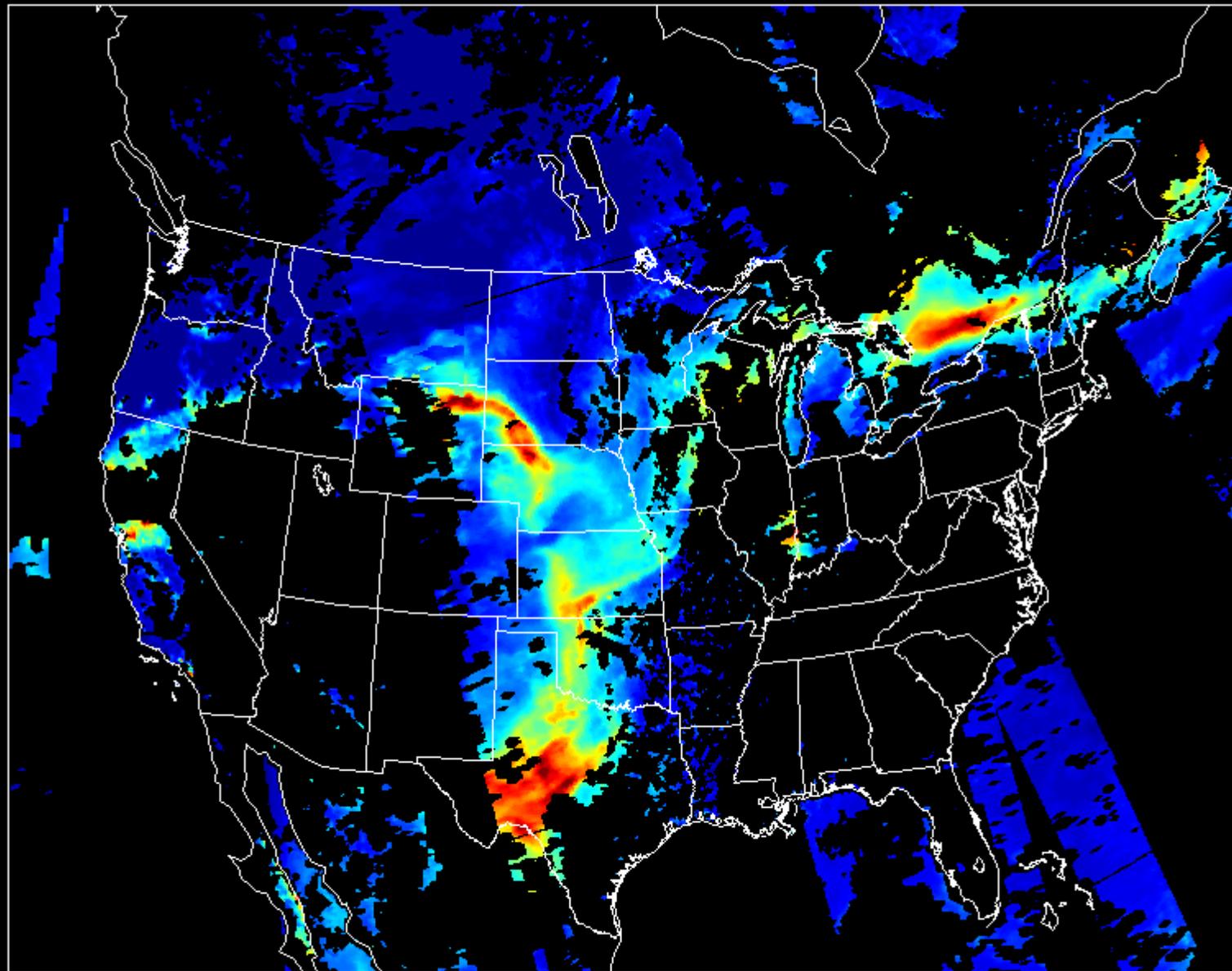
A satellite is shown in space, oriented diagonally. It features a large, rectangular solar panel array on the left side, composed of several smaller panels connected by a central spine. The main body of the satellite is complex, with various instruments, antennas, and structural components visible. A long, thin boom extends from the right side of the satellite, ending in a spherical instrument. The background is a deep blue space filled with numerous small white stars.

**The NOAA Satellite Air Quality Proving  
Ground: Enhancing the Air Quality  
Community's Ability to Forecast and  
Analyze Smoke, Dust, and Haze Events  
using S-NPP/VIIRS and GOES-R/ABI  
Aerosol Products**

Amy K. Huff, Pennsylvania  
State University  
Hai Zhang, Chuanyu Xu, and  
Pubu Ciren, IMSG  
Shobha Kondragunta, NOAA NESDIS  
Raymond M. Hoff, UMBC

# Satellite Aerosol Optical Depth (AOD)

- AOD indicates areas of high particulate matter in the atmosphere associated with smoke plumes, haze, and blowing dust
- Air quality forecasters, modelers, analysts use AOD for retrospective and near real-time applications
- Current AOD observations from geostationary (GOES) and polar-orbiting (Terra, Aqua) satellites
  - GASP: high refresh rate; 4 km resolution
  - MODIS AOD: high accuracy; 10 km and 3 km resolution
- Imagery is available via NOAA IDEA website  
<http://www.star.nesdis.noaa.gov/smcd/spb/aq/>



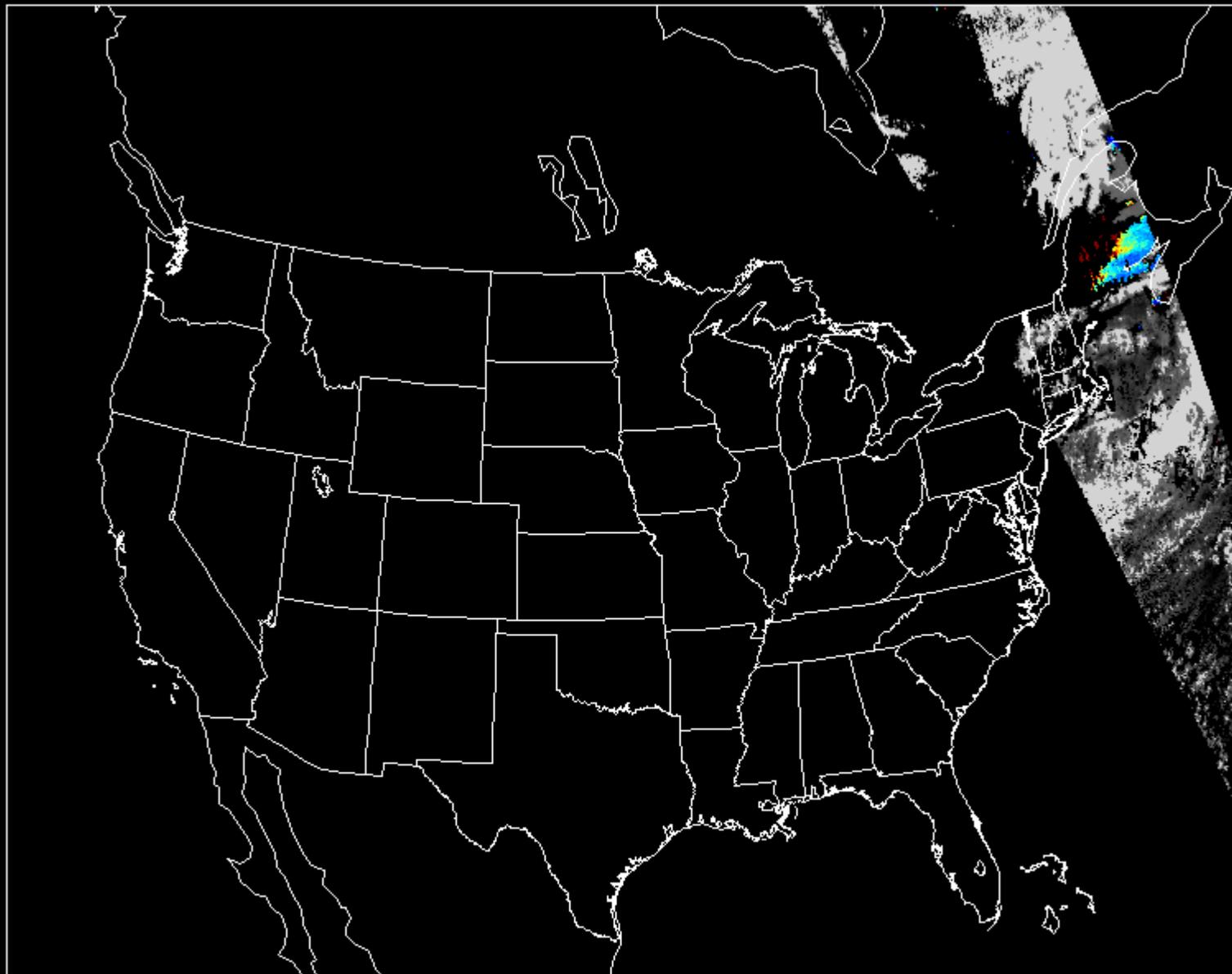
Febr

0.0 0.2 0.4 0.6 0.8 1.0

AOD

0 10 20 30 40 50 60 70

COT



# New and Improved AOD Products

1. Visible Infrared Imaging Radiometer Suite (VIIRS) on Suomi-NPP satellite was launched on Oct 28, 2011
  - Polar-orbiting satellite, afternoon overpass, similar to Aqua (~1:30 PM local time)
  - 2 AOD products:
    - Intermediate Product (IP), 750 m resolution
    - Environmental Data Record (EDR), 6 km resolution
2. Advanced Baseline Imager (ABI) on GOES-R satellite will be launched in early 2016
  - Geostationary satellite, next generation of GOES
    - AOD with “best of both worlds” (high refresh rate of current GASP and high accuracy of MODIS/VIIRS AOD)

# Satellite Air Quality Proving Ground (AQPG)

- NOAA AQPG provides training and outreach to the air quality satellite user community on new aerosol products from S-NPP/VIIRS and GOES-R/ABI
  - Training workshops at conferences (e.g., NAQC)
  - Training videos on YouTube (<http://youtu.be/k17IYMCcHvY> and <http://www.youtube.com/watch?v=vuoDpVafZAA> )
  - Annual AQPG meetings for user community
  - Article in *EM*, A&WMA's magazine for environmental managers
- Advisory Group of 40 air quality forecasters and analysts from federal, state, and local agencies
  - Receiving hands-on training on aerosol products
  - Providing feedback to NOAA on VIIRS and ABI aerosol product development

# VIIRS AOD is Available on IDEA

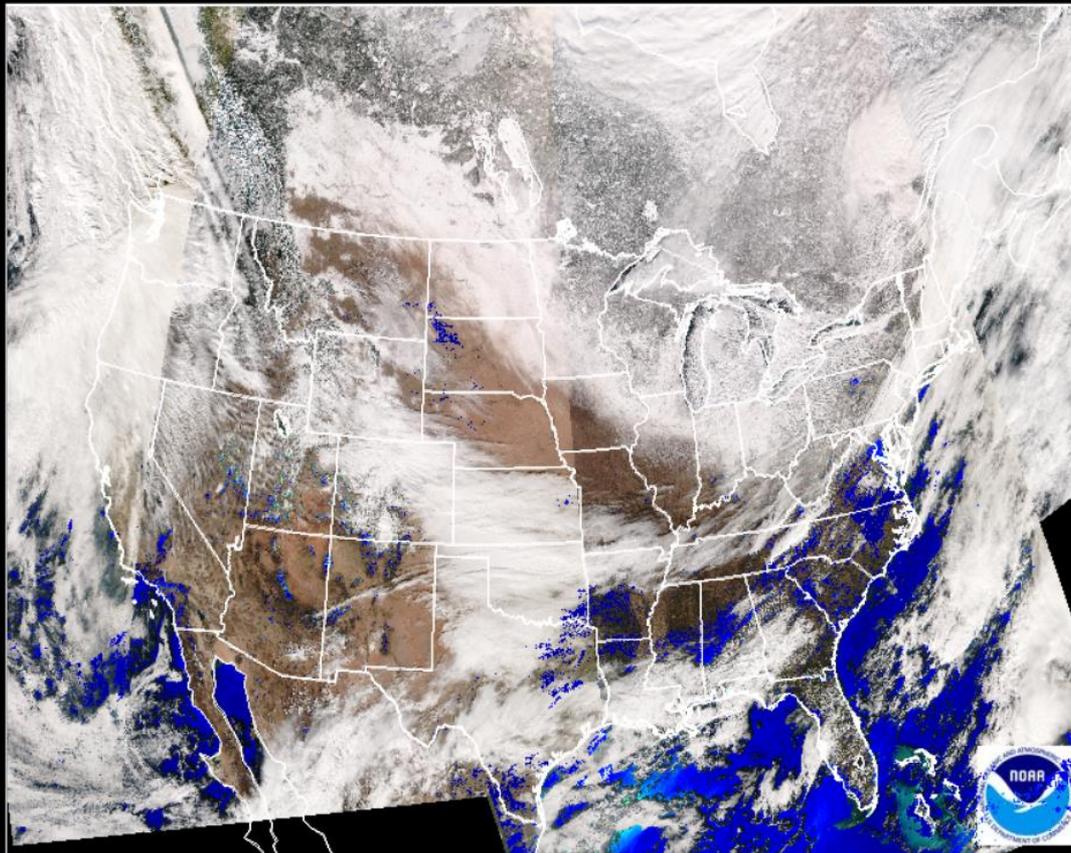
PREVIOUS FORECAST DAY | NEXT FORECAST DAY | 2014 | January | 27 | 0015 | Go | Product description

Valid date ranges (20080101 to 20140128)

Choose plot type:  MODIS (Terra)  MODIS (Aqua)  GASP animated  GASP west animated  
 GASP fixed frame  GASP west fixed frame  VIIRS EDR  VIIRS IP

AOD opacity

VIIRS IP 20140127



# VIIRS CONUS True Color (RGB) and Aerosol Images

SELECT PLOT   PREVIOUS FORECAST DAY   NEXT FORECAST DAY   select date 20140127   Go   Product Description

VIIRS RGB and EDR AOT high quality 20140127

Canada

United States

Mexico

Cuba

Google

NO DATA 0.0   0.2   0.4   0.6   0.8   1.0

NOAA  
NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE

Terms of Use



zoom in/out

select EDR or IP and quality flags

- Select AOT & Quality
- EDR High
  - EDR High & Medium
  - IP High
  - IP High \*
  - IP High & Degraded

change opacity

RGB Opacity

AOD Opacity

visualization options

- Toggle Dust Mask
- Toggle Fire Hotspots
- Toggle County

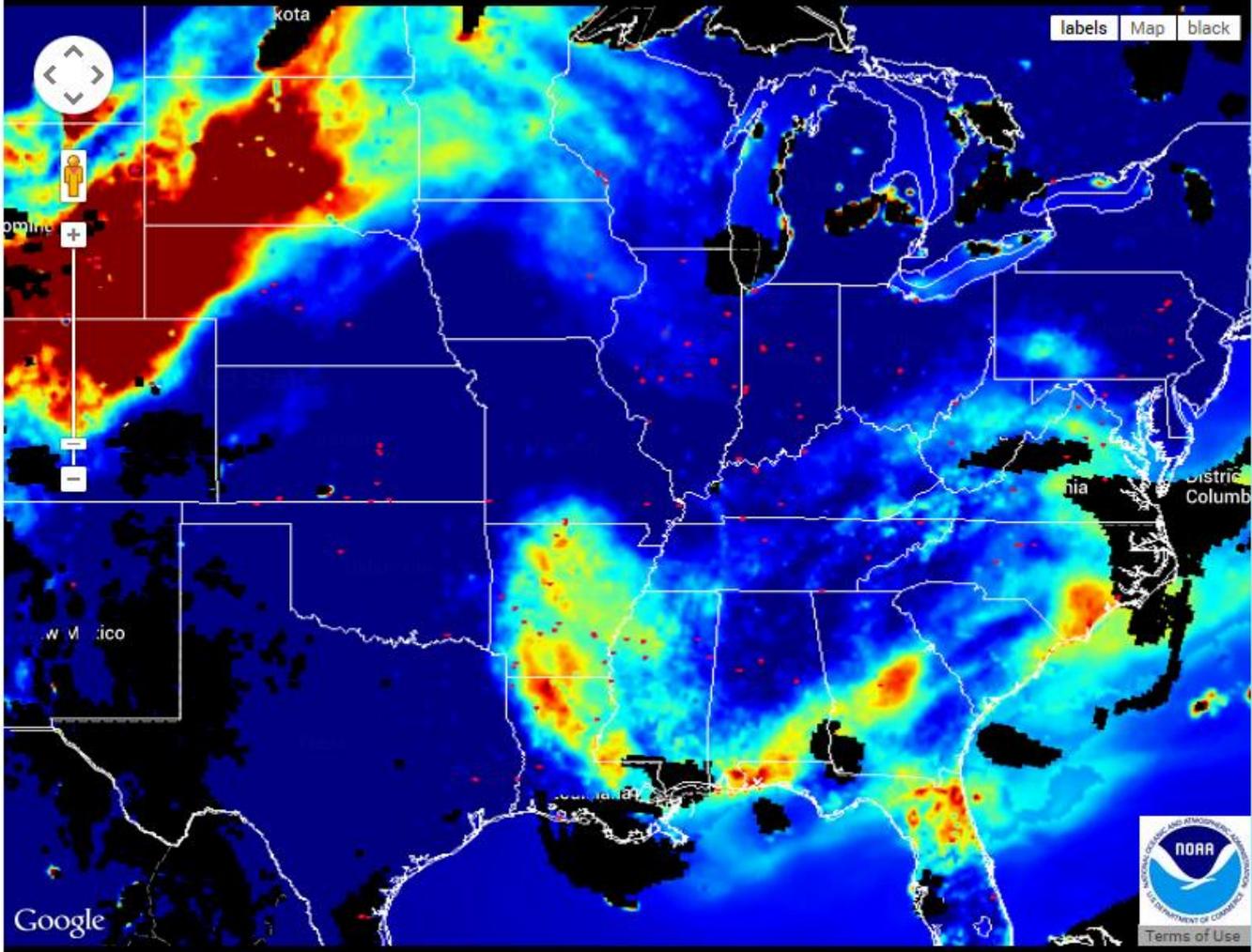
download imagery

- Image Files Download:
- RGB
  - RGB & EDR AOT (high)
  - RGB & EDR AOT (high and medium)
  - RGB & IP AOT (high)
  - RGB & IP AOT (high\*)
  - RGB & IP AOT (high and degraded)

# ABI Simulated Aerosol Products

- AQPG is generating *simulated* ABI aerosol imagery before GOES-R launches so users can:
  - Envision what actual ABI aerosol imagery will look like
  - Anticipate how ABI aerosol products will fit into their forecasting and analysis duties
- Basic steps include:
  1. WRF-Chem model output (12 km resolution)
  2. CRTM run to generate ABI synthetic radiances (6 bands)
  3. ABI AOD algorithm run to create simulated ABI AOD
  4. Post-processing and posting of imagery to web
- Near real-time streaming testbed July 12-30, 2011
  - AOD imagery available every hour
  - Advisory Group members provided feedback via email

GOES-R 2012-07-04 1600 UTC Simulated Natural Color & AOD (Beta)



labels Map black

Plot Select

NCI & AOD

Aerosol Type

Animation Controls



Animation Speed



NCI Opacity



AOD Opacity



Toggle AOD Contour

Toggle Fire Hotspots

Toggle County

KML Files Download:

- Natural Color And AOD
- Aerosol Type



# Upcoming AQPG Activities

- Next near real-time streaming testbed of simulated ABI aerosol products in July/Aug 2014; feedback is welcome
- 2-3 training/informational webinars in 2014 to keep Advisory Group members updated on product development
- Submitting journal article in next 2-3 months on the process for generating simulated ABI aerosol products
- 2014 annual AQPG meeting in Oct/Nov

# Acknowledgements

- NOAA NESDIS grants NA11NES4400009 and NA11NES4400005
- Support of Steve Goodman, GOES-R Program and Mitch Goldberg, JPSS Program
- AQPG Advisory Group Members

PENNSSTATE



UMBC  
AN HONORS UNIVERSITY IN MARYLAND

