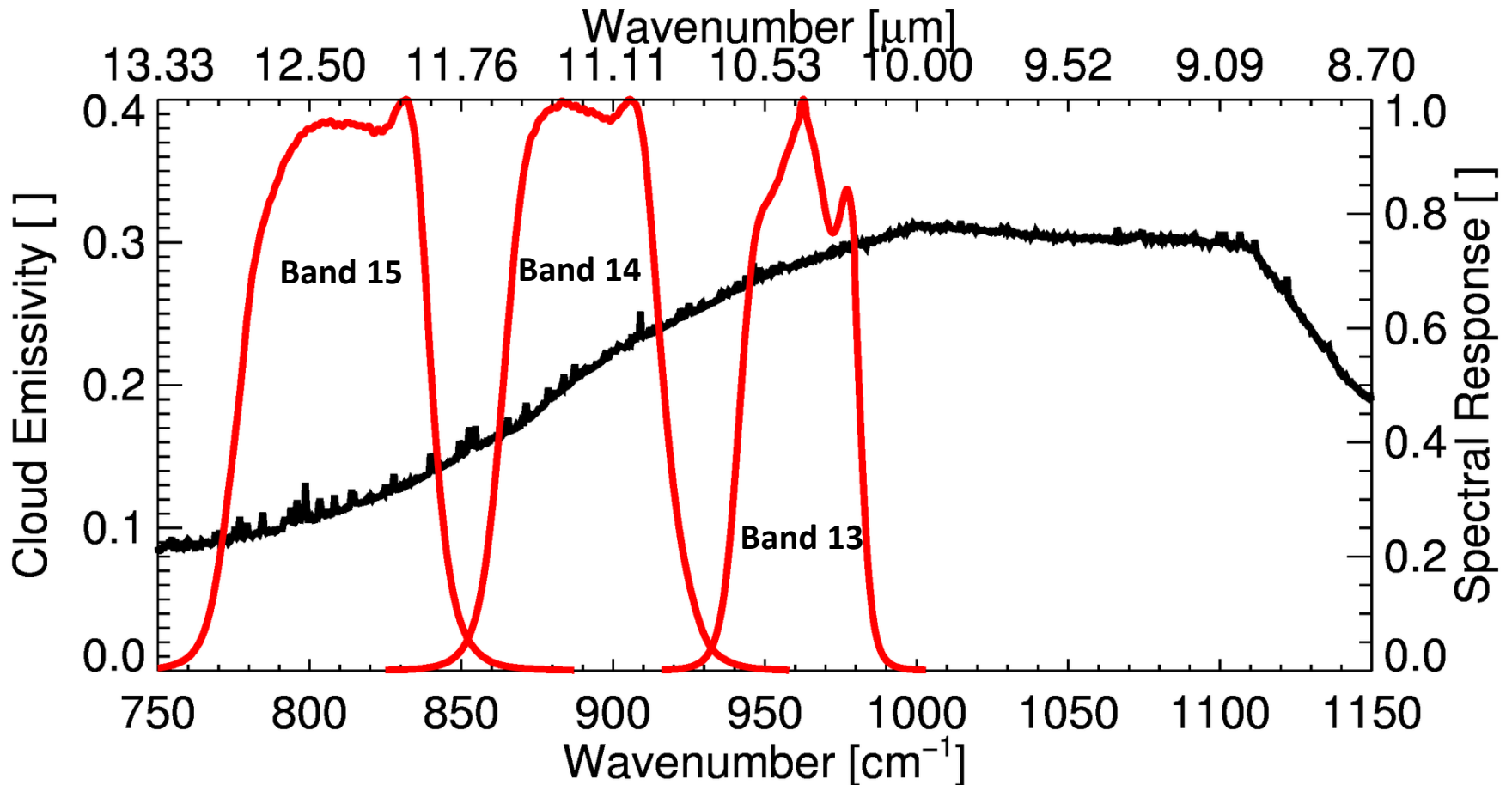
HIMAWARI-8 AHI (03/26/2015 – 13:00:00 UTC)

Ash essentially
“disappears” when Band
14 – Band 15 BTD is used



BTD[11–12 μm] [K]

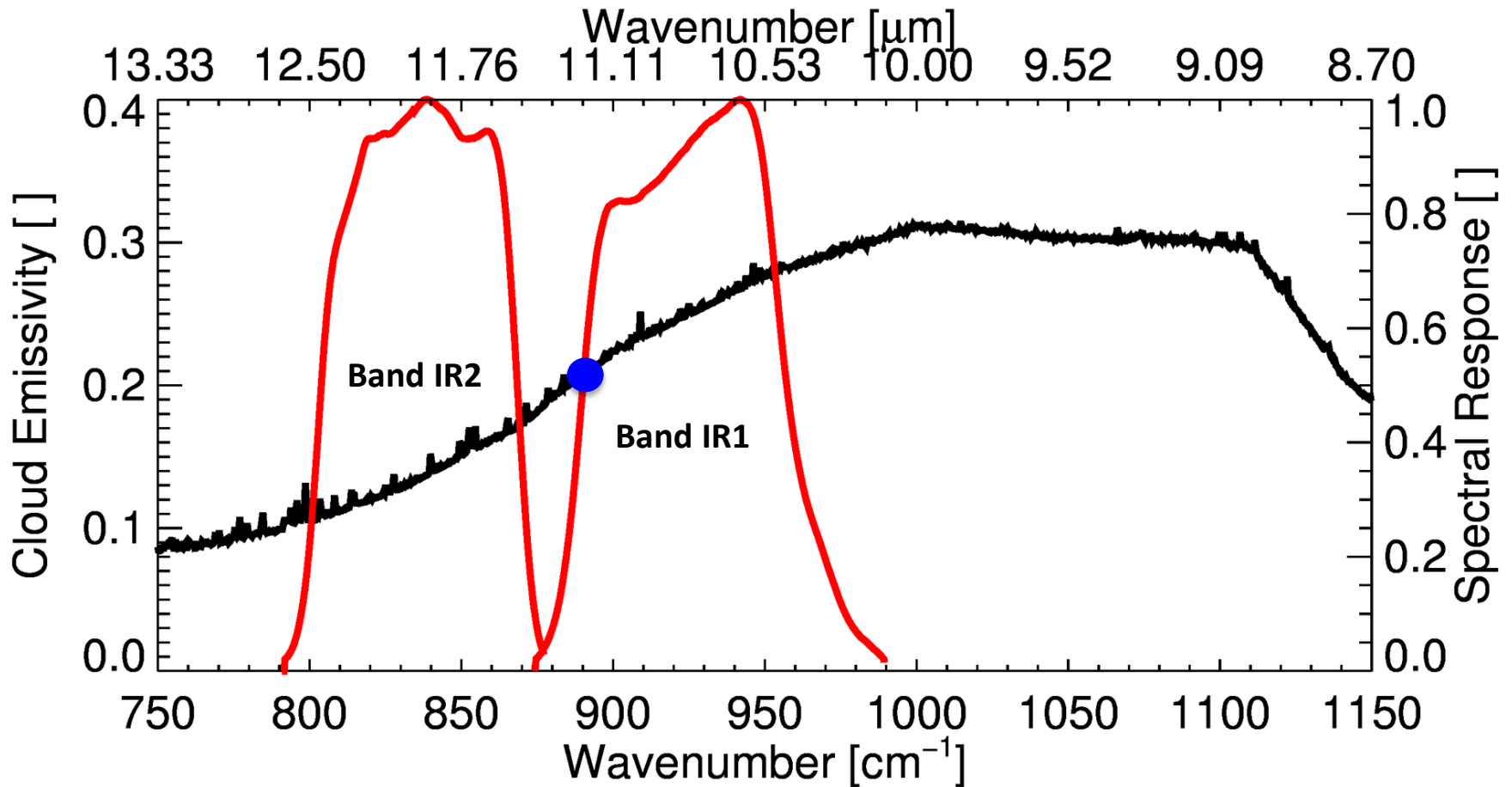
Himawari-8 AHI



The emissivity of ash clouds decreases with increasing wavelength in the “split-window” region (the opposite is true for met clouds)



MTSAT-2

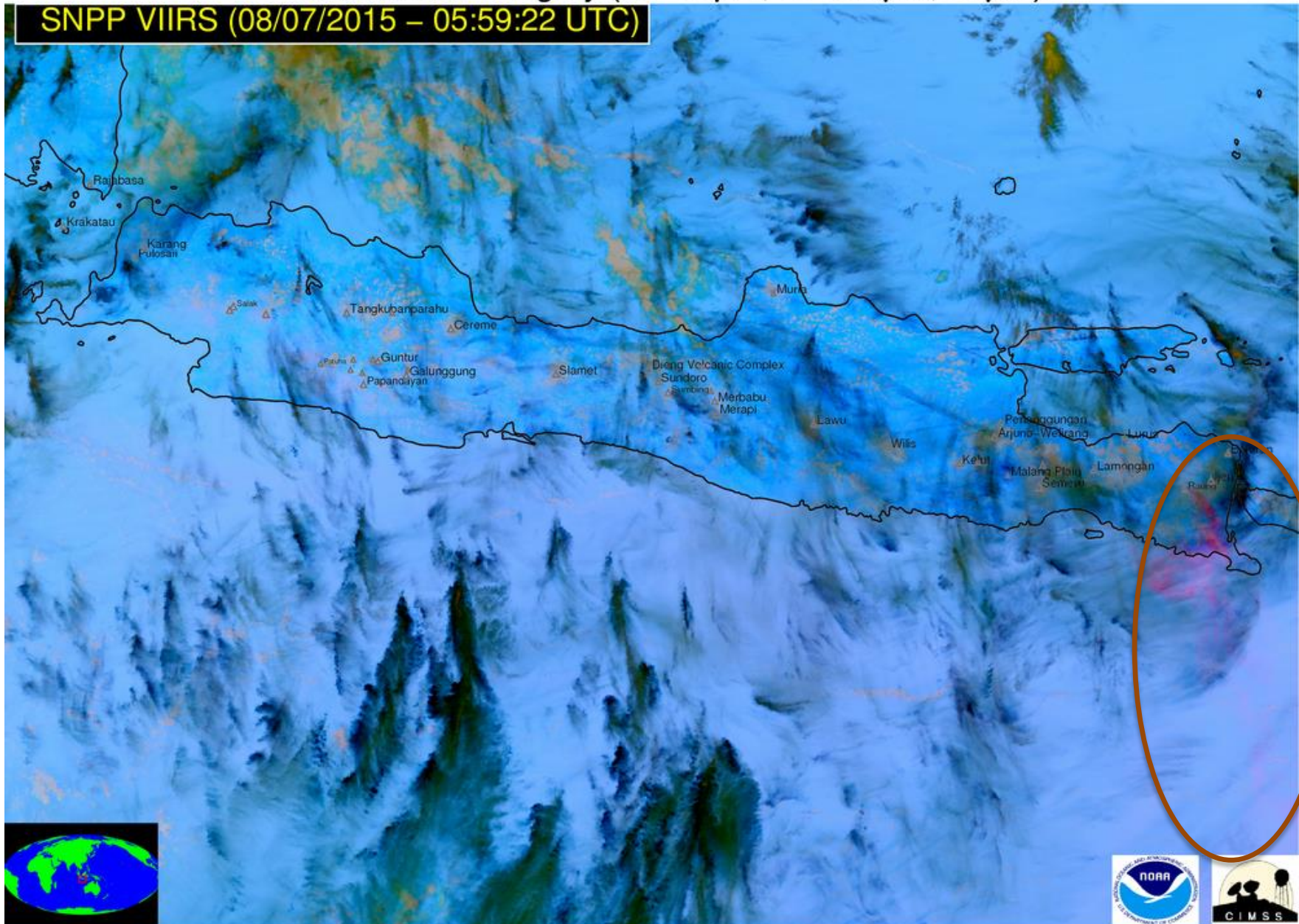


The emissivity of ash clouds decreases with increasing wavelength in the “split-window” region (the opposite is true for met clouds)



False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

SNPP VIIRS (08/07/2015 – 05:59:22 UTC)



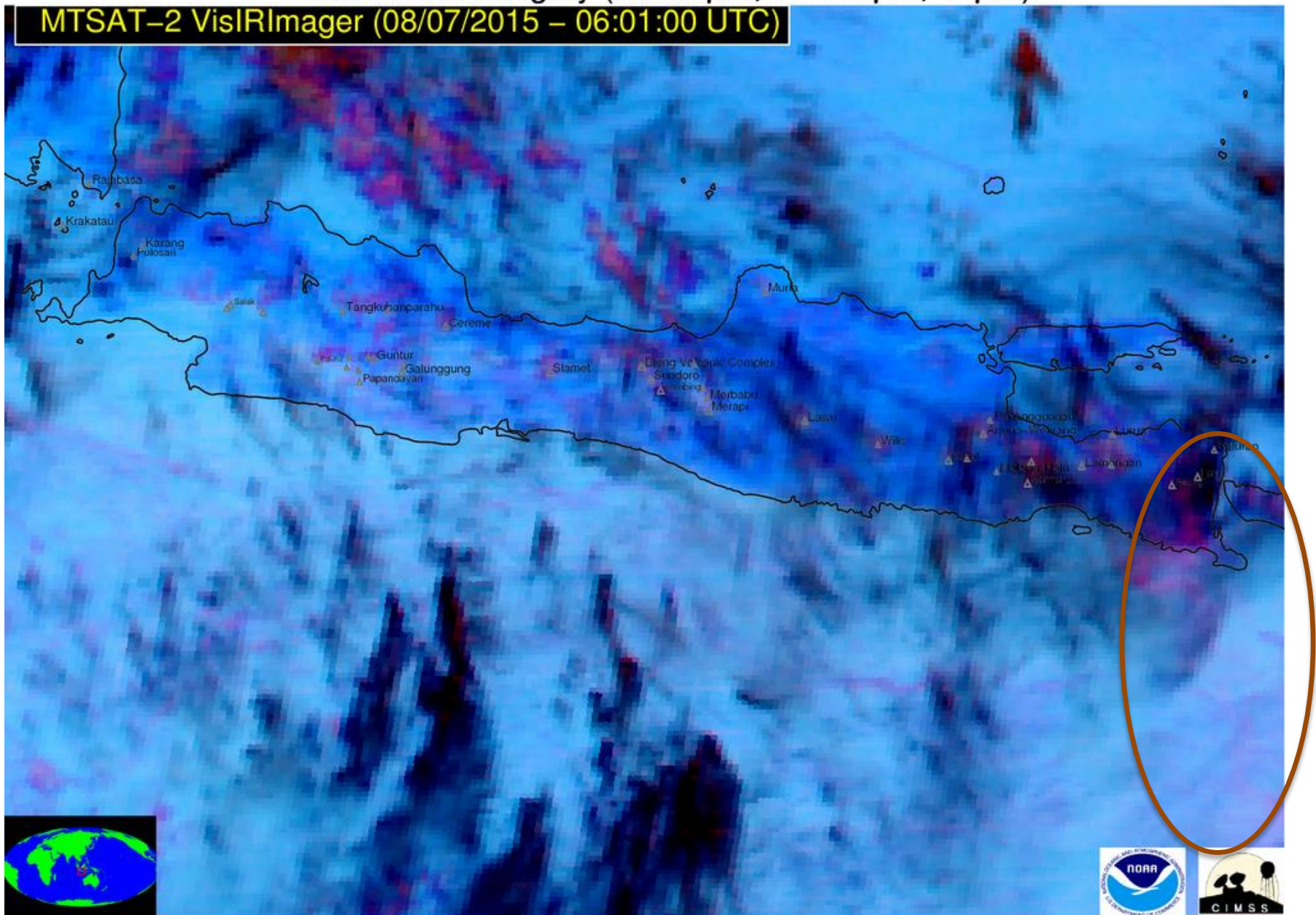
Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly

False Color Imagery (12–11 μ m, 11–3.9 μ m, 11 μ m)

MTSAT-2 VisIRImager (08/07/2015 – 06:01:00 UTC)



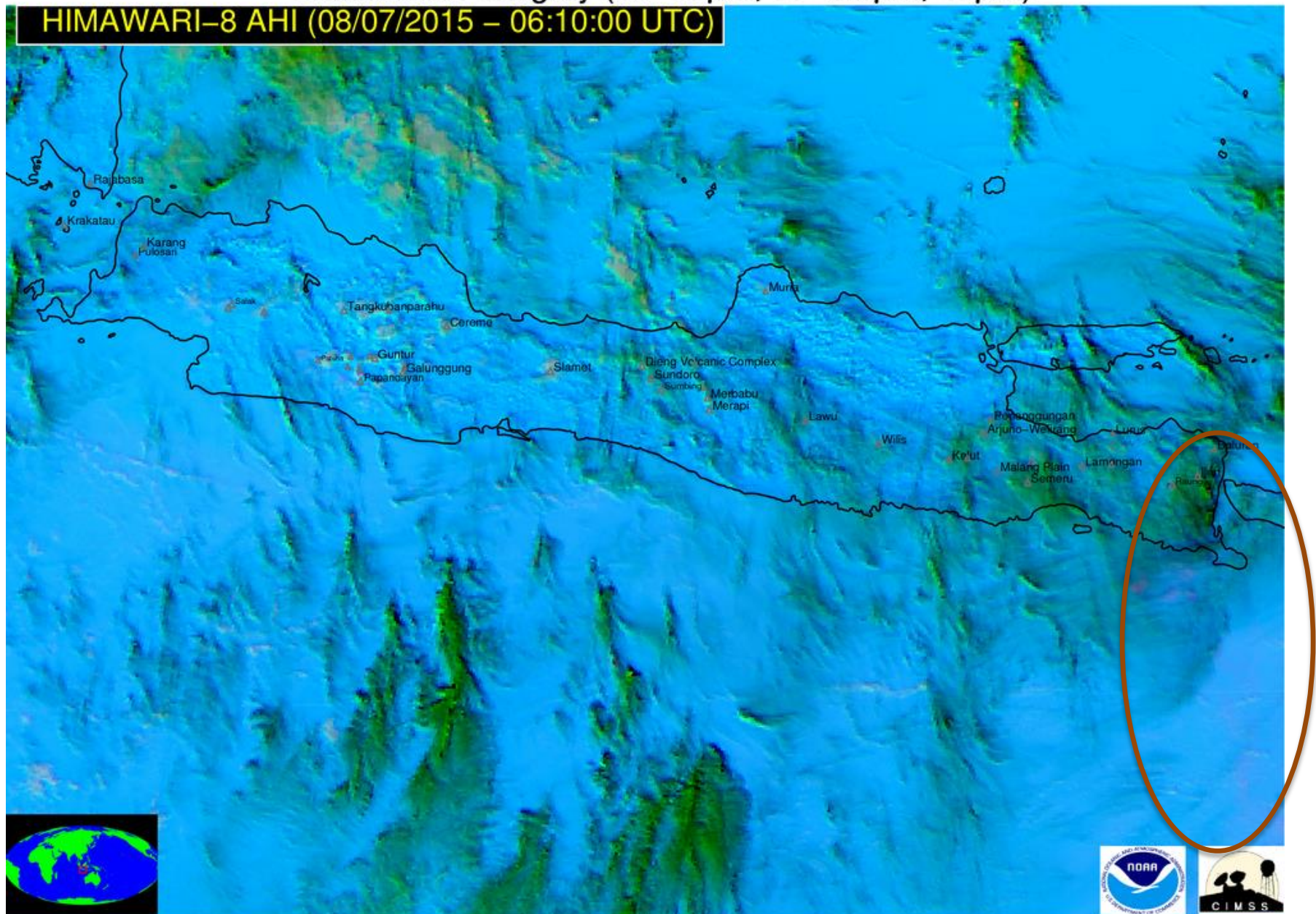
Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly

False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

HIMAWARI-8 AHI (08/07/2015 – 06:10:00 UTC)



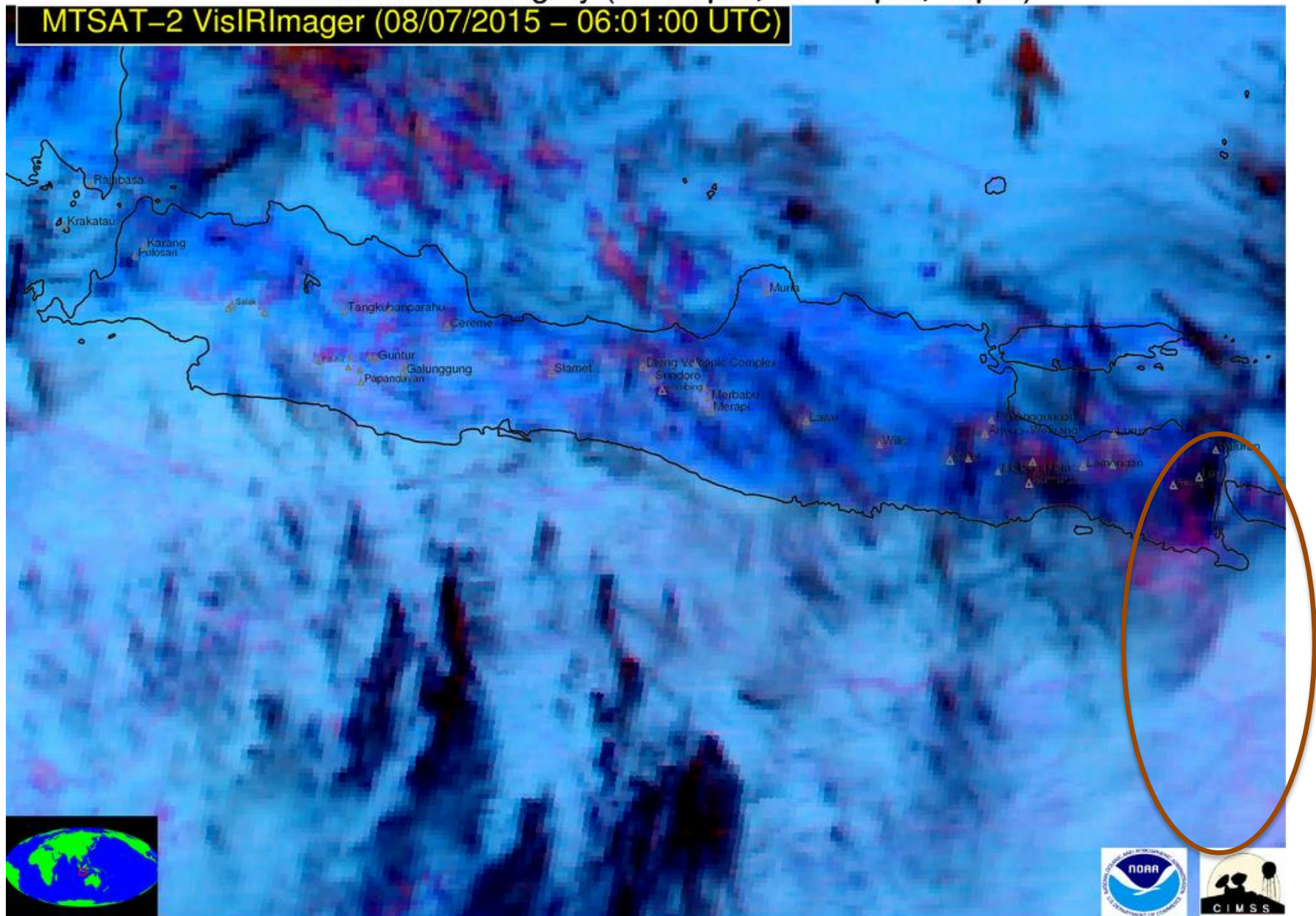
Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly

False Color Imagery (12–11μm, 11–3.9μm, 11μm)

MTSAT-2 VisIRImager (08/07/2015 – 06:01:00 UTC)

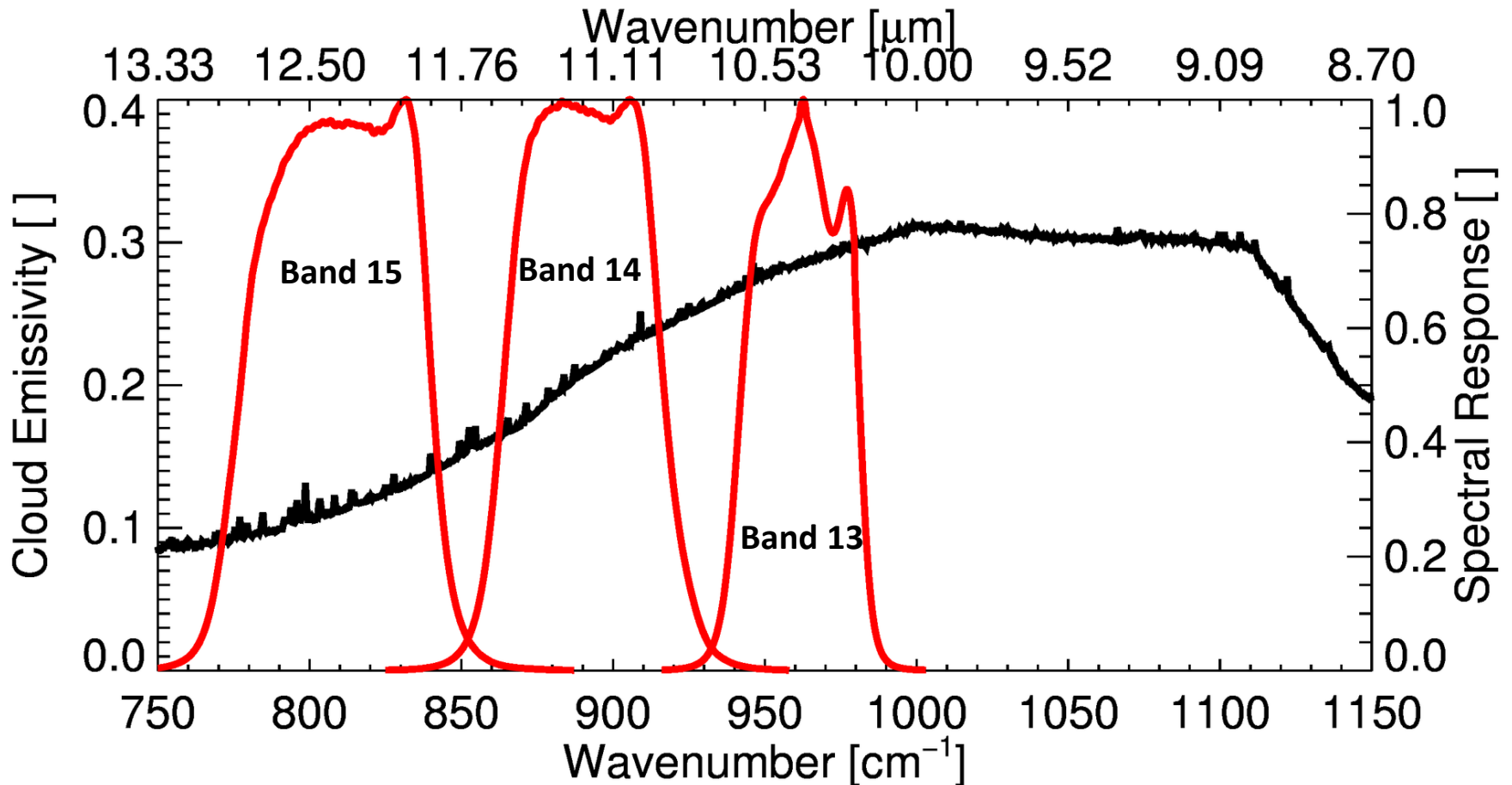


Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb Thermal Anomaly

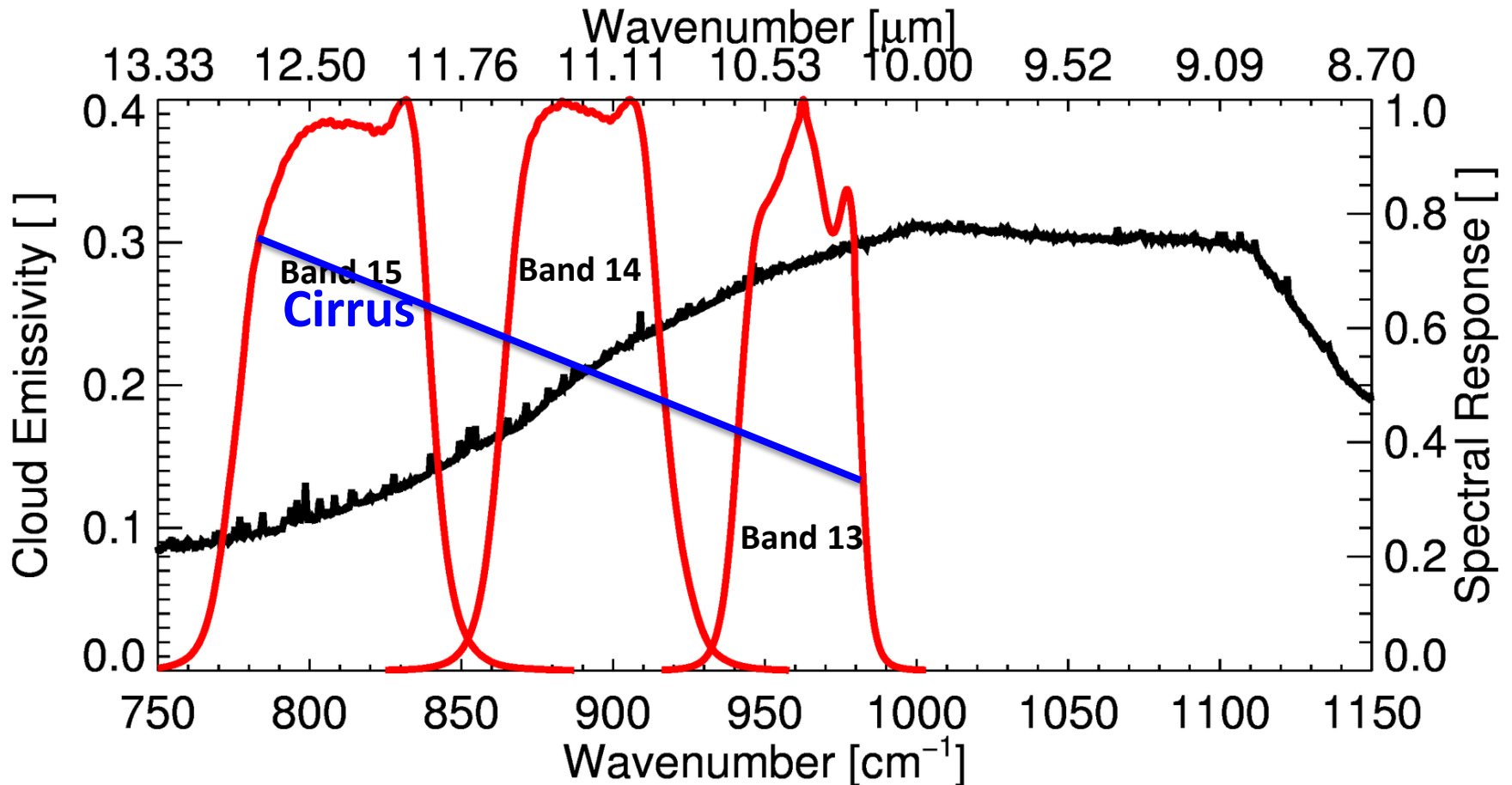
Himawari-8 AHI



The emissivity of ash clouds decreases with increasing wavelength in the “split-window” region (the opposite is true for met clouds)



Himawari-8 AHI



The emissivity of ash clouds decreases with increasing wavelength in the “split-window” region (the opposite is true for met clouds)



Summary

- **Impacts of next generation satellites:**
 1. Improved identification of ash clouds in the near field
 2. More timely detection of explosive eruptions
 3. Improvements in ash cloud tracking, with larger improvements possible when ash and SO₂ are co-located
 4. SO₂ imaging/detection capability in GEO orbit
 5. More accurate ash cloud properties (detection, height, mass loading, and effective particle radius)
- **Challenges:**
 1. Data volume – need for automated tools
 2. Converting “Big Data” to actionable information using the entire satellite constellation and other measurements
 3. User readiness

