Fire and Smoke Initiative Brief

Andy Edman/Bill Sjoberg

Representing the Fire and Smoke Initiative Team

JPSS/NCEP Aerosol Mtg - Sep 2017

Outline

- JPSS PGRR Background including Fire and Smoke Initiative
- Key Organizations in Fire Weather Support
- Fire Event Questions
- How Satellites Help
- What is Happening Now?
- What is Going on in the Future?
- Model Validation
- Discussion

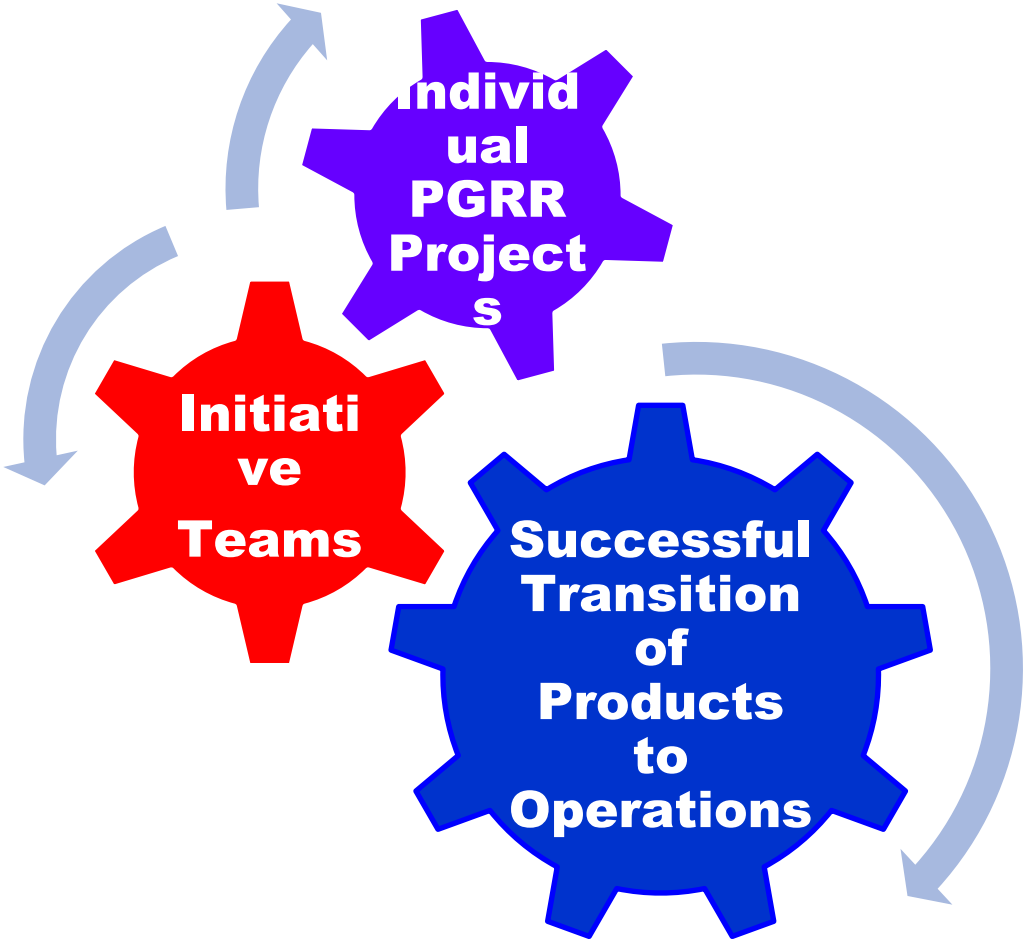
JPSS PGRR Background
Definitions

- **Proving Ground**
  - Demonstration and utilization of data products by the end-user operational unit, such as a NWS Weather Forecast Office or Modeling Center.
  - Promote outreach and coordination of new products with the end users, incorporating their feedback for product improvements

- **Risk Reduction**
  - Development of new research and applications to maximize the benefits of JPSS satellite data
    - Example - use of Day Night Band for improved fog and low visibility products at night, benefiting transportation industry.
  - **Encourages fusion of data/information from multiple satellite, models and in-situ data**
  - **Encourages use of satellite data to improve model forecast**

JPSS PGRR Background
RFP Timelines

JPSS PGRR Background
Success of PGRR Initiatives



JPSS PGRR Background
PGRR Initiatives List

JPSS PGRR Background Best Practices

JPSS PGRR Background
F&S Initiative Initial Objectives

- Organize a forum to allow stakeholders supporting Fire and Smoke products development to interact with key users of the capabilities.
- Understand the current use of geostationary and polar orbiting satellite capabilities in support of Fire and Smoke detection and forecasting mission
- Identify current SNPP/JPSS and new GOES-R Fire and Smoke data and capabilities with the potential to improve support to this mission
- Establish methodologies and procedures for the operational demonstrations of these capabilities
- Following these operational demonstrations, identify the satellite capabilities whose operational impacts are sufficient to warrant transition from research to operations
- Determine required actions for an effective transition of these capabilities to operations that can be maintained over the long term.
- As the Initiative Team met over the months and years, actions were taken to implement these objectives, and new objectives were identified and worked.

JPSS PGRR Background Telecon Participants

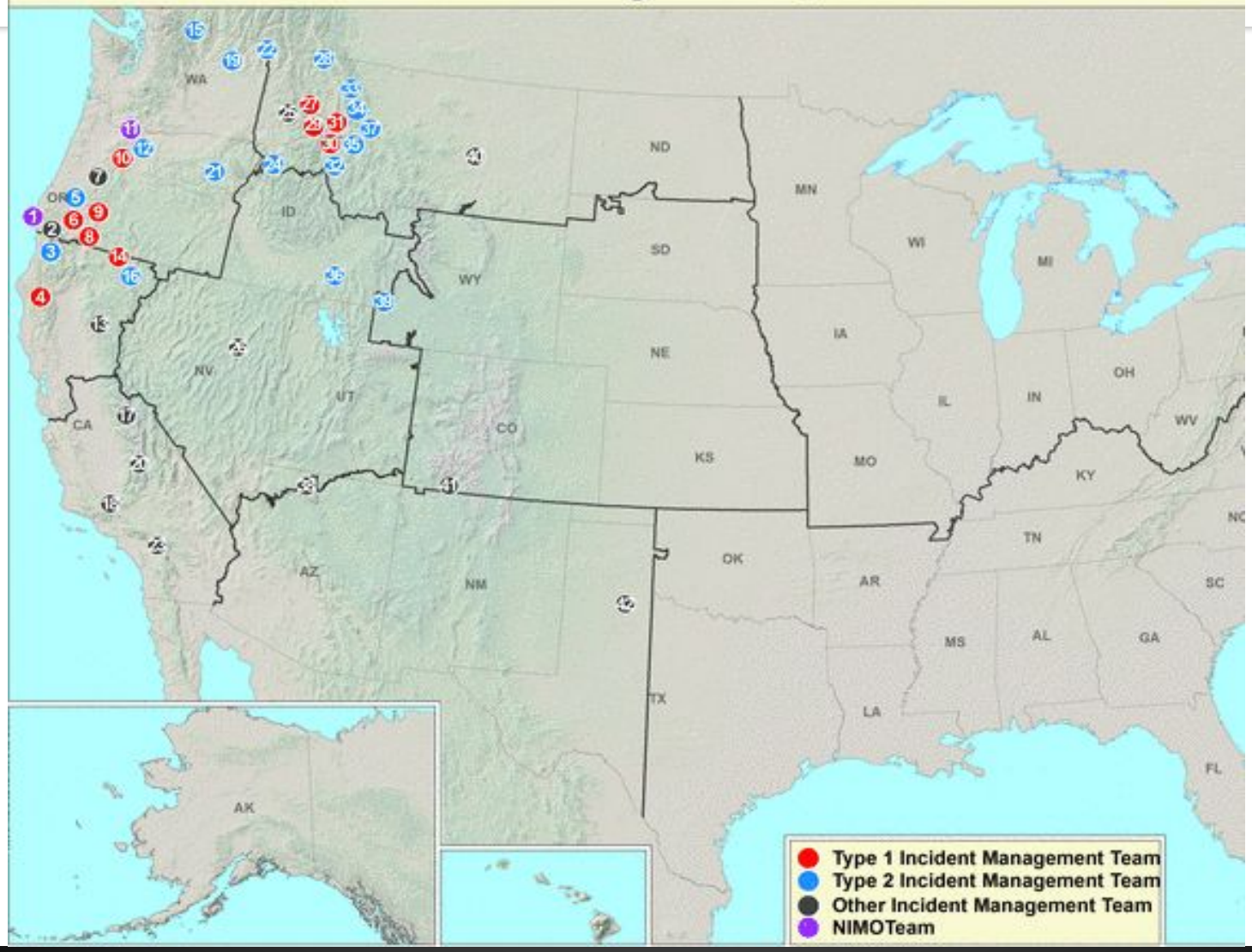
Name	Organization	Name	Organization
Tim Barker	NWS	Valerie Mikles	STAR
Nazmi Chowdhury	JPSS	Tony Mostek	NWS
Ivan Csiszar	STAR	Brian Motta	NWS
Andy Edman	NWS	Susan O'Neill	USDA Forest Service
Evan Ellicott	U of MD	Brad Pierce	STAR
Mitch Goldberg	JPSS	Julie Price	JPSS
Robyn Heffernan	NWS	Katherine Rowden	WFO Spokane Hydrologist
Amy Huff	Penn State	Bill Sjoberg	JPSS
Eric James	ESRL/GSD	Eric Stevens	GINA
Shobha Kondragunta	STAR	William Straka	CIMSS
Scott Lindstrom	CIMSS	Jorel Torres	JPSS Training Liaison
Mark Loeffelbein	NWS	Christine Waigl	UAF
Jeff McQueen	STAR		

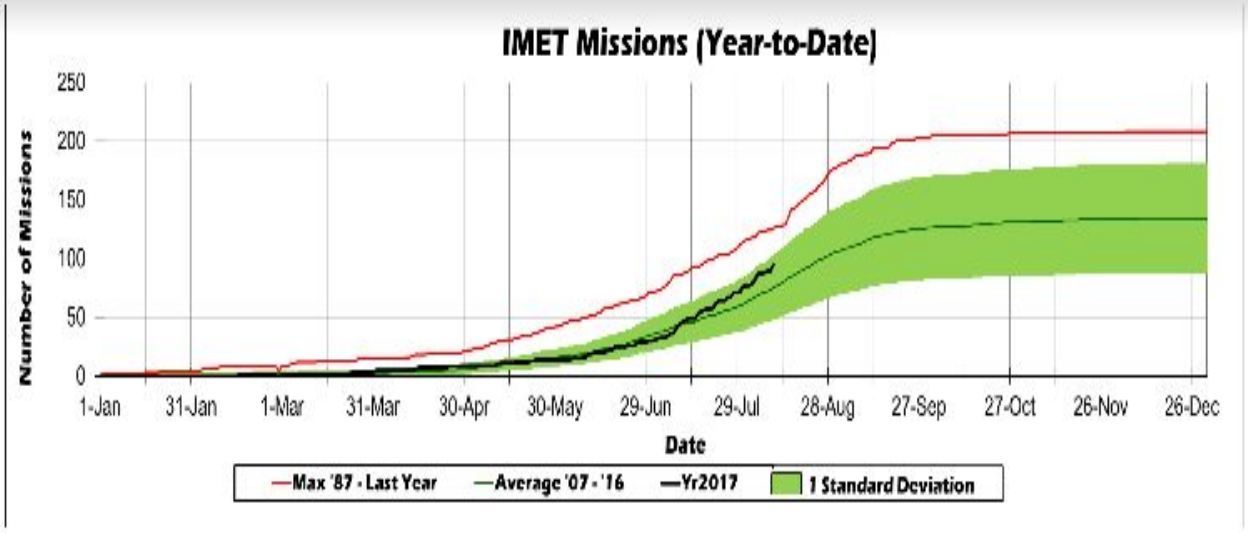
Key Organizations in Fire Weather Support

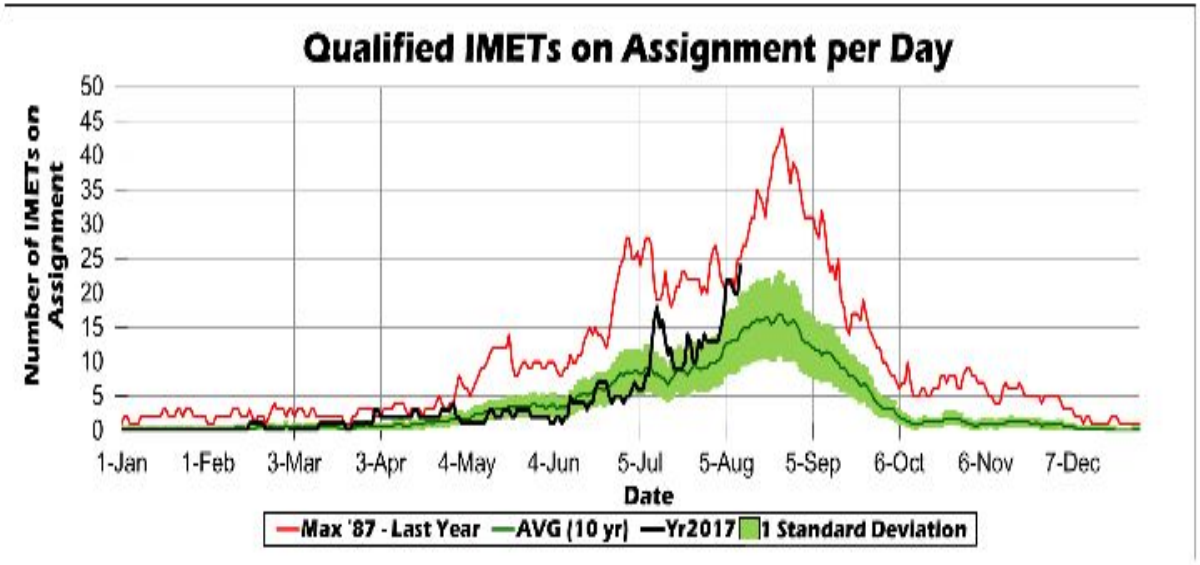
- National Weather Service (WFOs, IMETs
- National Interagency Fire Center
- National Interagency Coordination Center
- Bureau of Land Management
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- The National Wildfire Coordinating Group
- Regional Geographic Area Coordination Centers
- Air Quality Organizations

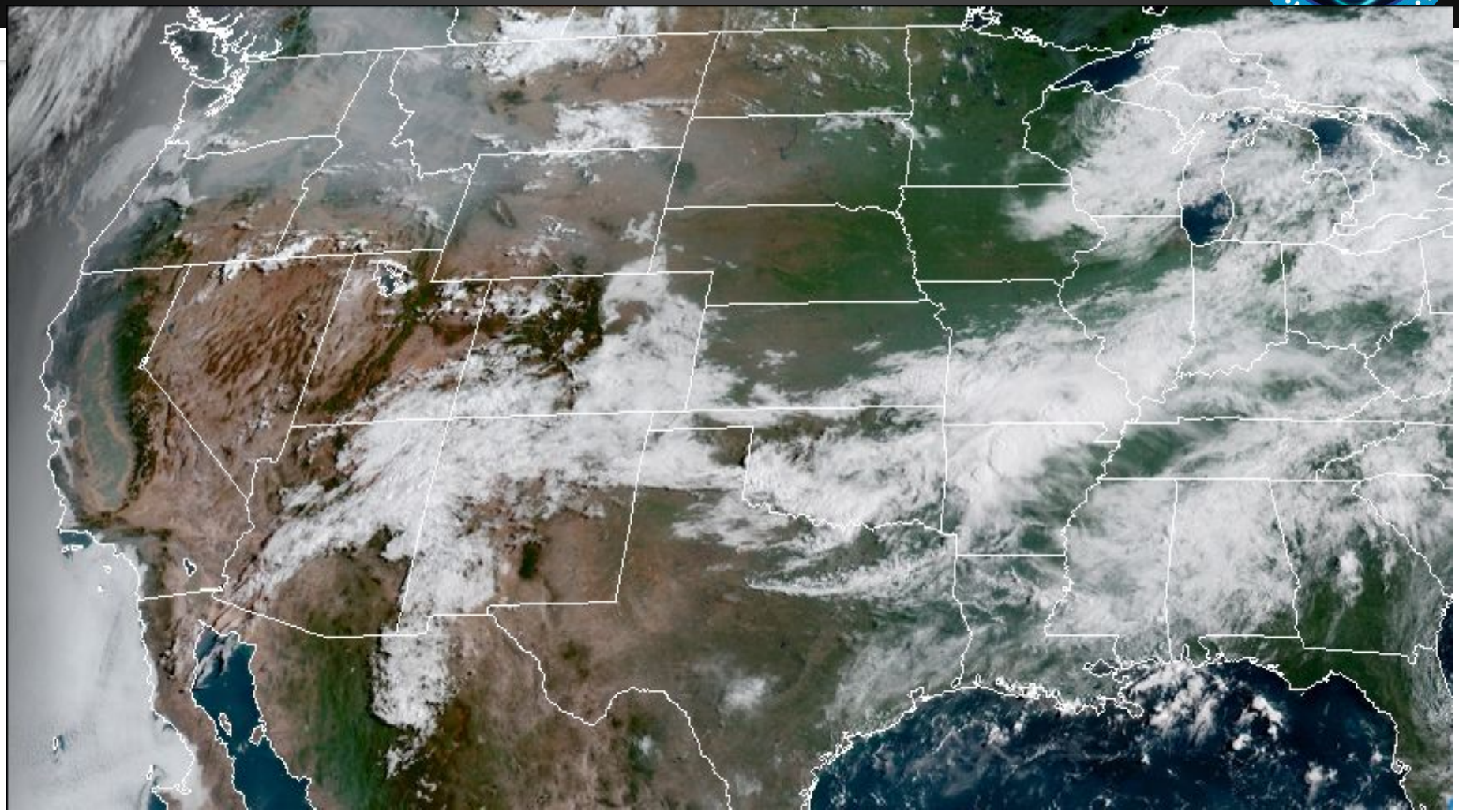
Current Large Incidents

August 12, 2017



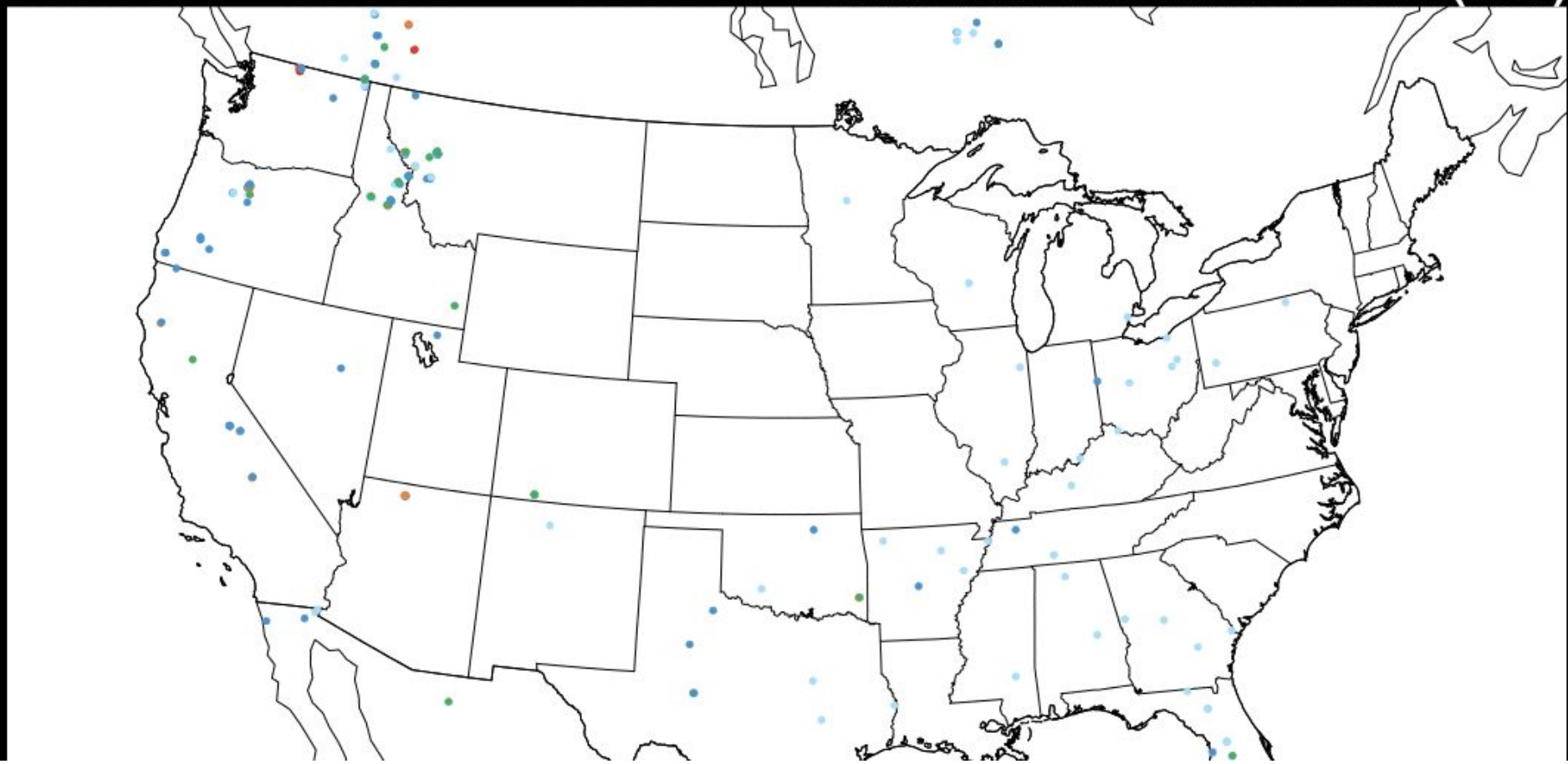

IMET Missions (Year-to-Date)
Number of Missions
250
200
150
100
50
0
1-Jan
31-Jan
1-Mar
31-Mar
30-Apr
30-May
29-Jun
29-Jul
28-Aug
27-Sep
27-Oct
26-Nov
26-Dec
Date
Max '87 - Last Year
Average '07 - '16
Yr2017
1 Standard Deviation

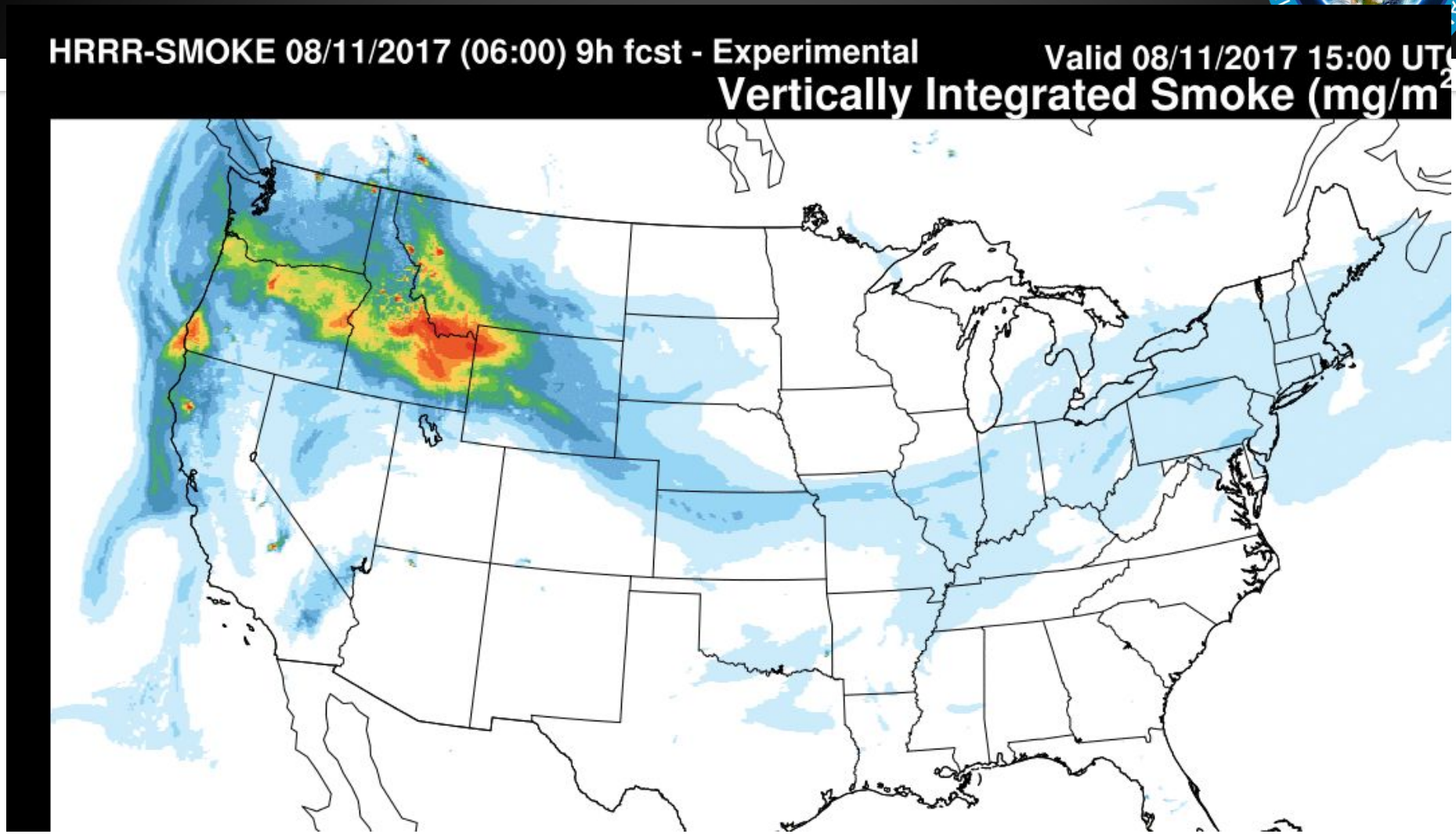

Qualified IMETs on Assignment per Day
Number of IMETs on Assignment
50
45
40
35
30
25
20
15
10
5
0
1-Jan
1-Feb
3-Mar
3-Apr
4-May
4-Jun
5-Jul
5-Aug
5-Sep
6-Oct
6-Nov
7-Dec
Date
Max '87 - Last Year
AVG (10 yr)
Yr2017
1 Standard Deviation

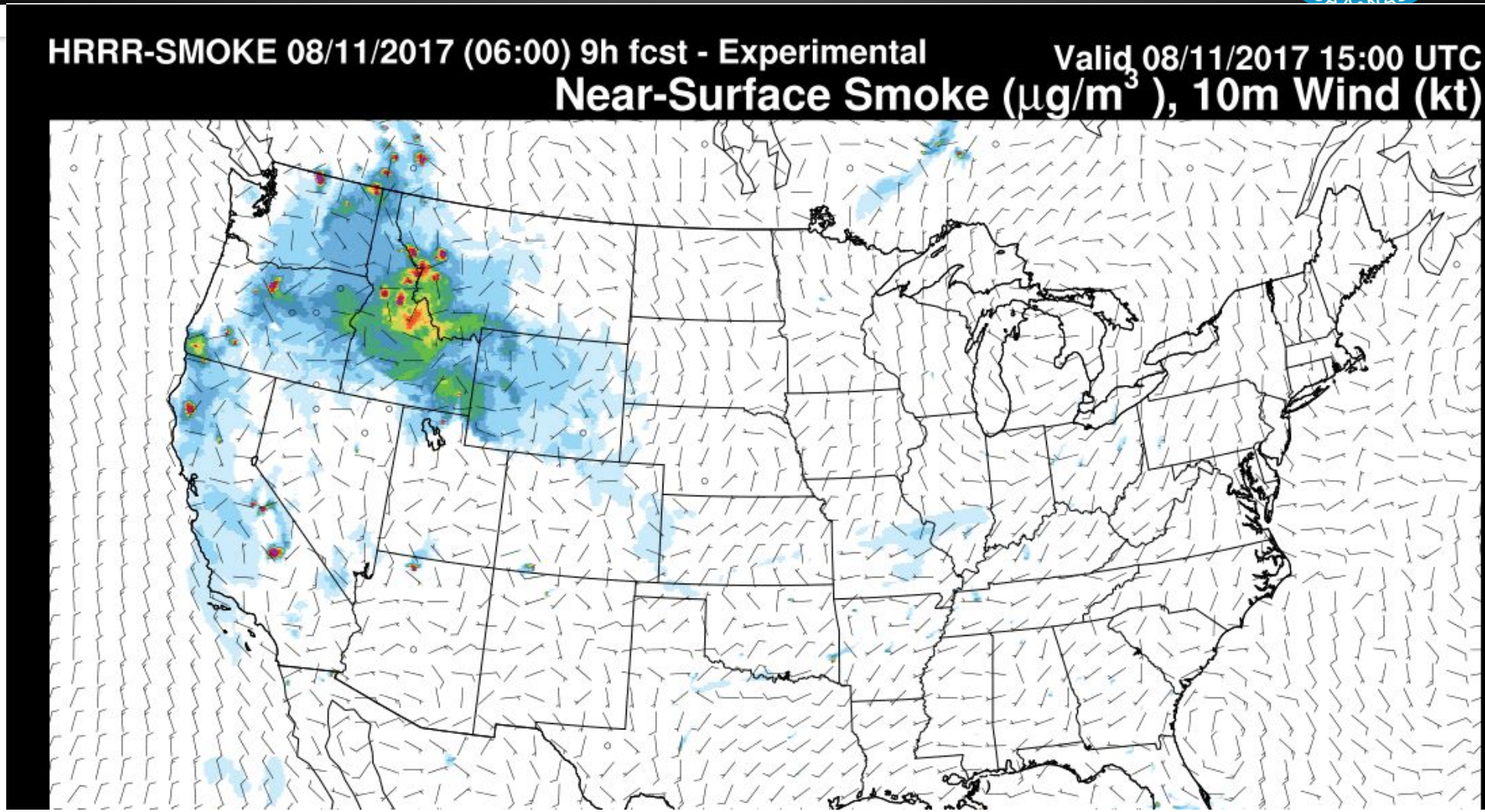


HRRR-SMOKE 08/11/2017 (06:00) - Experimental

VIIRS Fire Radiative Power (MW)



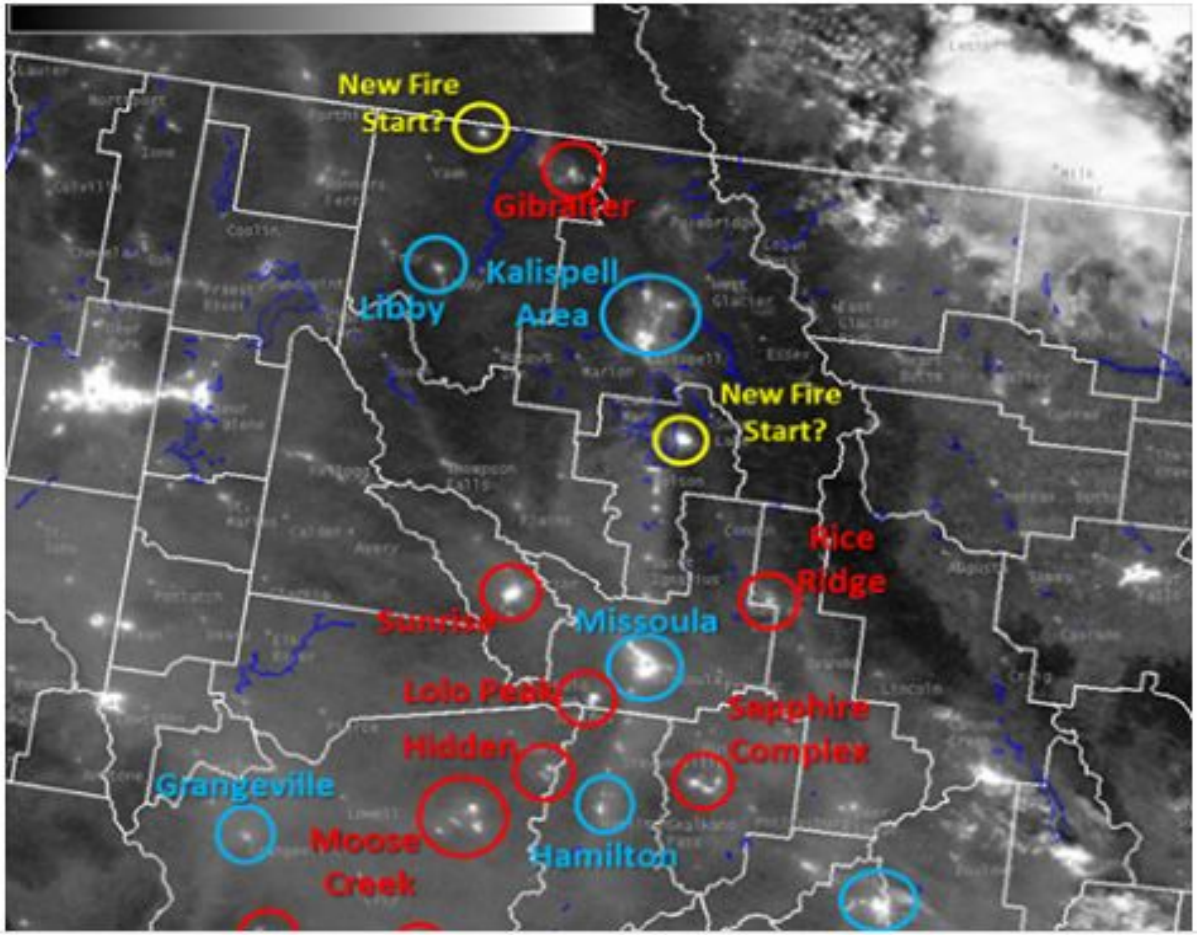

HRRR-SMOKE 08/11/2017 (06:00) 9h fcst - Experimental
Valid 08/11/2017 15:00 UT
Vertically Integrated Smoke (mg/m


HRRR-SMOKE 08/11/2017 (06:00) 9h fcst - Experimental
Valid 08/11/2017 15:00 UTC
Near-Surface Smoke (μg/m3), 10m Wind (kt)

US National Weather Service Missoula Montana

Yesterday at 5:59am

Both the city lights (blue circles) and visible light energy from active wildfires (red circles) were visible early this morning on the #VIIRS day/night band. Even think it shows a few possible new fire starts too (yellow circles).



FIRESCIENCE.GOV

Research Supporting Sound Decisions

Facebook Twitter Website LinkedIn Email

Wildland fire smoke health effects on wildland firefighters and the public

FRP Issues

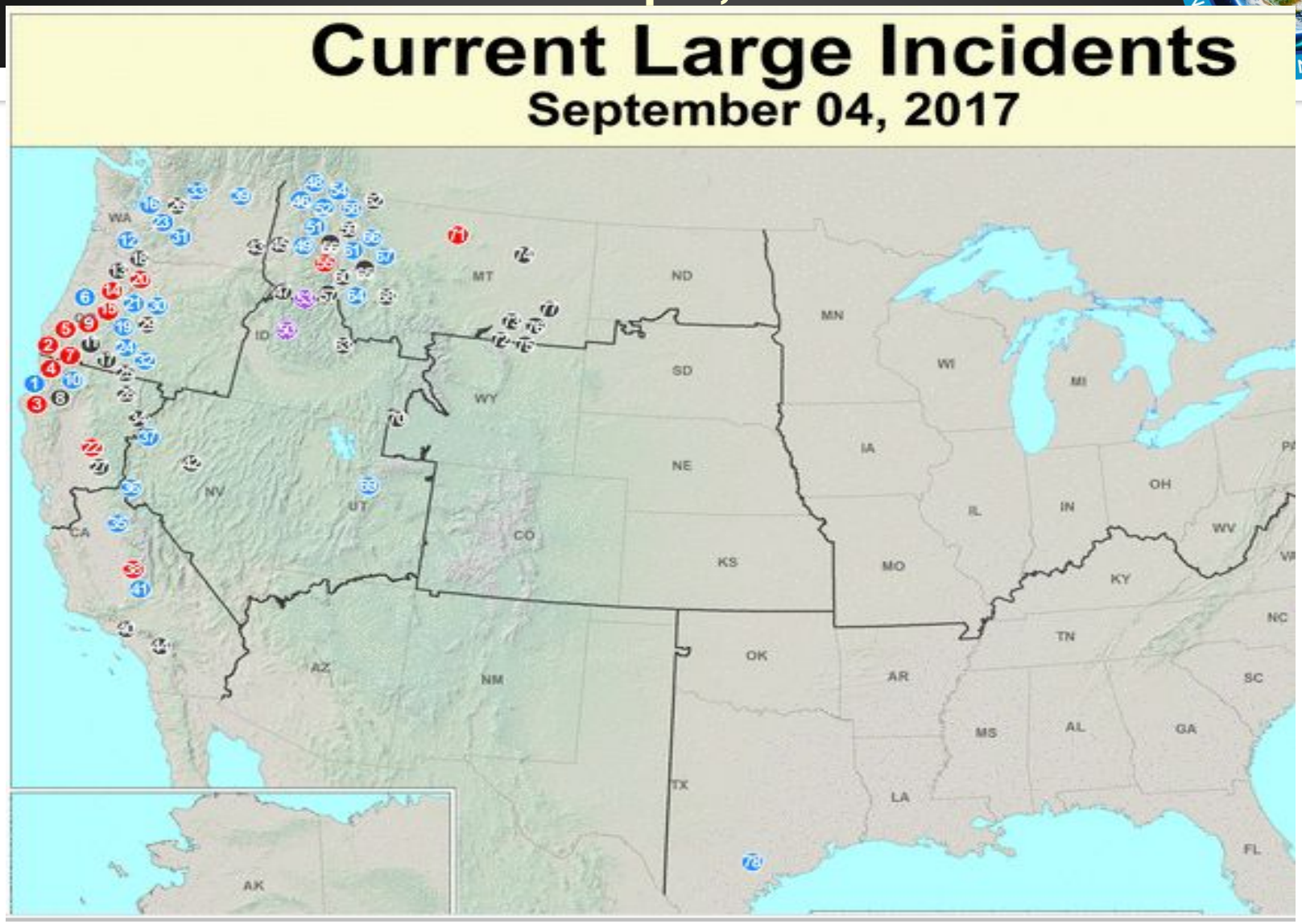
FRP does not always provide consistent behavior – especially for small fires -- timing from JPSS alone is problematic due to pass intervals

Fires pulse and evolve – but there are detection issues with FRP that need further work

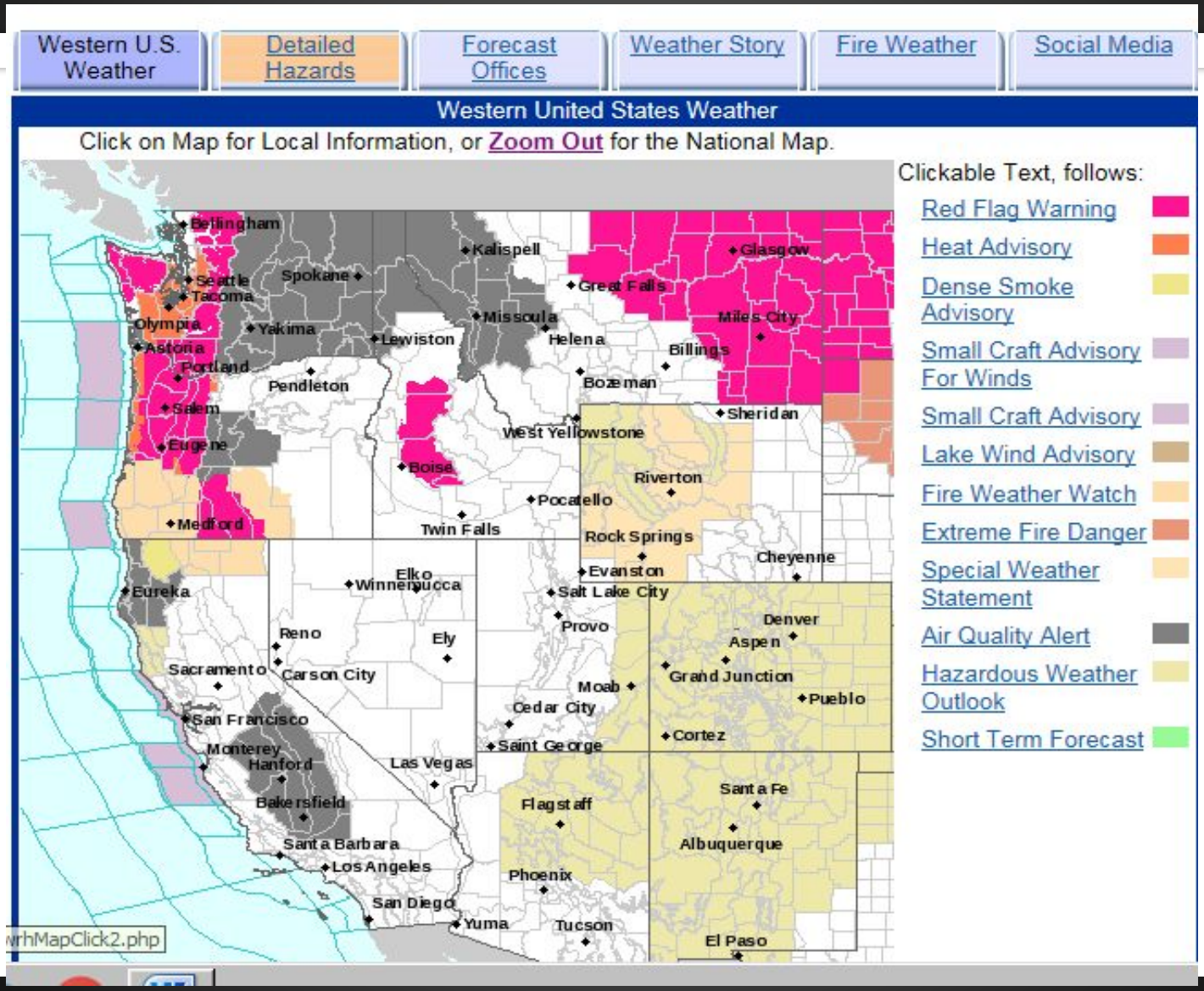
Enterprise FRP – working for GOES-16??

Comments from WFOs

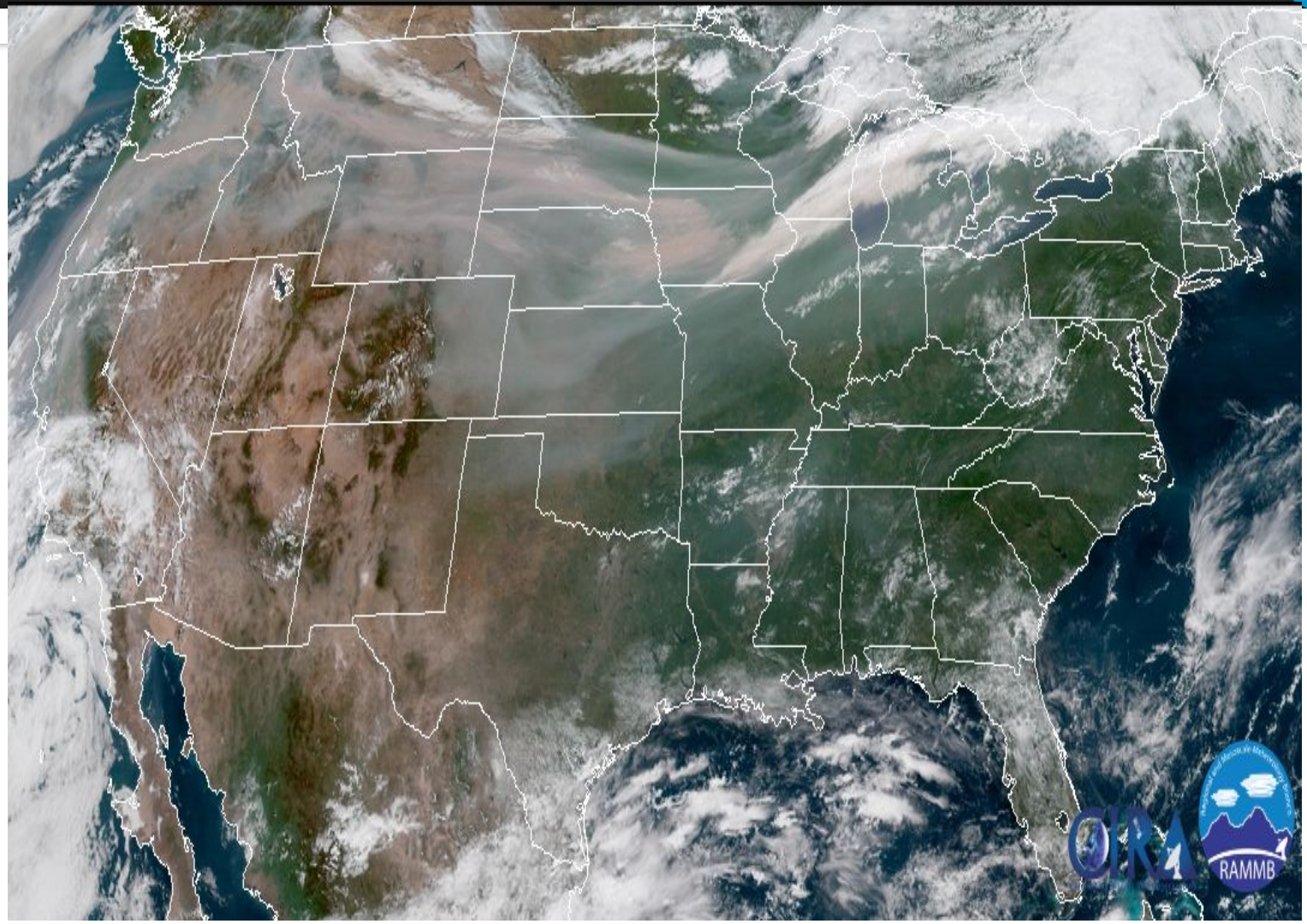
NWS Western Fire Activity
Valid Sep 4, 16z



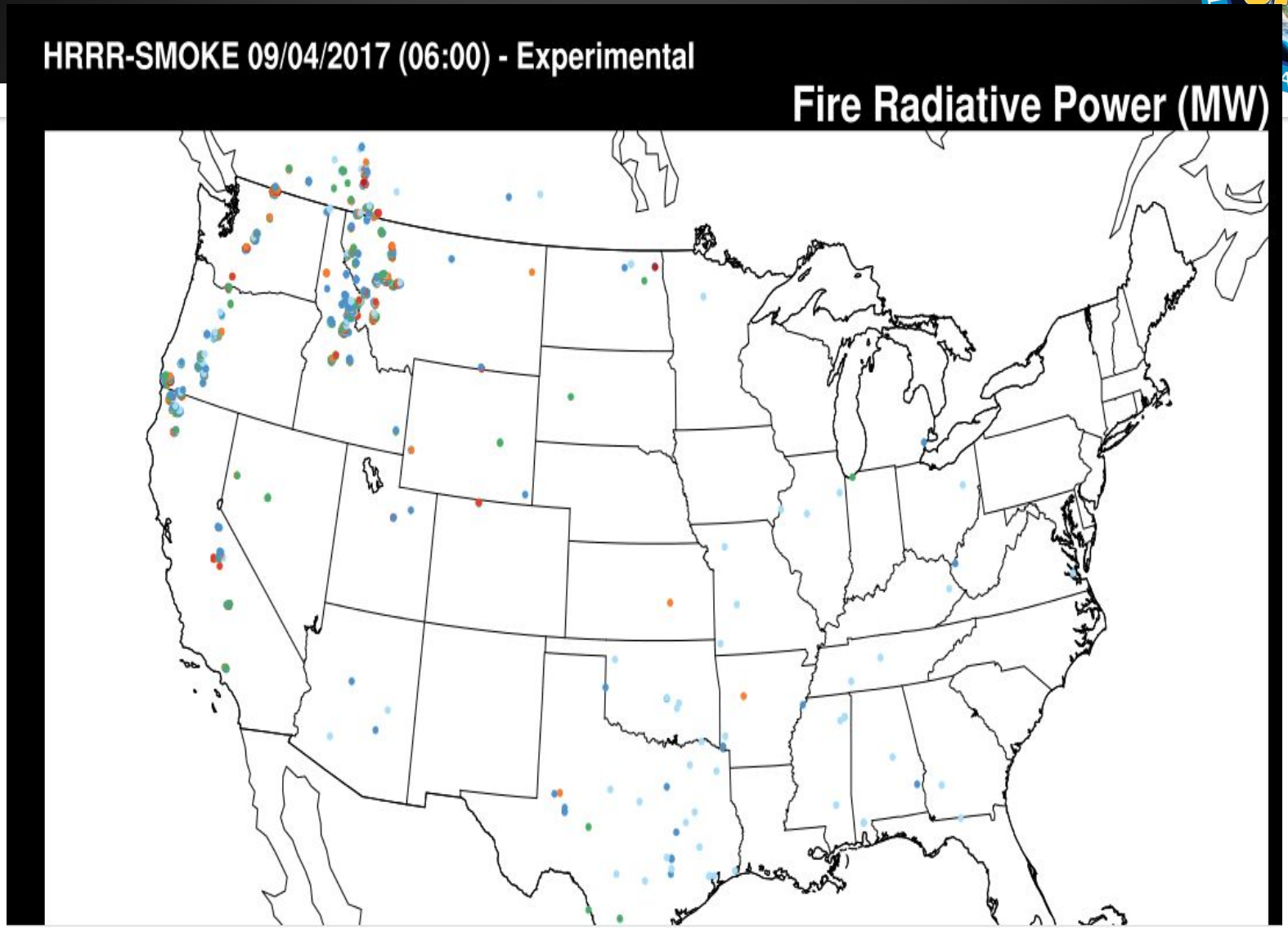
NWS Forecast
Valid approx Sep 4, 16z



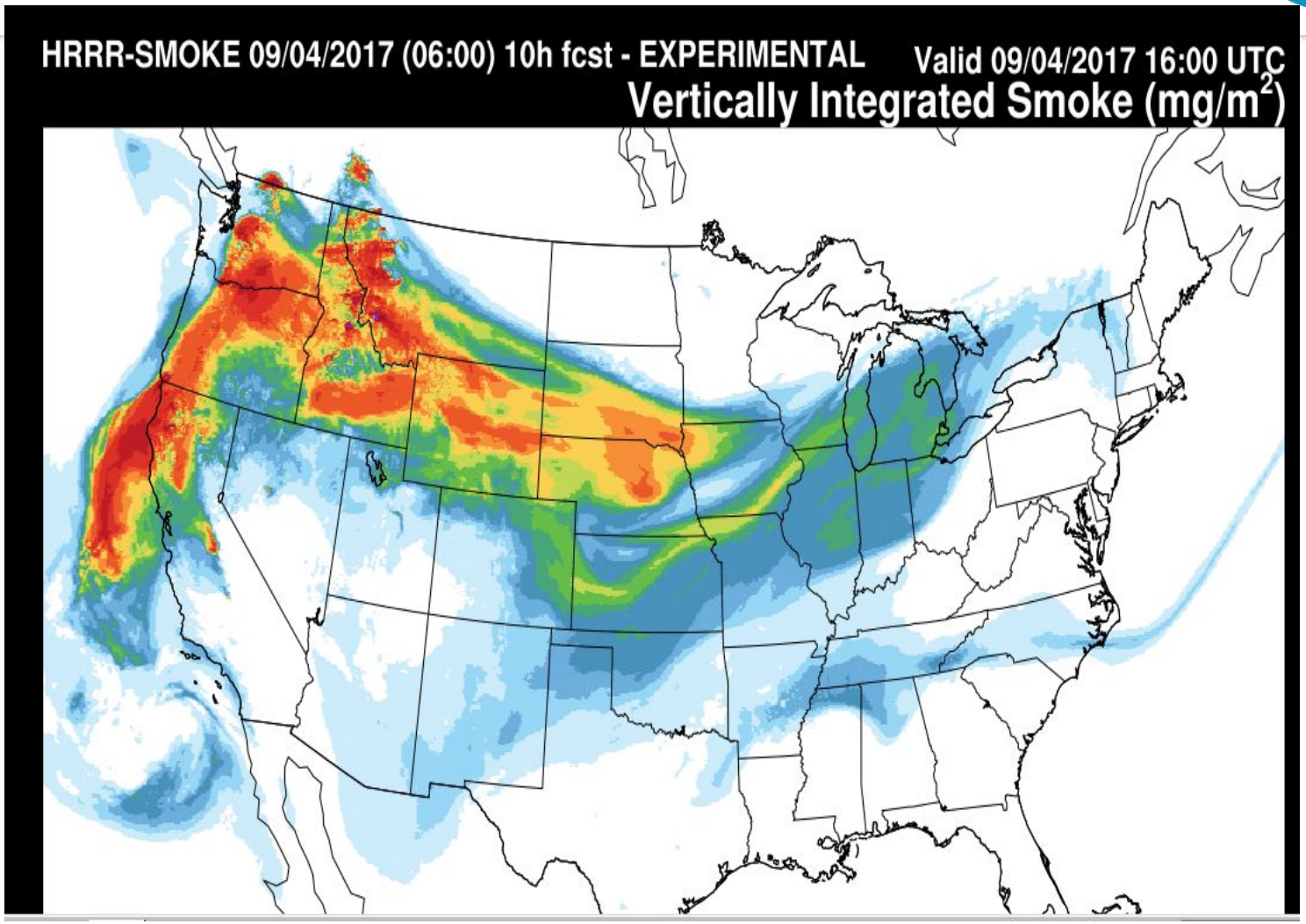
GOES-16 CIRA Goe-Color
Valid at Sep 4, 06z approx 16Z



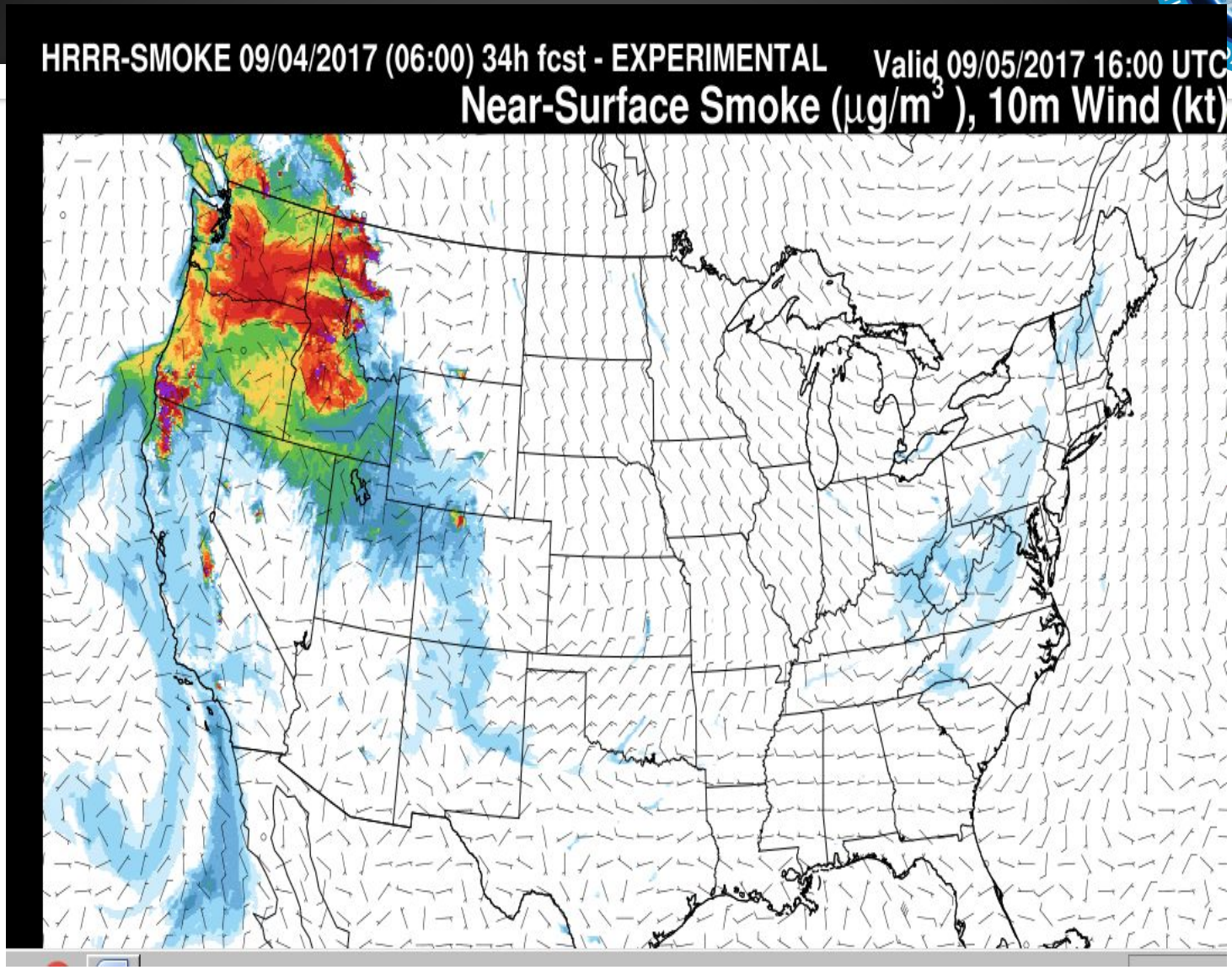
HRRR Smoke run on Sep 4, 06z



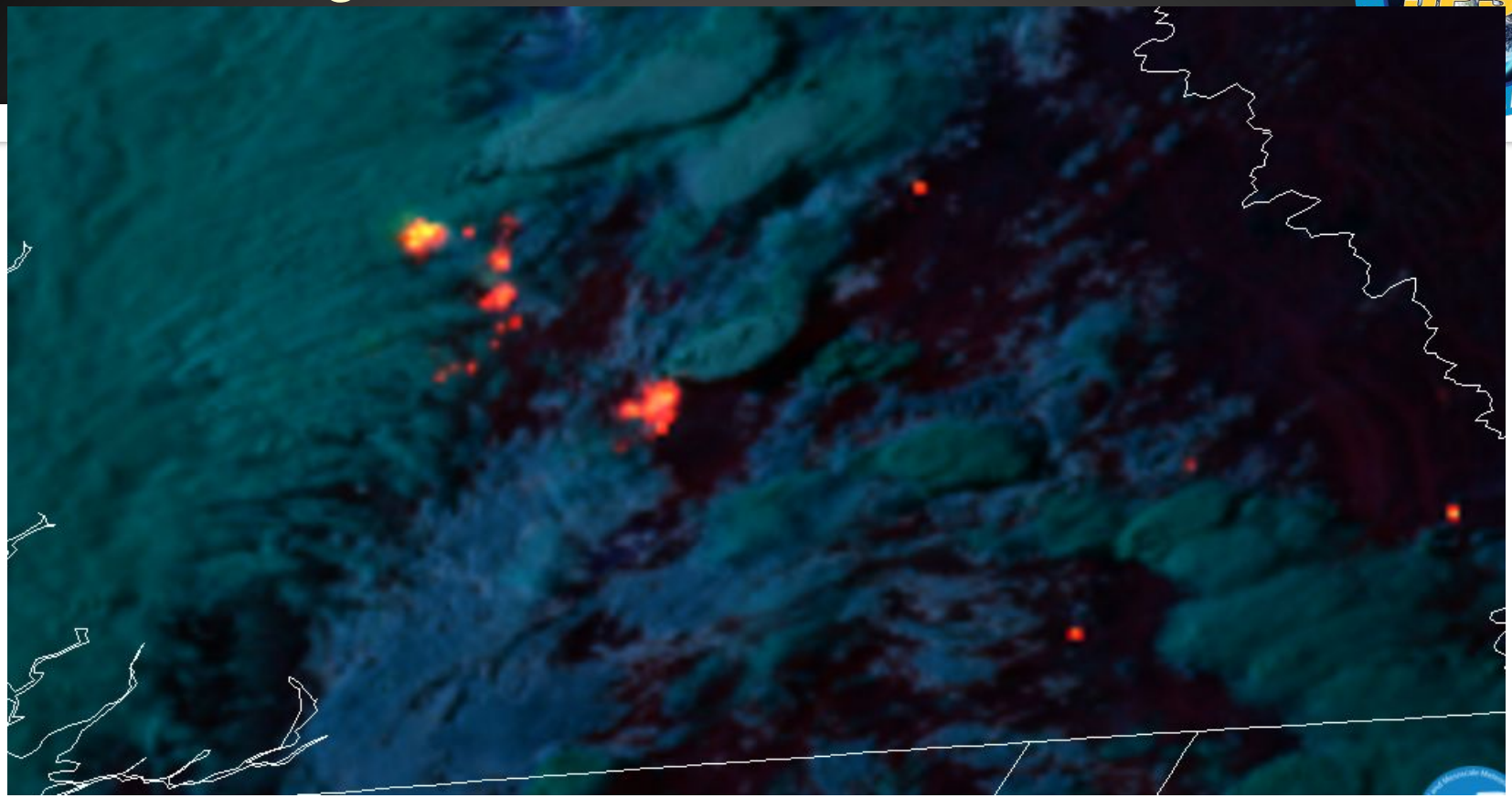
HRRR Smoke run on Sep 4, 06z
Forecast valid at 16Z



HRRR Smoke run on Sep 4, 06z
Forecast valid at 16Z



BC Fires Aug 12



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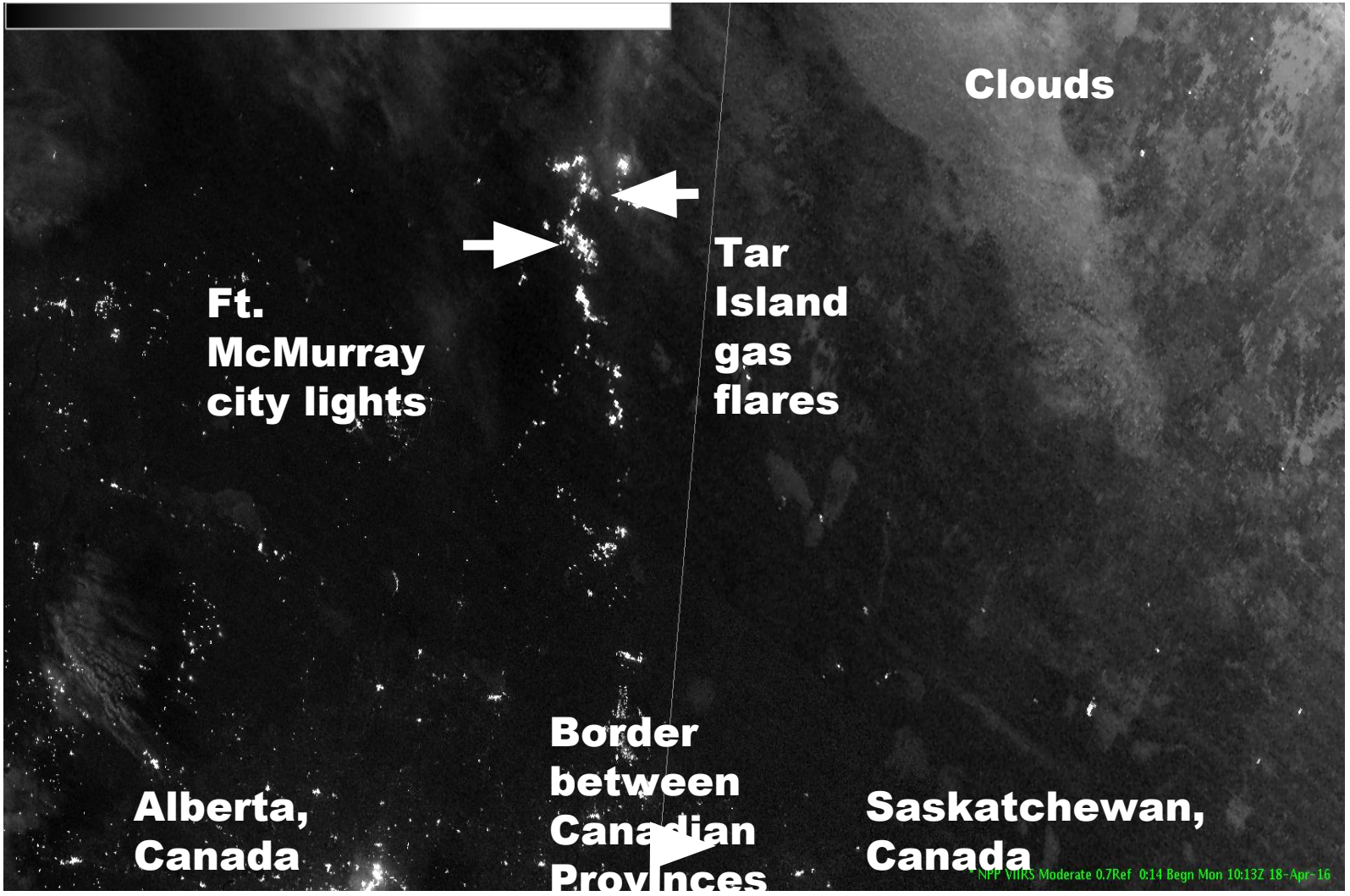
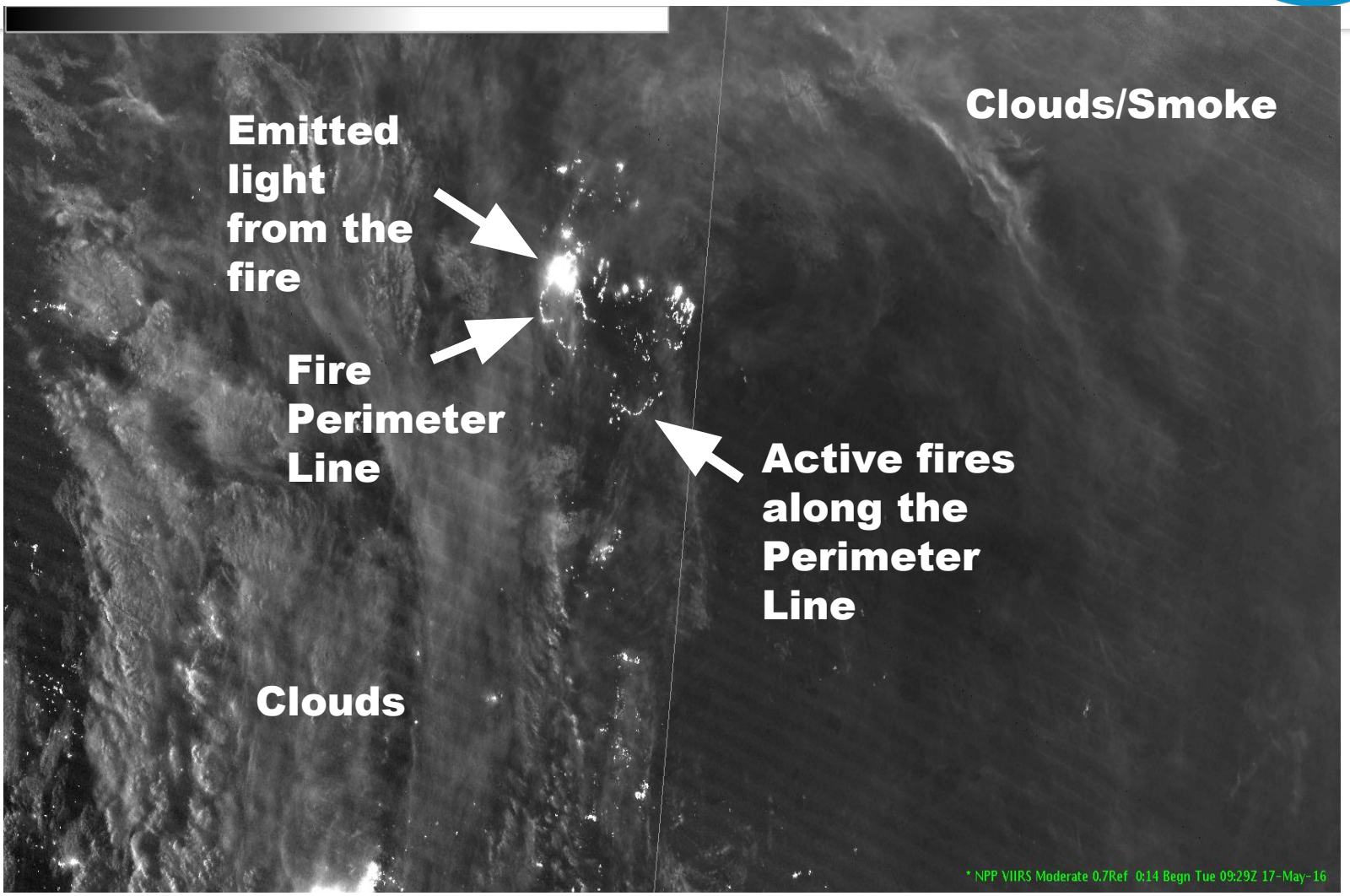
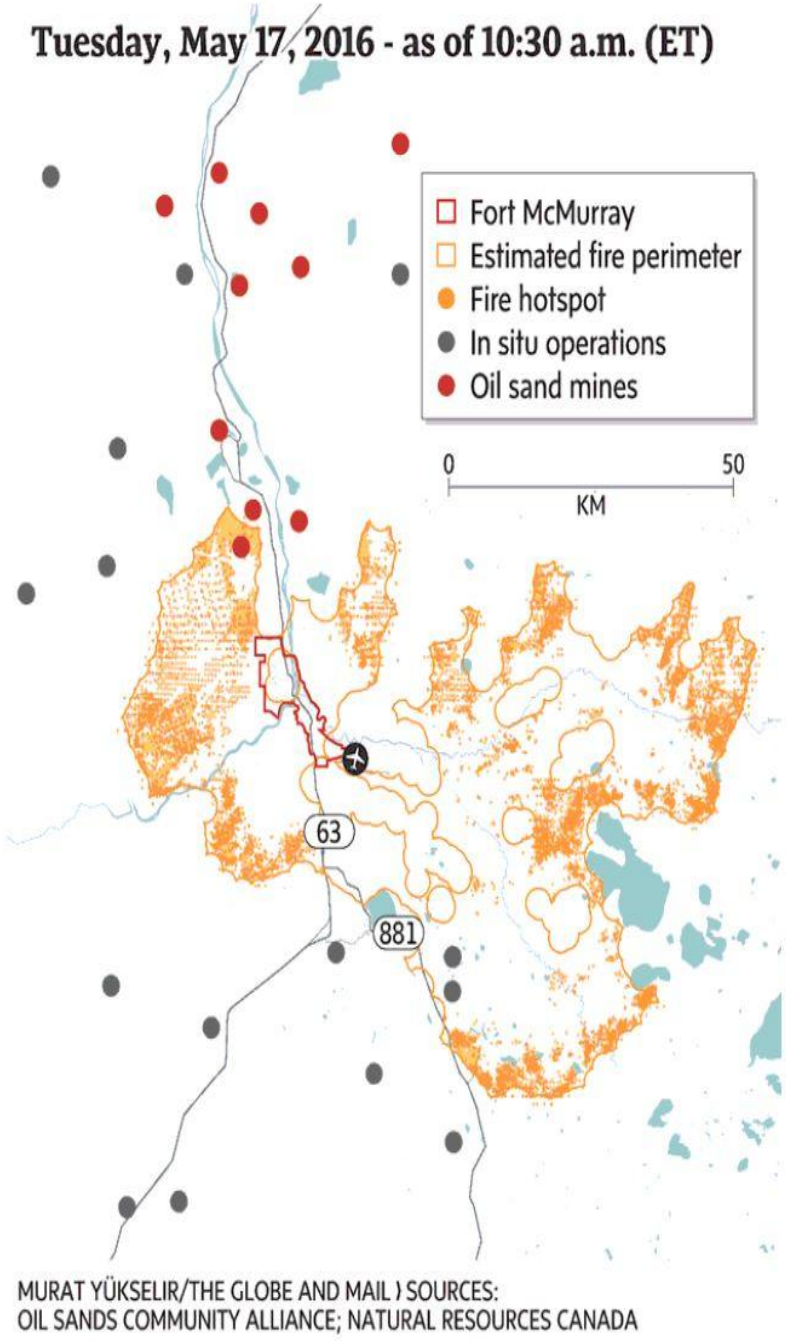
Fort McMurray Fire

Suomi NPP IMAGERY - Before the fire

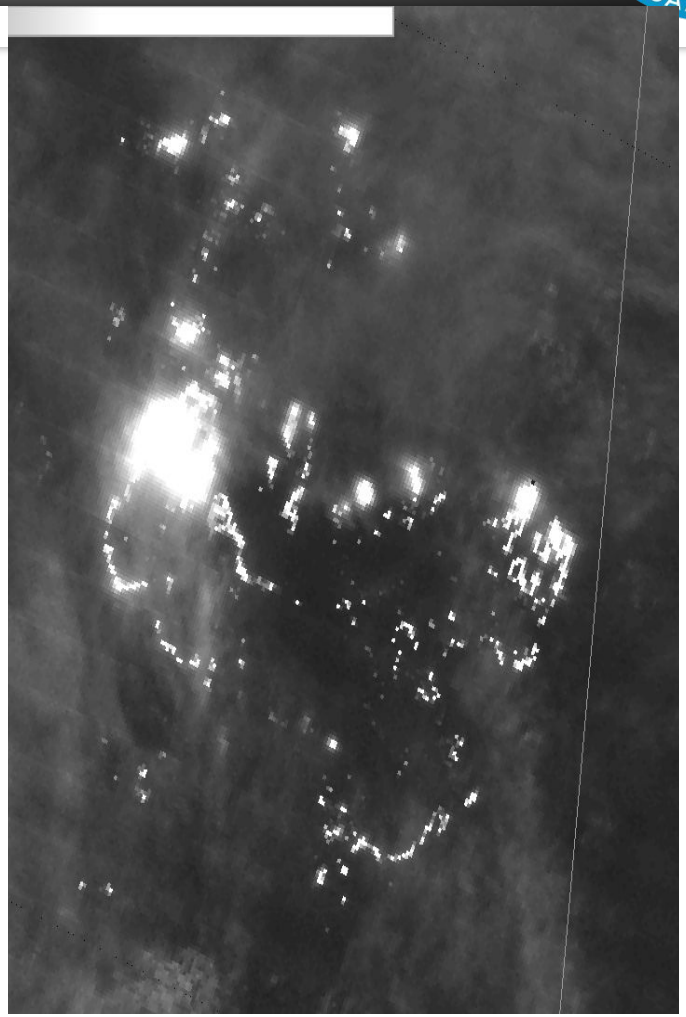


Suomi NPP Imagery of Ft McMurray Wildfire
7 May at 0930 UTC



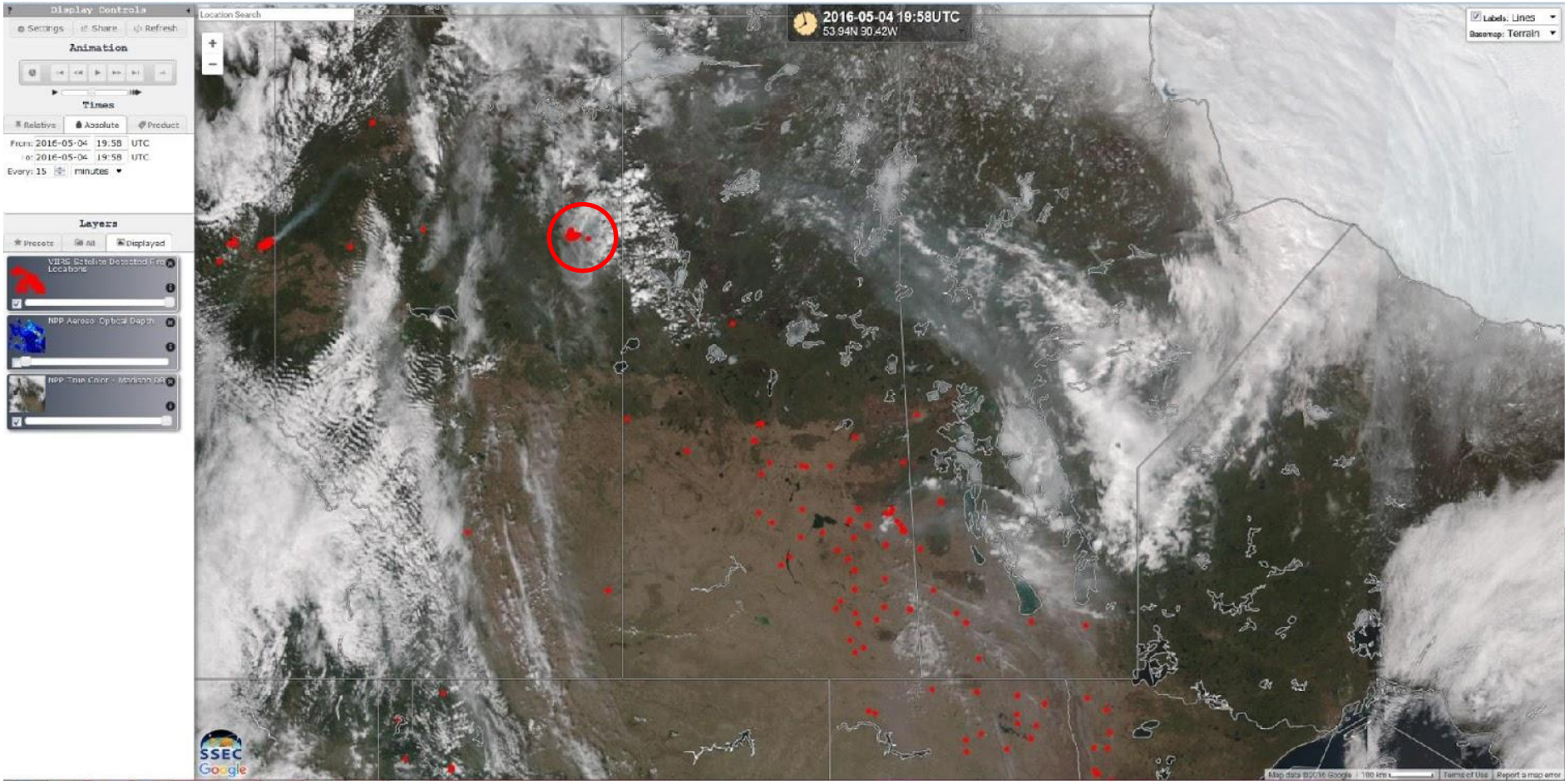


NCC Imagery 17 May 2016
at 0929Z (i.e., 05:29 a.m. ET)

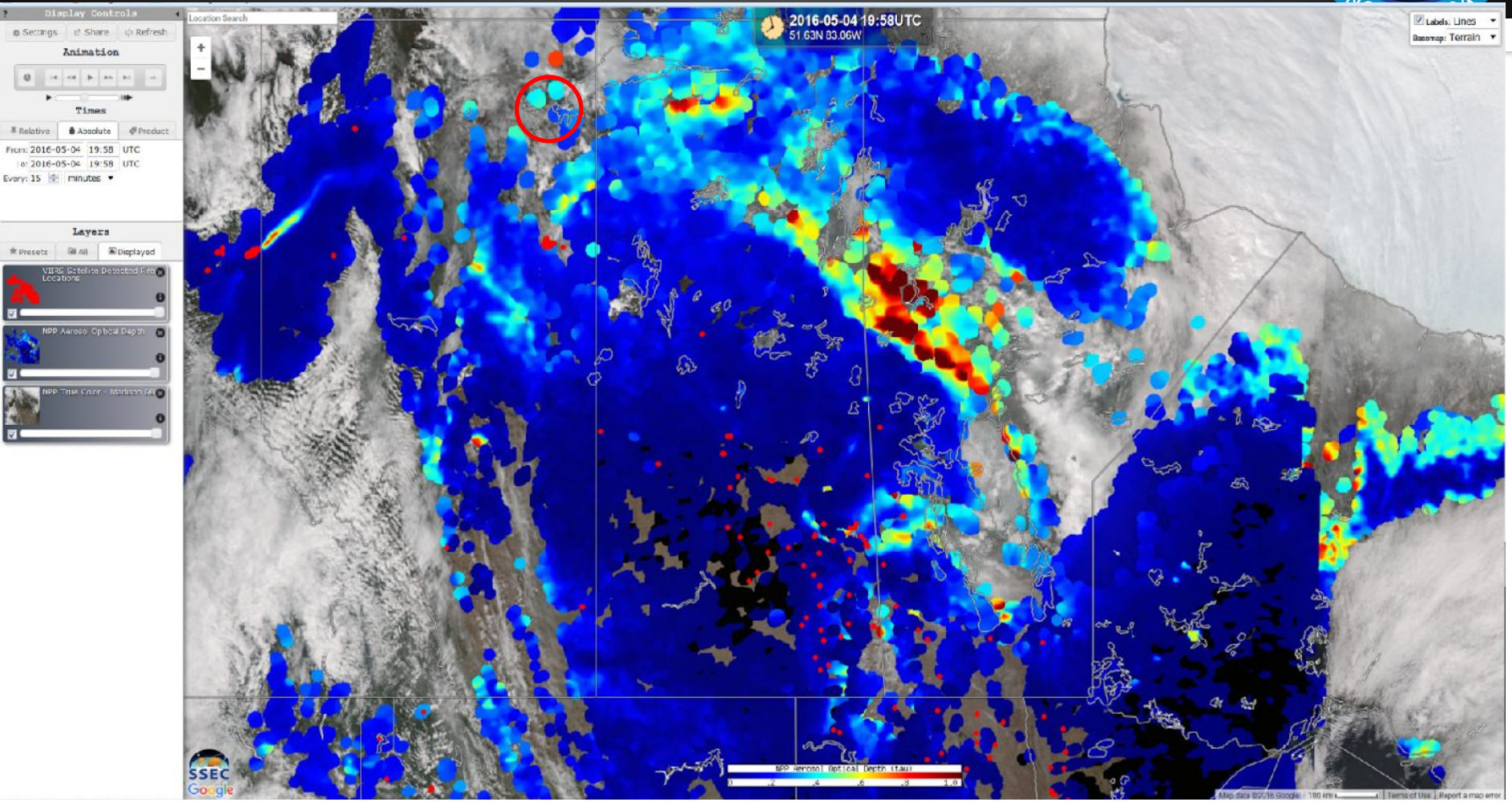


COMPARISON BETWEEN ESTIMATED FIRE PERIMETER AND NCC IMAGERY

RealEarth Image May 04, 2016
VIIRS Fire Detection and True Color Composite
Fort McMurray Wildfire Smoke Plume

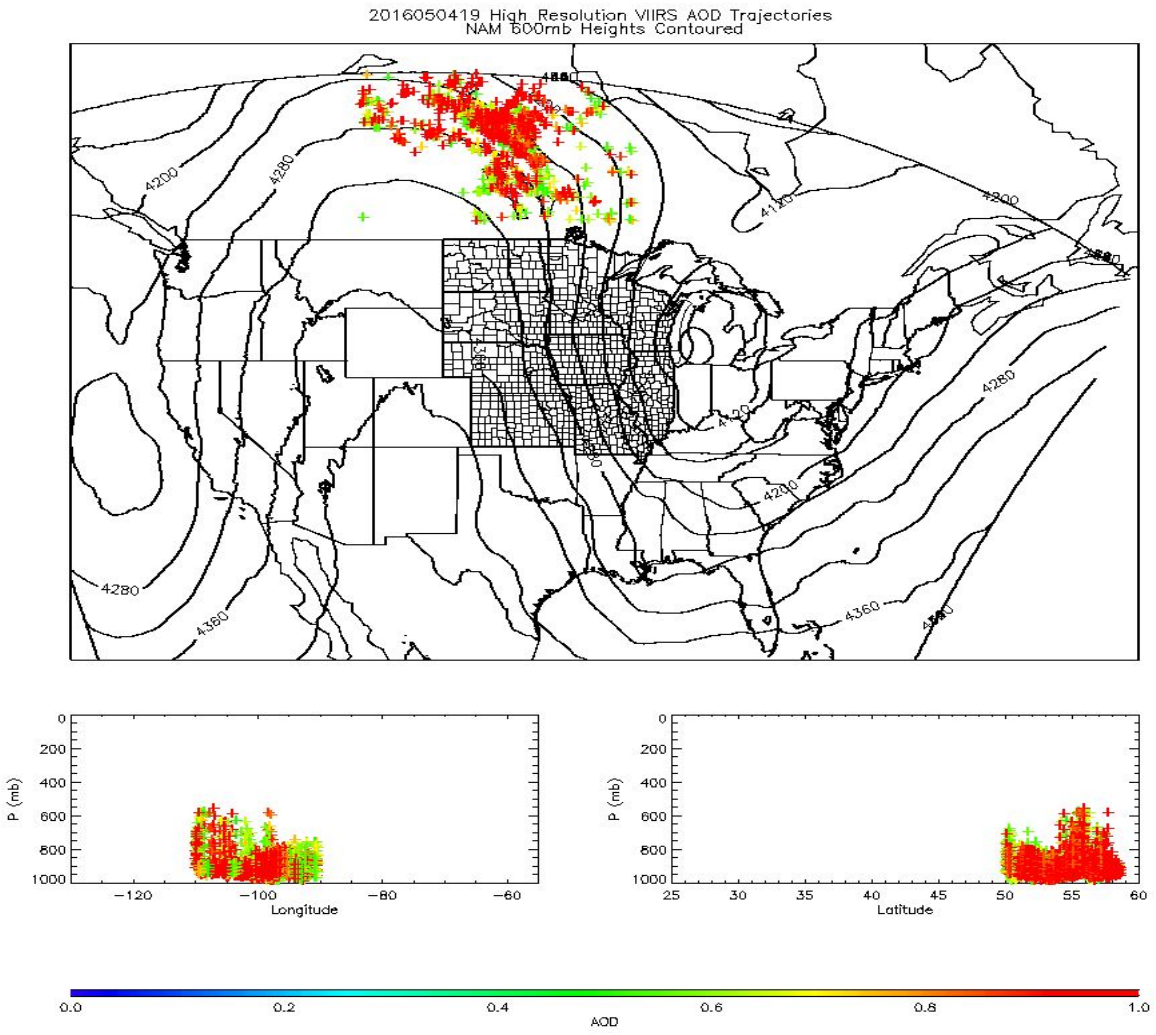


RealEarth Image May 04, 2016
VIIRS Fire Detection, True Color composite and AOD
Fort McMurray Wildfire smoke plume

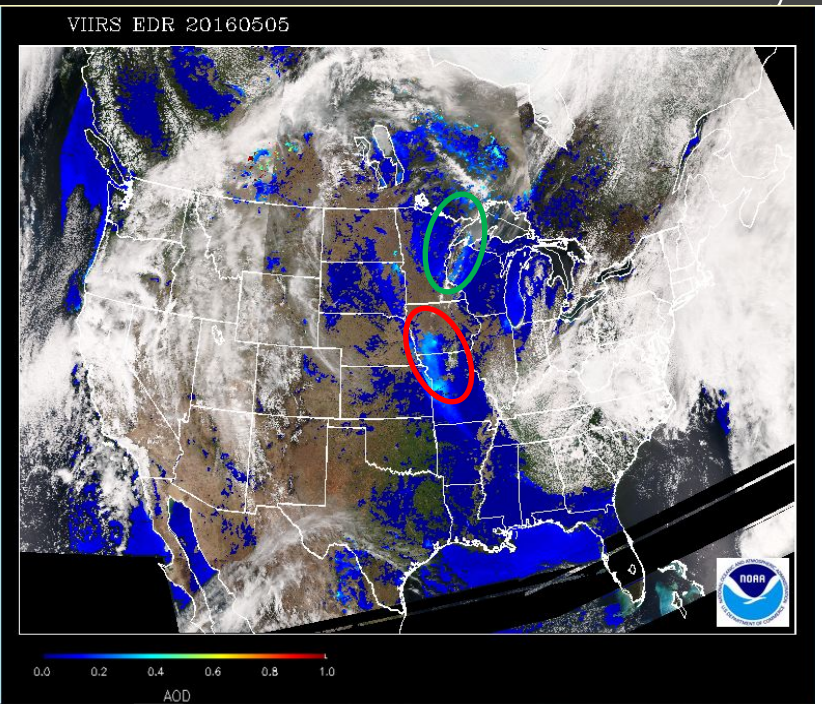


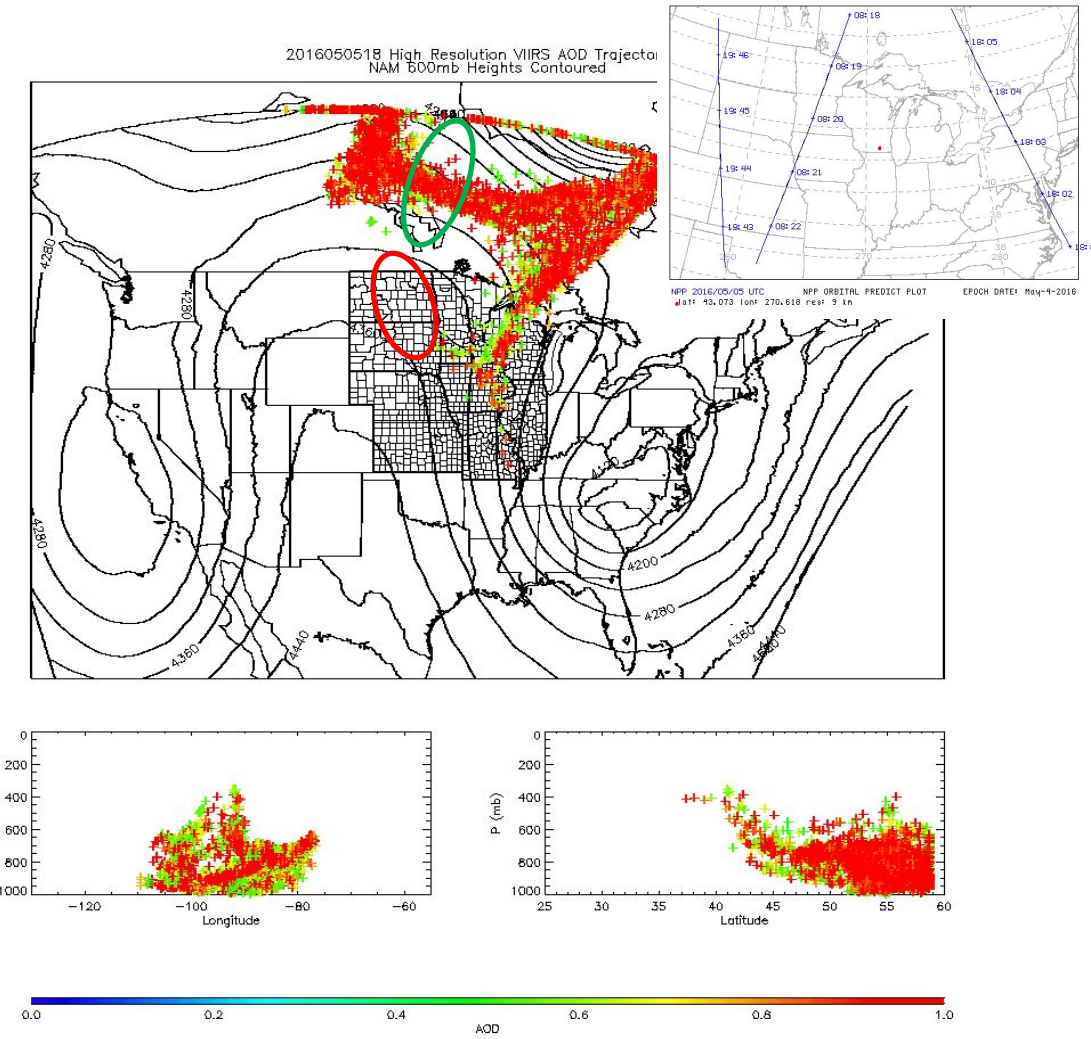
IDEA-I High resolution (NAM 3km) Trajectory Forecast
Fort McMurray Wildfire
May 04, 2016

- **IDEA-I high resolution trajectory forecast colored by initial AOD**
- **Upper panel shows NAM 600mb heights and precipitation (purple)**
- **Lower panels show longitude and latitude cross sections**
- **Only AOD>0.5 initialized**



IDEA-I High resolution (NAM 3km) Trajectory Forecast
Fort McMurray Wildfire
May 05, 2016





- **May 05, 2016 VIIRS AOD shows plume along MN/WI and IA/MO boarders**
- **IDEA-I high resolution trajectory forecast predicts southern extent too far east**

questions