



Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

Exceptional Event Analysis at the State Management Level

Michael Geigert – HAQAST6, July 2019

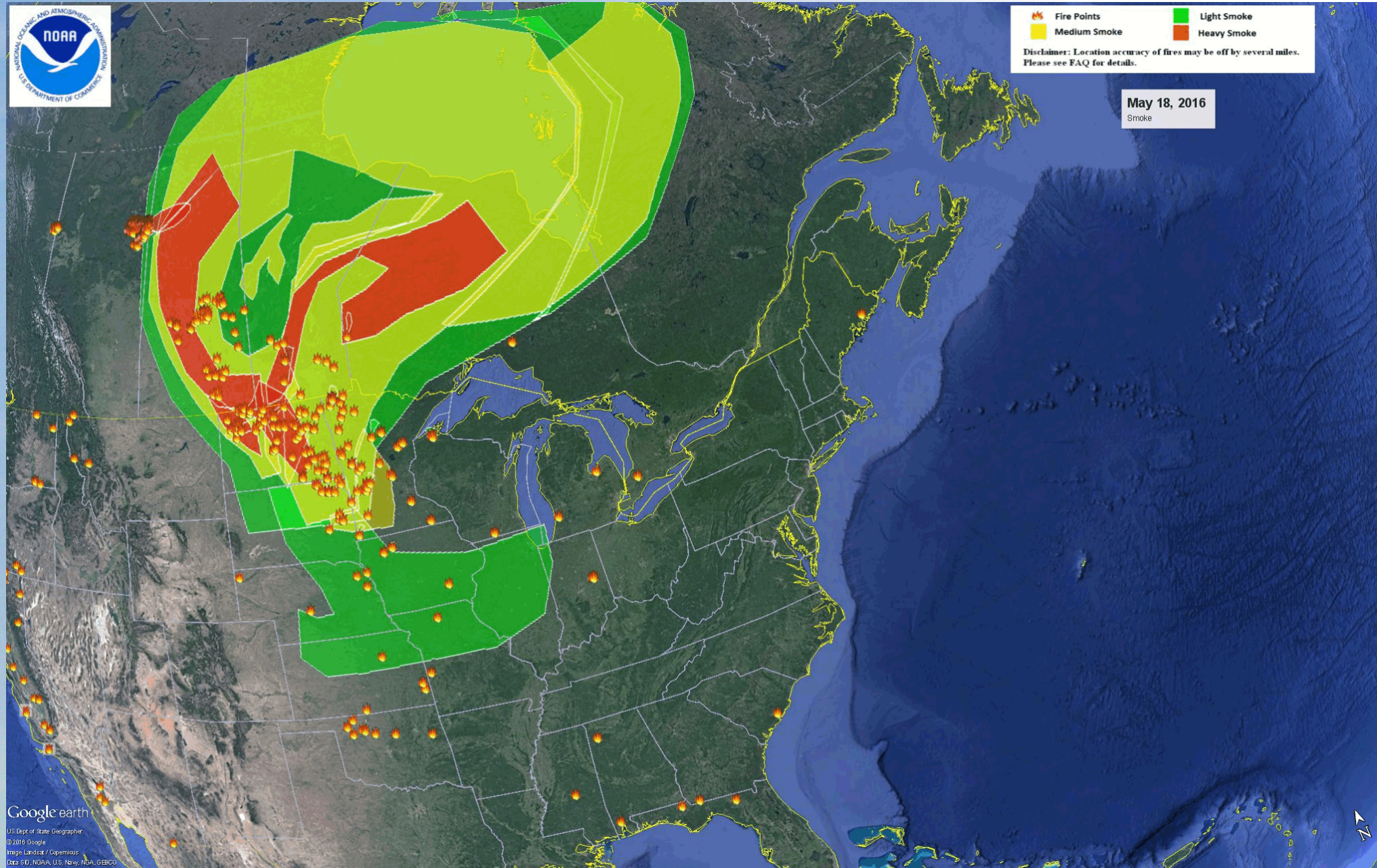


Fort McMurray Fire, May 2016



- The last ozone exceptional event submittal from Connecticut;
- Notified EPA Region 1 on September 28, 2016;
- Concurrence Letter received on July 31, 2017;
- Only smoke plume ozone 'enhancement' episodes since then.

Smoke Plume Animation from May 18th- May 28th



The Final 2016 Exceptional Events Rule, Supporting Guidance Documents

Guidance Documents and FAQs Updated April 2019

- **High Winds:** [Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Air Quality Data Influenced by High Wind Dust Events Under the 2016 Exceptional Events Rule](#) (April 2019)
- **Data Modification:** [Clarification Memo on additional Methods, Determinations and Analyses to Modify Air Quality Beyond Exceptional Events](#) (April 2019)
- **Stratospheric Ozone:** [Guidance on the Preparation of Exceptional Events Demonstrations for Stratospheric Ozone Intrusions](#) (November 2018)
 - [Forecasting Tools for Stratospheric Ozone Intrusions](#) (PDF)
 - [Forecasting Tools for Stratospheric Ozone Intrusions \(PPTX\)](#) (23 pp, 19 MB, 11/6/2018)
- **Wildfire:** [Final Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations](#) (September 2016)
- [Updated Exceptional Events Rule FAQs](#) (July 2018)

Other EPA-Developed Rule Implementation Documents

- [Best Practices for Preparation of Multi-Agency Exceptional Events Demonstrations](#)
- [2007 to 2016 Exceptional Events Rule Crosswalk](#)
- [Mitigation Plan Checklist \(DOCX\)](#) (7 pp, 28 K, 3/29/2018)
- [EPA Review Technical Support Document Template for Wildfire/Ozone Events](#)
- [Fact Sheet – Wildland Fire and Air Quality](#)

EPA Exceptional Events Submissions Table (2016 Rule)

<https://www.epa.gov/air-quality-analysis/example-demonstrations-and-epa-responses-prepared-under-2016-exceptional-events>

Event	Agency	Location	Available Documentation (Ozone)
2015 and 2016 Wildfires	Washoe County Health District	Reno, Nevada	Washoe Documents
2016 Canadian Wildfire	Connecticut Department of Energy and Environmental Protection (CDEEP)	State of Connecticut	Connecticut Documents
	Massachusetts Department of Environmental Protection (MassDEP)	State of Massachusetts	Massachusetts Documents
	New Jersey Department of Environmental Protection (NJDEP)	State of New Jersey	New Jersey Documents
	Rhode Island Department of Environmental Management (RI DEM)	State of Rhode Island	Rhode Island Documents RI DEM Supporting Analysis (PPSX) (49 pp, 66 MB, 6/20/2017)
	Maryland Department of the Environment (MDE)	State of Maryland	Maryland Documents
	Pennsylvania Department of Environmental Protection (PADEP)	State of Pennsylvania	Pennsylvania Documents
2017 Northwest Wildfires	Louisiana Department of Environmental Quality (LDEQ)	State of Louisiana	Louisiana Documents

This table contains examples of air agency submitted exceptional events demonstrations and responsive EPA decision documents that have been prepared and/or acted upon under the 2016 Exceptional Events Rule. These examples may help agencies develop demonstrations that support requests for data exclusion due to the influence of exceptional events; however, the provided examples may not contain the minimum level of data or case-specific analyses necessary for other exceptional events demonstrations. This table is not intended to serve as a database for all Agency actions on exceptional events.

Event	Agency	Location	Available Documentation (Particulates)
2015 Wildfires	Oregon Department of Environmental Quality (ODEQ)	Klamath Falls, Oregon	Klamath Falls Documents - ODEQ Demonstration - EPA Technical Support Document
2015 High Wind Dust Event	Washington Department of Ecology (WDE)	Kennewick, Washington	Kennewick, WA Documents - WDE Demonstration for August 2015 Event - WDE Cover Letter for Demonstration - EPA Cover Letter and Technical Support Document

Available Tools for Analysis

- [NOAA Model Forecasts](#) and [Airnow AQI maps](#);
- [NOAA OSPO](#) analyzed smoke plume coverage;
- [MODIS Satellite with AOD estimations](#);
- [CALIPSO satellite](#) aerosol analysis;
- [Airnowtech Navigator](#) trajectory analysis;
- [Hysplit](#) trajectory analysis;
- [NOAA Aerosol Watch](#);
- [Bluesky Smoke Model Runs](#);
- [EPA Remote Sensing Information Gateway](#) (RSIG);
- [Panoply netCDF, HDF and GRIB Data Viewer](#) (NASA).

EPA Remote Sensing Information Gateway (RSIG)

February 19, 2019 - Display of TROPOMI NO2 Column

RSIG3D Controls

Map Data View Info Save RSIG Web

Scenario: Restore Last Clear All

omibehioapi
tropomi
nrti
offli

nitrogen dioxide_tropospheric_column
nitrogen dioxide_tropospheric_column_p
air_mass_factor_total
air_mass_factor_troposphere

viirsnsa

Selected data: tropomi.offli.nitrogen dioxide_tropospheric_column

Aggregate Layer Re-grid

MODIS True Color Imagery

Date and Days: Date 02/19/2019 # of days 2

Bounding Box: N 45.00 W -83.00 E S 37.00

Re-grid parameters Filter parameters Get Data

Timestep: Speed: 15

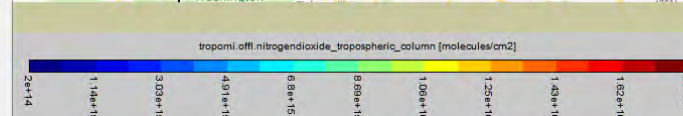
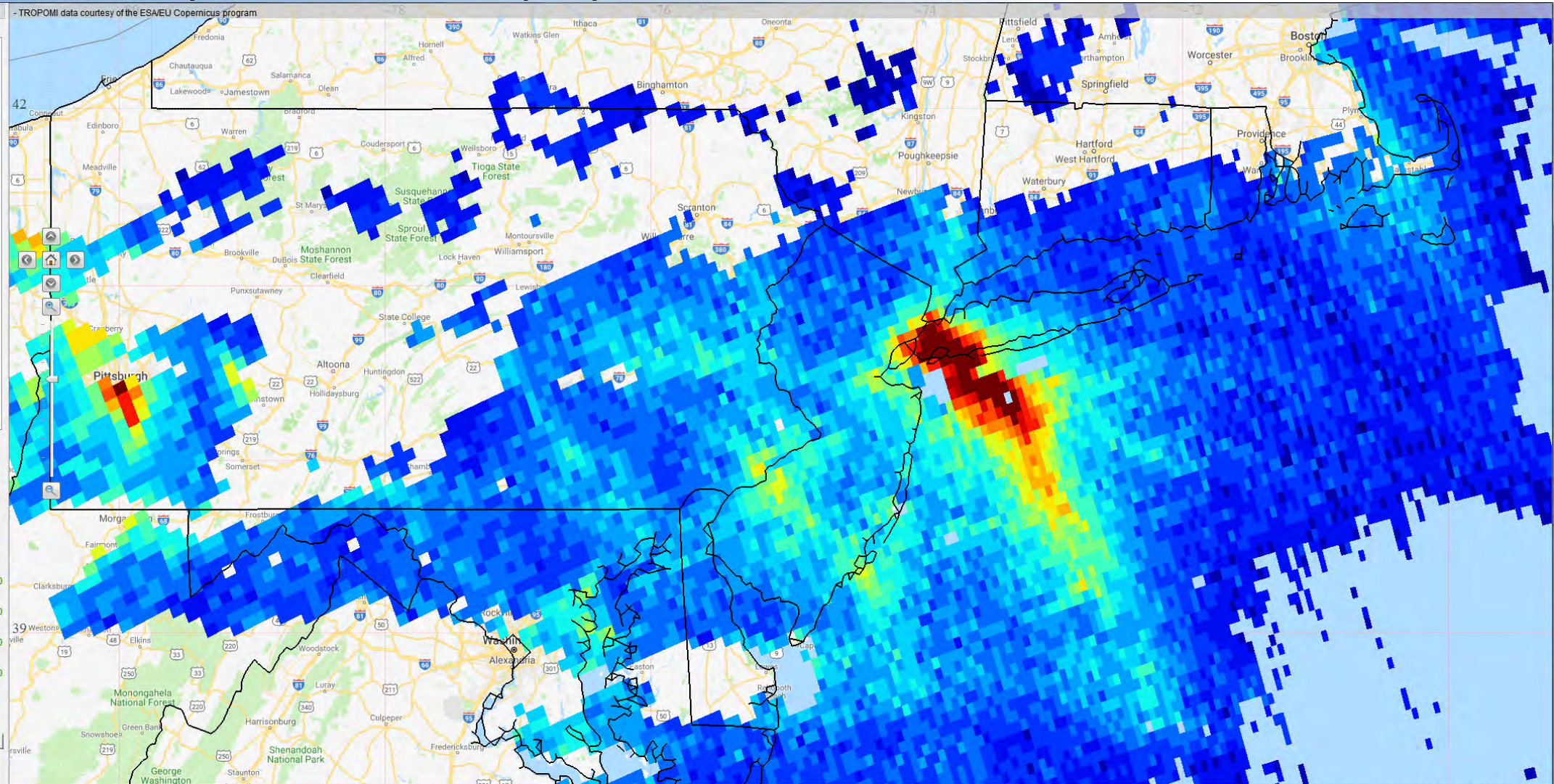
Play

RSIG3D version 20181026
Data server: ofmpub
Checking RSIG3D version...
RSIG3D is up to date.
Network data: tropomi.offli.nitrogen dioxide_tropospheric_column loaded.
Network data: airnow.ozone loaded.
State file C:/Users/GeigertM/rsig3d.xml restored.

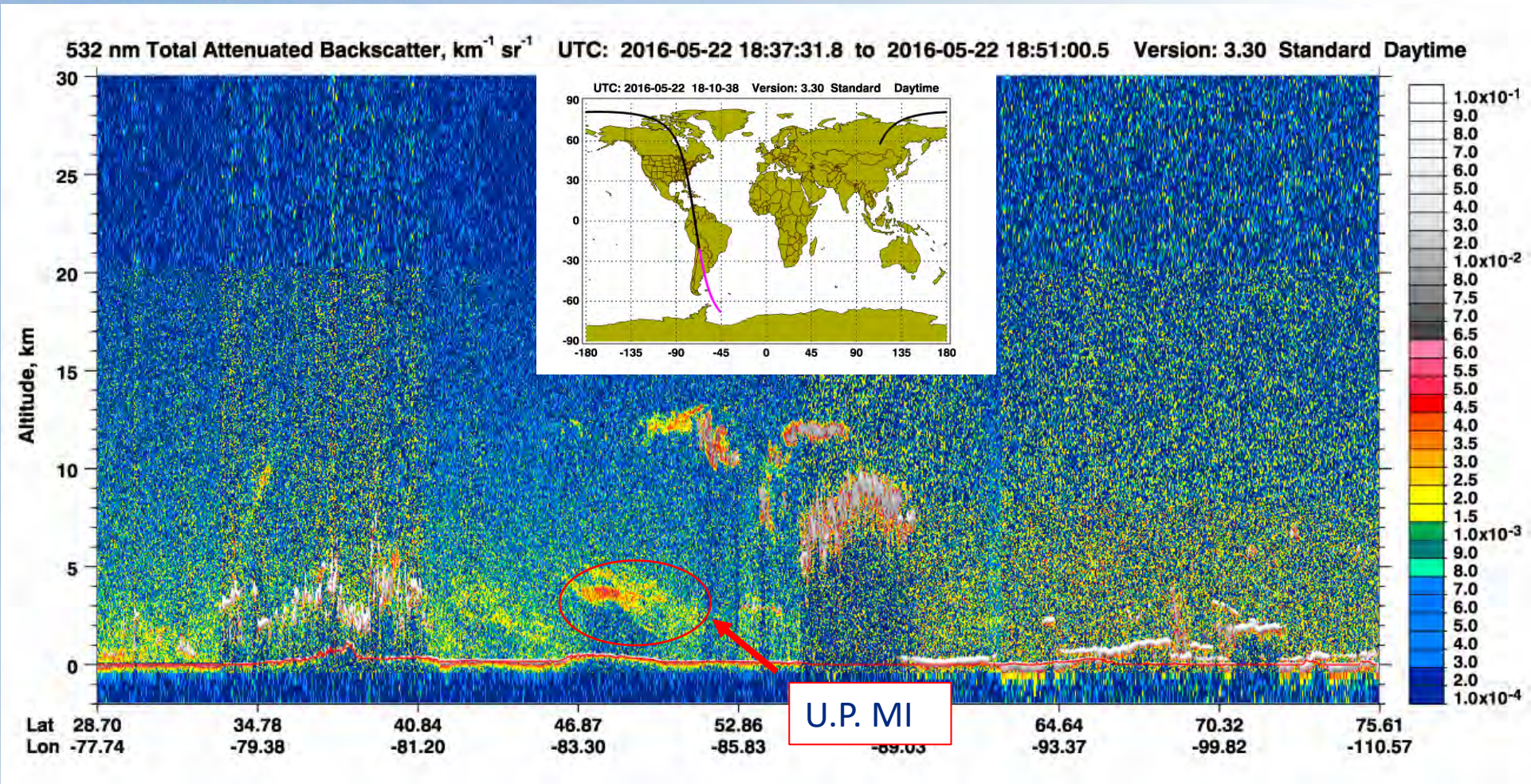
WCS: http://ofmpub.epa.gov/rsig/rsigserver?SERVICE=wcs&VERSION=1.0
Network data: tropomi.offli.nitrogen dioxide_tropospheric_column failed.

WCS: http://ofmpub.epa.gov/rsig/rsigserver?SERVICE=wcs&VERSION=1.0
Network data: tropomi.offli.nitrogen dioxide_tropospheric_column loaded.

WCS: http://ofmpub.epa.gov/rsig/rsigserver?SERVICE=wcs&VERSION=1.0
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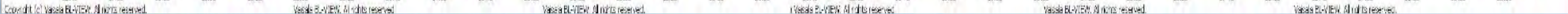


CALIPSO LIDAR, May 22, 2016

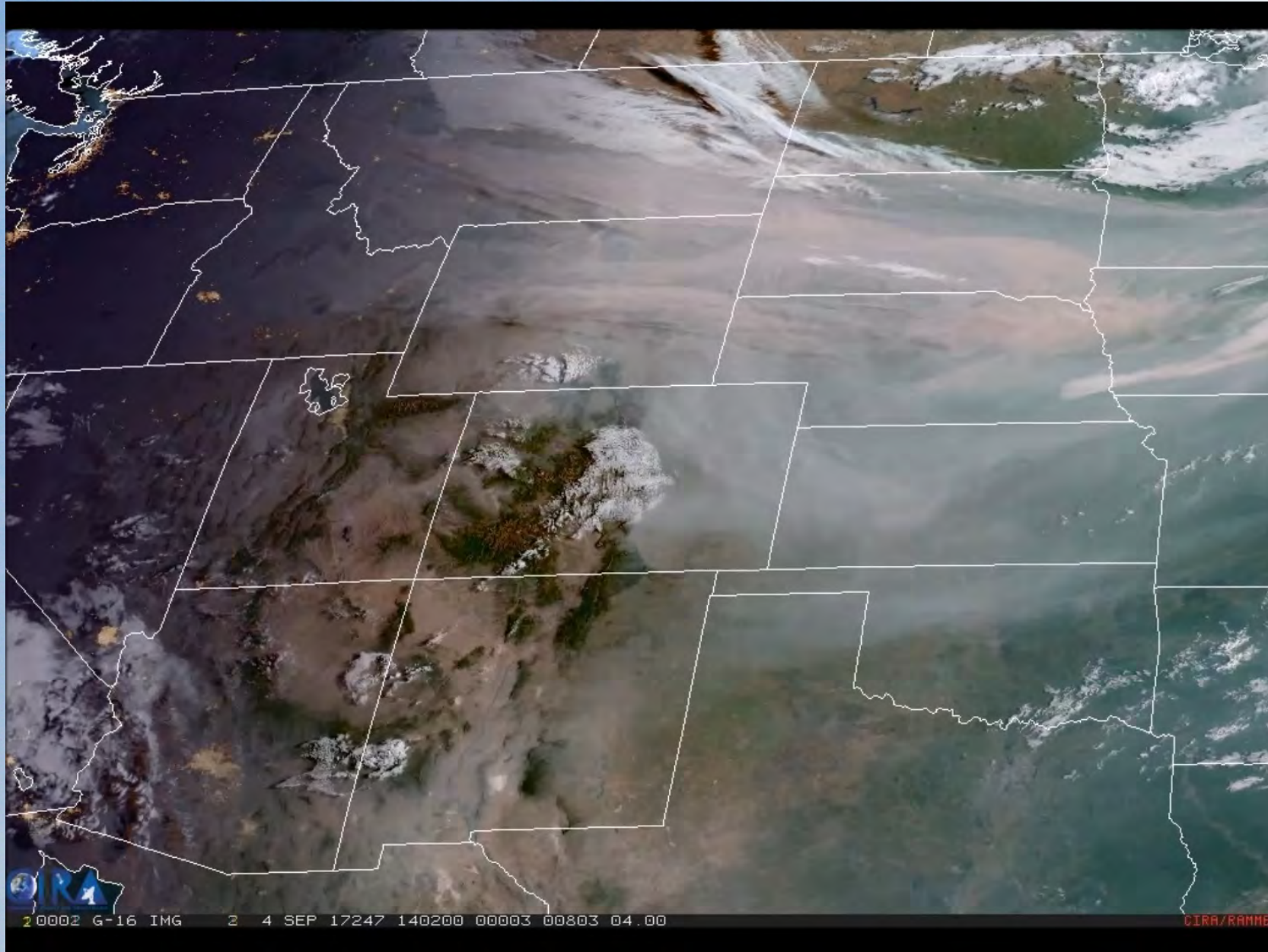


- CALIPSO images are produced for narrow swaths but can show the location and altitude of aerosol plumes on a daily basis.

The CL51 Ceilometer at New Haven shows a thick aerosol layer moving over New Haven after 6:00 am LST on May 25th with the upper boundary layer exceeding 3000 meters during the afternoon. Need this instrument for more 'weight of evidence'.

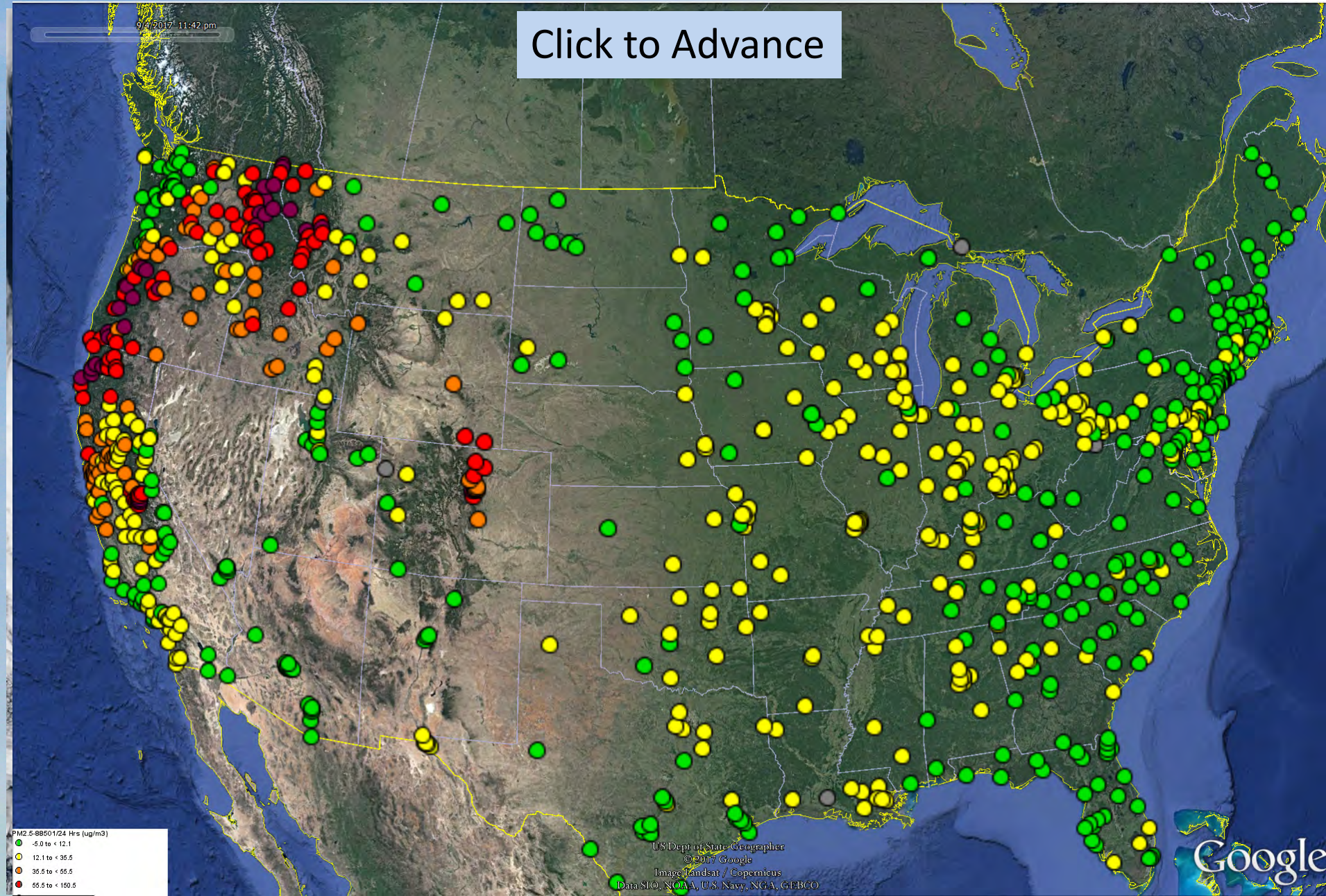


2017 Western North American Fires



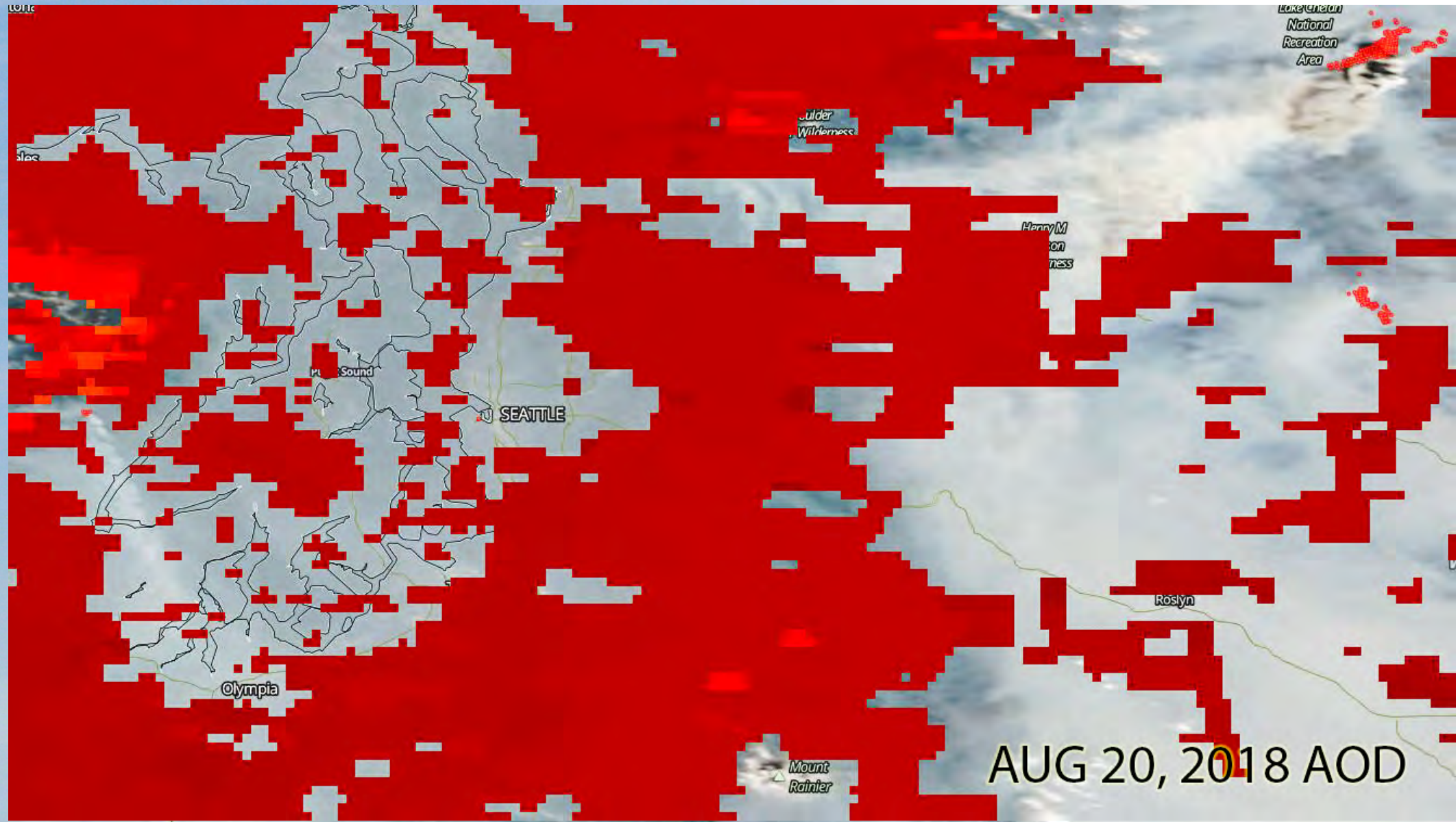
- Stunning images from the GOES-16 Satellite on September 4, 2017.

September 4, 2017 Western North American Fires



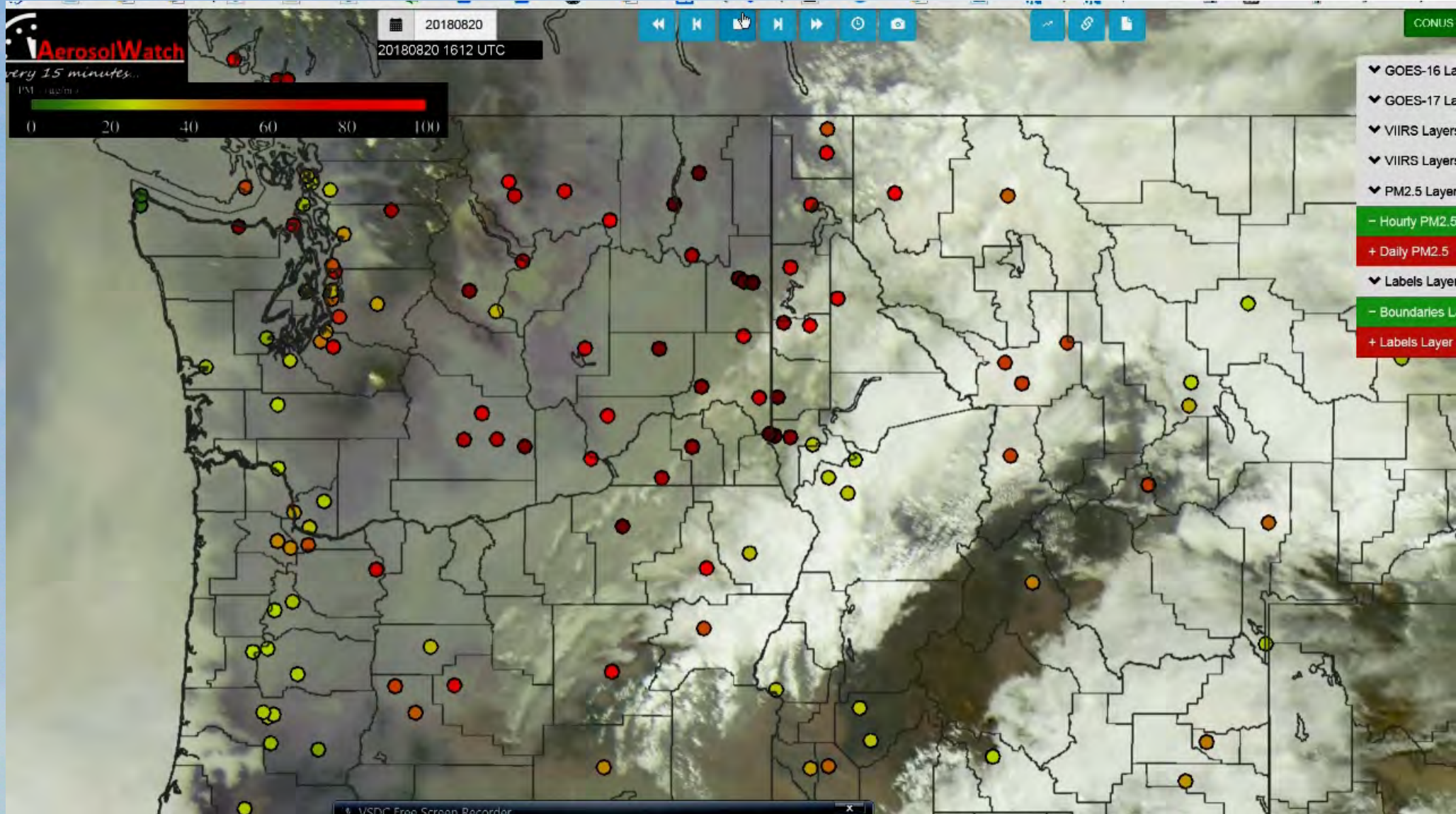
August 20, 2019 Northwest USA Smoke Event

Click to Advance



August 20, 2019 GOES16 Animation

Used Aerosol Watch to compare different satellite images and add PM2.5 and aerosol layers.



Wrap up

- Satellite technology and imagery is constantly improving, especially with GOES16 and GOES17;
- The EU Copernicus TROPOMI instrument has already been useful for visualizing NO₂ source areas, down to the urban scale;
- Looking forward to the 2022 launch of the geostationary TEMPO instrument.
- Also looking forward to the 2022 launch of [MAIA](#) : The Multi-Angle Imager for Aerosols investigation will seek to understand how different types of air pollution affect human health.

