GOES-R

Getting ready for the next generation earth observing system

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AER
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Outline

- AER in research and applications
- AER on GOES-R
- GOES-R: the next generation
- Getting ready for launch and supports
  - Products in GOES-R
  - GOES-R for oceanography

AER in Research and Applications

- AER = Atmospheric and Environmental Research, founded in 1977
- Offices:
  - Lexington, MA
  - Albuquerque, NM
  - Omaha, NE
  - College Park, MD
  - Greenbelt, MD
  - Hampton, VA

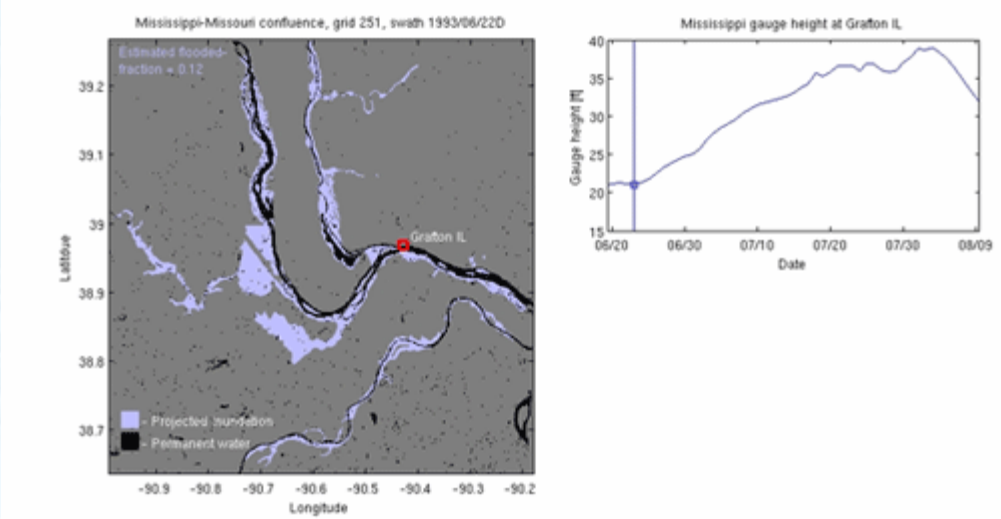
AER in Research and Applications (cont'd)

- Research
  - Atmosphere (Air quality, clouds, data assimilation and modeling, radiative transfer, remote sensing, etc)
  - Climate (seasonal, severe weather)
  - Earth (mass and rotation, land surface emissivity)
  - Ocean (physical oceanography)
  - Space (planetary, space weather)

AER in Research and Applications (cont'd)

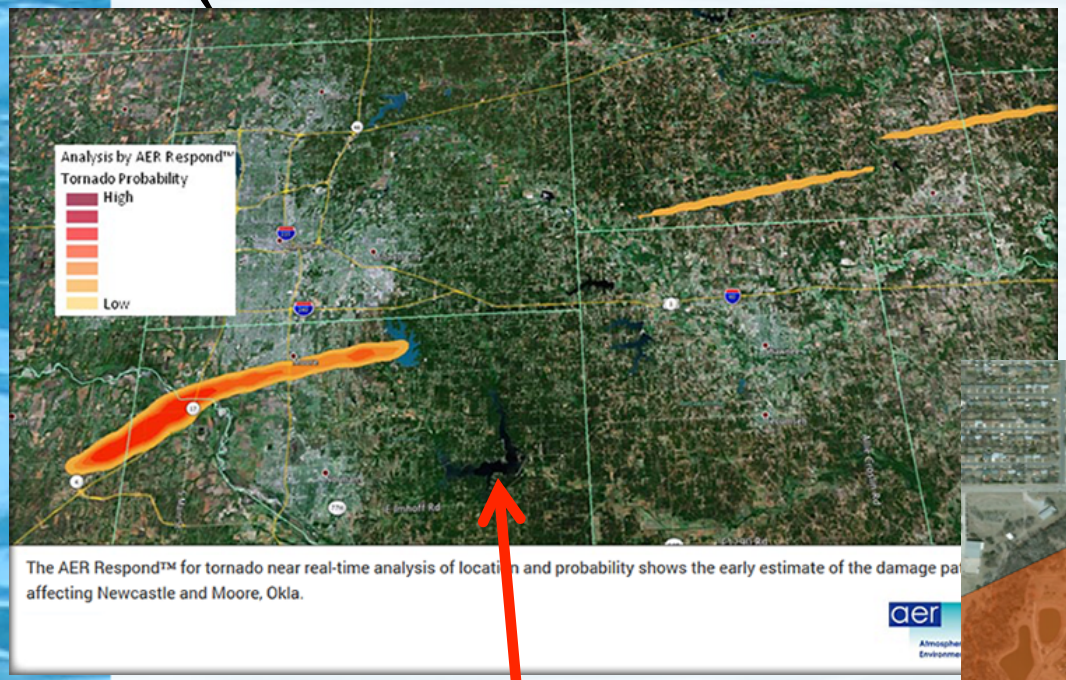
- Applications
  - Insurance
  - Investment
  - Energy
  - Weather risk management
  - Satellites

AER in Research and Applications (real-time flood monitoring)



- AER scientists have developed an innovative mapping method that leverages lower-resolution microwave data that can "see through clouds" to provide high-resolution inundation maps in real time as flood waters expand. This example shows flood extent mapped daily at the Mississippi-Missouri confluence during the 1993 Midwest Flood. Gauge height data (right) is used to validate the flood map (left) projected daily from low-resolution microwave data.

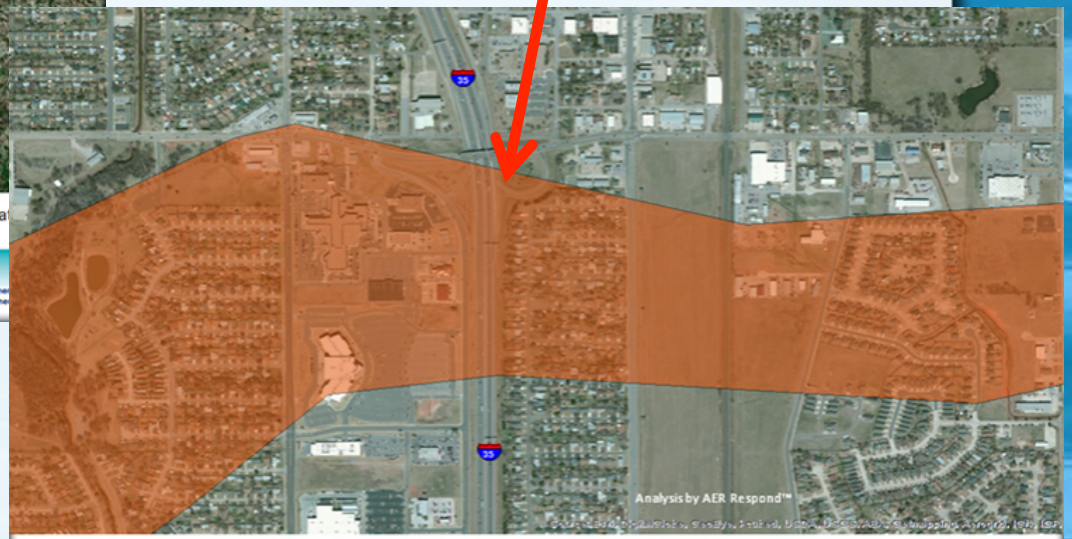
AER in Research and Applications (near-real-time Tornado Path Analysis)



The AER Respond™ for tornado near real-time analysis of locati n and probability shows the early estimate of the damage pa affecting Newcastle and Moore, Okla.

- Early estimate of locations and paths in Newcastle and Moore, OK

- Damage path close-up east and west of Route 35 in Moore, OK



The AER Respond™ service uses satellite change detection to determine the damage path as shown in the detailed path close-up east and west of Route 35 in Moore OK.

Career Highlights at AER

- Joined AER, 1997
- NPOESS
- JCOOT
- CRTM
- EUMETSAT
- GOES-R
- Weather derivatives for NYSE, CME

AER on GOES-R

- Since 2009, AER has been under the contract for implementing L1 to L2+ algorithms and supporting software for the GOES-R ground system
- System Engineers (SE) and Software Engineers (SWE) working together as a team, combining the latest earth and space science research and the cutting edge technology
- The GS software is complete and now undergoing final stages of integration testing to support the launch in March 2016
- AER will provide continuing support to the GOES-R program during post-launch activities.

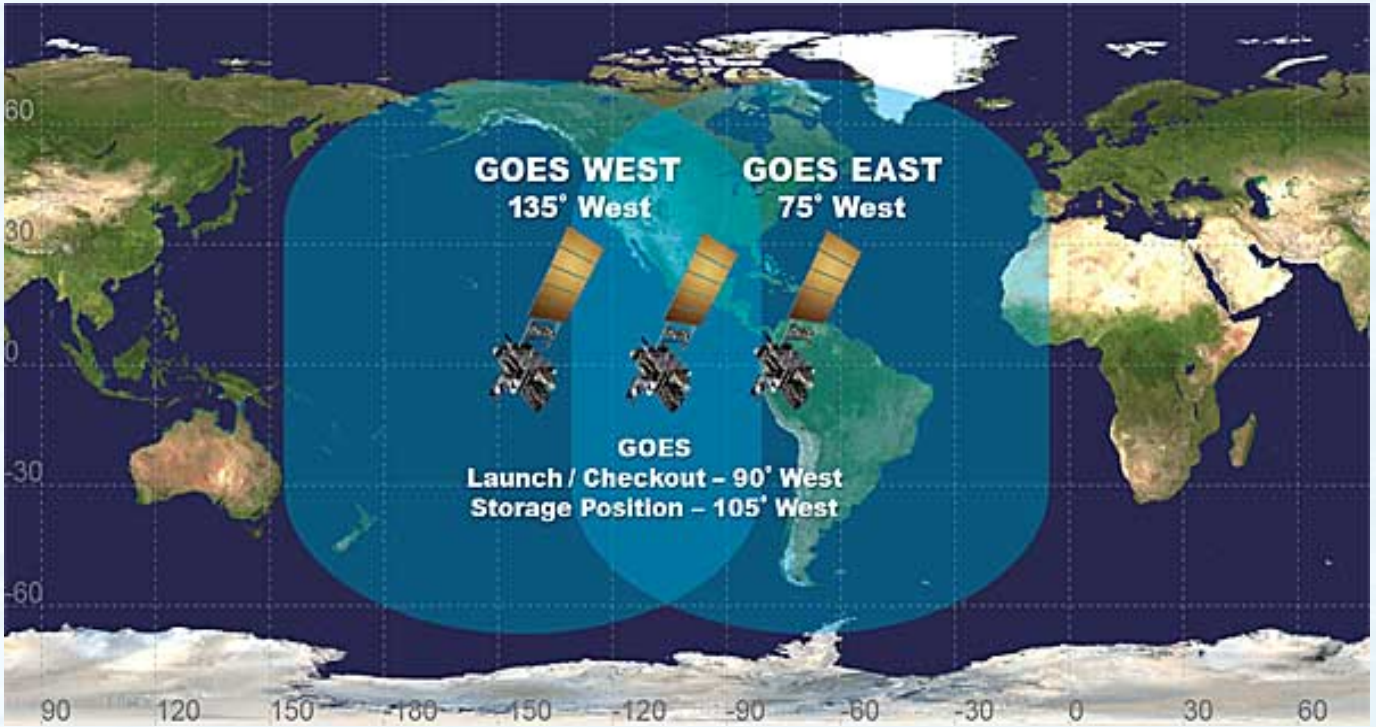
GOES-R

The next generation earth observing system

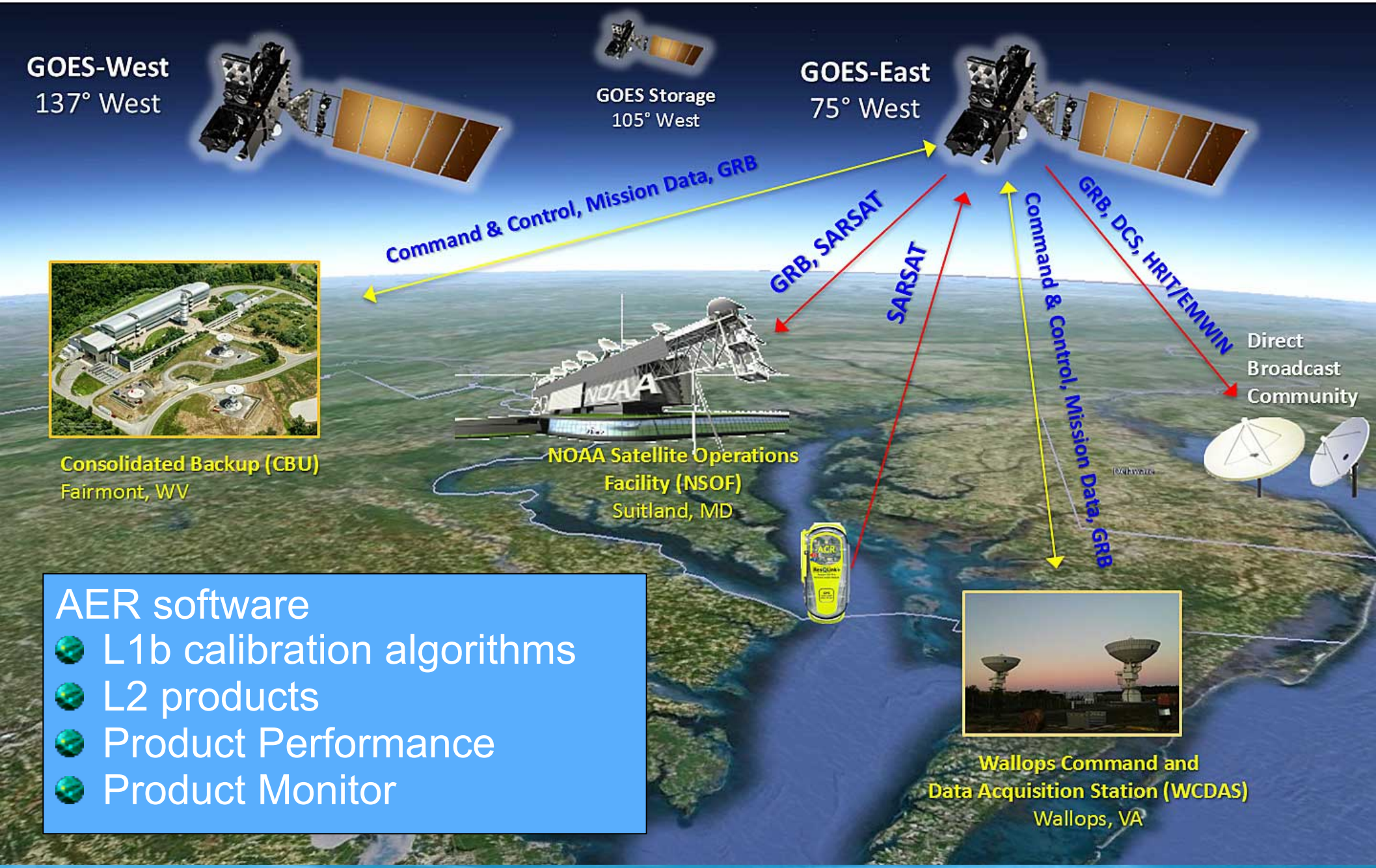
- Started in 1970s, a new generation of GOES about every decade
- GOES-R technology improvements
  - More spectral bands (e.g., 16 vs. 5)
  - Higher spatial resolution (e.g., 2 times)
  - Faster full disk coverage (e.g., 3 times)
- State of Art Science
  - Example, Hybrid regression algorithm for SST

GOES-R (coverage)

The next generation earth observing system



GOES-R System Architecture



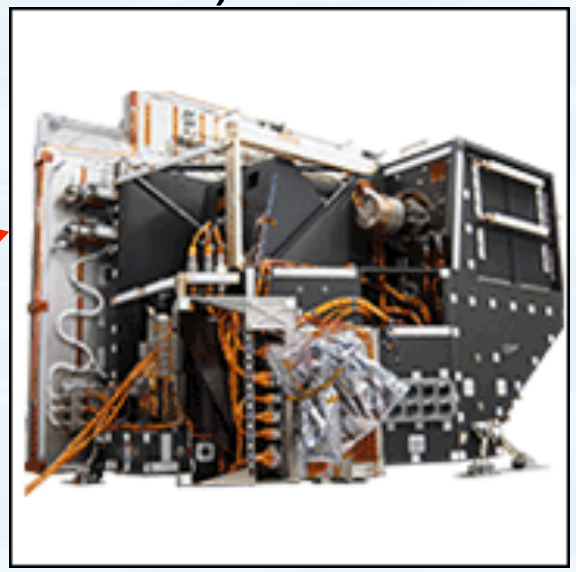
AER software

- L1b calibration algorithms
- L2 products
- Product Performance
- Product Monitor

GOES-R (Instruments)

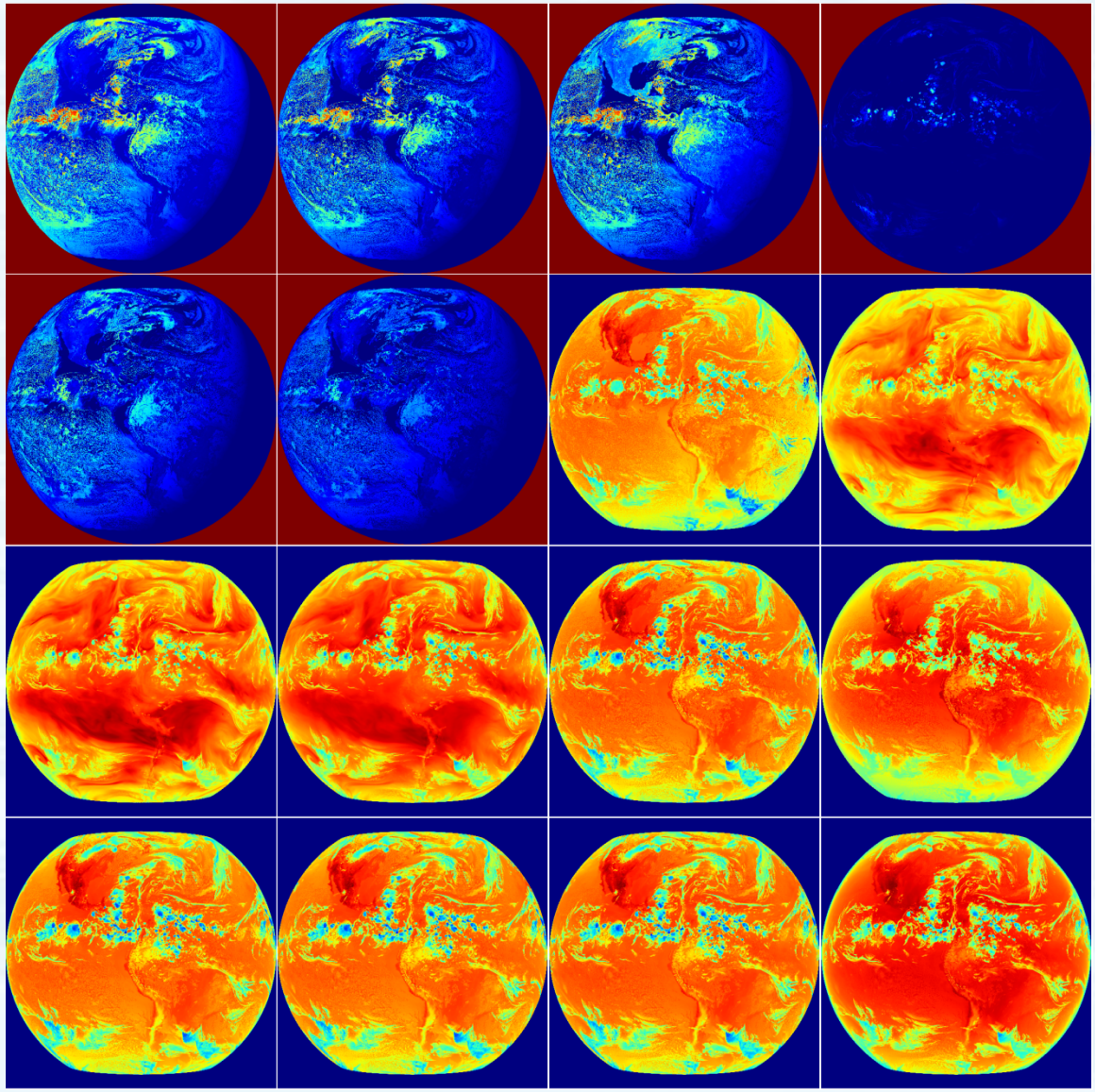
The next generation earth observing system

- SUVI (Solar Ultraviolet Imager)
- EXIS (Extreme Ultraviolet (EUVS) and X-ray Irradiance Sensor (XRS)
- SEISS (Space Environment In-Situ Suite)
- MAG (Magnetometer)
- GLM (Lighting)
- ABI (Advanced Baseline Imager)



ABI Bands

μm
0.47
0.64
0.865
1.378
1.61
2.25
3.9
6.19
6.95
7.34
8.5
9.61
10.35
11.2
12.3
13.3



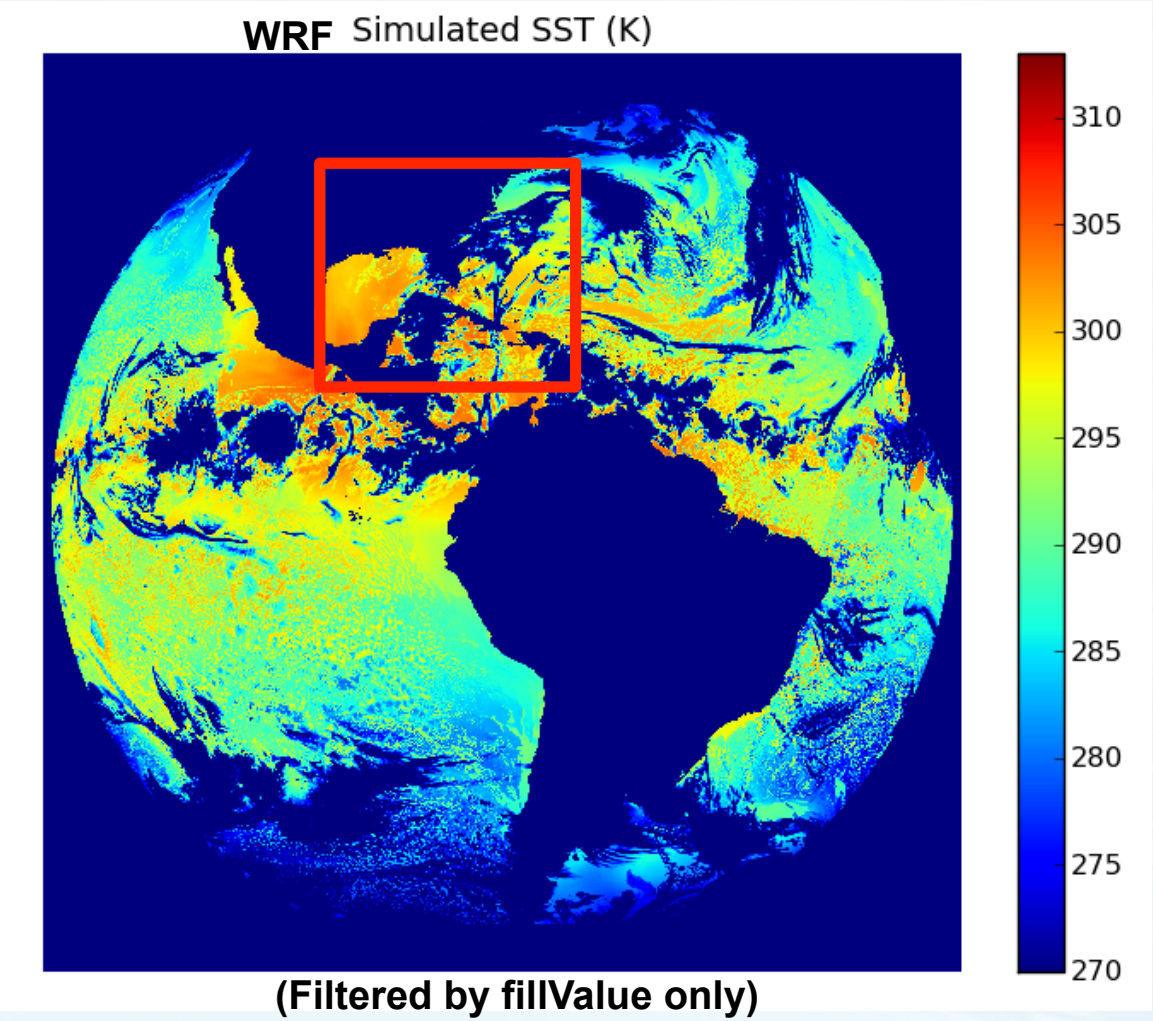
ABI L2 Products

- Imagery (cloud and moisture)
- Radiation (shortwave at TOA and surface)
- Air Quality (aerosol detection and optical depth)
- Aviation (volcanic ash)
- Cloud (mask, height, phase, and optical properties)
- Hydrology (rain rate)
- Land (LST, snow, and fire)
- Soundings (temperature, moisture, TPW, stability indices)
- Winds (derived motion winds, hurricanes)
- Ocean (SST)

ABI L2 Products - SST

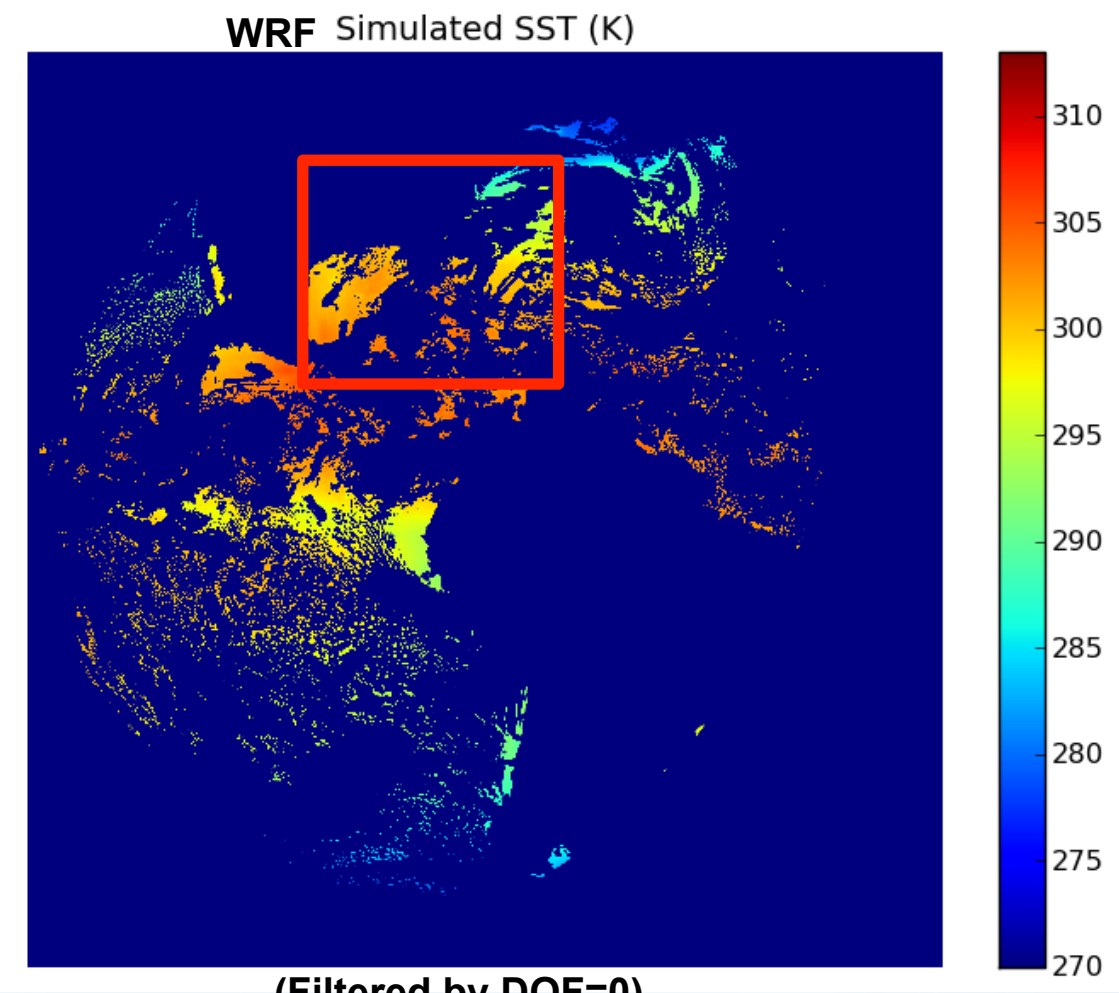
- Product fields: SST, DQF, metadata
- Measurement range: 271K – 313K
- Product precision: 1K
- Product Accuracy: 2.1K
- Coverage: FD, CONUS, MESO
- Coverage time: 60 min, day+night
- Resolution: 2km
- Methodology
  - Hybrid regression algorithm
  - Multi-spectral: 3.9, 11.2, 12.3 μm

ABI L2 Products - SST



Testing based on a combination of real observations (from SEVIRI) and CRTM simulated observations based on WRF atmospheric model with Reynolds surface SST.
Future pre-launch testing could be based on Himawari data.

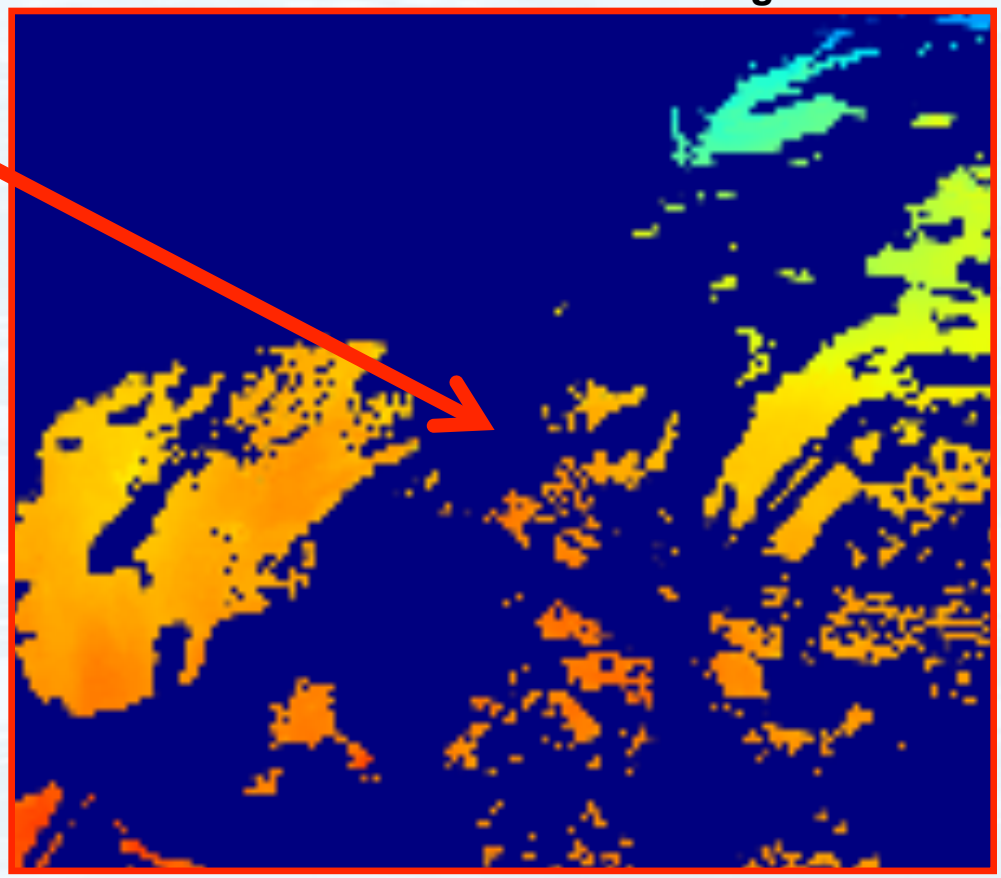
ABI L2 Products - SST



ABI L2 Products - SST

Pseudo-MESO: The Gulf Region

Over-shadowed by clouds



(Filtered by DQF=0 only)

Thank You!

Congratulations, Randy!