# Side Meeting on Combined Geo/Leo Observations


## Dan Lindsey

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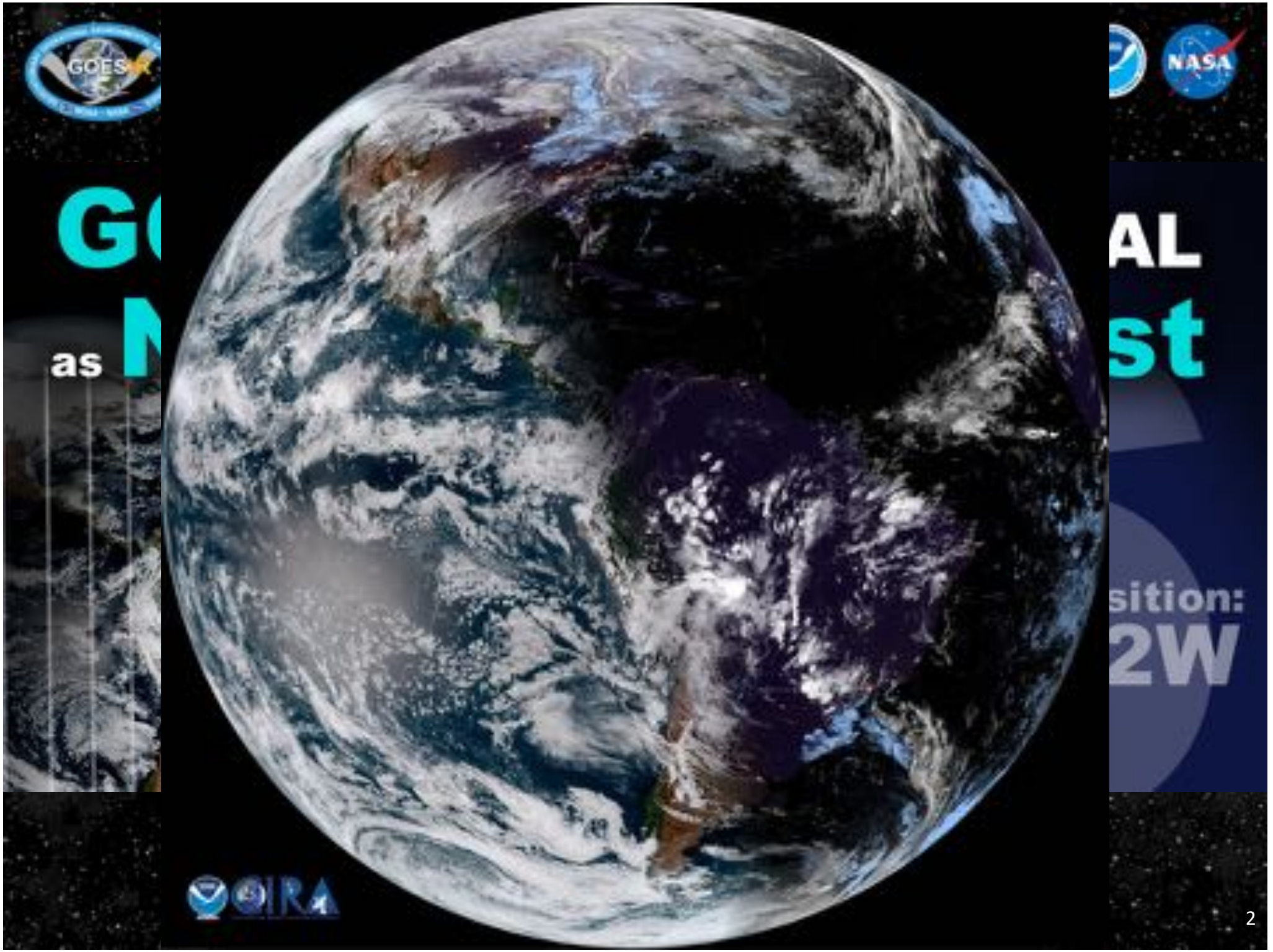
**CEOS-SIT Meeting**

**Boulder, CO**

**23 April 2018**


GOES
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# New Observing Platforms

- JPSS-1 lifted off on 18 November 2017 and became NOAA-20
- Provides the same instrumentation as that on Suomi-NPP; follows the samesun synchronous orbit separated by 50 minutes

# New Observing Platforms

- GOES-S was successfully launched on March 1, 2018, from Kennedy Space Center
- Reached geostationary orbit on March 12 and was renamed GOES-17
- Will undergo checkout from 89.5 W longitude for 6 months
- Will be moved to 137 W in October, where it will become GOES-West and provide excellent coverage of the western U.S., Alaska, Hawaii, and the central and eastern Pacific Ocean

# Pilot Projects: CEOS/CGMS Cooperation

Three Pilot Projects were proposed at the 2017 CGMS Plenary:

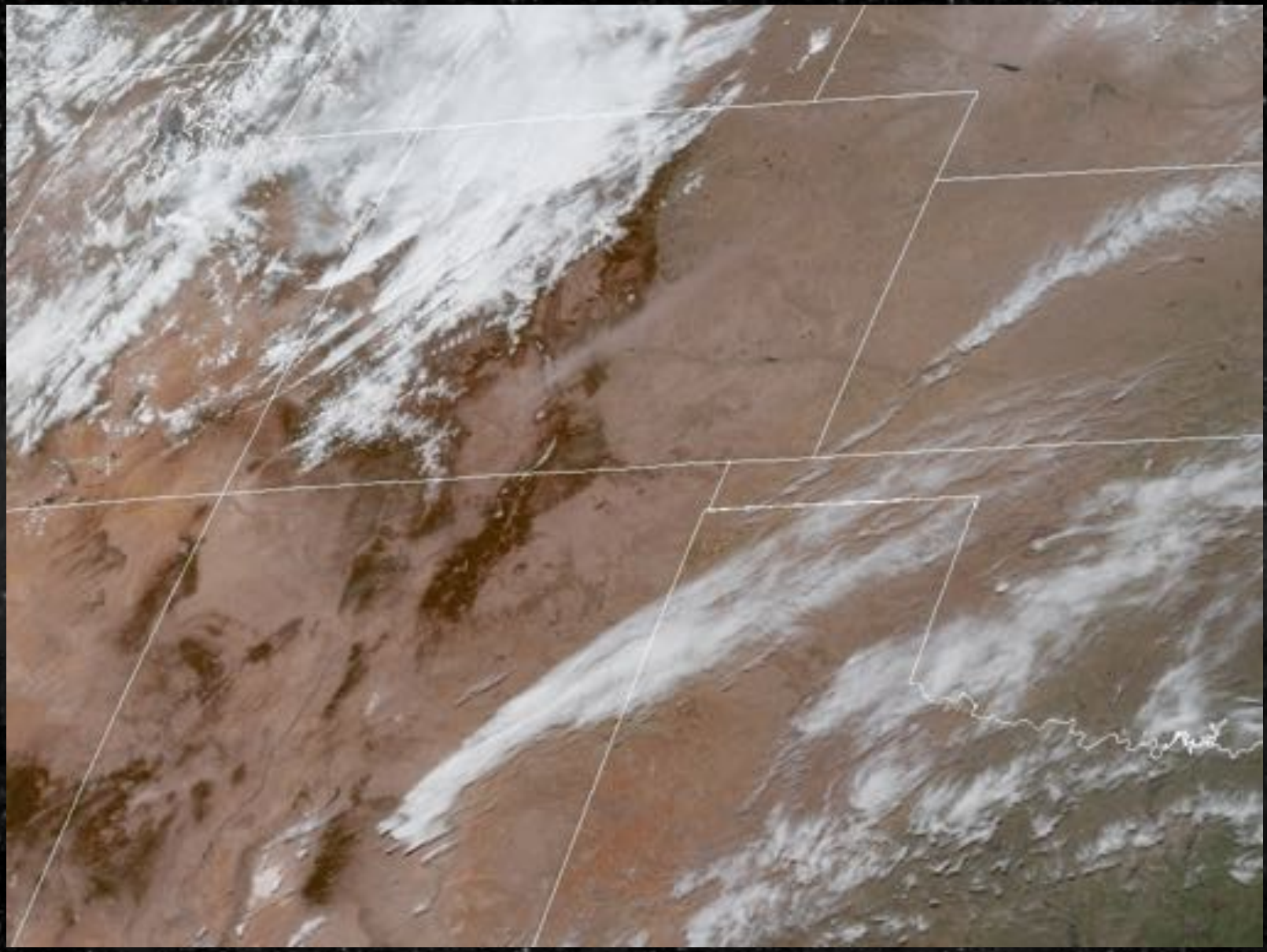
1. Aerosol/Dust Observations
2. Fire Observations
3. Flood Observations

*Here we'll highlight how combined Geo/Leo observations, particularly from the new, next generation sensors, can be used to address these focus areas*

# Aerosol/Dust Observations

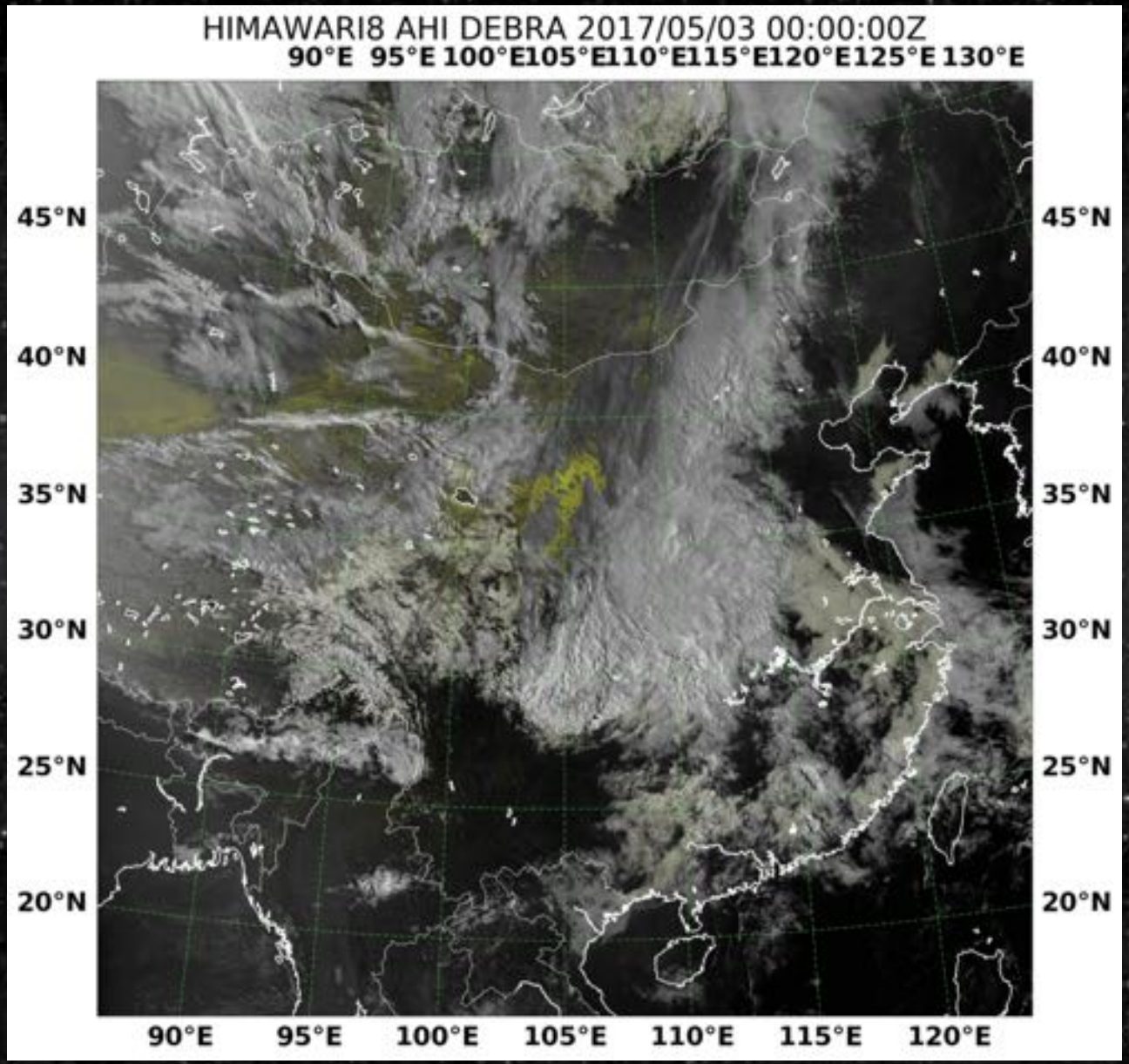

Himawari-8 – GeoColor – 27 May 2017

# Aerosol/Dust Observations



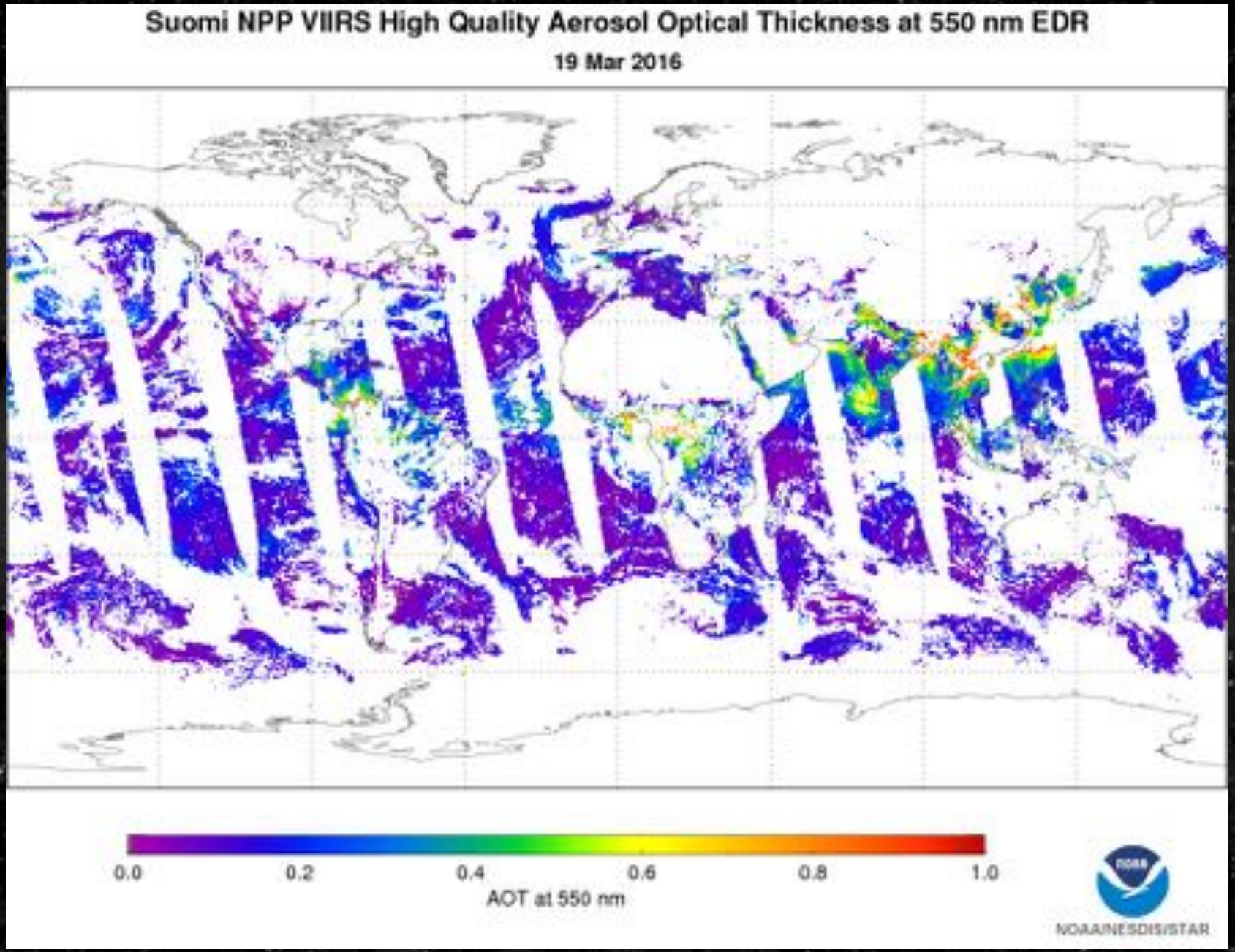
GOES-16 – GeoColor – 17 April 2018

# Aerosol/Dust Observations




Himawari-8 – DEBRA Dust Detection – 4 May 2017

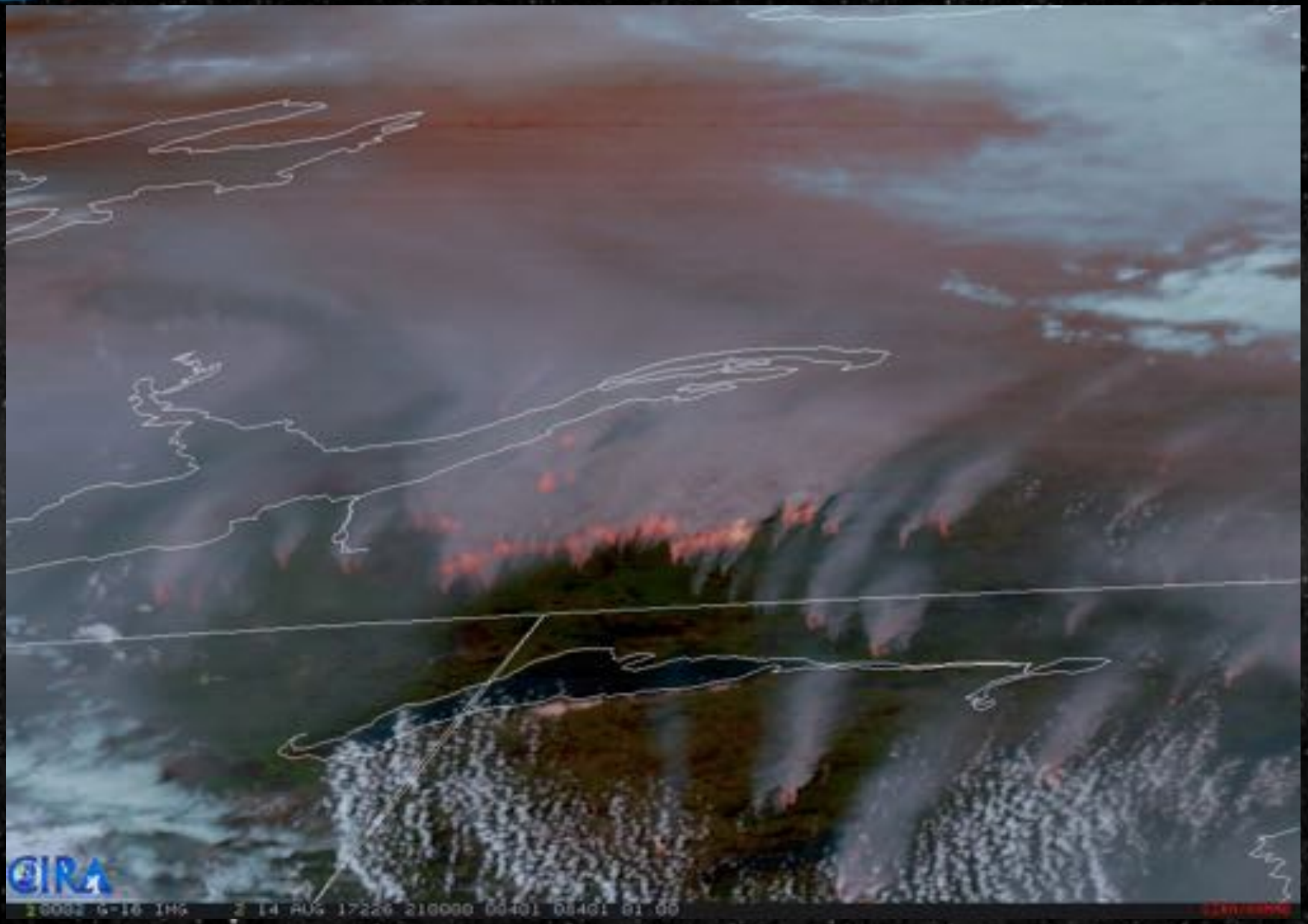
# Aerosol/Dust Observations



# Fire Observations

GOES-16 – Fire Temp. RGB + GeoColor – 3 Sept. 2017

# Fire Observations




GOES-16 – Fire Temp. RGB + GeoColor – 14 Aug. 2017

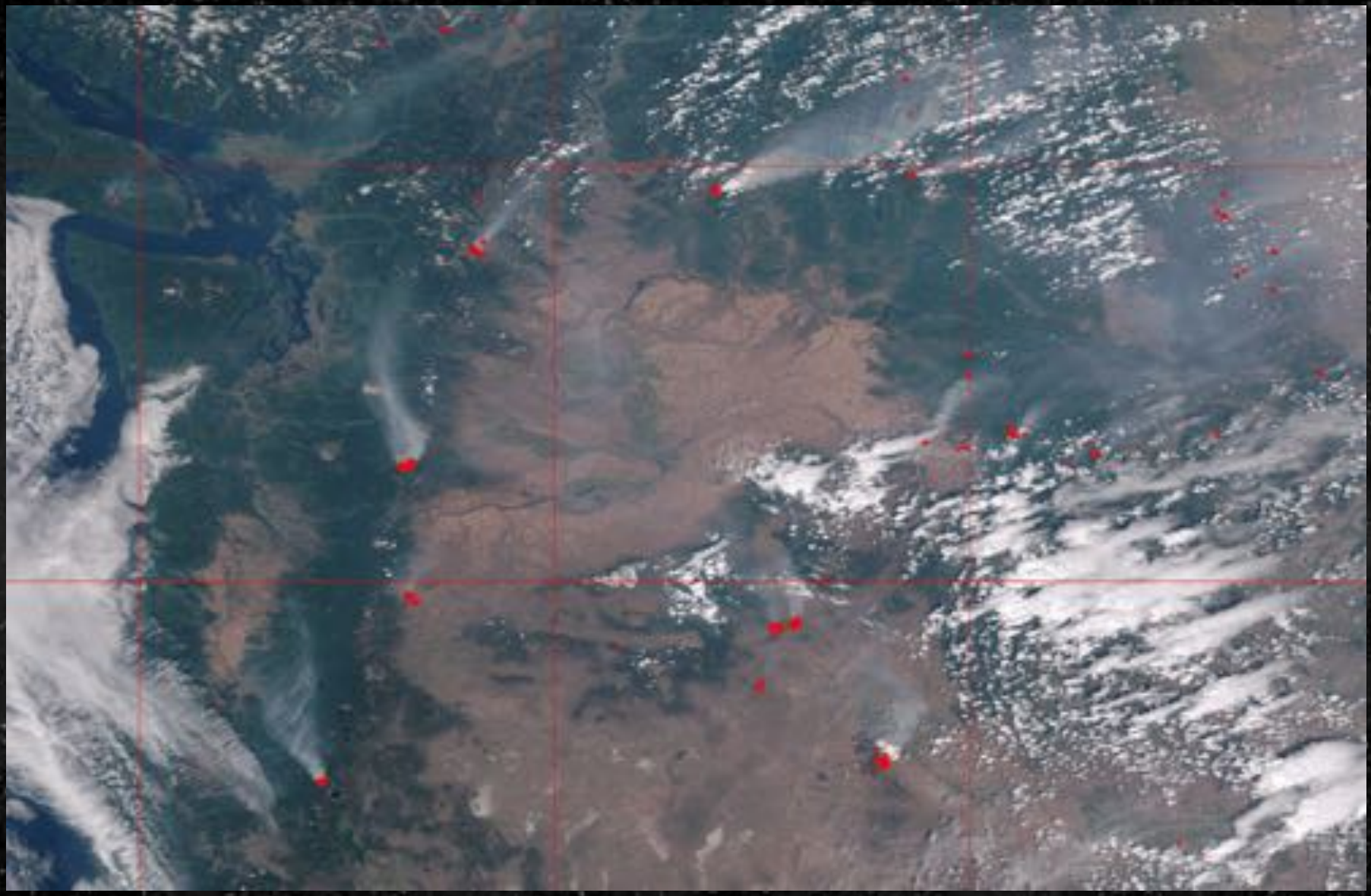
# Fire Observations

GOES-16 – Band 2 Visible – Oklahoma – 12 Apr. 2018

# Fire Observations

Himawari-8
Fire Temperature RGB
Australian Outback
17-18 Oct. 2017

# Fire Observations



Suomi NPP VIIRS Fire Detection

# Fire Observations

MODIS Fire Detection

# Fire Observations

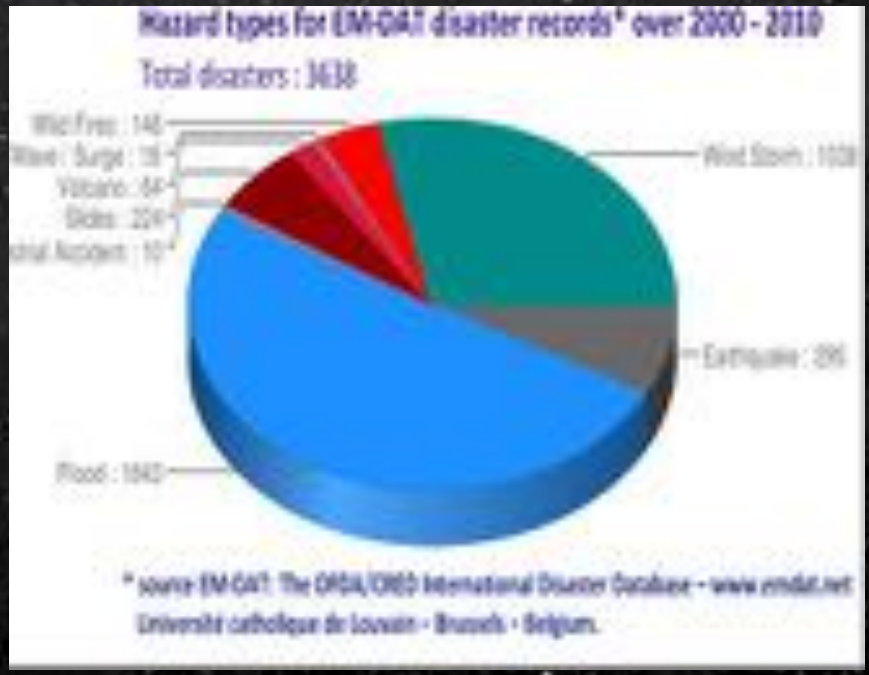
- Sensors aboard polar-orbiters able to detect newer, smaller fires given better resolution than GEO sensors
- Geostationary sensors can fill in the temporal holes and track the fire hot spots at up to 30-second sampling
- This information can be combined for early detection (LEO) followed by hot spot tracking (GEO) to help protect lives and property

# Flooding Observations

Mississippi River flood in 2011:
392 killed, economic loss: $2.8B

New York flood in 2012:
233 killed, economic loss: $75B

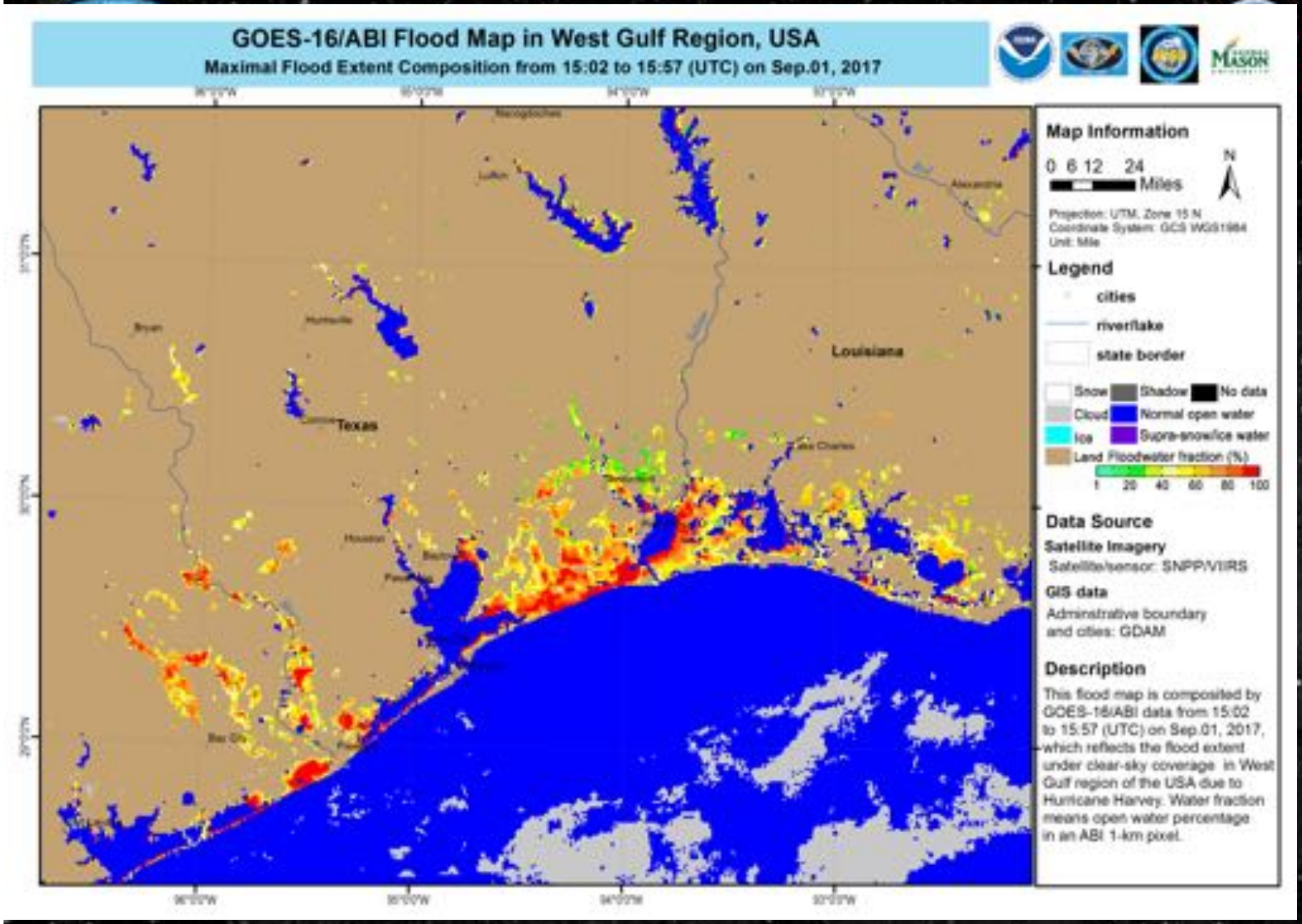
Galena, AK ice-jam flood in 2013:
90% buildings were destroyed.



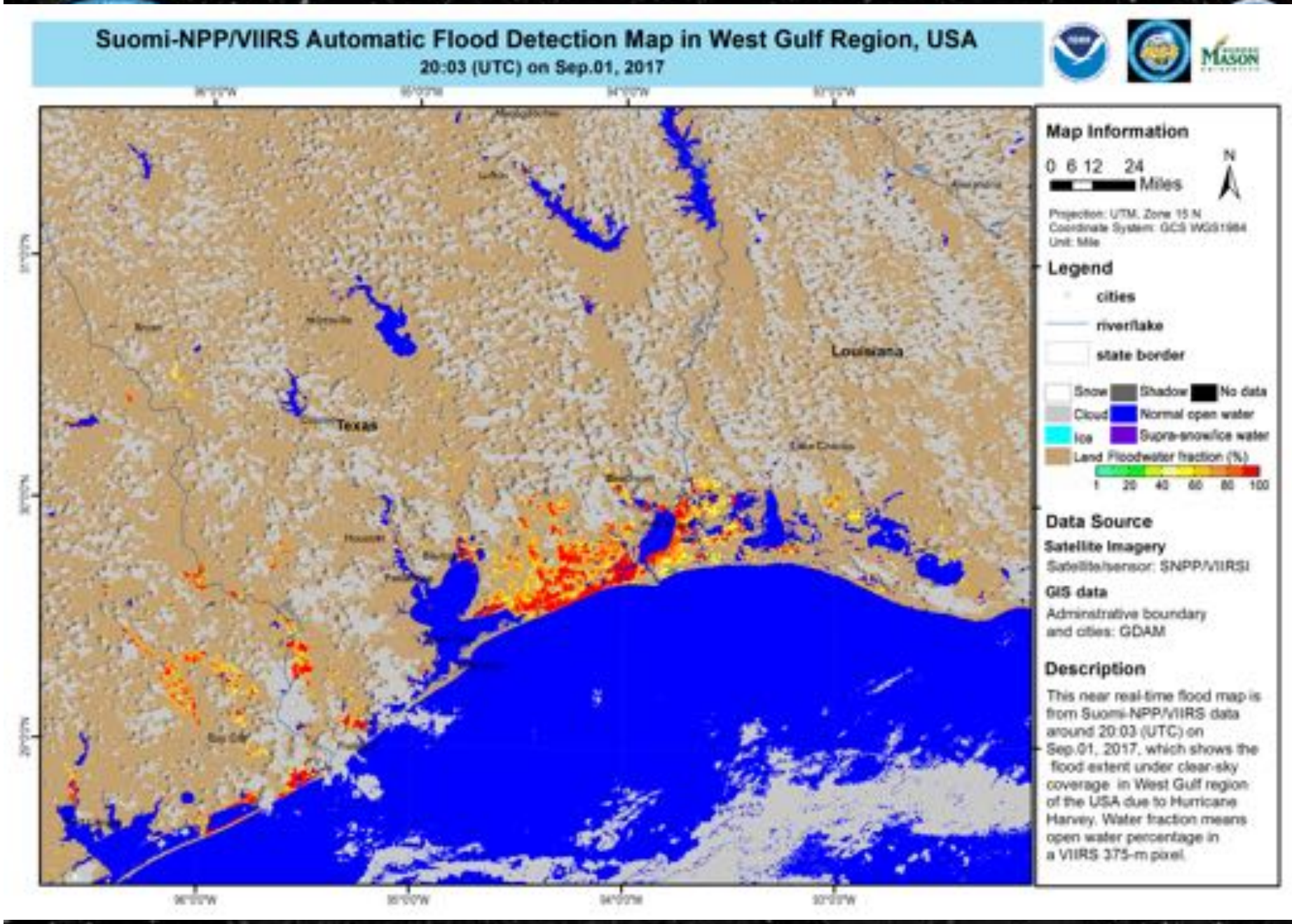
# Flooding Observations


GOES-16 view of Hurricane Harvey making landfall

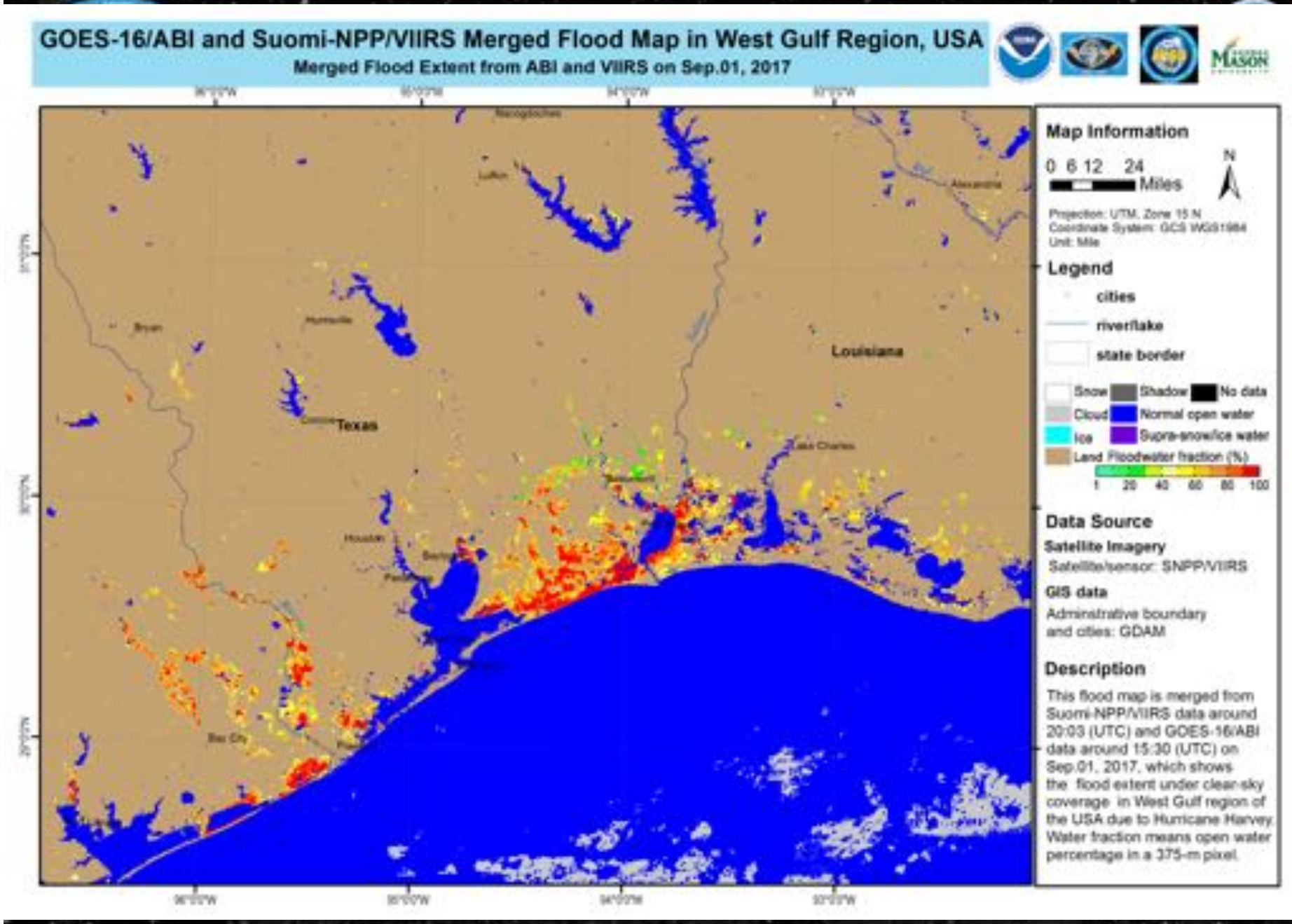
# Flooding Observations



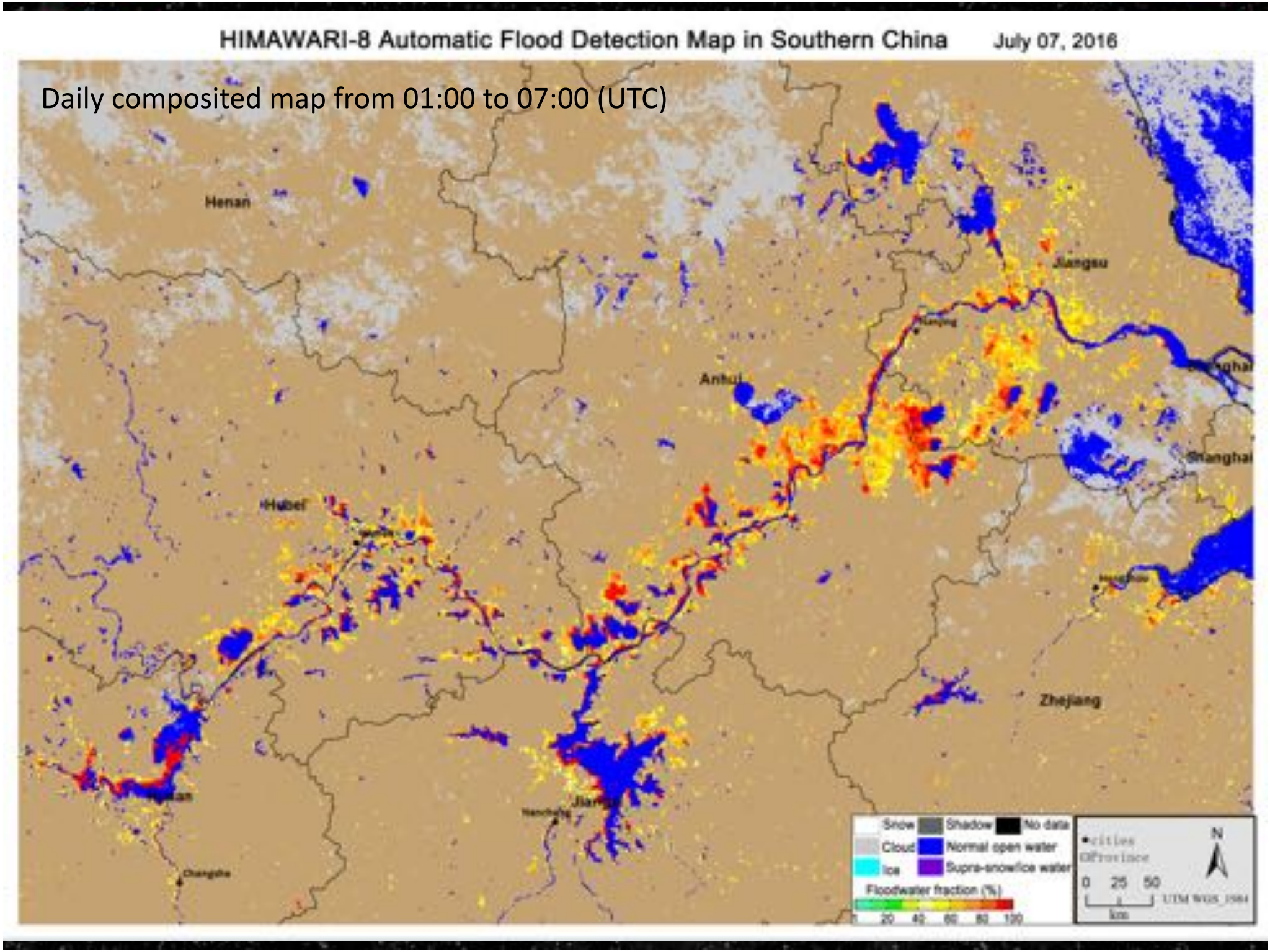

GOES-16/ABI flood map on Sep. 01, 2017 presented most clear-sky coverage in West Gulf region of USA, but is with coarse spatial resolution.




Suomi-NPP flood map on Sep. 01, 2017 is with higher spatial resolution, but is with a lot of clouds and cloud shadows.




The merged flood map on Sep. 01, 2017 combines the advantages of both ABI and VIIRS.


HIMAWARI-8 Automatic Flood Detection Map in Southern China
July 07, 2016
Daily composited map from 01:00 to 07:00 (UTC)
Henan
Jiangsu
Anhui
Shanghai
Hubei
Zhejiang
Changsha
Snow
Shadow
No data
Cloud
Normal open water
Ice
Supra-snow/ice water
Floodwater fraction (%)
0
20
40
60
80
100
N
0
25
50
km

# Summary

- Here we only mentioned a few of the many possible applications for combined Geo/Leo products
- Utility includes aerosol, fire, and flood detection
- Good opportunity for coordinating CGMS and CEOS priority items
- More next generation observing systems coming in the next few years, including the FCI on MTG (EUMETSAT) AMI on GK-2 (South Korea), among others