

**Tactical Fire Remote Sensing Advisory Committee (TFRSAC) Meeting
May 27-28, 2020**

Co-Chair: Vince Ambrosia

Briefing on the NASA Update: Wildland Fire Element

Vince Ambrosia (CA. State University – Monterey Bay / NASA-ARC
NASA Applied Science Associate Program Manager – Wildland Fire

As the NASA ESD, Applied Science Program, Associate Program Manager responsible for the agency's Wildland Fire Program portfolio, Vince Ambrosia manages and oversees NASA's participation in developments of Earth Observations capabilities supporting improved wildland fire management. The Wildland Fire Program has been subsumed within the ASP Disaster Program element and focuses on the NASA progress developments of the Group on Earth Observations (GEO) Global Wildfire Information System, where V. Ambrosia also serves as the GEO-GWIS NASA representative to the international panel. The NASA GWIS developments for the past year are highlighted in the briefing. In addition, other wildland fire-related NASA projects are also highlighted in this presentation, providing a context for the various successful developments and operationalization of Earth Observing systems data by partner entities and organizations involved in fire management.

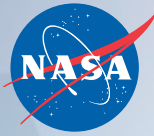
NASA Update Wildland Fire Element

Vince Ambrosia
NASA Applied Science Program



14 November 2019
National Interagency Fire Center (NIFC)
Boise, ID





NASA ASP Disaster Management Team

NASA Applied Sciences Program Disaster Program Manager:

David Green

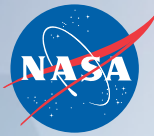
Associate Program Managers:

Vince Ambrosia (Wildland Fire)

Mike Goodman (Geophysical Disasters)

John Murray (Atmospheric & Hydro-meteorological Disasters)

NASA Disasters Mapping Portal



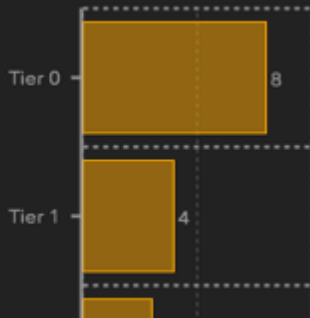
NASA Disasters Mapping Portal

Si

Wildfires

Wildland fire research and applications spans across multiple NASA programs, and fire itself, is an integral natural process that acts to maintain ecosystem biodiversity and structure. Wildland fire, which includes any non-structure fire that occurs in vegetation or natural fuels, is an essential process that connects terrestrial systems to the atmosphere and climate. However, the effects of fire can be disastrous, both immediately (e.g., poor air quality, loss of life and property) and through post-fire impacts (floods, debris flows/landslides, poor water quality).

15 Responses



100 Most Recent Responses in Map

- 2/18/2019 - Chile Wildfires
- 11/10/2018 - California Wildfires: Camp Fire
- 11/10/2018 - California Wildfires: Woolsey Fire
- 8/7/2018 - California Wildfires Summer 2018: Redding,



NASA Disasters Mapping Portal



NASA Disasters Mapping Portal

Sign

Event Response Story Maps

These Story Maps contain NASA Products created for these events and other information to help interpret the data.



Recent NASA Products for the California Wildfires of

A collection of NASA's products used in response to the Summer 2018 wildfires in California.

Explore



NASA Products for the California Wildfires in Fall

NASA Products for the California Wildfires in Fall 2018

Explore



Disasters Program Response to the 2018

Disasters Program Response to the 2018 California Wildfires

Explore



Mendocino Wildfire Complex

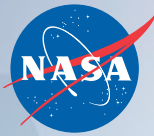
Explore

Event Responses

Click the links below to open the Product Gallery and discover NASA Products created for a specific event response.

- [California Wildfires Summer 2018](#)
- [California Wildfires November 2018](#)
- [Southern California Wildfires December 2017](#)

Global Wildfire Information System (GWIS)



GWIS

Global Wildfire Information System

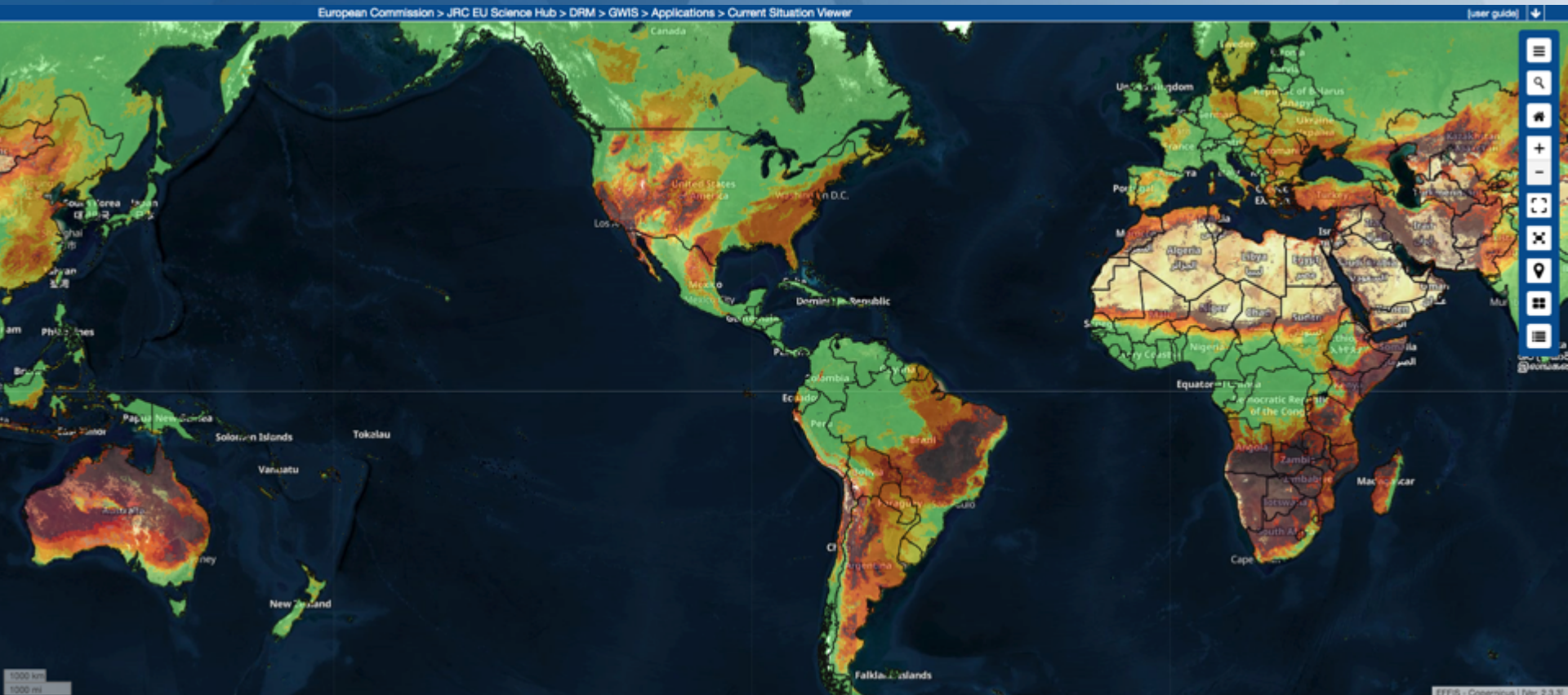
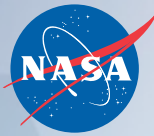


European Commission > JRC EU Science Hub > DRM > GWIS > Applications > Current Situation Viewer

[user guide] ↑

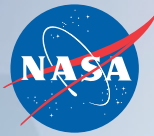


GWIS Prototype: Fire Danger Forecast

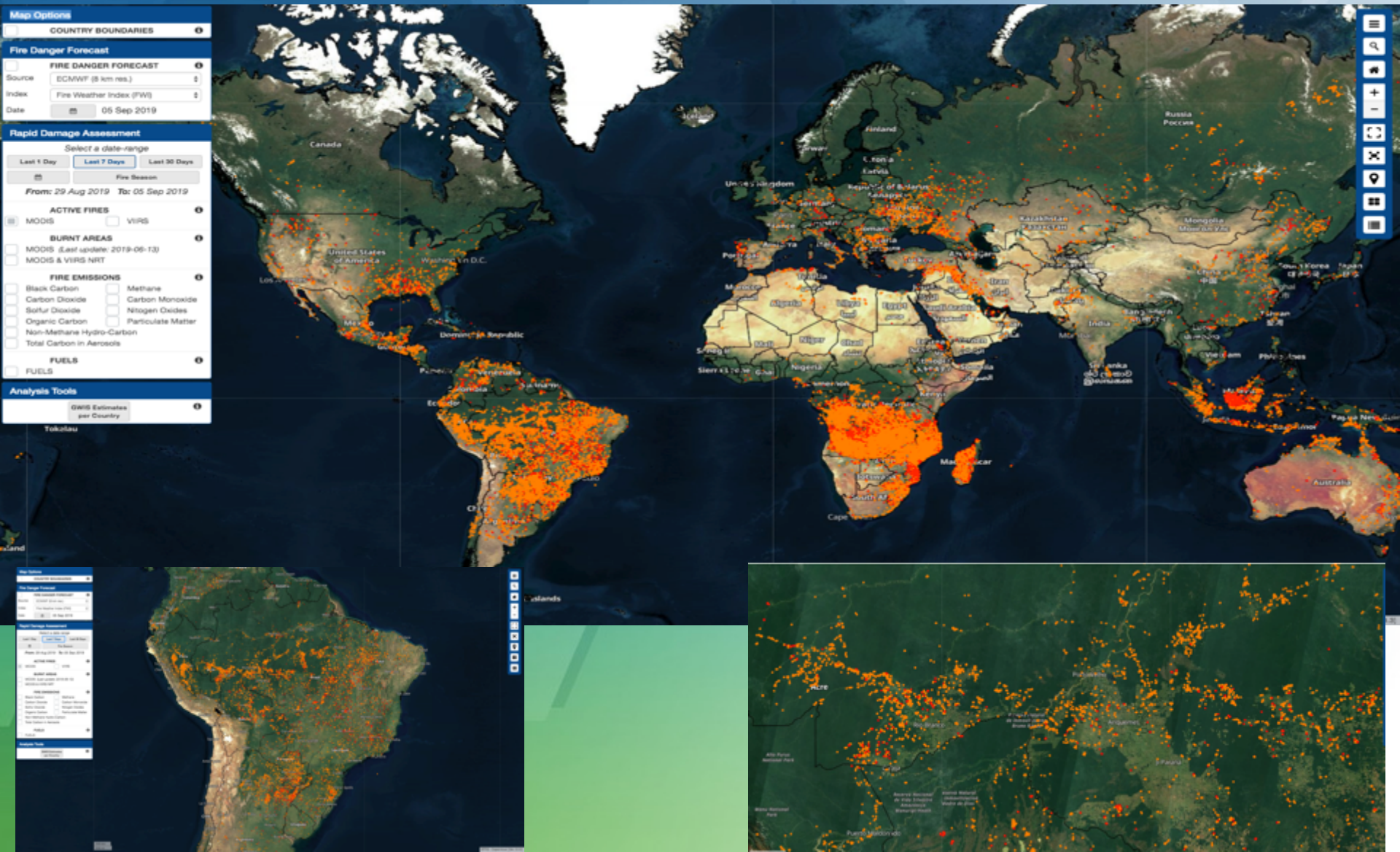


- GWIS provides forecast maps from 1 to 9 days of fire danger levels;
- Numerical weather predictions are used to compute FWI; GWIS uses met forecasts data received daily from the European Centre for Medium-Range Weather Forecast (ECMWF);
- Fire Danger is mapped in 6 classes with a spatial resolution of ~8 km (ECMWF data).

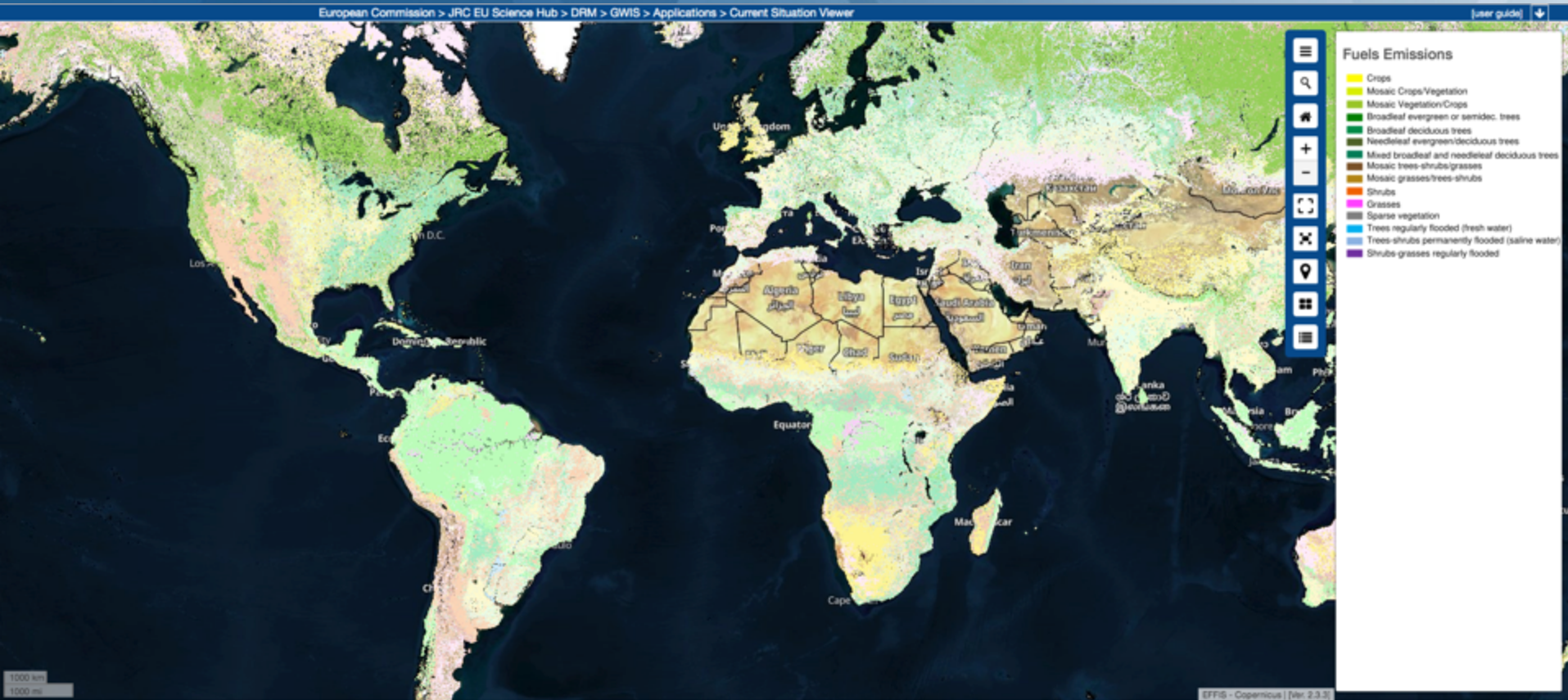
GWIS Active Fire Detection



GWIS provides a WMS viewer that includes R/T information sets such as Fire Danger, Active Fires, Fire Emissions, Burned Areas, Fuels, on a global scale.



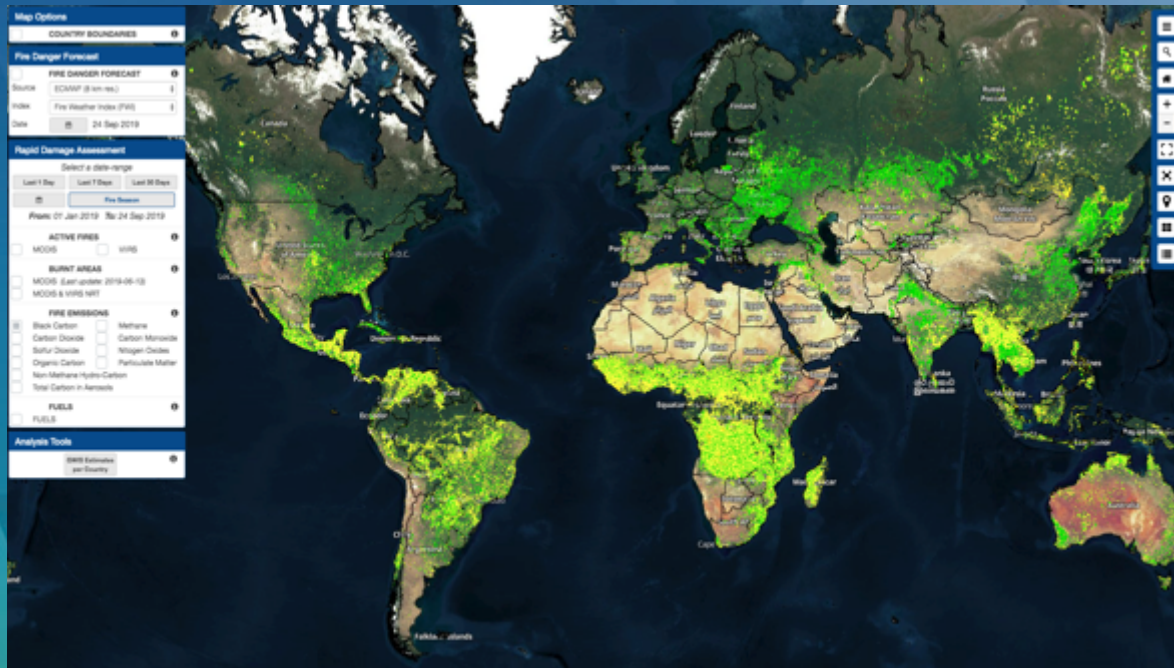
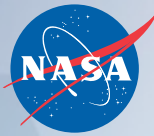
GWIS Global Fuels



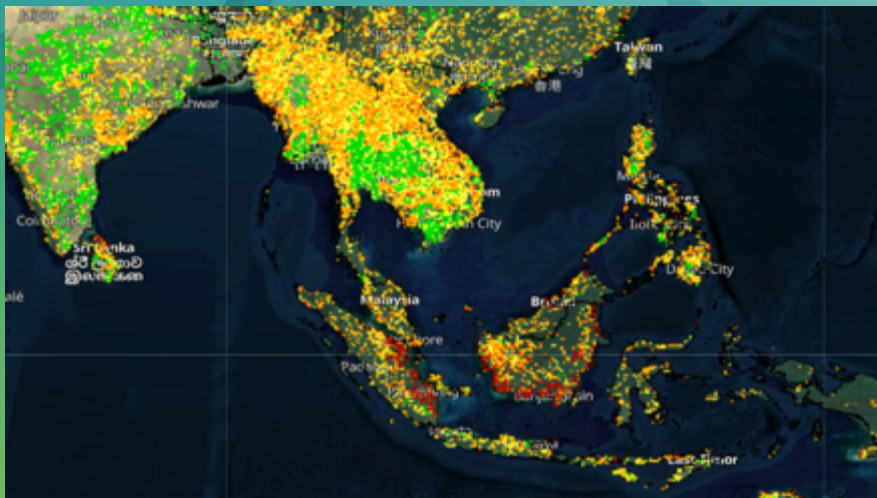
Fuels information derived from:

Pettinari, M Lucrecia (2015): *Global Fuelbed Dataset*. Department of Geology, Geography and Environment, University of Alcalá, Spain, doi:10.1594/PANGAEA.849808

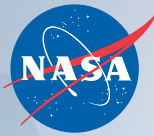
GWIS Fire Emissions



Emissions from forest fires in GWIS are provided by the Copernicus Atmosphere Monitoring Service (CAMS) operated by the European Centre for Medium-Range Weather Forecast (ECMWF). A selection of fire emissions species is presented in GWIS to allow compatibility with the emissions estimates of those species provided in the European Forest Fire Information System (EFFIS).



Recent Enhancements to GWIS

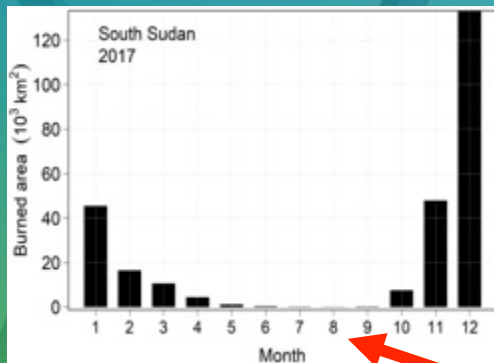


Fire Analysis Portal Ex; South Sudan 2017

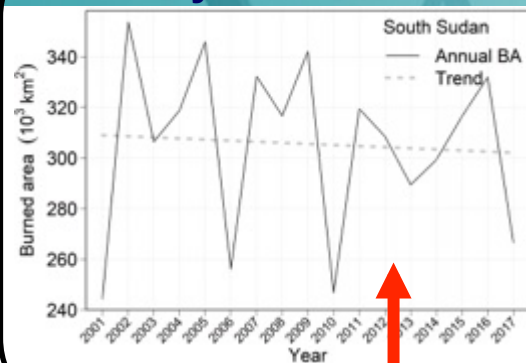


This user selected region and analysis year; page spawned as a separate window (a user can spawn many windows e.g. several different years for the same region, e.g. several different regions for the same, e.g. for different regions and years).

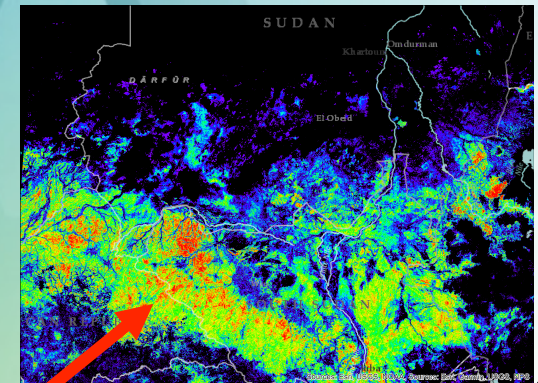
2017statistics



Multi-year statistics

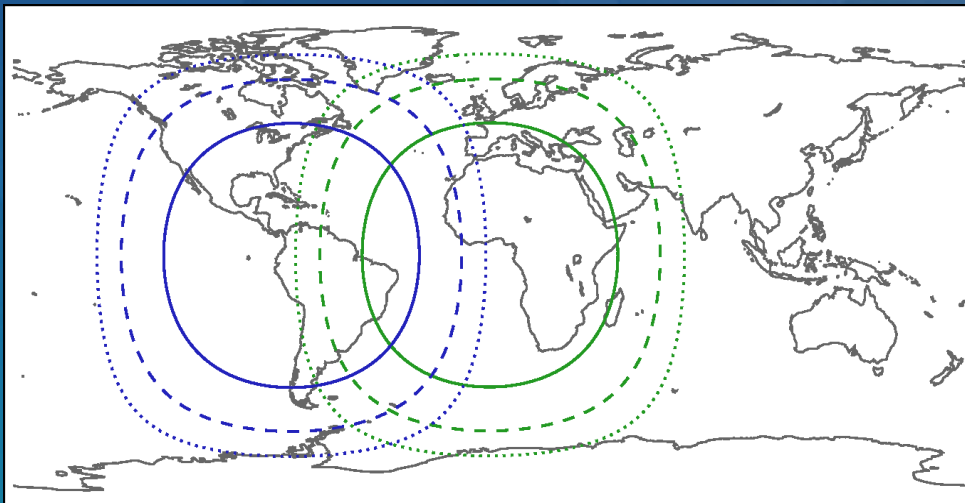


Maps



User can interactively select three options; (note, these 3 options graphics should show real results for the selected region and year)

Harmonized Multi-Sensor Global Active Fire Data Set

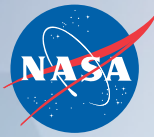


Advanced Baseline Imager (ABI) on board the NOAA GOES-16 satellite

Spinning Enhanced Visible and Infra-Red Imager (SEVIRI) on board the ESA Meteosat Second Generation (MSG) satellite series.

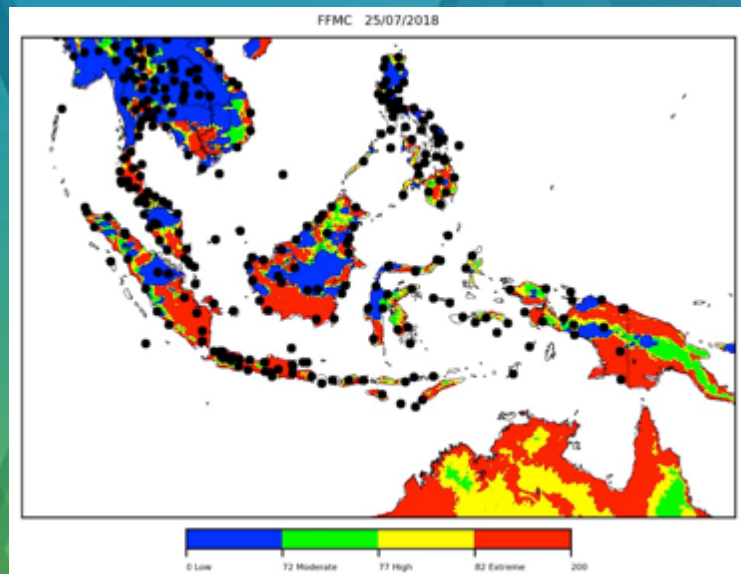
	GOES-16 ABI	MSG SEVIRI
Product	Fire Detection and Characterization (FDC; Schmidt et al., 2012)	Fire Radiative Power (FRP-PIXEL; Wooster et al., 2015)
Spatial Resolution	2km at nadir	3km at nadir
Temporal Resolution	Full Disk: 15 minutes CONUS: 5 minutes	Full Disk: 15 minutes Europe: 5 minutes
Active Fire Product Values	10(30) = processed 11(31) = saturated 12(32) = cloudy 13(33) = high prob. 14(34) = med prob. 15(35) = low prob.	Fire Confidence (0 – 100%)

GWIS Fire Danger Rating Enhancements



Goals:

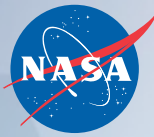
- Enhance the NASA Global Fire Weather Database (GFWED) with short-term fire weather forecasts;
- Contribute selected GFWED data to GWIS;
- Improve the Indonesian Fire Danger Rating System using NASA Global Precipitation Measurement mission precipitation estimates to enhance fire management decision aids.



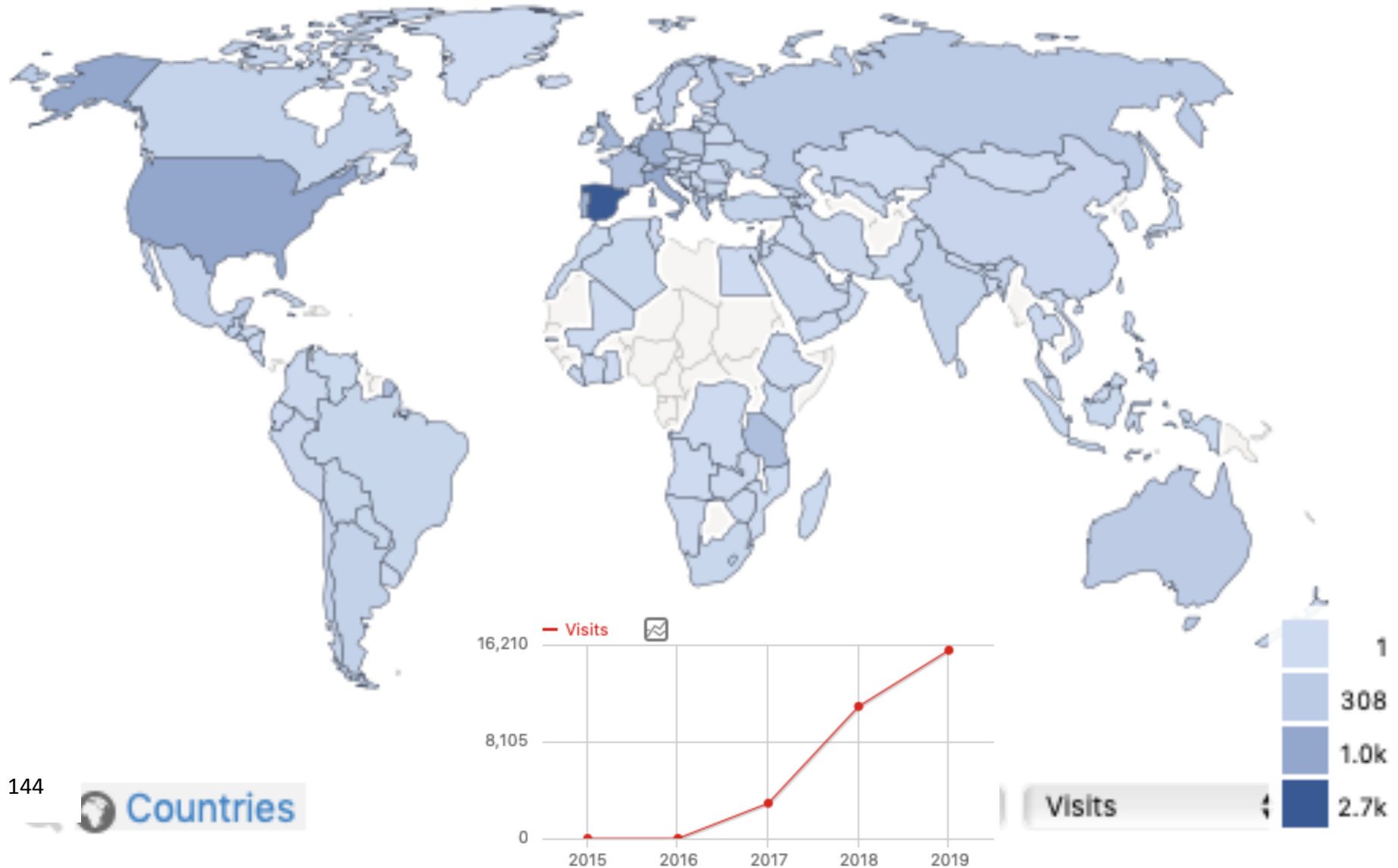
**Preliminary Fire Weather Index
Map calculated for July 25, 2018**



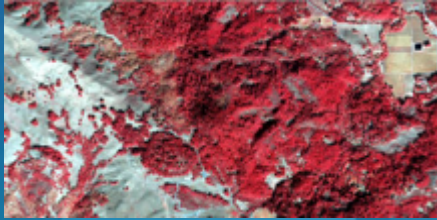
Achievements of GWIS: 2017-2019



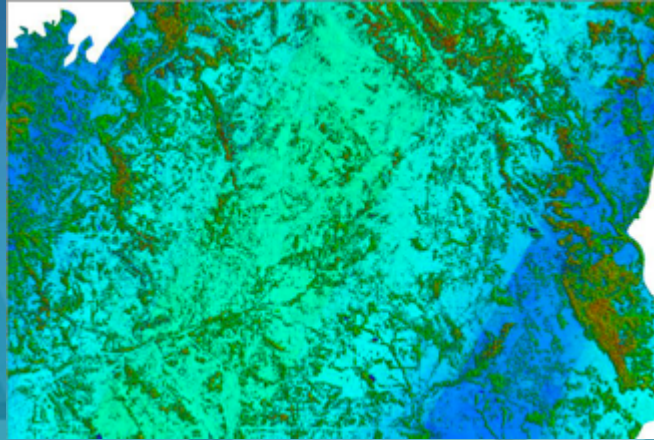
15.7k visits



Sonoma County Ag Preservation & Open Space District RRNRESS Project

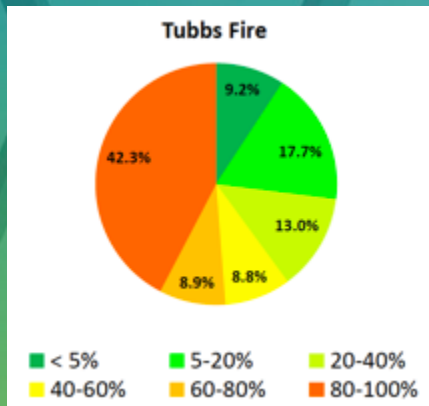
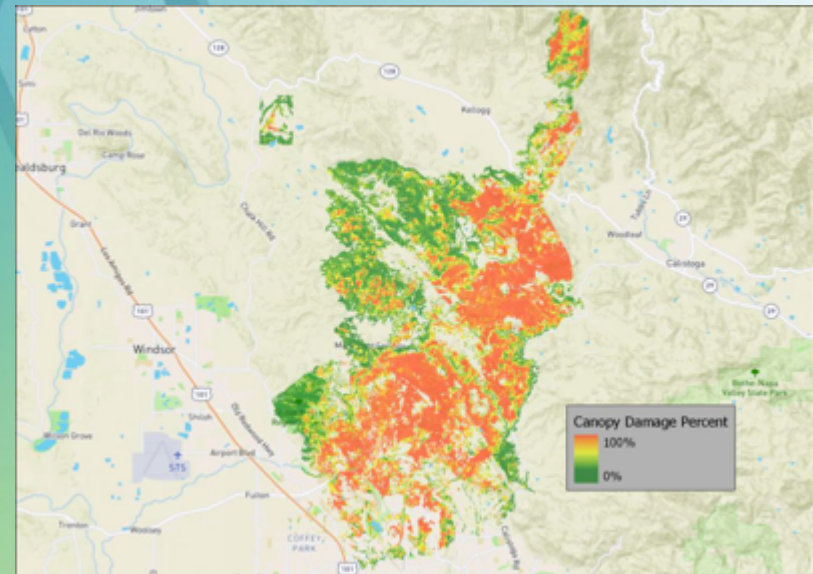


2013 (top) pre-fire vs. 2018 post-fire imagery



A difference image of the 2013 lidar based nDSM versus the 2018 post fire nDSM.

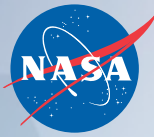
Tubbs Fire Canopy Damage Map



Percent of Tubbs Fire Area by percent woody damage class.

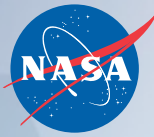
Recommendations From ASAC to ES Director

(S. Cauffman)



...We also learned that there is no longer a dedicated program to Wildfires as has been the case in prior years. We learned that ESD has spread wildfire applications into the Ecological Forecasting, Disasters, and Health & AQ programs.

- **FINDING: The current approach to Wildfires applications is minimally adequate but far from ideal.** ASAC recognizes that Earth observations can play roles from before any wildfire starts in assessing and reducing risk, to during fires in supporting strategic and tactical response, to after wildfires end in supporting remediation. While ASAC recognizes that Wildfires are cross-cutting in nature and that multiple applications areas may touch on Wildfires topics, ASAC is concerned that the lack of a dedicated program is suboptimal to addressing this national issue adequately.
- **RECOMMENDATION:** ESD should strive for a dedicated Wildfires area and a dedicated program manager. This topic represents a strong opportunity for cross-benefits within ESD and a clear way to address a topic of national importance.



Contact Information

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