JPSS Proving Ground Project "Fire and Smoke Initiative"

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NOAA/NESDIS

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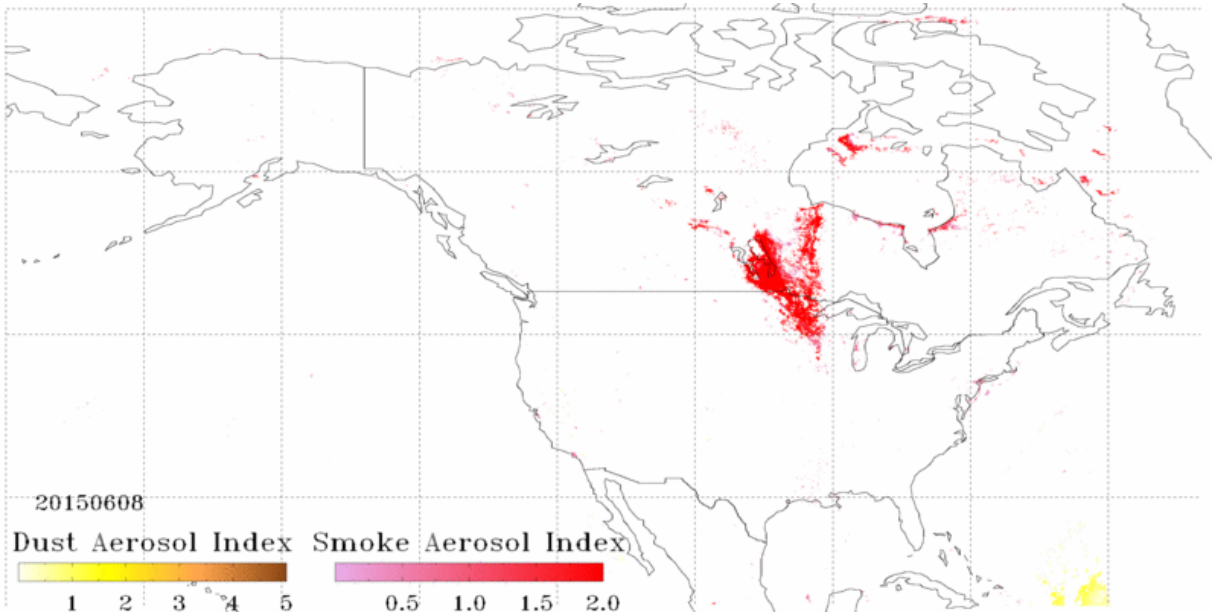
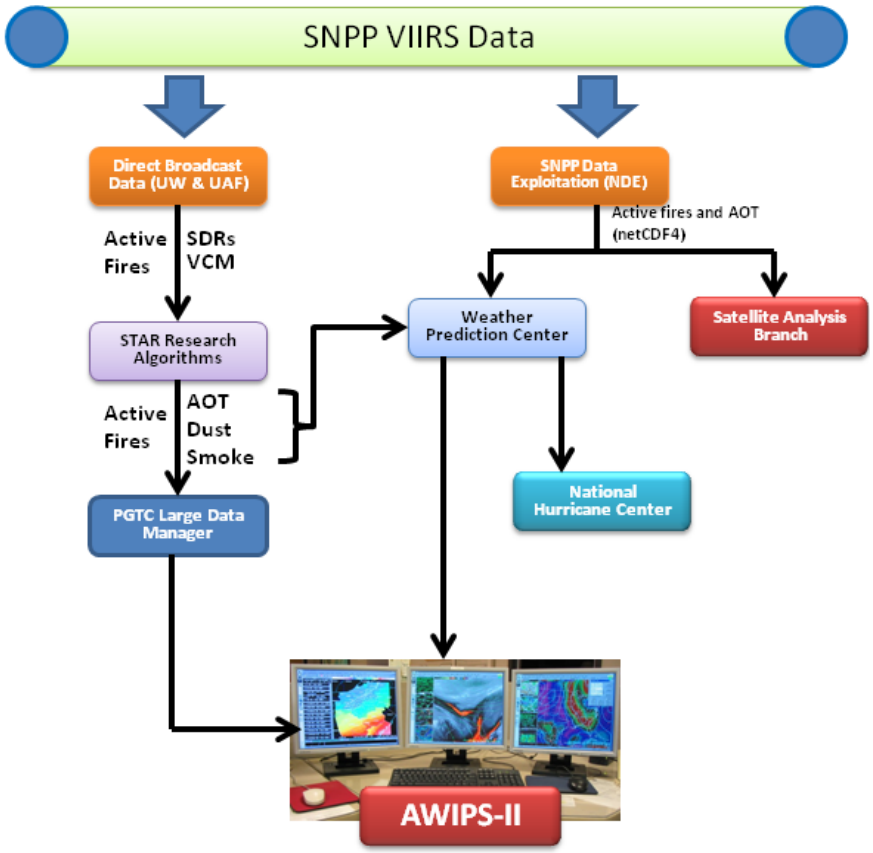


Objective

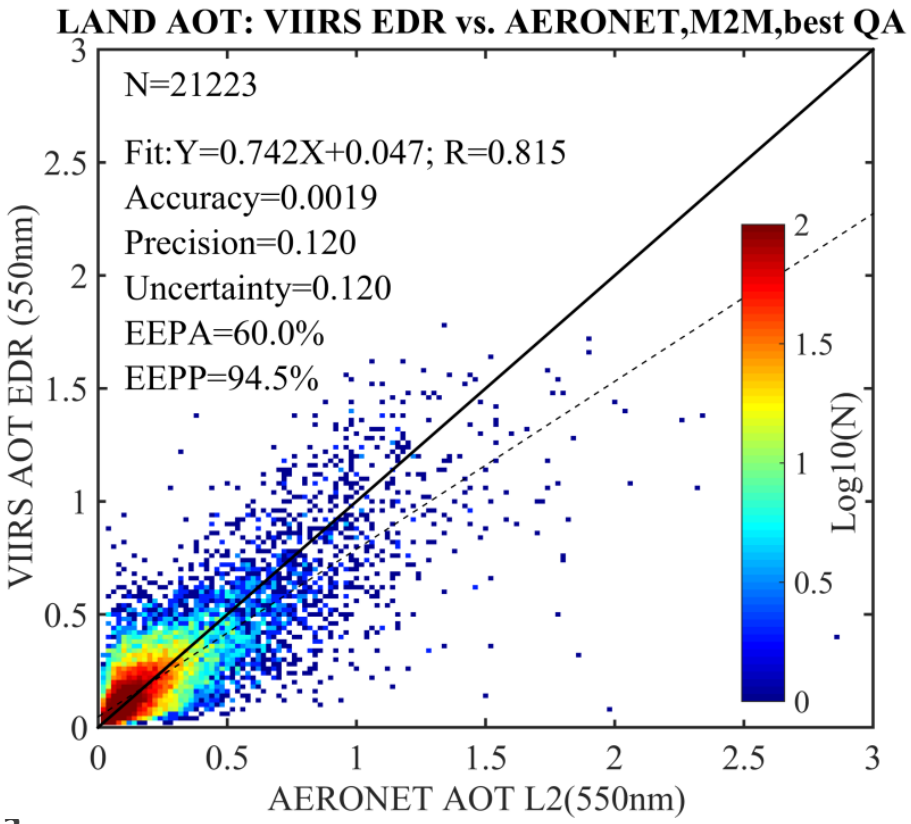
- **To quantify key socio-economic impacts of fires and smoke using SNPP VIIRS products.**
- **To enhance product distribution generated from SNPP VIIRS direct broadcast (DB) data for CONUS and Alaska for targeted regions to end users.**
- **To port SNPP VIIRS fire and aerosol products into AWIPS-II in collaboration with University of Maryland Proving Ground and Training Center (PGTC).**

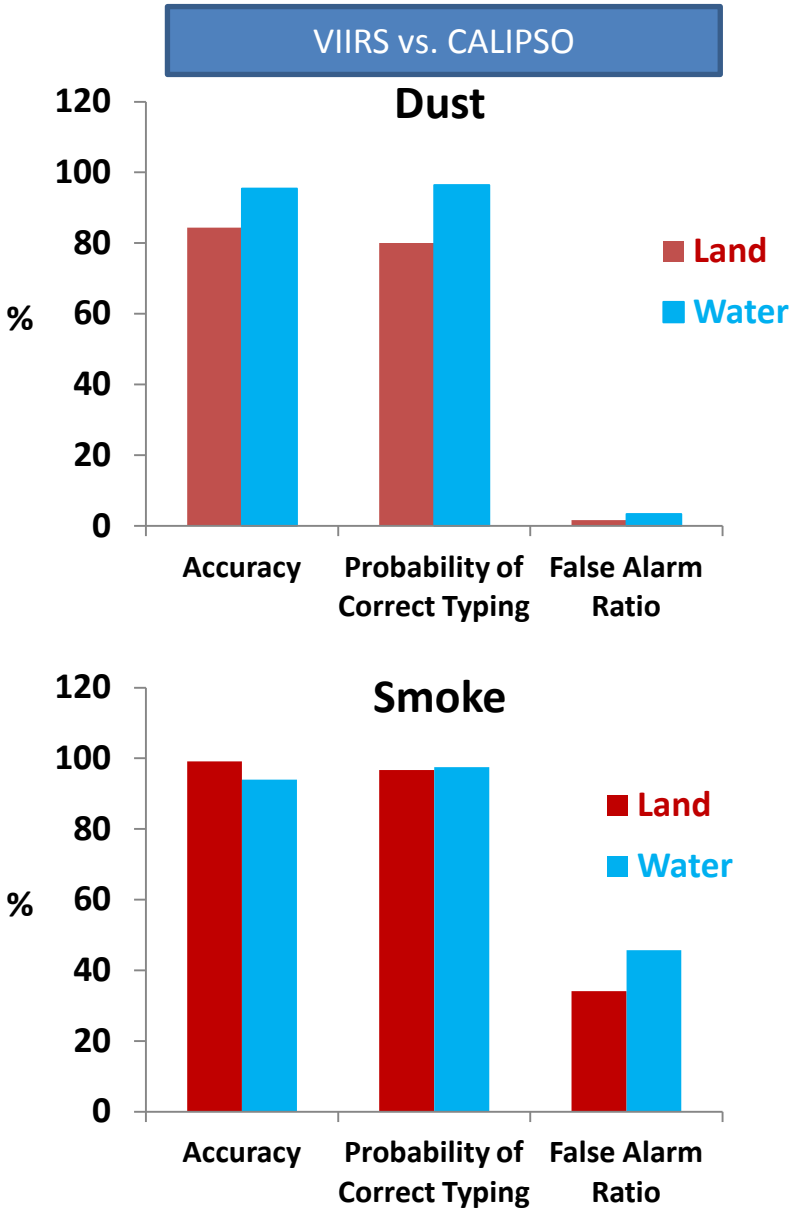


PGTC lead is Scott Rudlosky

AOT (within IDPS) and smoke/dust mask (Direct Broadcast data and within NDE by January 2016) are well validated and at a mature stage.

Courtesy of VIIRS aerosol cal/val team





Wildfires have detrimental effect on human health and economy: May 2014 San Diego Fires as a specific example

Smoke can be seen rising from the 8,000-acre Pulgas Fire on Camp Pendleton on May 16, 2014. San Diego-area fires prompted a smoke advisory in areas to the north. (Credit: KSWB)

Estimated Cost to Local Governments of Responding to Fires

Agency	Estimated Cost* (millions)
County of San Diego	$3.9
City of Carlsbad	$12.5
City of San Marcos	$10.4
City of San Diego	$1.3
Other Agencies	$0.4
Total	**$28.5**

*Estimated costs represent revised estimates submitted to the State of California Office of Emergency Services. Initial cost estimates of $27.9 million were later revised to include the County's cost of debris removal.

http://www.readysandiego.org/aar/may-2014-san-diego-county-wildfires/May-2014-San-Diego-County-Wildfires.pdf

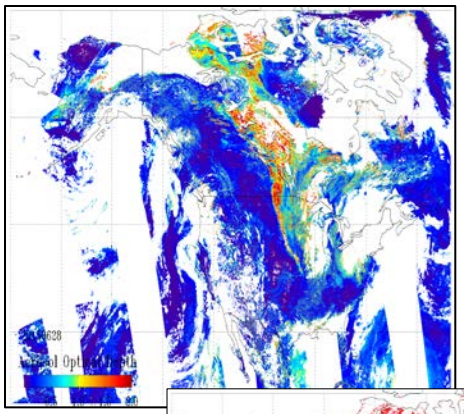
14 fires
26,000 acres burned
149,000 evacuation orders
65 structures damaged
$29.8 million loss to private property owners

SNPP VIIRS Products in Near Real Time

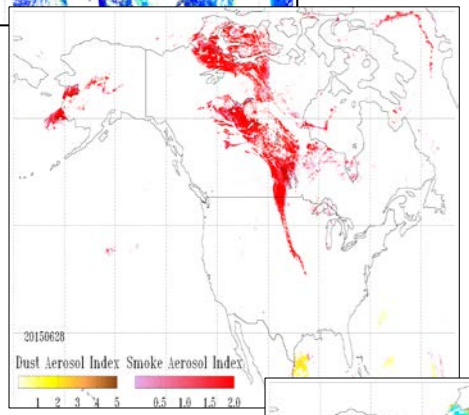
1. Fire hot spots
2. Area burned
3. Smoke aerosols
4. Air Quality Index

Operational decision making process by multiple federal, state, and local agencies : is there a significant smoke associated with a fire, where is the smoke now and where is it headed, how bad is the air, should hospitals be evacuated, should roads be closed etc.

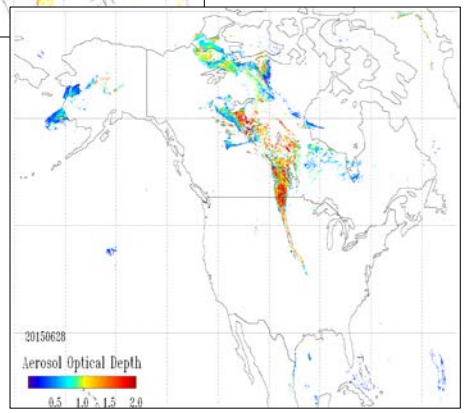
Value Added SNPP VIIRS Aerosol Products



Quantitative Retrieval of "Aerosol Optical Thickness"
Jackson et al., JGR, 2014



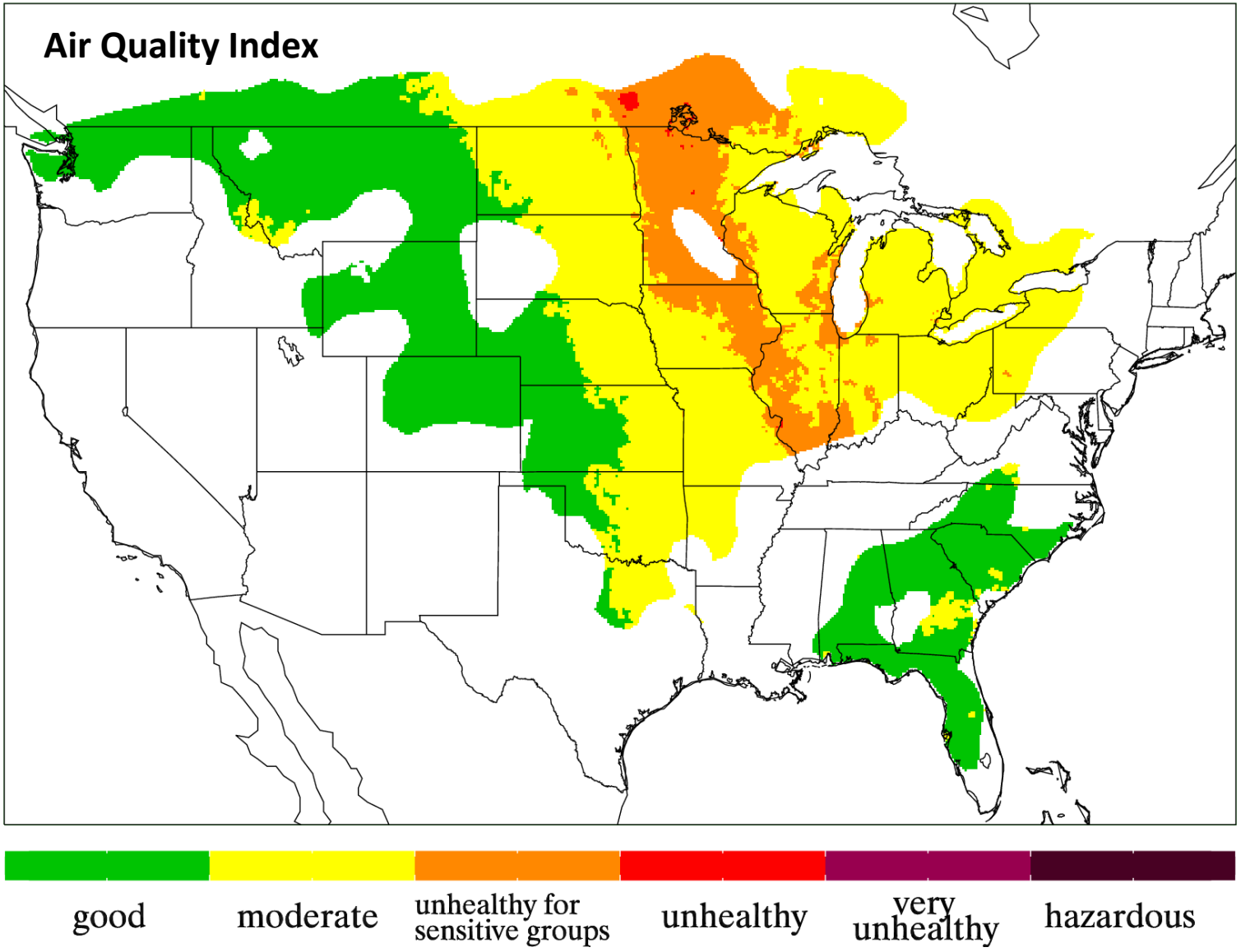
Qualitative Retrieval of "Smoke Mask"
Ciren and Kondragunta, JGR, 2014



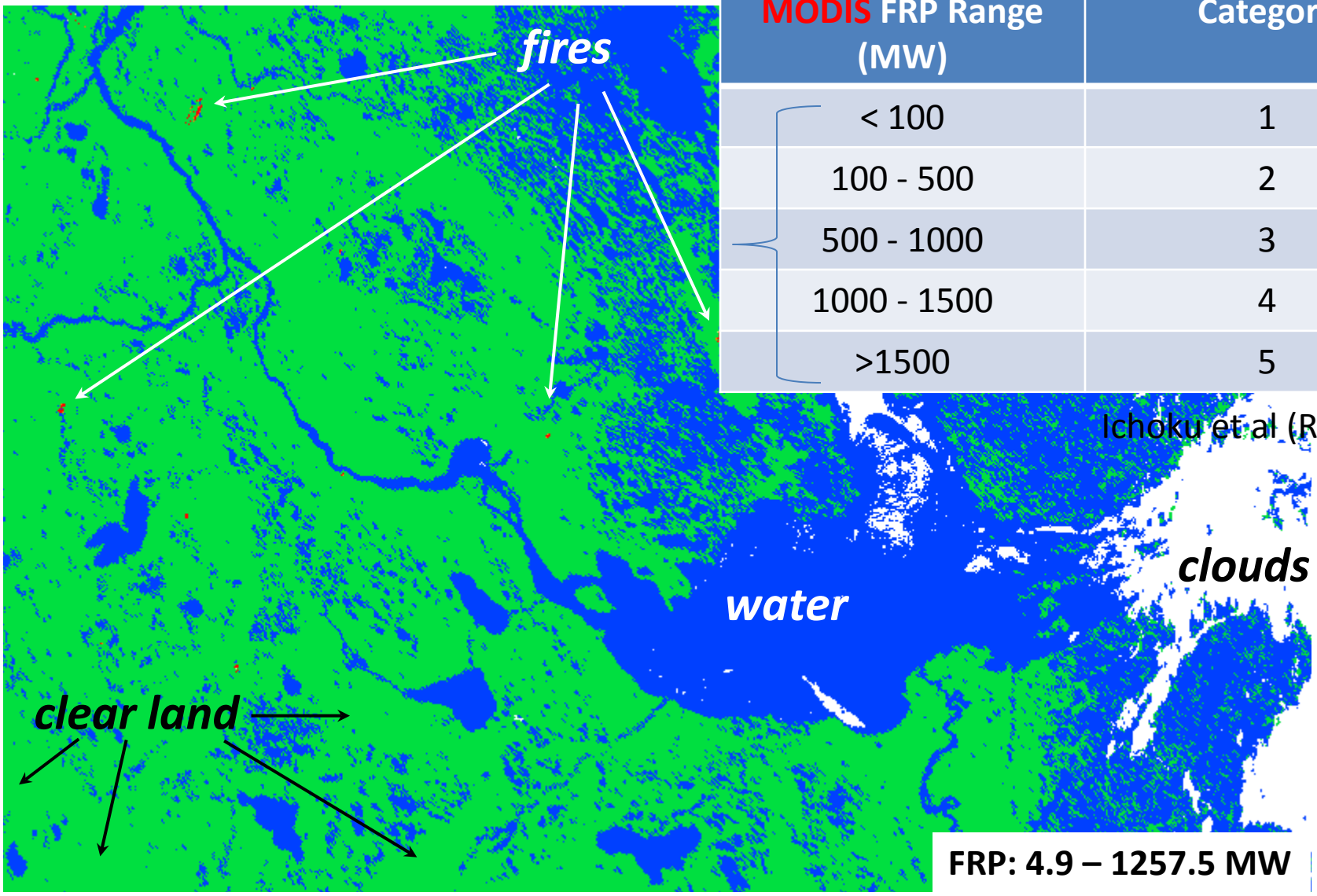
Quantitative Information of "Smoke Aerosol Optical Thickness"

- Forecast: NWS WFOs via AWIPS-II
- Mitigation: NWS IMETs via web
- Forecast guidance: NWS NCEP and other models
- Monitoring: Local, State, Federal environmental agencies

Value Added SNPP VIIRS Aerosol Products



Value Added SNPP VIIRS Fire Products



MODIS FRP Range (MW)	Category
< 100	1
100 - 500	2
500 - 1000	3
1000 - 1500	4
>1500	5

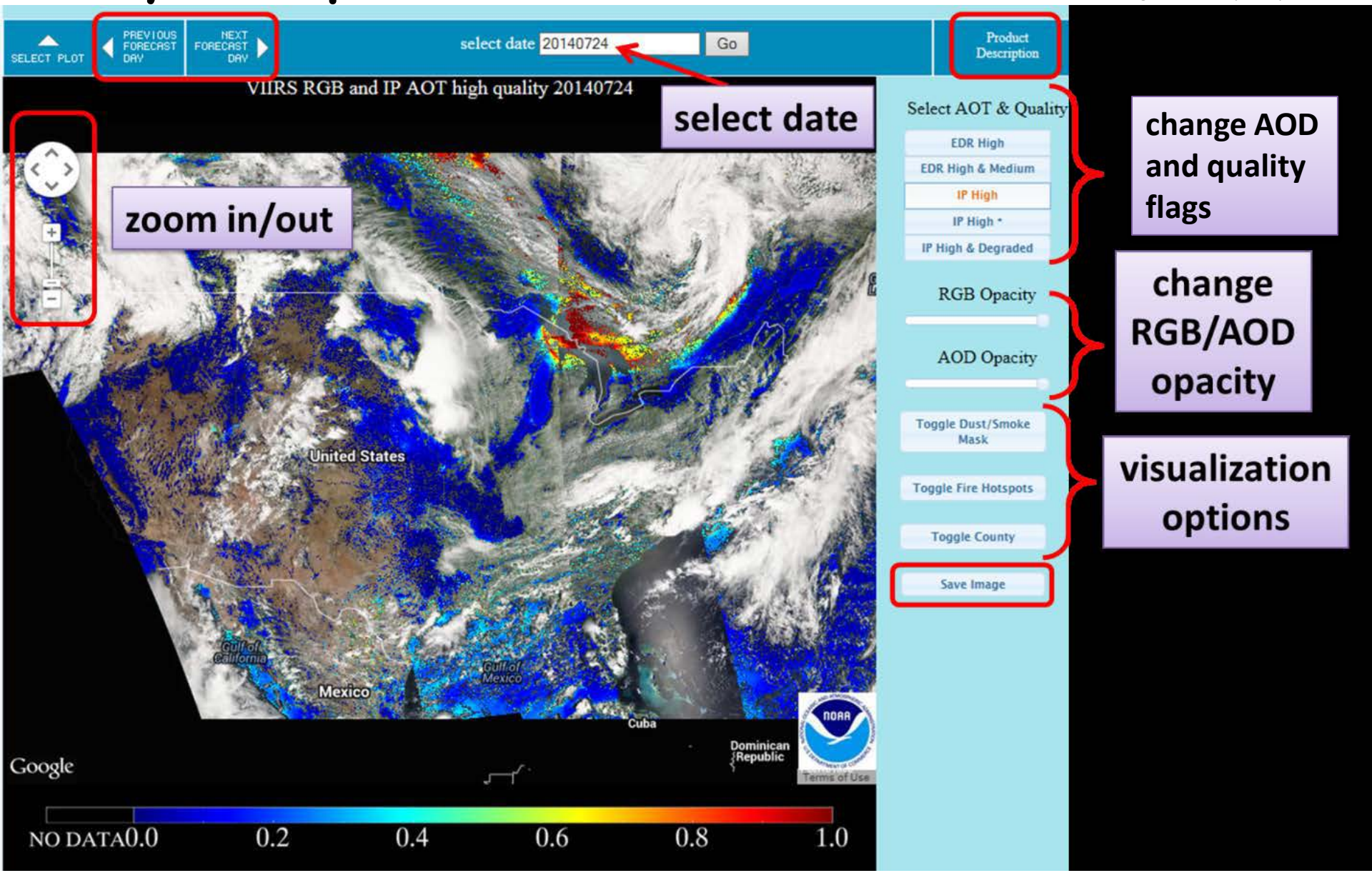
Ichoku et al (RSE, 2008)

VIIRS fire mask over NW Canada 5/29/2015 20:06 UTC

FRP: 4.9 – 1257.5 MW

VIIRS fire and aerosol products are validated and ready for operational use

www.**star**.nesdis.**noaa**.gov/smcd/spb/aq



What has been done so far…

- **Coordination with NWS Western Region, WFOs, IMETs, NWS Alaska (through GINA) to develop a roadmap in line with objectives/VIIRS products highlighted here.**

- **While many smoke forecast models exist, HRRR (High Resolution Rapid Refresh) model and an enhanced IDEA tool will be the focus for this Proving Ground (PG) fire and smoke initiative project.**

- **Ongoing discussions with PGTC to develop plug-in tools that can display VIIRS fire and aerosol products in AWIPS-II**

- **Ongoing discussions with IMETs to enhance IDEA tool to display smoke extent and transport without specifying which satellite is providing the information**
  - **Highest resolution possible**
  - **Clickable layers**
  - **Zoom capabilities**