



GOES-R Series Program Status and GOES-16 Early On- Orbit Results

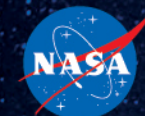
Steve Goodman

**GOES-R Series Program
Senior Scientist**

**CSPP/IMAPP Users' Working Group
Meeting**

Madison, WI

June 28, 2017

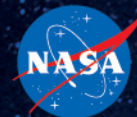


GOES-16 Will Go East in November





GOES-16 Post-Launch Test Status



Component	Initial Power-On	Door Open	1 st Light	Public Release (Actual)	Broadcast via GRB	Last Active Test Complete	Tables Updated	Last Passive Test Complete
ABI	12/9/16	1/7/17	VNIR 1/7/17 IR 1/14/17	1/23/17	3/1/17	2/15/17 (Spatial)	5/22/17 (GPA LUT in DE)	Routine Cal Ops Started
EXIS	12/9/16	1/10/17	XRS 12/9/16 EUVS 1/20/17	2/3/17	3/23/17	3/22/17 (Off point/darks)	5/31/17 (GPA LUT)	Routine Cal Ops Started
GLM	12/9/16	1/4/17	1/4/17	3/6/17	7/5/17	4/23/17 (Solar Intr)	6/23/17 (GPA LUT)	Routine Cal Ops Started
Mag	12/7/16	N/A	12/7/16	1/4/17	6/1/17	3/17/17 (FSW upload)	3/3/17 (GPA LUT)	Routine Cal Ops Started
SEISS	DPU 12/21/16 Sensors 1/8/17	N/A	1/8/17	2/10/17	2/13/17	4/12/17 (EHIS Cal Repeat)	6/20/17 (EHIS Coeff U/L)	Routine Cal Ops Started
SUVI	12/9/16	1/9/17	1/26/17	2/27/17	4/20/17	5/25/17 (Flat Field Rep)	6/22/17 (GPA LUT)	Routine Cal Ops Started
Spacecraft	At Launch	N/A	SPP Sun Point 1/20/17	N/A	N/A	5/4/17 (IMU align)	N/A	Routine Cal Ops Started
Mission Milestones	Launch					PLAR 5/9/17	HRR 6/20/17	Handover 6/23/17

Complete

In Progress

ECD

As of June 13, 2017





L1b

Science Product Validation Status

ABI L1b Product	Beta	Provisional	Full
Radiances	2/28/17	6/1/17	6/5/18
GLM L2 Product			
Lightning: Events, Groups, Flashes	7/5/17	11/1/17	6/5/18
SEISS L1b Products			
Energetic Heavy Ions	2/10/17	11/1/17	6/1/18
Magnetospheric e ⁻ /p ⁺ : Low Energy	2/10/17	11/1/17	6/1/18
Magnetospheric e ⁻ /p ⁺ : High Energy	2/10/17	11/1/17	6/1/18
Solar & Galactic Protons	2/10/17	11/1/17	6/1/18
EXIS L1b Product			
Solar Flux: EUV	3/23/17	11/2/17	6/1/18
Solar Flux: X-ray Irradiance	3/23/17	11/2/17	6/1/18
SUVI L1b Product			
Solar EUV Imagery	4/19/17	11/2/17	6/1/18
MAG L1b Product			
Geomagnetic Field	5/25/17	11/2/17	10/9/18

Bold Dates = New since last month

Validation Maturity Levels:

Not Validated

Beta Maturity

Provisional Maturity

Full Maturity



L2



Science Product Validation Status

ABI L2+ Products	Beta	Prov	Full
Cloud and Moisture Imagery (CMI) and Sectorized CMI (KPP)	2/28/17	6/1/17	9/3/18
Aerosol Detection (Smoke & Dust)	5/24/17	12/15/17	9/3/18
Aerosol Optical Depth (AOD)	5/24/17	12/15/17	9/3/18
Clear Sky Mask	4/19/17	12/15/17	9/3/18
Cloud Optical Depth	6/8/17	12/15/17	9/3/18
Cloud Particle Size Distribution	6/8/17	12/15/17	9/3/18
Cloud Top Height	5/16/17	12/15/17	9/3/18
Cloud Top Phase	5/16/17	12/15/17	9/3/18
Cloud Top Pressure	5/16/17	12/15/17	9/3/18
Cloud Top Temperature	5/16/17	12/15/17	9/3/18
Derived Motion Winds	6/8/17	12/15/17	9/3/18
Derived Stability Indices	5/16/17	12/15/17	9/3/18

ABI L2+ Products	Beta	Prov	Full
Downward S/W Radiation: Surface	6/23/17	12/15/17	9/3/18
Fire/Hot Spot Characterization	5/24/17	12/15/17	9/3/18
Hurricane Intensity Estimation	9/8/17	12/15/17	9/3/18
Land Surface Temperature	5/24/17	12/15/17	9/3/18
Legacy Vertical Moisture Profile	5/16/17	12/15/17	9/3/18
Legacy Vertical Temperature Profile	5/16/17	12/15/17	9/3/18
Rainfall Rate/QPE	7/1/17	12/15/17	9/3/18
Reflected S/W Radiation: TOA	6/23/17	12/15/17	9/3/18
Sea Surface Temperature	6/14/17	12/15/17	9/3/18
Snow Cover	TBD*	TBD*	TBD*
Total Precipitable Water	5/16/17	12/15/17	9/3/18
Volcanic Ash: Detection and Height	6/8/17	12/15/17	9/3/18

Current as of June 12, 2017. Bold Dates = New since last month.

Validation Maturity Levels:

Not Validated

Beta Maturity

Provisional Maturity

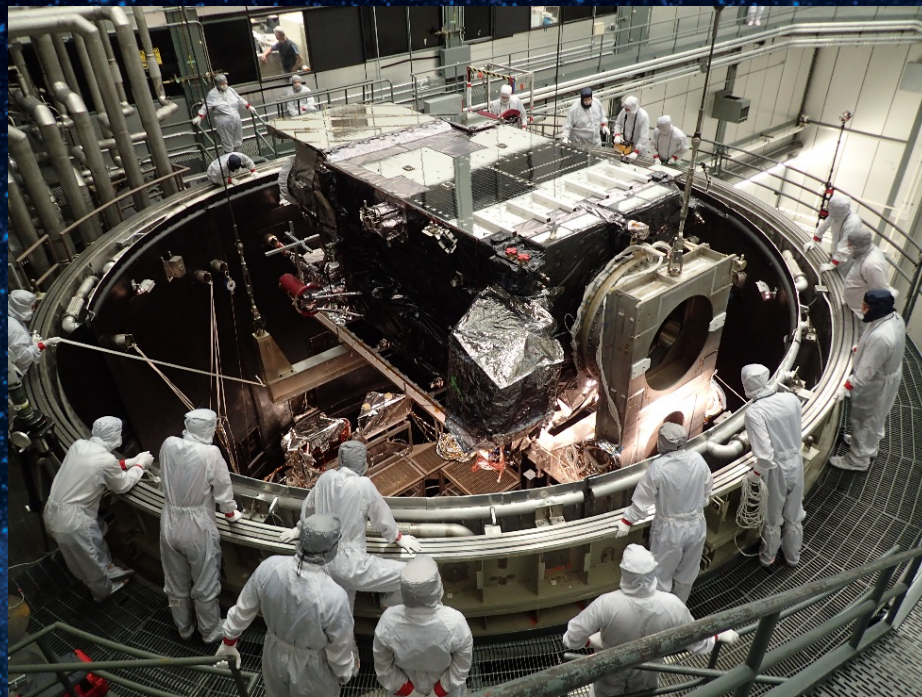
Full Maturity

*Dependent upon non-baseline Albedo Product which is in development

- Thermal vacuum testing complete
- Completed third GOES-S end-to-end test with the ground system
- Launch vehicle completed Critical Design Review

Upcoming GOES-S milestones:

- Operational Readiness Review: Dec. 2017
- Pre-Shipment Review: ~Nov. 2017
- Mission Readiness Review: Jan. 2018
- Launch planned for spring 2018



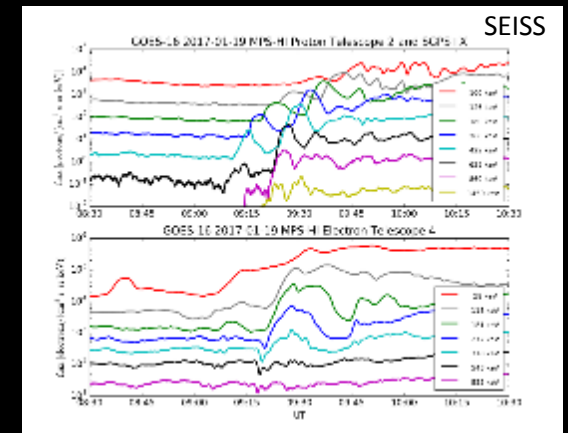
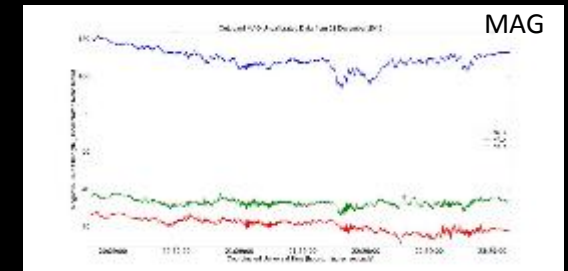
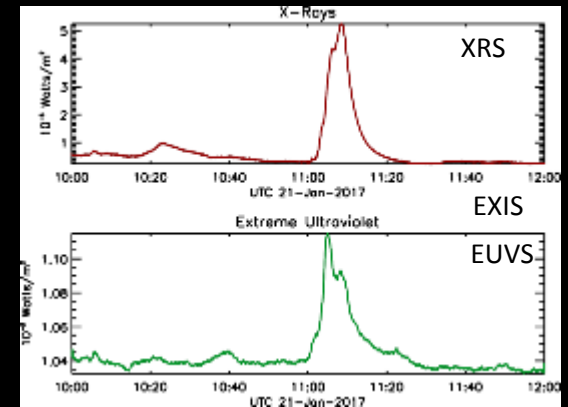
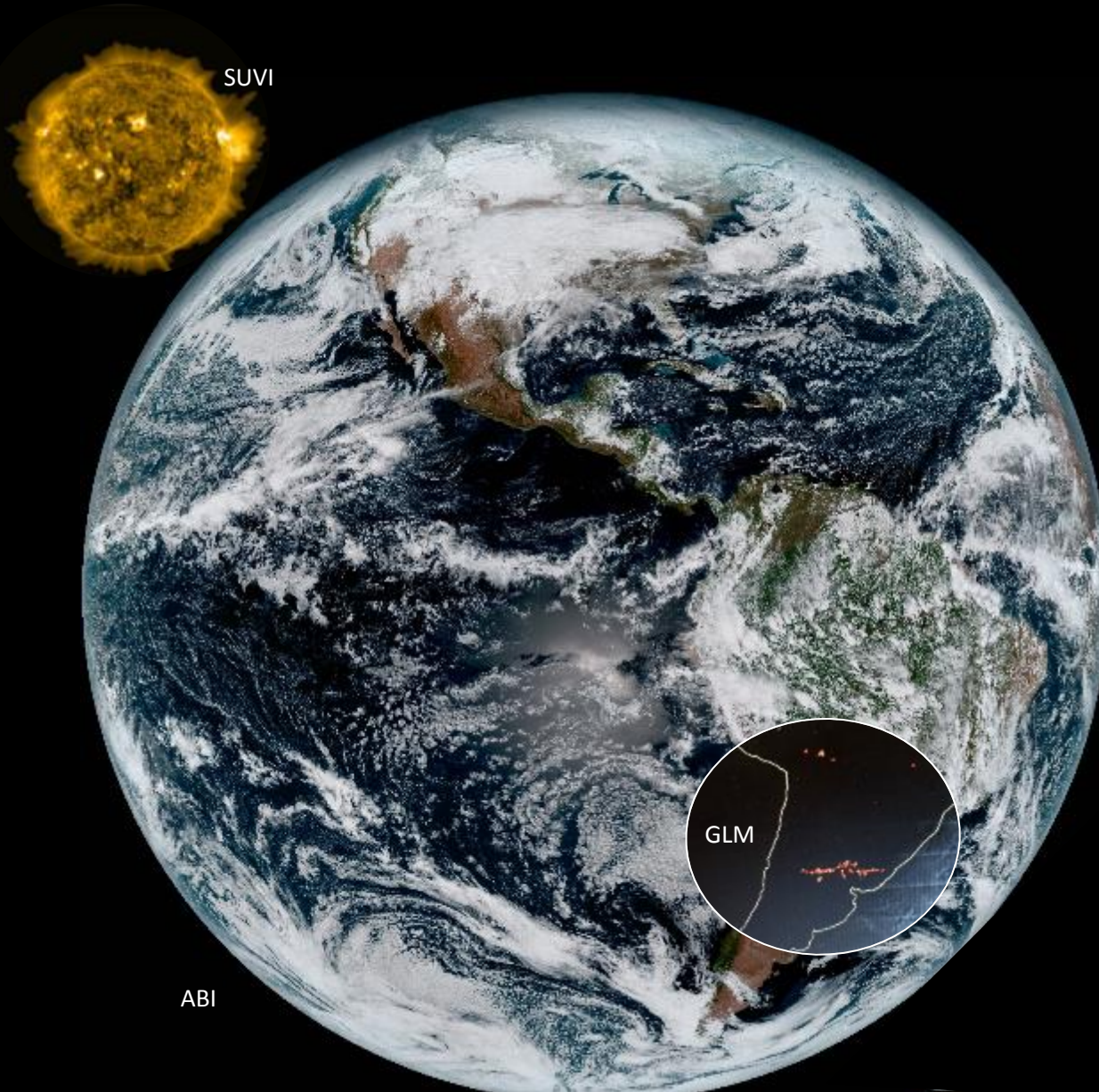


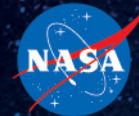
GOES-T and GOES-U Status



- GOES-T:
 - EXIS and SUVI integrated with Solar-Pointing Platform (SPP)
 - ABI and SEISS integration underway
 - Completed Test Readiness Review
 - Initiated acceptance test of propulsion module
 - Upcoming milestones:
 - System Integration Review: July 2017
- GOES-U:
 - All structure hardware shipped
 - All solar-pointing subsystem detail parts complete

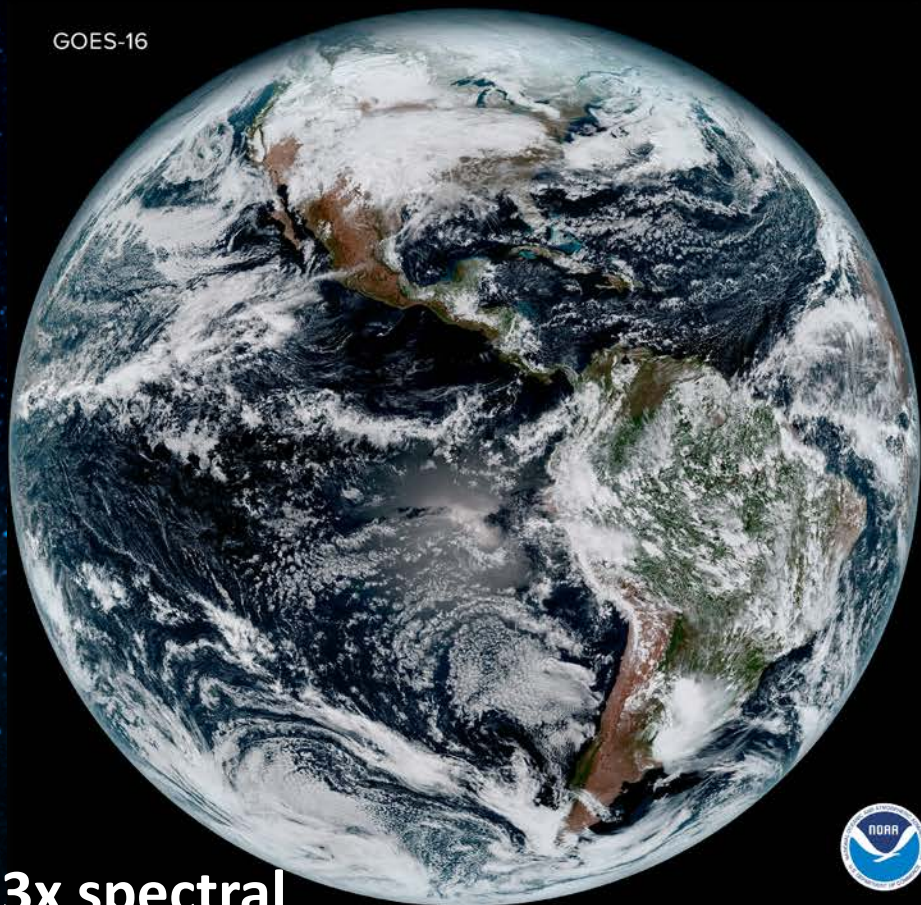
All Instruments Generating Science Data



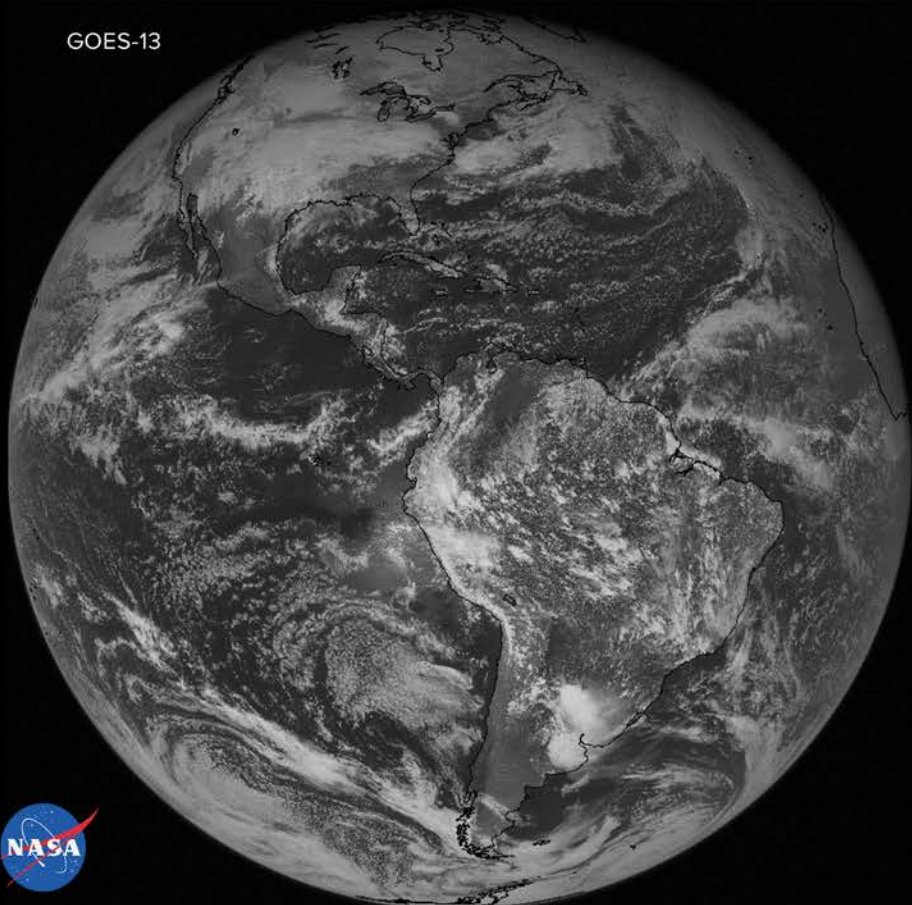


First ABI Imagery January 23

GOES-16



GOES-13

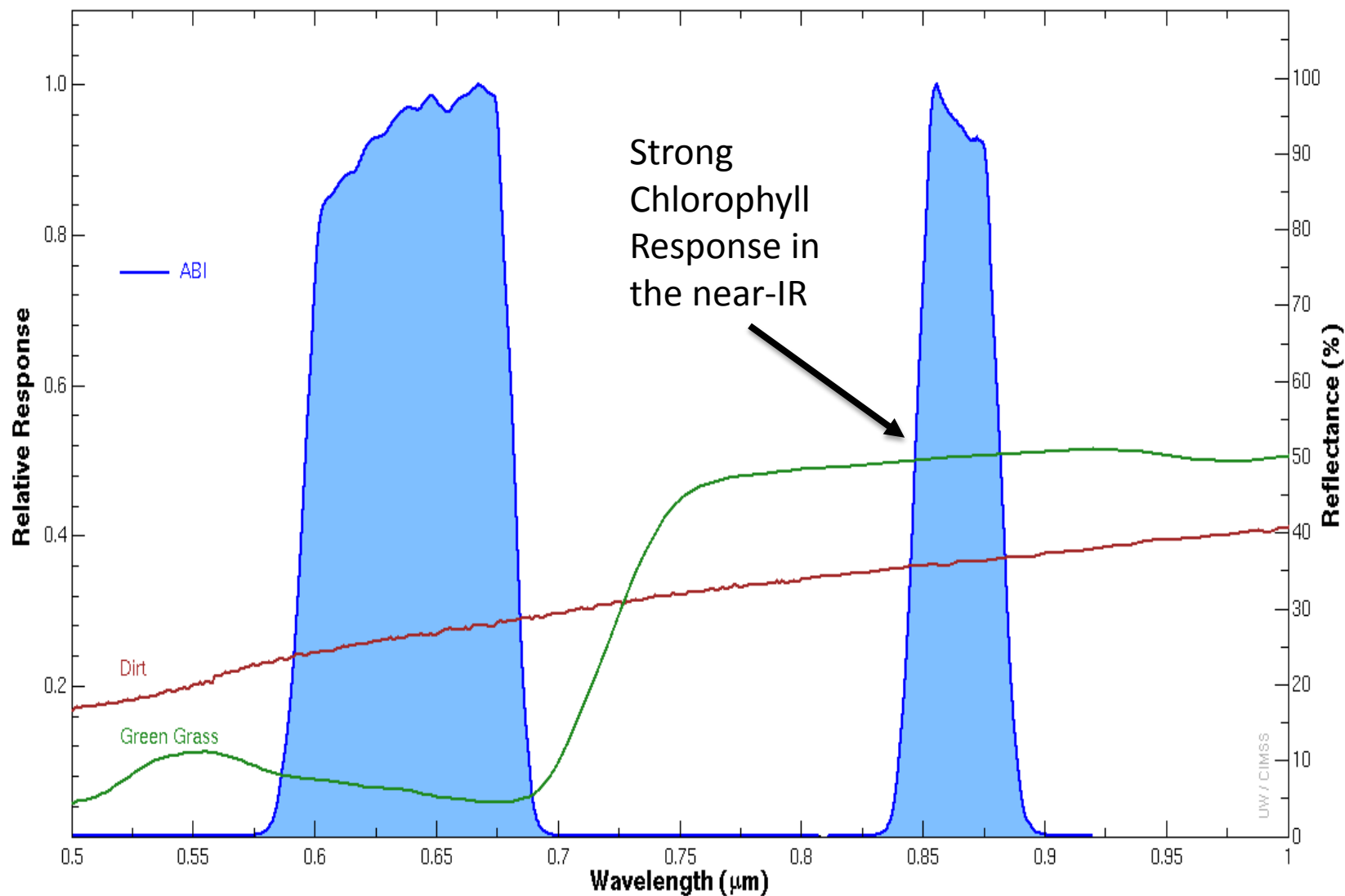


3x spectral
4x spatial
5x temporal

GOES-16 vs GOES-13 on January 15, 2017

Recipe for GOES-16 RGB

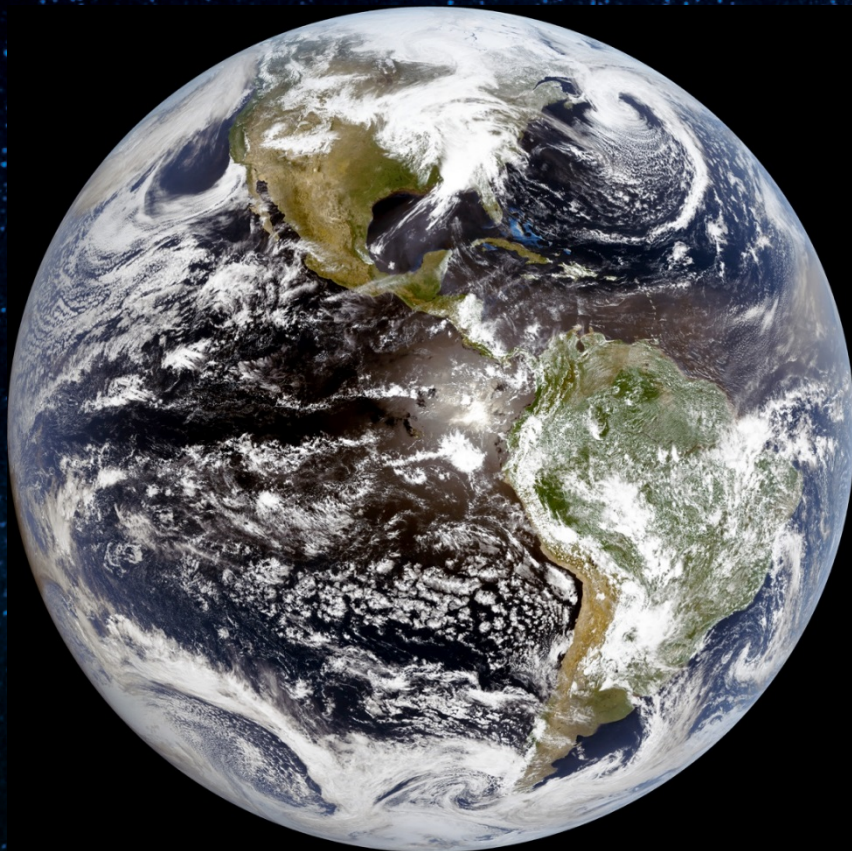
ABI Flight Model 1 v2 SRFs



True Color

04-03, 17:15Z

04-03, 18:18Z



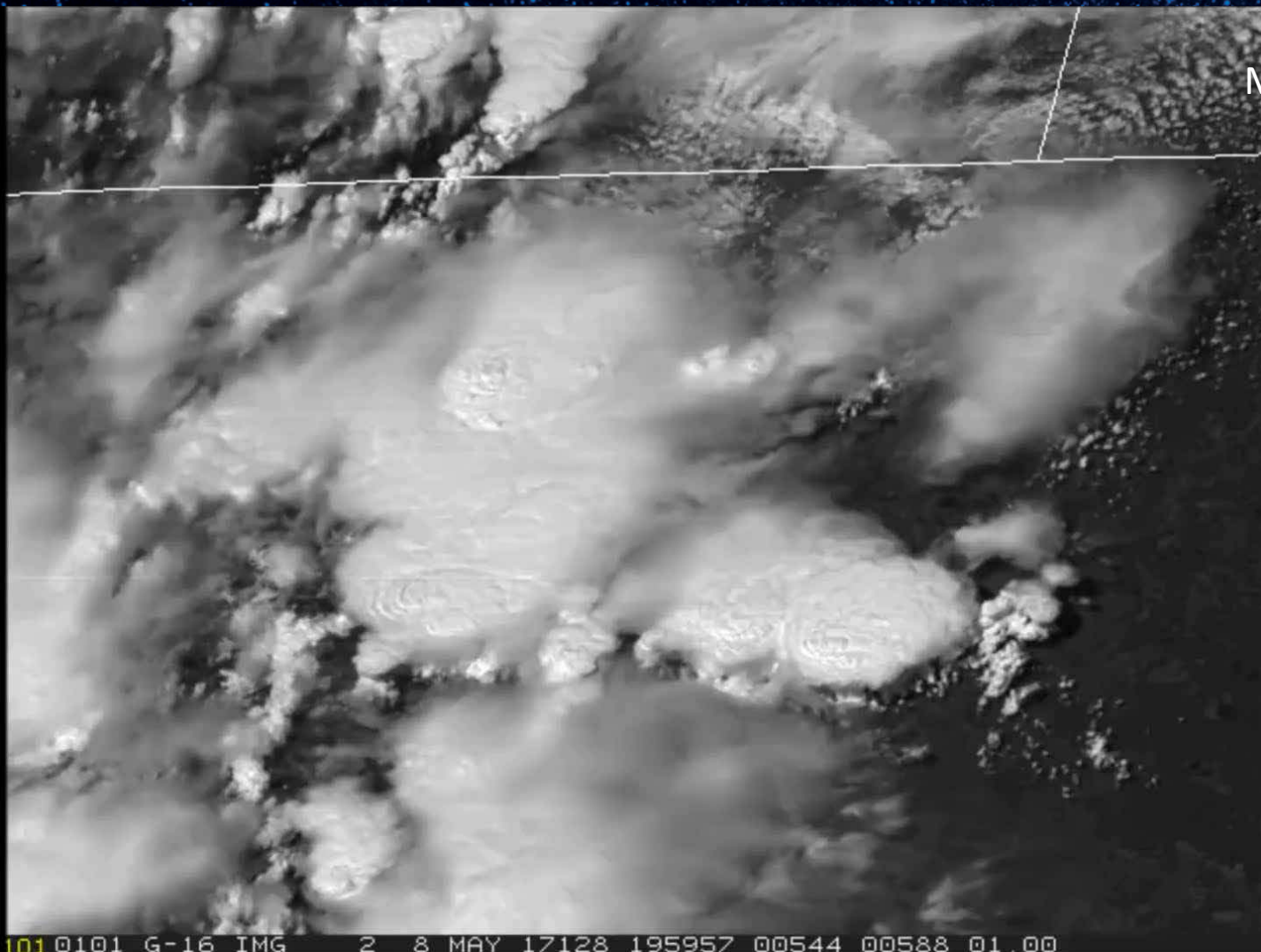
GOES-R Imagery Team

EPIC (on DSCVR)



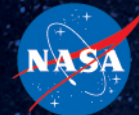
Denver, CO Hailstorm

May 8 2017



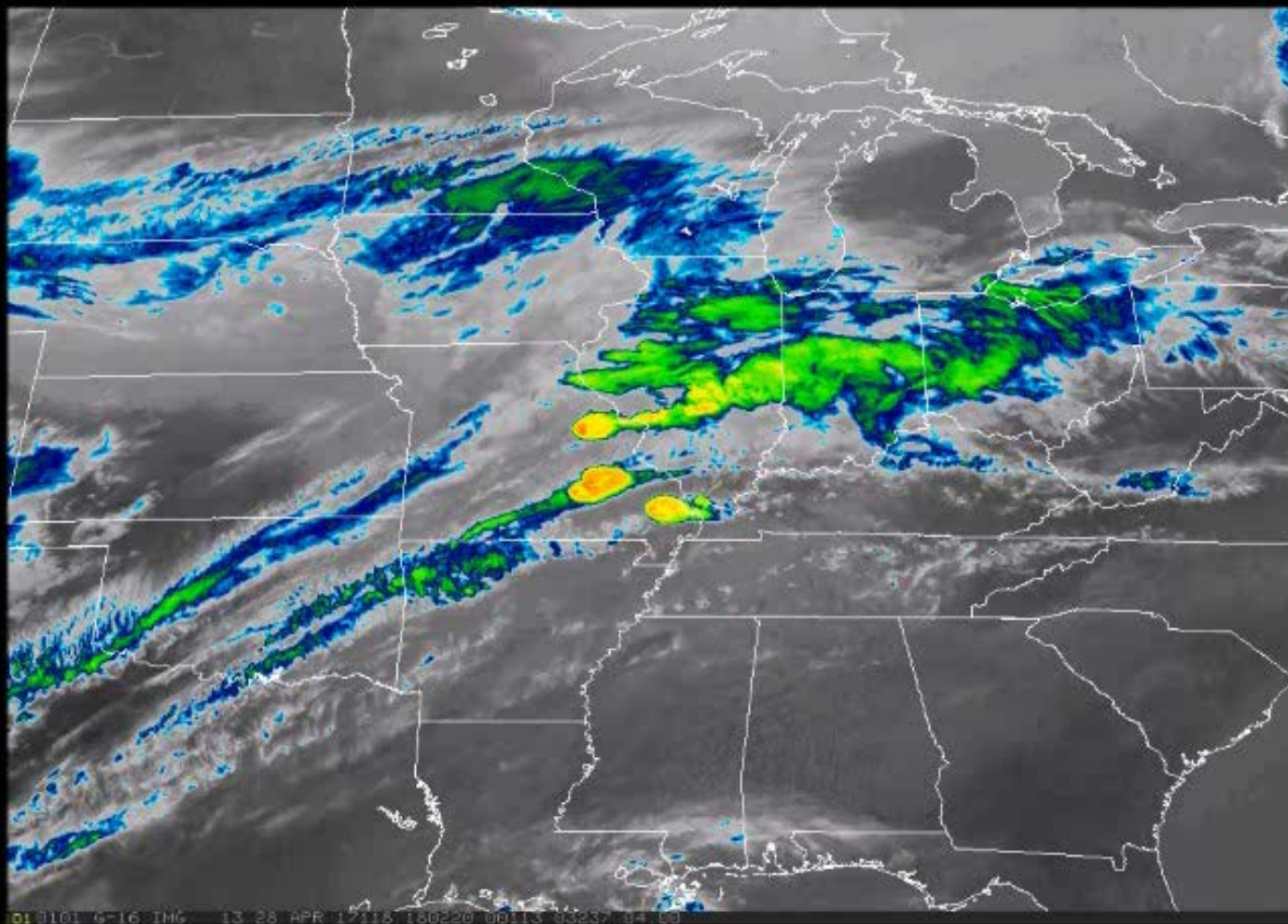
1010101 G-16 IMG 2 8 MAY 17128 195957 00544 00588 01.00





Infrared Imagery of Severe Storms

April 28-30, 2017

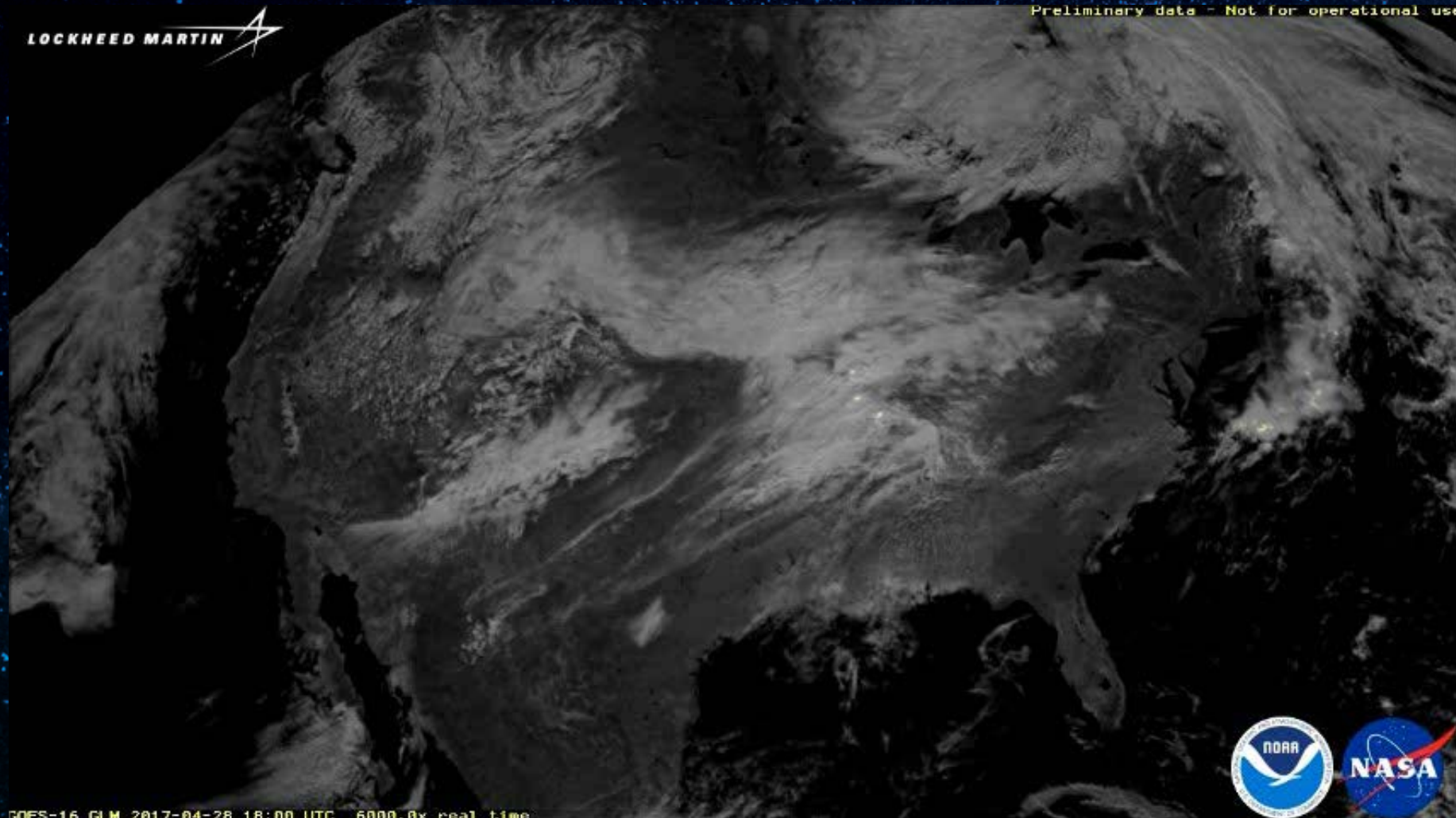


Note: This is preliminary, non-operational data as GOES-16 undergoes on-orbit testing



GLM Imagery of Severe Storms

April 28-29, 2017



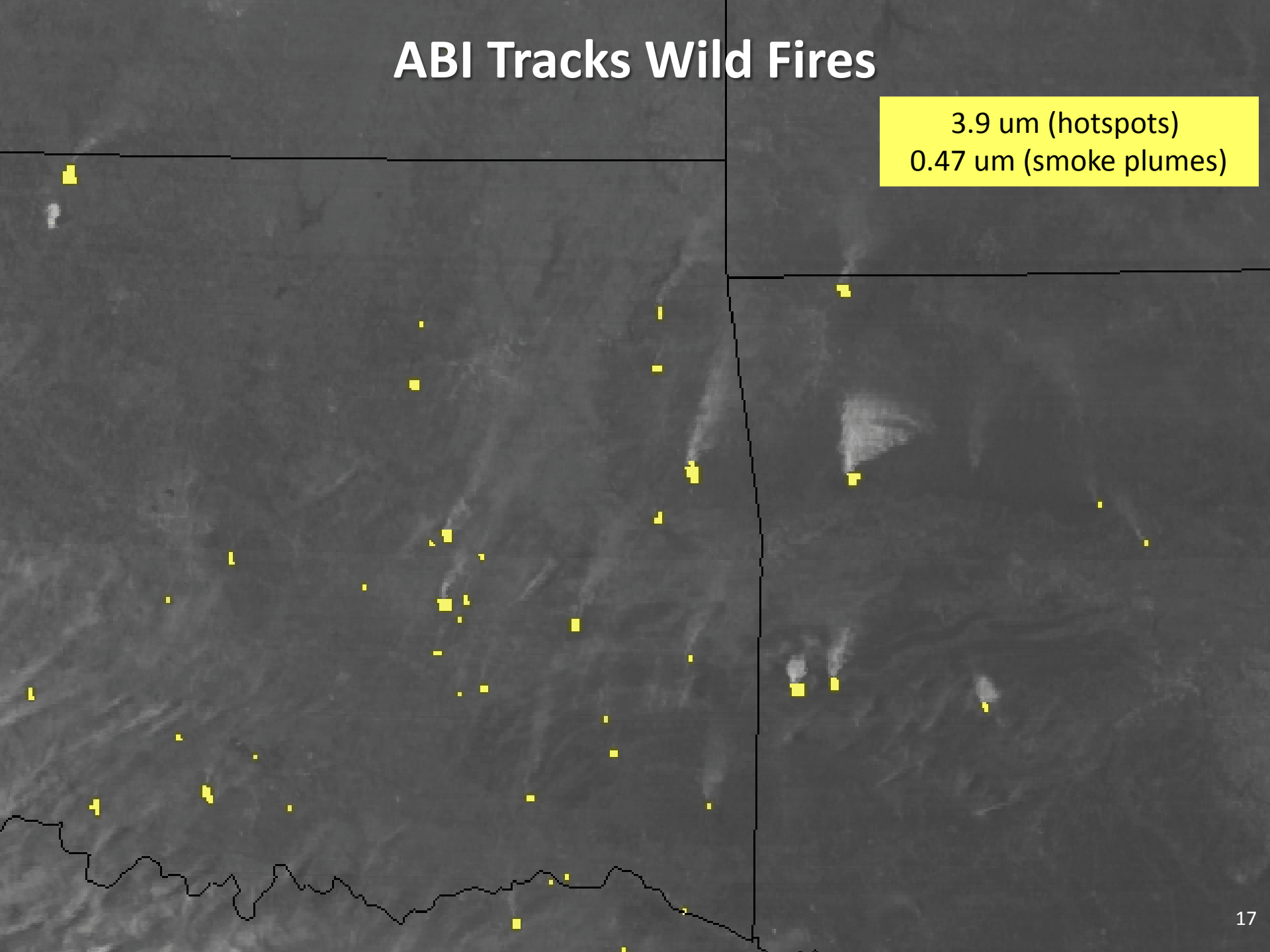
GOES-16 GLM 2017-04-28 18:00 UTC 6000.0x real time



Note: This is preliminary, non-operational data as GOES-16 undergoes on-orbit testing

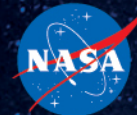
ABI Tracks Wild Fires

3.9 μm (hotspots)
0.47 μm (smoke plumes)





GOES-16 Imagery of West Mims Fire



GOES-16

10002 G-16 PRD 2 7 MAY 17127 200200 01101 02801 01.00

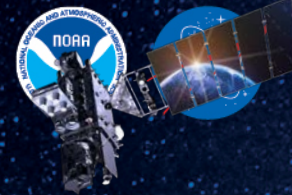
CTRA/RHMB

Note: This is preliminary, non-operational data as GOES-16 undergoes on-orbit testing



ABI 0.64um Channel

5-min Imagery, Yucatan Peninsula



10001 G-18 IMG 2 3 APR 17093 185718 04445 04892 01.00

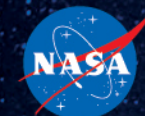
CIRA/RAMMB



Geocolor of Tropical Storm Cindy

June 20, 2017





Saharan Dust

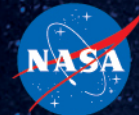
May 19, 2017





GOES-16 Geocolor Fog Dissipation

June 8, 2017



CIRA

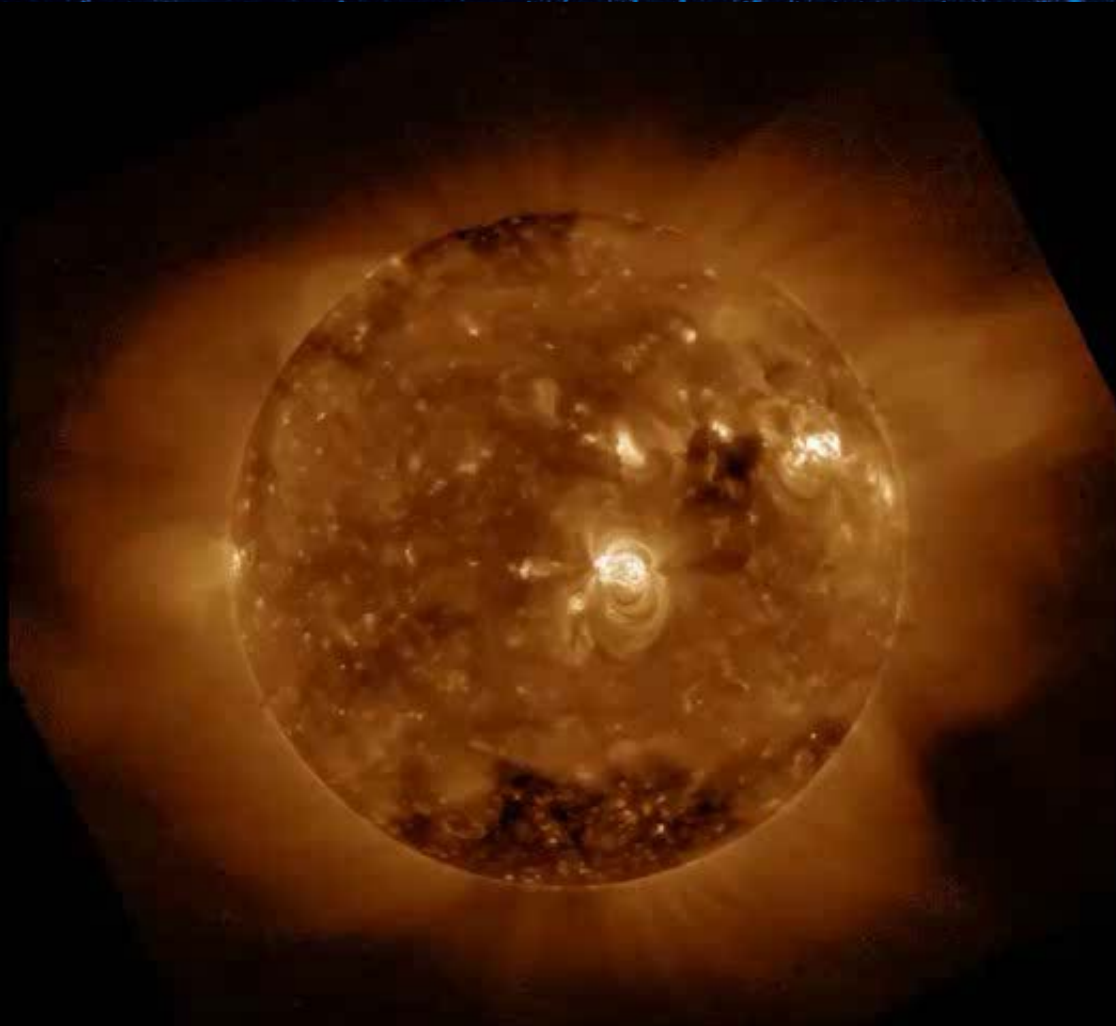
2 0002 G-16 PRD 2 8 JUN 17159 090200 00301 03301 01.00

CIRA/RAMMB



SUVI Sees a Solar Flare

April 1, 2017

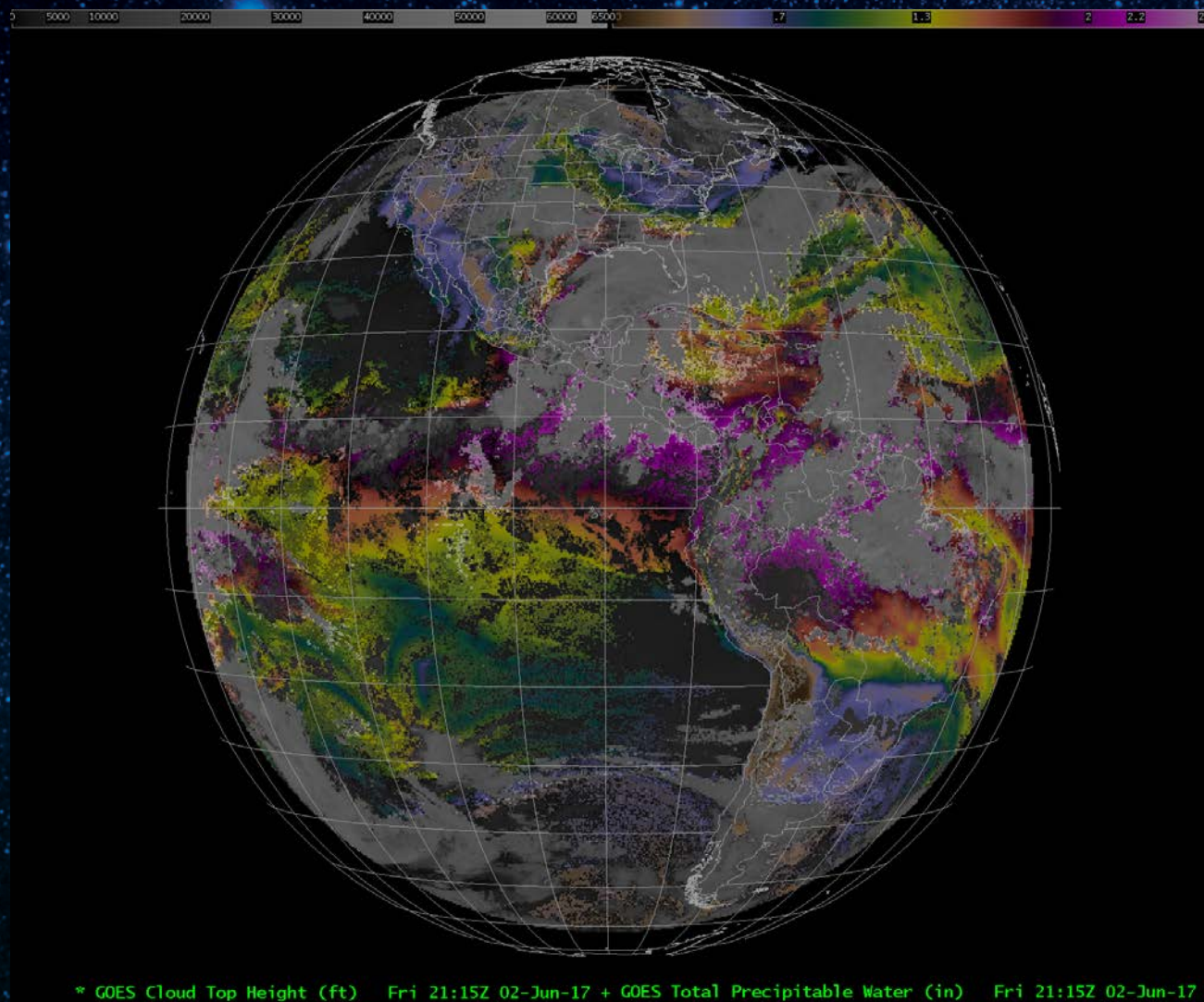


Note: This is preliminary, non-operational data as GOES-16 undergoes on-orbit testing



GOES-16 Derived Products

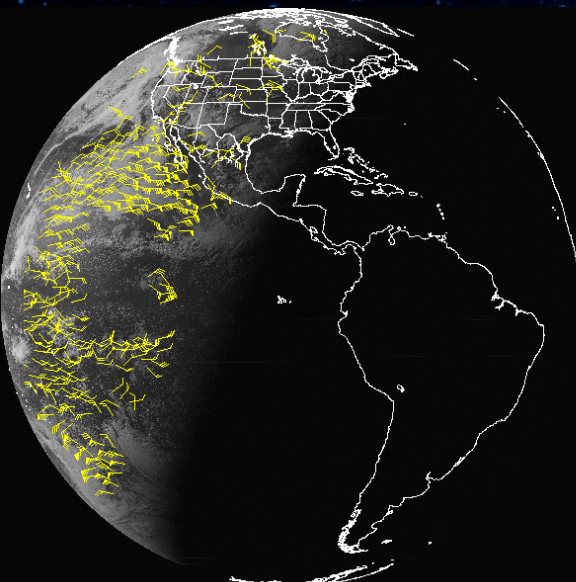
Total Precipitable Water and Cloud Top Height (Beta Status)



AWG Cloud Team

GOES-16 Derived Products

Winds (Beta Status)

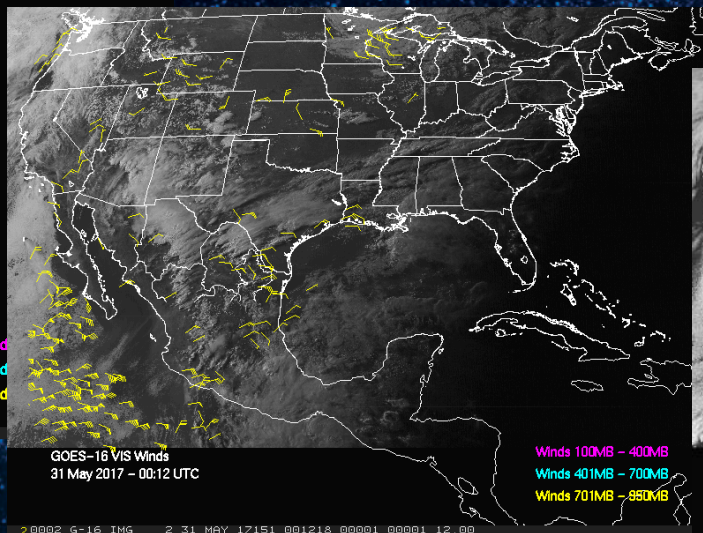


GOES-16 VIS Winds
31 May 2017 - 00:30 UTC

High-Level 100-400 mb

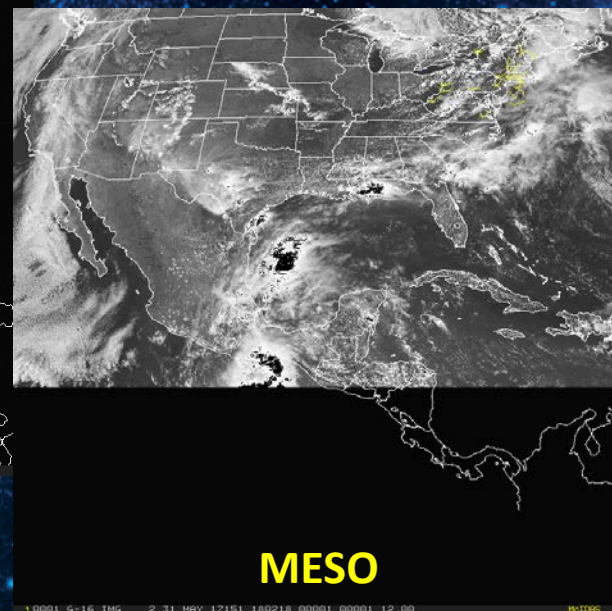
Mid-Level 400-700 mb

Low-Level >700 mb



GOES-16 VIS Winds
31 May 2017 - 00:12 UTC

Winds 100MB - 400MB
Winds 401MB - 700MB
Winds 701MB - 850MB



Full Disk

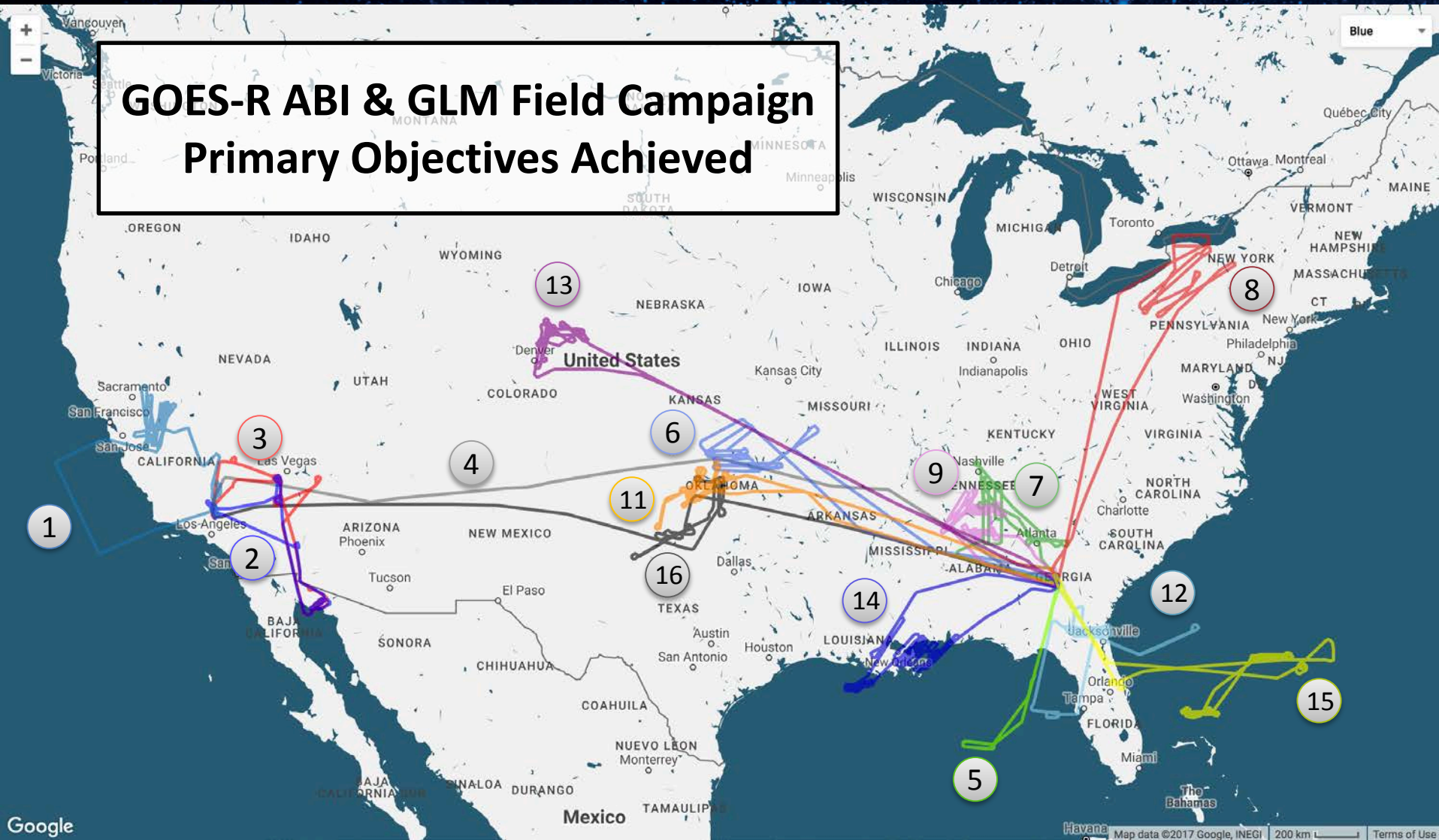
CONUS

MESO

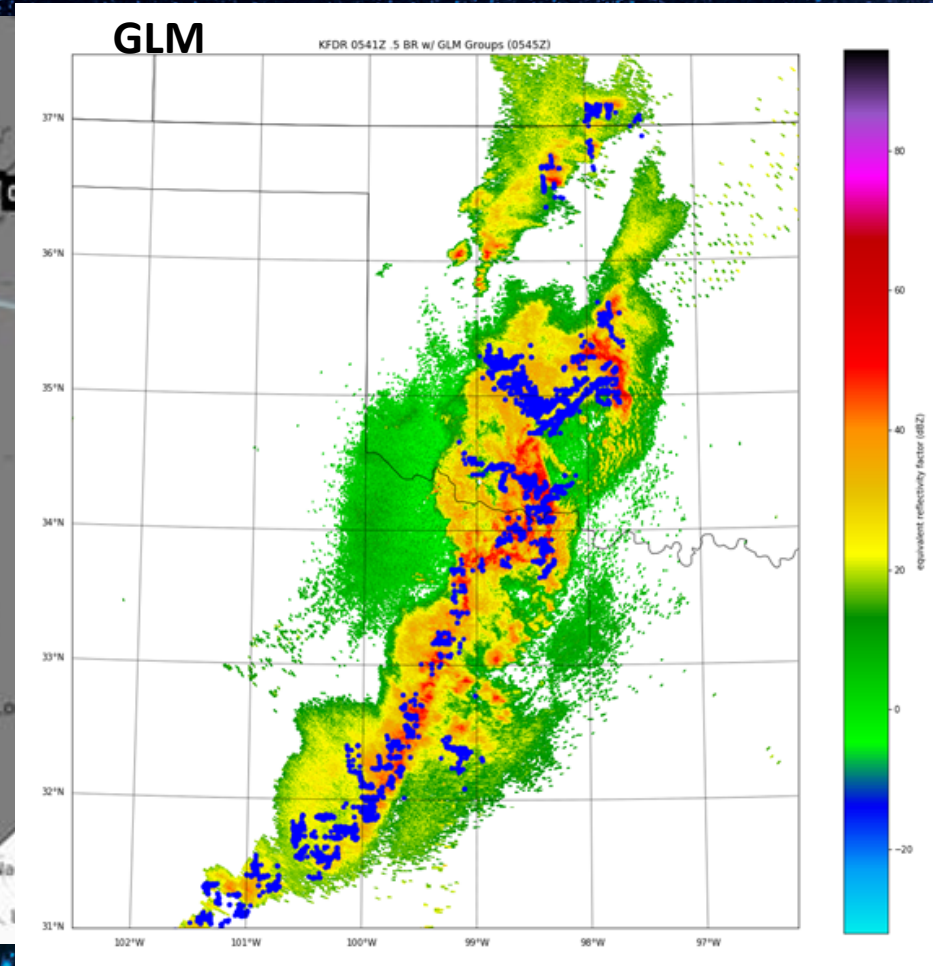
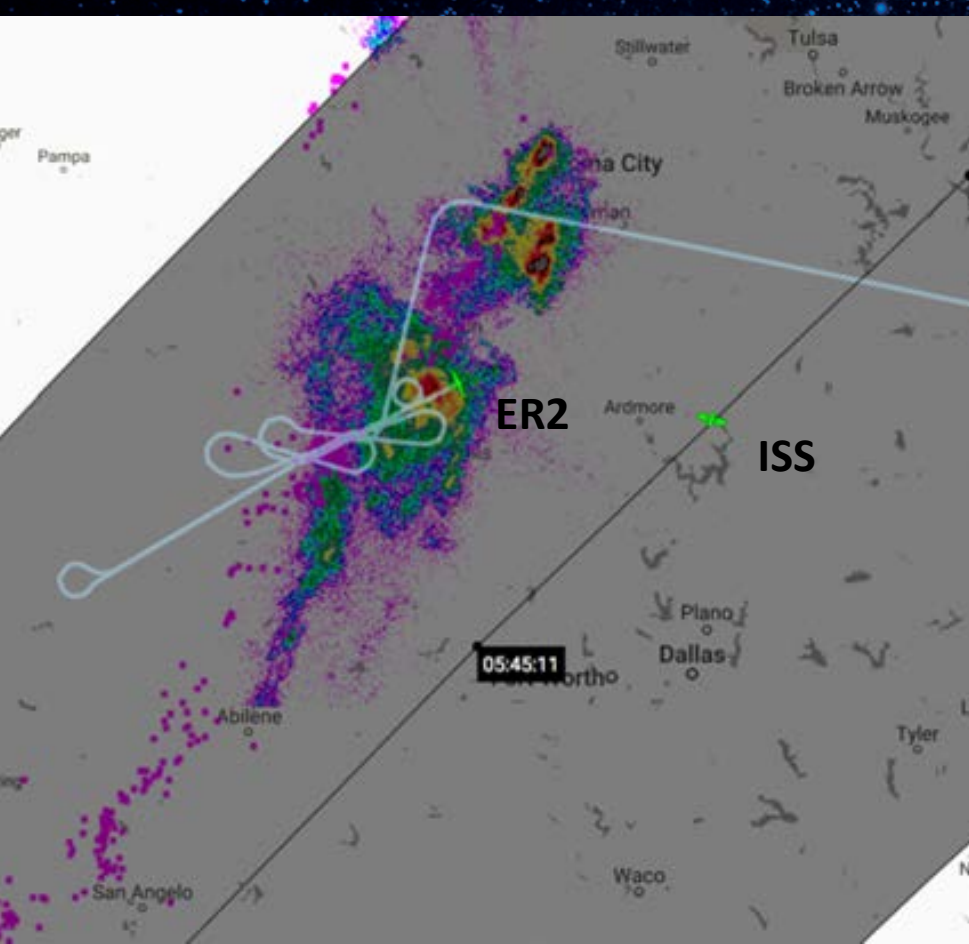
Band 2 Winds **Mode 3:**
May 31 (0030 UTC) - June 1 (2215 UTC), 2017

GOES-R Post Launch Airborne Science Cal/Val Field Campaign (March 21 to May 17, 2017)

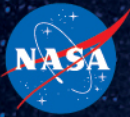
GOES-R ABI & GLM Field Campaign Primary Objectives Achieved



*Flight #10 - April 27, 2017 - Huntsville, AL not shown due to aircraft navigation not reporting



0541 Z Lightning, May 17, 2017



GOES-R

GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE R-SERIES

The **next**
generation of
geostationary
environmental
satellites

Thank you

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