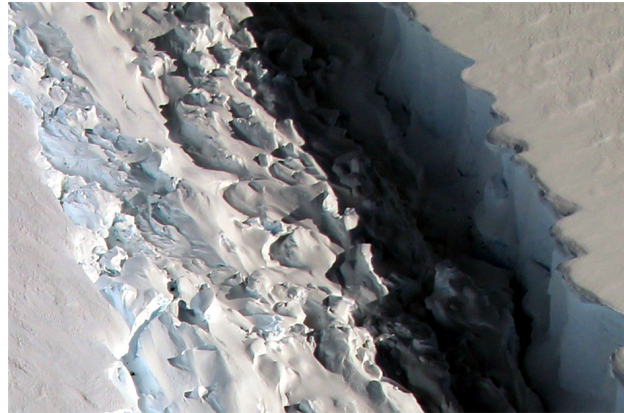


National Aeronautics and  
Space Administration



# SCIENCE



**The NASA Disasters Mapping Portal**  
[maps.disasters.nasa.gov](https://maps.disasters.nasa.gov)

**Jeremy Kirkendall**  
NASA Disasters Program



# NASA Operating Missions

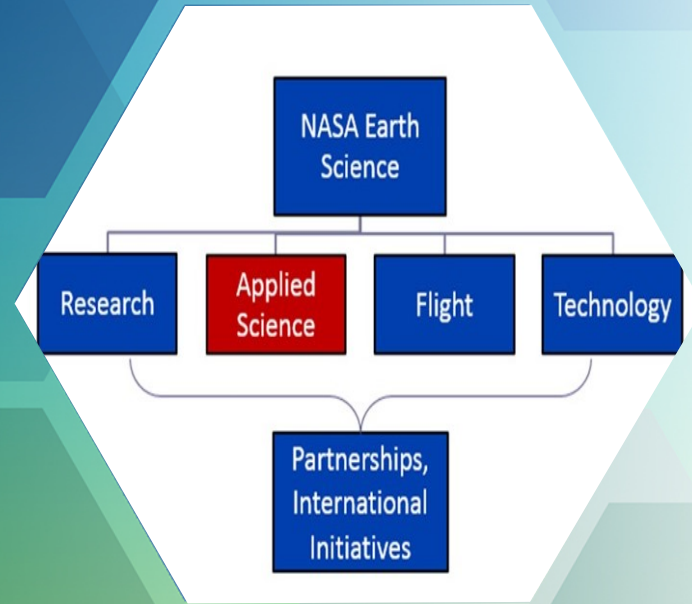




# Approach and Principles of the Disasters Program



- Utilizing the various NASA centers and their resources, a robust response program has been assembled to respond to various disasters worldwide
  - Meteorological (hurricanes, tornadoes)
  - Hydrological (heavy rain/flood)
  - Geophysical (earthquakes, volcanoes)



	Tier 1	Tier 2	Tier 3
<b>Assessment</b> <b>Rapid Hazard Assessment Expected</b> <ul style="list-style-type: none"> <li>- Centers and program experts to contribute within scope of daily activity</li> <li>- Guidance to elevate to Tier response, direct to research or no action</li> <li>- Days</li> <li>E.g.: media report</li> </ul>	<b>Response and Recovery Short Term and Best Effort</b> <ul style="list-style-type: none"> <li>- Centers and programs respond as available with only minor impact to existing/on-going activities</li> <li>- Detailed assessment and products scaled to modest response</li> <li>- Weeks to Month(s)</li> <li>E.g.: Napa Earthquake (2014), Chile Earthquake (2015), Oklahoma tornadoes, yearly floods</li> </ul>	<b>Significant Contributions Over Extended Period</b> <ul style="list-style-type: none"> <li>- Contributions are considerable given continual assessment of size and scale of impact</li> <li>- Personnel relevant to disaster type (s) expected, tasked, and assigned to support</li> <li>- Data and products adapted into recovery</li> <li>- Weeks to Month(s)</li> <li>E.g.: Nepal Earthquake (2015), Deep Horizon (2010), Eyjafjallajökull Eruption (2015)</li> </ul>	<b>Disaster is of major national importance</b> <ul style="list-style-type: none"> <li>- All relevant personnel expected to review activities for level of support to the disaster and/or be on-call</li> <li>- Assets and personnel may specifically assigned and tasked for lengthy time period (Months into recovery).</li> <li>E.g.: Super Storm Sandy (2012), Hurricane Katrina (2005), September 11, 2001 attacks</li> </ul>

# What is the NASA Disasters Mapping Portal?

- The Portal takes data from NASA scientists related to disasters and puts it into a geospatial format to allow easy ingestion by emergency managers and the public.
- The goal is to bridge the gap between the science products and the people who can find the data useful to assist in disaster response and mitigation.
- All data is free and openly available without any login requirements.
- Every service has a REST endpoint making it possible to ingest into your own GIS
- The Portal has two types of products:
  - Event-based Products
  - Near Real Time Products





# Portal Demo

# Homepage

Home Gallery Map Scene Groups Sign In

NASA Earth Science  
**DISASTERS** PROGRAM  
NASA Disasters Mapping Portal  
TOOLS TRAINING NEWS PREVIOUS EVENTS

Featured Maps & Apps

Disasters Program Response ...  
NASA Products for the Califor...  
NASA Products for Hurricane ...  
NASA Products for Hurricane ...

Disasters Program 2018 Highlights

1 NASA Disasters Program 2018 Responses  
Organization  
The NASA Disasters Program promotes the use of Earth observations to improve the prediction of, preparation for, response to, and recovery from...

2 Power Outages - Hurricane Michael

3 Flooding - Hurricane Florence

View NRT Map Fullscreen

Recent Responses

Alaska Earthquake 2018  
November 2018 California Wildfires  
Typhoon Yutu 2018  
Hurricane Willa 2018  
Hurricane Michael 2018  
Sulawesi Island, Indonesia Earthquake and Tsunami 2018  
Hurricane Florence 2018  
Hokkaido Japan Earthquake 2018  
Hurricane Lane 2018  
Kerala India Flood 2018  
Lombok Indonesia Earthquake 2018

Tropical Cyclones  
Earthquakes  
Floods  
Wildfires  
Volcanoes  
Industrial Accidents  
Landslides  
Severe Weather  
Winter Weather  
Risk Reduction  
External Resources  
NRT Products



# Featured Maps and Apps

## Featured Maps & Apps



Disasters Program Response ...



NASA Products for the Califor...



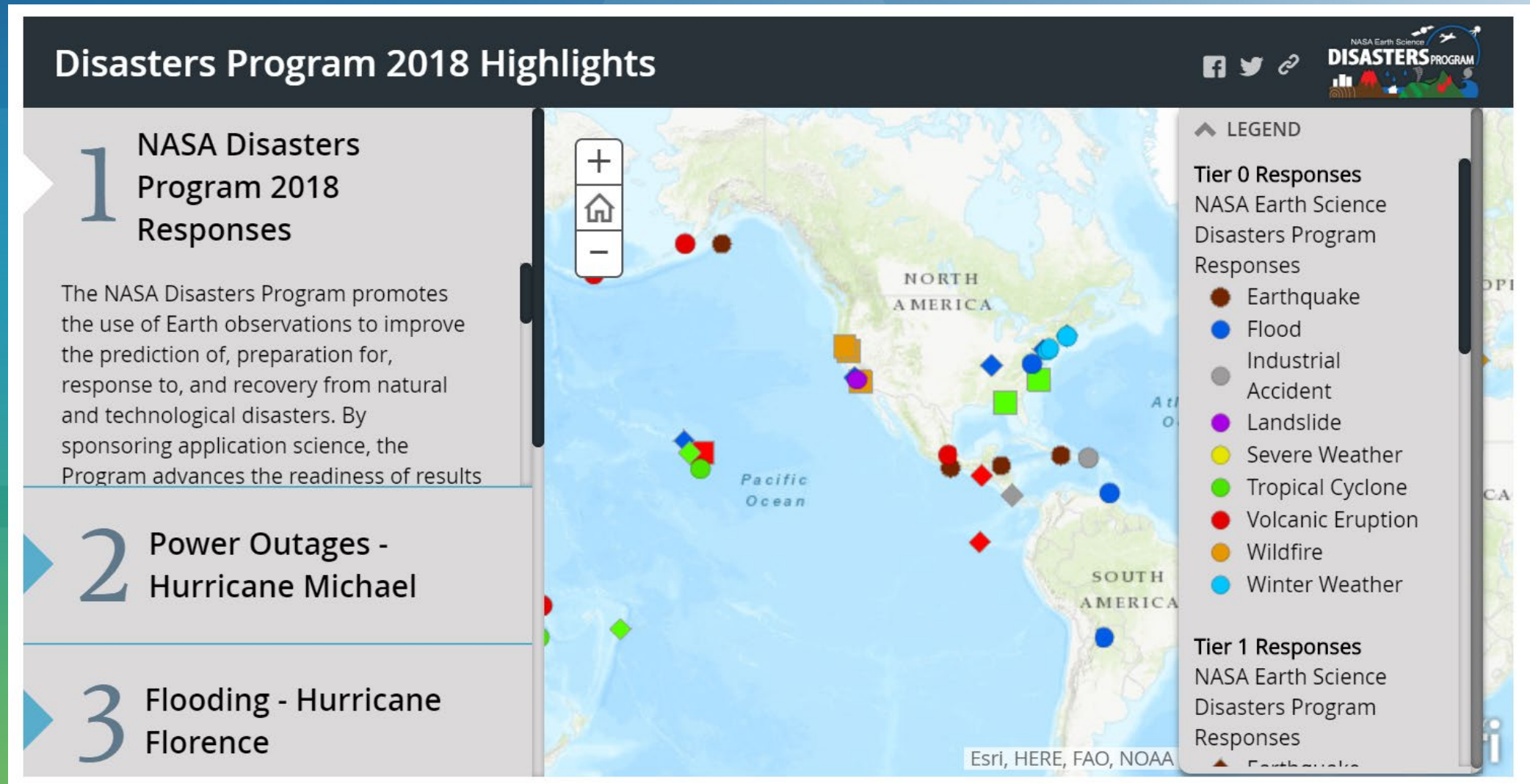
NASA Products for Hurricane ...



NASA Products for Hurricane ...



# Featured Story Map

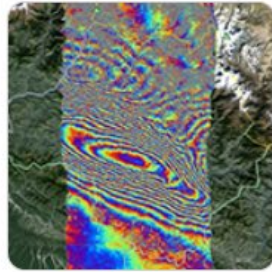




# Recent Responses



Tropical Cyclones



Earthquakes



Floods



Wildfires



Volcanoes



Industrial  
Accidents



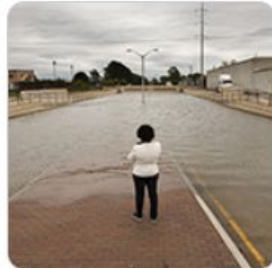
Landslides



Severe Weather



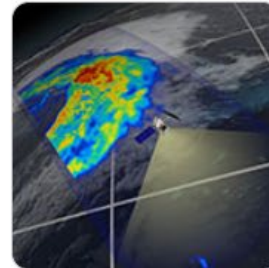
Winter Weather



Risk Reduction



External  
Resources



NRT Products

## Recent Responses

Alaska Earthquake 2018

November 2018 California  
Wildfires

Typhoon Yutu 2018

Hurricane Willa 2018

Hurricane Michael 2018

Sulawesi Island, Indonesia  
Earthquake and Tsunami 2018

Hurricane Florence 2018


Hokkaido Japan Earthquake  
2018

Hurricane Lane 2018

Kerala India Flood 2018


Lombok Indonesia Earthquake  
2018

# Example of Event Response Product Gallery



## NASA Products for the California Wildfires in Fall 2018

NASA data Products available for the California Wildfires in Fall of 2018.



Sort by

Date ▾

Title

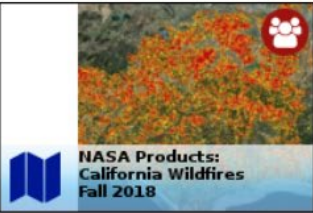
Type


Ratings

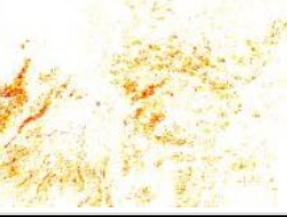
Avg. Rating


Comments

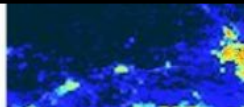
Views




**NASA Products for the California Wildfires in Fall 2018**  
Web Mapping Application by jkirkend. Last Modified Jan 25, 2019.  
NASA Products for the California Wildfires in Fall 2018  
(4,291 views) 



**Camp Fire ARIA Damage Proxy Map in Vector Format Captured 11/16/2018 at 14:00 UTC Produced Using ESA Sentinel-1**  
Map Service by jkirkend. Last Modified Jan 25, 2019.  
Camp Fire ARIA Damage Proxy Map in Vector Format Captured on 11/16/2018 at 14:00 UTC produced using ESA Sentinel-1  
(39 views) 



**Woolsey Fire Black Marble HD 11/15/2018**  
Image Service by jkirkend. Last Modified Jan 25, 2019.  
Black Marble HD imagery of the Woolsey Fire 11/15/2018  
(70 views) 

Show

All Results

Maps

Layers

Applications

Tools

Files

There are 2 ways to view the NASA products on this page:

1. Open the [NASA Story Map](#) for this event
2. Click on an individual product and it will take you to the item details page. Clicking the Open button allows you to view it in the free browser based map viewer or in ArcGIS for Desktop if you have the software installed. From there you can read about how to interpret the product, how it was captured, and when the next update may be available.



# Example of Image Service for the Camp Fire

## Camp Fire ARIA Damage Proxy Map in Vector Format Captured 11/16/2018 at 14:00 UTC Produced Using ESA Sentinel-1



Camp Fire ARIA Damage Proxy Map in Vector Format Captured on 11/16/2018 at 14:00 UTC produced using ESA Sentinel-1

Map Image Layer by jkirkand

Source: Map Service

Last Modified: January 23, 2019

☆☆☆☆ (0 ratings, 22 views)

Sign in to rate this item.

OPEN

METADATA

### Description

#### Date of Imagery:

11/16/2018 14:00 UTC (11/16/2018 6:00am PST)

#### Next Update:

11/16/2018

#### Summary:

The Advanced Rapid Imaging and Analysis (ARIA) team at NASA's Jet Propulsion Laboratory in Pasadena, California, created this Damage Proxy Map (DPM) depicting areas of California that are likely damaged (shown by red and yellow pixels) as a result of the Camp Fire. The map is derived from synthetic aperture radar (SAR) images from the Copernicus Sentinel-1 satellites, operated by the European Space Agency (ESA). The pre-event images were taken before (November 5, 2018) and the post-event image was acquired during the fire (November 16, 2018). The map covers an area of 50 miles x 25 miles (80 km x 40 km). Each pixel measures about 33 yards x 33 yards (30 m x 30 m). The color variation from yellow to red indicates increasingly more significant ground surface change. Preliminary validation was done by comparing to the Approximate fire location by the Google Crisis map. This damage proxy map should be used as guidance to identify damaged areas, and may be less reliable over vegetated areas. For example, the scattered single colored pixels over vegetated areas may be false positives, and the lack of colored pixels over vegetated areas does not necessarily mean no damage.

#### Suggested Use:

The color variation from yellow to red indicates increasingly more ground surface change. This damage proxy map should be used as guidance to identify damaged areas, and may be less reliable over vegetated areas. For example, the scattered single colored pixels over vegetated areas may be false positives, and the lack of colored pixels over vegetated areas does not necessarily mean no damage.

#### Satellite:

Synthetic Aperture Radar (SAR) from Copernicus Sentinel-1 operated by the European Space Agency (ESA); 30 meter resolution

#### Credits/Acknowledgements:

Sentinel-1 data were accessed through the Copernicus Open Access Hub. The image contains modified Copernicus Sentinel data (2018), processed by ESA and analyzed by the NASA-JPL/Caltech ARIA team. This research was carried out at JPL funded by NASA. For more information about ARIA, visit: <http://aria.jpl.nasa.gov>

### Access and Use Constraints

NASA data and products are freely available to federal, state, public, non-profit and commercial users. This information can be experimental- or research-grade data products and may not be appropriate for operational use. These NASA data products, services, and the Disasters Mapping Portal are intended to aid decision makers and enhance situational awareness, but these data are not guaranteed to be consistently available or routinely updated. Please cite the information according to the direction provided in the metadata. Use of this product should include: "Contains modified Copernicus Sentinel data (2018) processed by ESA"

### Map Contents

Camp Fire ARIA Damage Proxy Map in Vector Format Captured 11/16/2018 at 14:00 UTC Produced Using ESA Sentinel-1

[https://maps.disasters.nasa.gov/ep03/rest/services/CA\\_fires\\_2018/camp\\_fire\\_aria\\_dpm\\_vector\\_20181116\\_1400/MapServer](https://maps.disasters.nasa.gov/ep03/rest/services/CA_fires_2018/camp_fire_aria_dpm_vector_20181116_1400/MapServer)

### Properties

Tags

NASA Disasters Program, ARIA, DPM, ESA, Sentinel, Sentinel-1, Camp, Camp Fire, Wildfire, Fire, Wildfires, Fires, California, vector

Credits

NASA Disasters Program, ARIA, ESA



# Example of Image Service for the Camp Fire

Home ▾ Camp Fire ARIA Damage Proxy Map in Vector Format Captured 11/16/2018 at 14:00 UTC Produced Using ESA Sentinel-1

Modify Map  Sign In

 Details

 Basemap

 Print

 Measure

Find address or place



 About





 Content

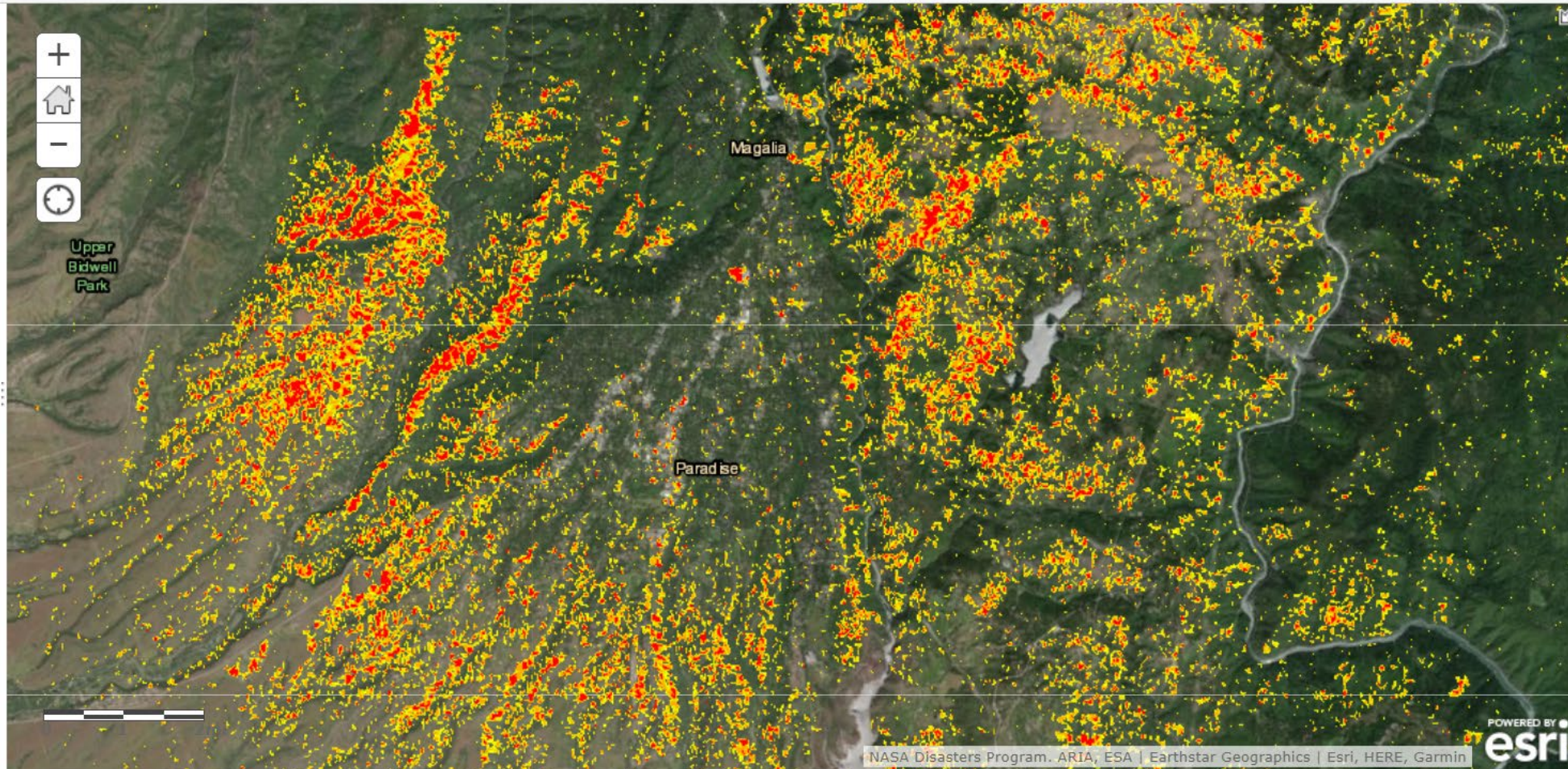
 Legend

## Legend

Camp Fire ARIA Damage Proxy Map in Vector Format Captured 11/16/2018 at 14:00 UTC Produced Using ESA Sentinel-1

CampFire\_Nov16\_6am\_ARIA\_DPM

-  1
-  2
-  3
-  4

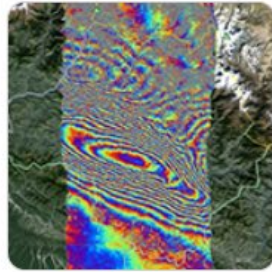




# Disaster Type



Tropical Cyclones



Earthquakes



Floods



Wildfires



Volcanoes



Industrial  
Accidents



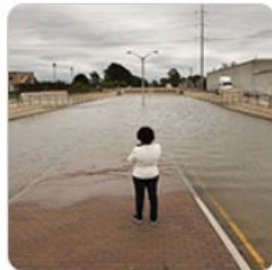
Landslides



Severe Weather



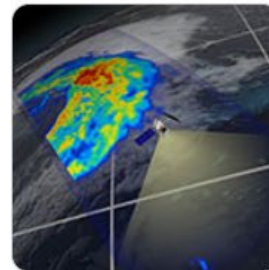
Winter Weather



Risk Reduction



External  
Resources



NRT Products

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Typhoon Yutu 2018

Hurricane Willa 2018

Hurricane Michael 2018

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Earthquake and Tsunami 2018

Hurricane Florence 2018

Hokkaido Japan Earthquake  
2018

Hurricane Lane 2018

Kerala India Flood 2018

Lombok Indonesia Earthquake  
2018

# Example of Fire Events

[Home](#) [Gallery](#) [Map](#) [Scene](#) [Groups](#)

 [Sign In](#)

 wildfire

## Search Results

### Related Searches

[Find items related to "wildfire"](#)

[Find items published by Esri related to "wildfire"](#)

### 4 results

[Relevance](#) [Title](#) [Owner](#) [Date ▼](#)



[Details](#)

#### California Wildfires Fall 2018

NASA data Products available for the California Wildfires in Fall of 2018.  
owned by jkirkend on November 11, 2018



[Details](#)

#### California Wildfires Summer 2018

Sharing Data Products available for California Wildfires. Summer 2018 ([click here for more information](#))  
owned by gwayne on August 8, 2018



[Details](#)

#### Greece Wildfires July 2018

Sharing Data Products available for Greece Wildfires. ([click here for more information](#))  
owned by gwayne on July 26, 2018



[Details](#)

#### Southern California Wildfires, December 2017

NASA Derived Data Products available for Southern California Wildfires. December, 2017  
owned by gwayne on February 13, 2018

### More Information

[What types of items can I find here?](#)

[Advanced search options](#)

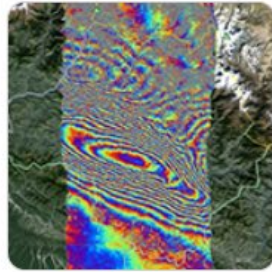
[Finding layer packages and other ArcGIS desktop content.](#)



# Near Real-Time Products



Tropical Cyclones



Earthquakes



Floods



Wildfires



Volcanoes



Industrial  
Accidents



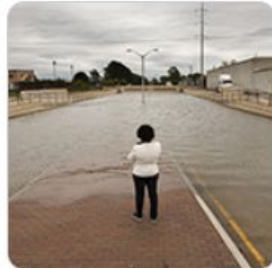
Landslides



Severe Weather



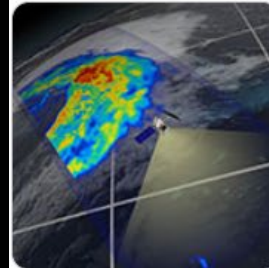
Winter Weather



Risk Reduction



External  
Resources



NRT Products

## Recent Responses

Alaska Earthquake 2018

November 2018 California  
Wildfires

Typhoon Yutu 2018

Hurricane Willa 2018

Hurricane Michael 2018

Sulawesi Island, Indonesia  
Earthquake and Tsunami 2018

Hurricane Florence 2018

Hokkaido Japan Earthquake  
2018

Hurricane Lane 2018

Kerala India Flood 2018

Lombok Indonesia Earthquake  
2018

# Near Real-Time Products.

[Home](#) [Gallery](#) [Map](#) [Scene](#) [Groups](#) [Sign In](#)

**Near Real Time Products**

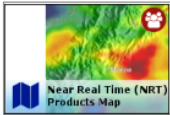
[JOIN THIS GROUP](#) [SHARE](#)

Near Real-Time Products from NASA Earth Science ▼

**Group Content**

**All Results**

[Maps](#)  
[Layers](#)  
[Scenes](#)  
[Apps](#)  
[Tools](#)  
[Files](#)  
☐ Show ArcGIS Desktop Content



Open

Details


[Homepage Map] NASA Near Real-Time Products (Current Snapshot)

Web map is published to give a current snapshot of all Near Real-Time (NRT) products available as web services thru NASA Disasters Mapping Platform.

Web Mapping Application by gwayne

Last Modified: July 24, 2018

★★★★★ (0 ratings, 0 comments, 6,028 views)



Open

Details


[Time-enabled] FIRMS Active Fire: previous 7 days, Update every 3 hours

The Fire Information for Resource Management System (FIRMS) distributes Near Real-Time (NRT) active fire data within 3 hours of satellite overpass fr

Map Image Layer by gwayne

Last Modified: July 19, 2018

★★★★★ (0 ratings, 0 comments, 11,451 views)



Open

Details

[Time-enabled] Flood Detection 1 Observation Image, Daily, MODIS

MODIS Flood 1 Day 1 Observation, Cloud & Terrain Shadow Masking Applied

Imagery Layer by gwayne

Last Modified: July 19, 2018

★★★★★ (0 ratings, 0 comments, 16 views)

**Group Details**

Owner: gwayne

Status: Public

Contributors: Members

Tags: NASA, NASA Disasters Program, NRT

**7 Members**

[gwayne](#)  
[dborges1](#)  
[jseepers](#)  
[bosmanog](#)  
[laschul1](#)  
[jrbell1](#)  
[jkirkend](#)

16



# California Atmospheric River and Flooding Feb/March 2019

## NASA Products for the California Atmospheric River and Flooding 2019

[Home](#)[Optical vs SAR Detected Flooding](#)[MODIS 1 Day 1 Observation Flood Map](#)[Sentinel-1 Water Extent](#)[Sentinel-1 RGB Flood Map](#)[Optical vs SAR RGB Composites](#)

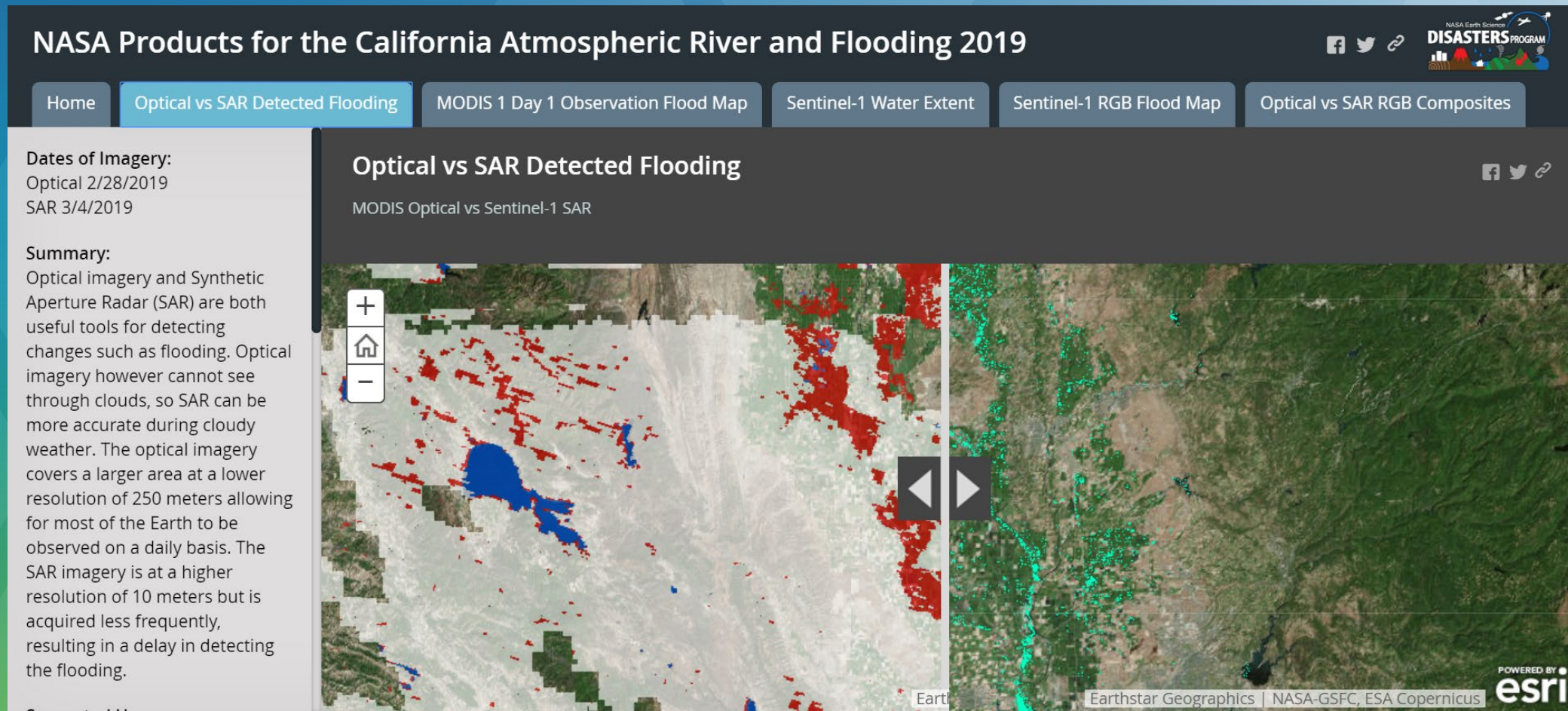
As another round of severe rainstorms doused California in late February 2019, the Russian River approached record levels and brought catastrophic flooding. More than 2,000 businesses and homes in Sonoma County were flooded and the river valley towns of Guerneville and Monte Rio were turned into islands, temporarily cut off from all land transportation.

Scientists from the National Weather Service and the [Scripps Institution of Oceanography](#) declared an [atmospheric river](#) event, one of several that has brought soaking rain and [heavy snowfall to California](#) this winter. Off the West Coast of the United States,



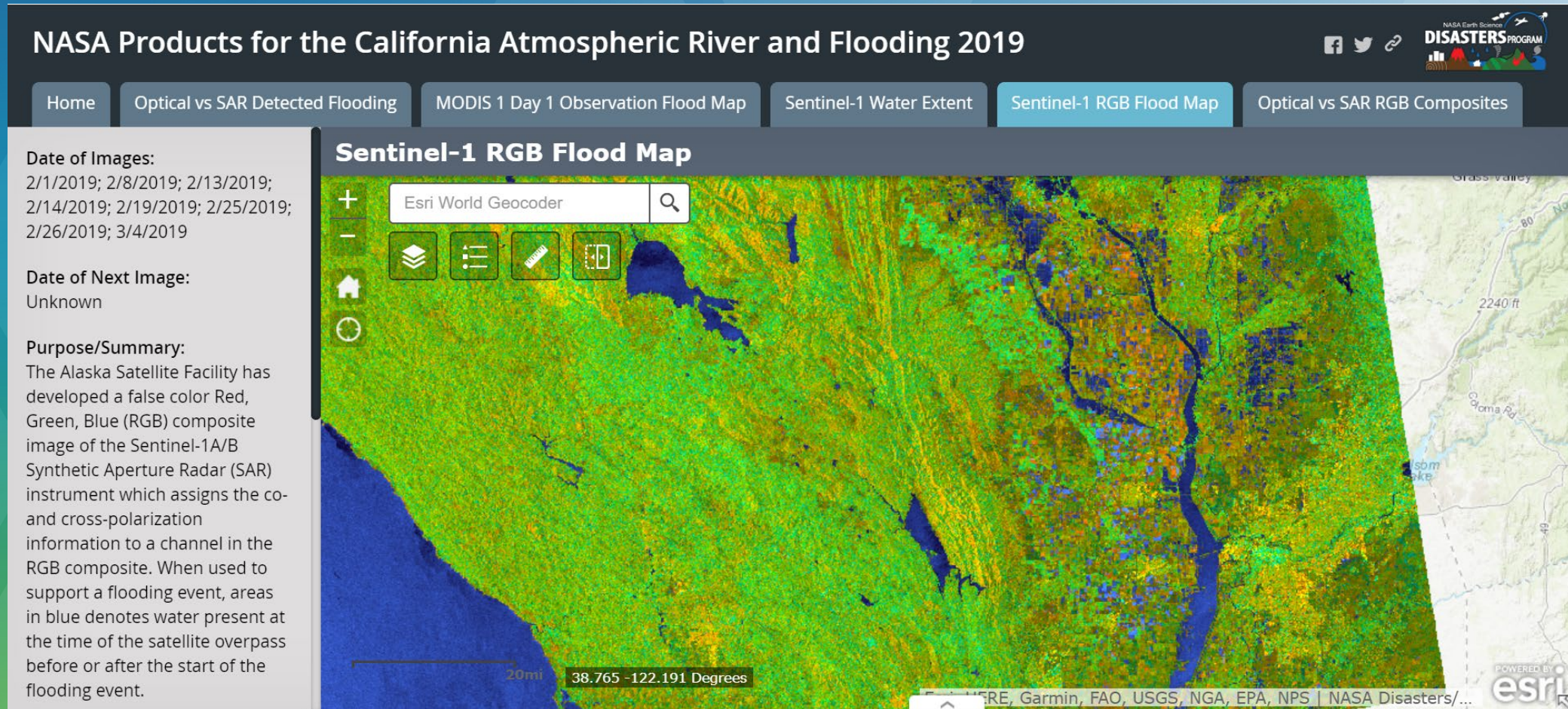


# California Atmospheric River and Flooding Feb/March 2019



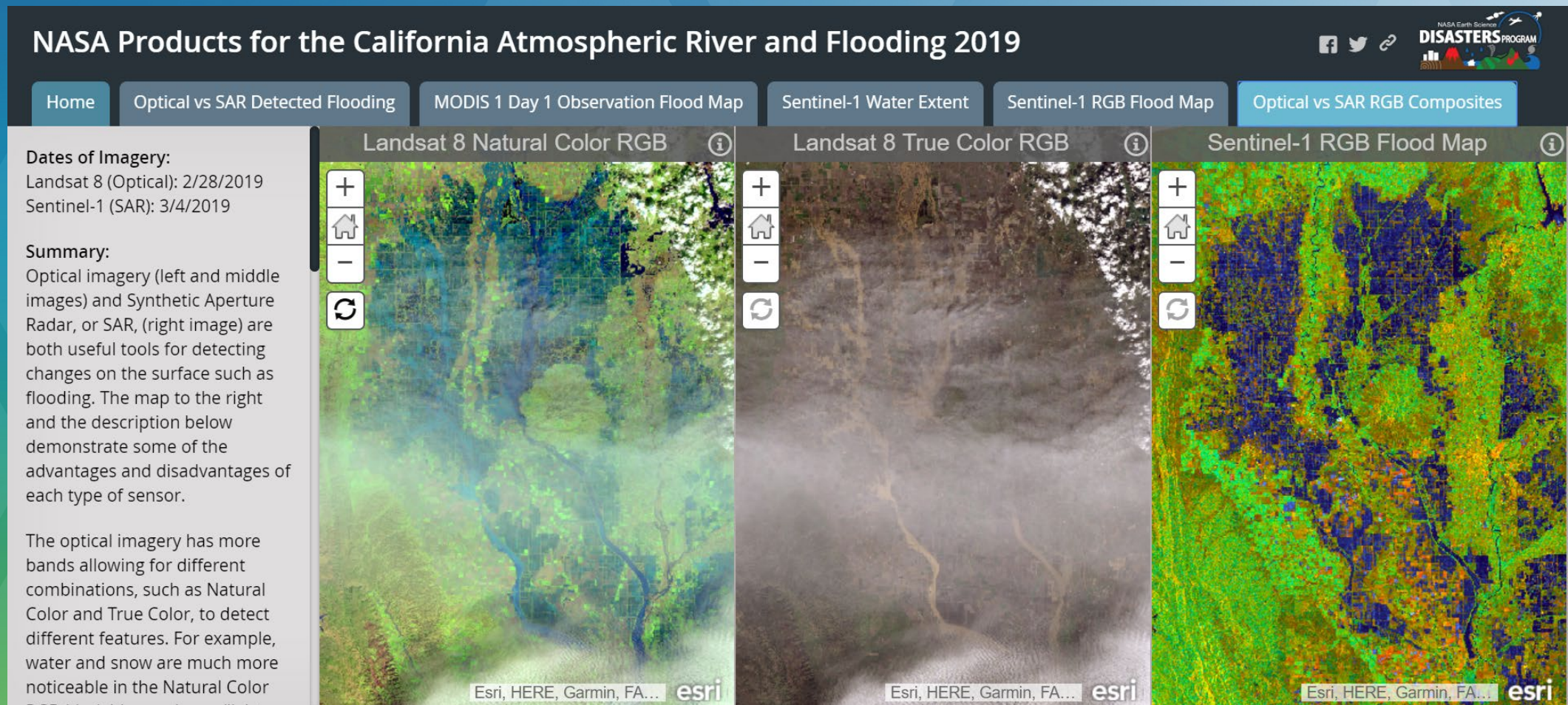


# California Atmospheric River and Flooding Feb/March 2019





# California Atmospheric River and Flooding Feb/March 2019







**Learn More**

**NASA Disasters Mapping (GIS) Portal:**  
**<https://maps.disasters.nasa.gov>**

**[Jeremy.J.Kirkendall@nasa.gov](mailto:Jeremy.J.Kirkendall@nasa.gov)**