



Disaster Applications with Data from NASA's Terra Platform

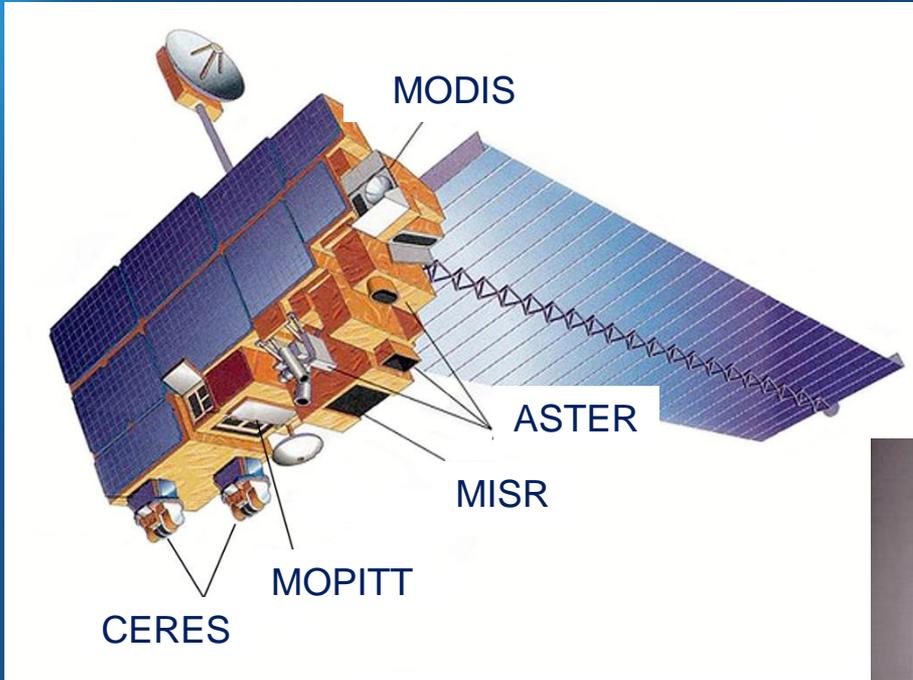
Michael Abrams

Jet Propulsion Laboratory, California
Institute of Technology, Pasadena USA

(c) 2017 California Institute of Technology. Government sponsorship acknowledged.



Terra Platform



- ❖ Launched Dec. 1999
- ❖ Polar orbit, 10:30 am crossing
- ❖ Collaboration between US, Japan, Canada





Terra Platform Imaging Instruments

ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer)
14 channels, VNIR-SWIR-TIR; 60 km swath; 15m, 30m, 90m resolution; stereo for DEMs; programmable data acquisitions

MODIS (Moderate Resolution Spectroradiometer)
36 channels, VNIR-SWIR-TIR; 2,330 km swath; 250m, 500m, 1000m resolution; global coverage every 2 days

MISR (Multi-angle Imaging SpectroRadiometer)
4 channels, VNIR; 380 km swath; variable resolution; global coverage every 9 days



MODIS Flood



National Aeronautics and Space Administration



3 Day Composite 2 Day Composite 1 Day Composite 14 Day Composite

« August 2017 »
S M T W T F S
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31

Products	Available Downloads	
MODIS Flood Map	MFM	png
MODIS Flood Water	MFW	shapefile (.zip) KMZ
MODIS Surface Water	MSW	shapefile (.zip) KMZ
MODIS Water Product	MWP	geotiff
README	pdf	txt



Data Viewer

- Africa
- Asia
- Australia/NZ
- Europe
- North America
- South America

Product Description

Documents

- Project Summary
- MODIS Product README
- Evaluation Report
- Presentations

Future Enhancements

News/Status

Mailing list

To subscribe to our mailing list to receive email notification of updates, please, click [here](#).

NASA EXPERIMENTAL SCIENCE PRODUCT

MODIS Flood Map
5-7 Aug 2017
Tile: 060W030S

- Current floodwater
Input: LANCE MODIS
- Cloud
MODIS - MODIS
- Reference water
MODIS-W lakes
Natural Earth - rivers
- Urban areas

Background:
US NPS World Physical Map

100 kms Projection: Plate Carree, WGS-84

NASA GSFC Flood Mapping Project
NASA Goddard Space Flight Center
Greenbelt MD 20771 USA



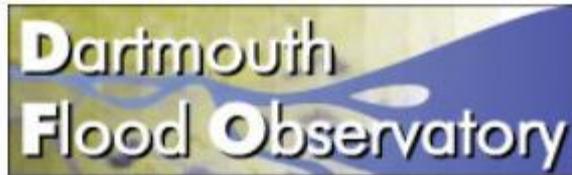
Product: 1000F / 2017-09
Generated: 07 Aug 2017 21:10:44 GMT



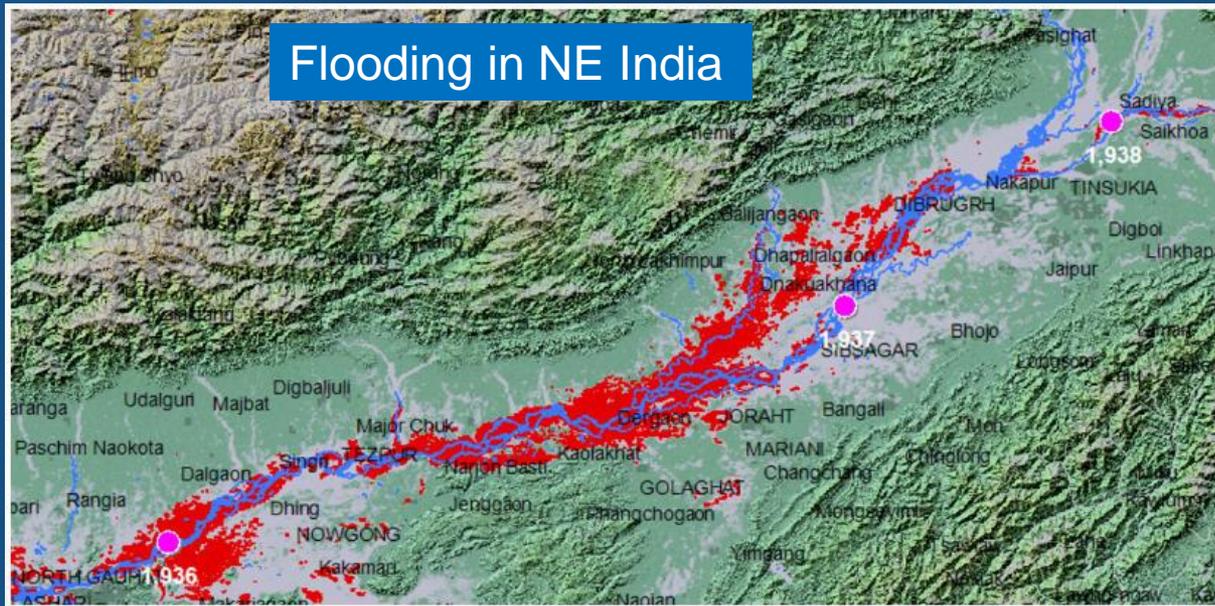
<https://floodmap.modaps.eosdis.nasa.gov/projSummary.php>



MODIS Flood



*Space-based Measurement, Mapping, and Modeling of Surface Water
For Research, Humanitarian, and Water Management Applications*



<https://floodobservatory.colorado.edu/>



MODIS Volcanoes

MODVOLC
near-real-time satellite monitoring
of global volcanism using MODIS



MODVOLC uses infrared satellite data acquired by NASA's MODIS instrument to monitor Earth's surface for the thermal emission signature of volcanic eruptions, wildfires, and anthropogenic heat sources (e.g. gas flares). Two MODIS sensors, one on the Terra satellite, one on the Aqua satellite, allow the entire Earth to be monitored every 48 hours. If an eruption is detected, its details are reported here, usually within 12-18 hours of the satellite passing over the volcano. You can search, plot, and download the data using the tools below. If you are unsure as to what you are looking at, [this page](#) provides links to published papers and other information that describe the data, and this website. This project is funded by NASA grant NNX14AP37G.



1. Which volcano are you looking for?

Volcano name:

Lat/Long/Center:

Volcano ID:

2. What period of time?

Start date:

End date:

<http://modvolc.higp.Hawaii.edu>

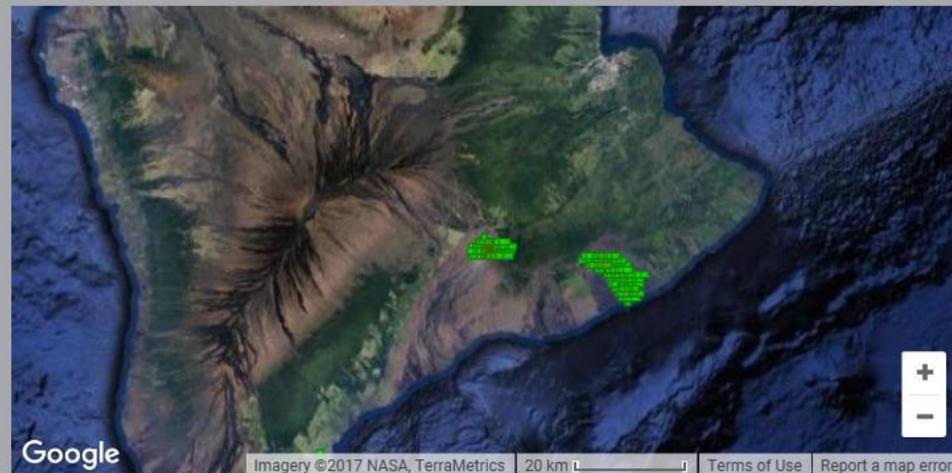


MODIS Volcanoes

MODVOLC near-real-time satellite monitoring of global volcanism using MODIS



MODVOLC uses infrared satellite data acquired by NASA's MODIS instrument to monitor Earth's surface for the thermal emission signature of volcanic eruptions, wildfires, and anthropogenic heat sources (e.g. gas flares). Two MODIS sensors, one on the Terra satellite, one on the Aqua satellite, allow the entire Earth to be monitored every 48 hours. If an eruption is detected, its details are reported here, usually within 12-18 hours of the satellite passing over the volcano. You can search, plot, and download the data using the tools below. If you are unsure as to what you are looking at, [this page](#) provides links to published papers and other information that describe the data, and this website. This project is funded by NASA grant NNX14AP37G.

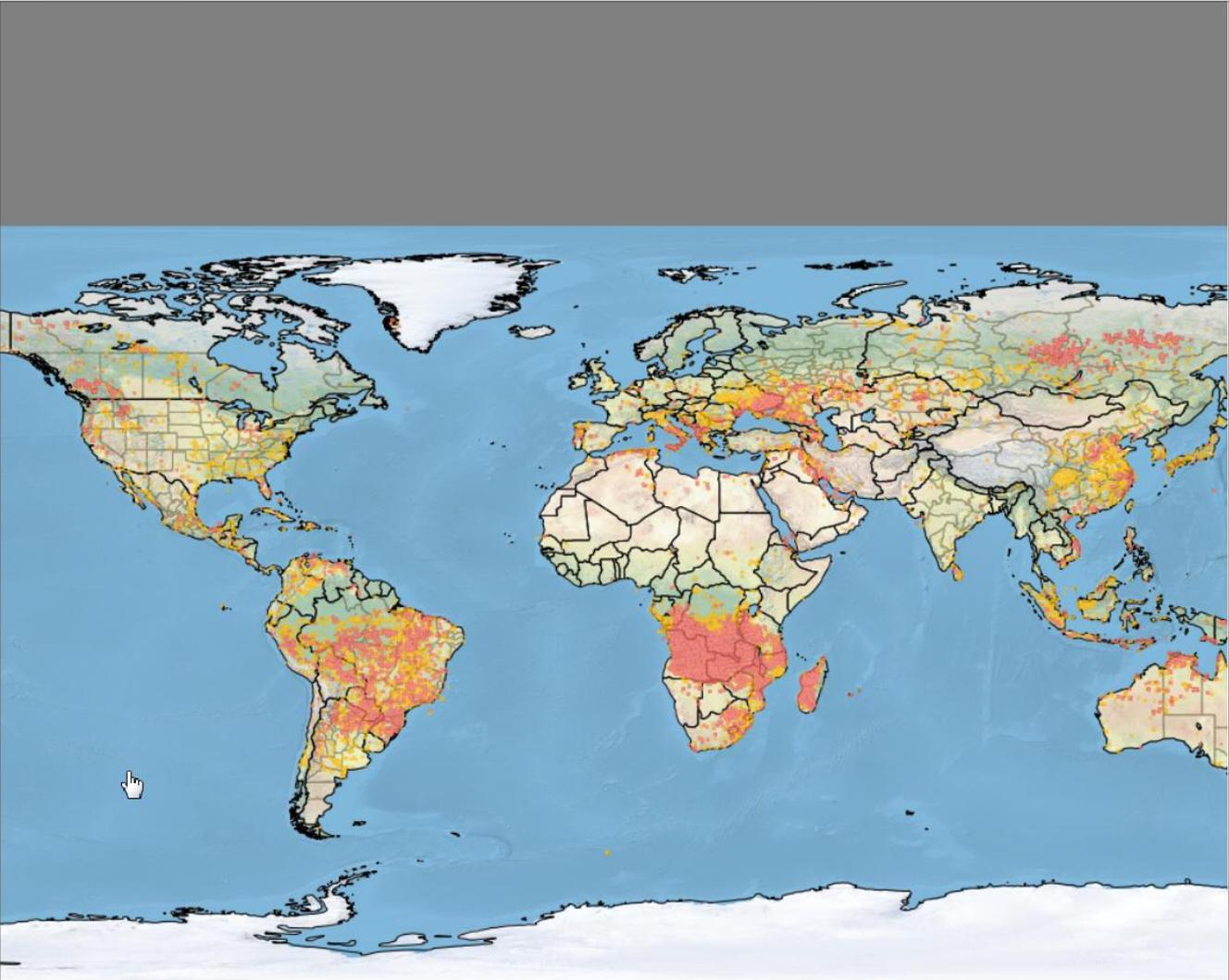




MODIS Fires



FIRMS Web Fire Mapper



[Bookmark current view](#)

Fires

Select fires to display using the following choices.

Data source:

Satellite source:

Time period:
 Past 24 hours
 Past 48 hours
 Past 72 hours
 Past 7 days
 Custom

Start:

End:

Viewing the Fire Aggregate Grid?
[Toggle Fire Aggregates Legend](#)

Note: Cloud cover may obscure active fire detections.

- Regions
- Background Images
- Layers
- MODIS Burned Area
- Activity Log
- Links

<https://firms.modaps.eosdis.nasa.gov/firemap/>



MODIS Fires

MODIS ACTIVE FIRE AND BURNED AREA PRODUCTS

BURNED AREA PRODUCTS

Home

About Us ▾

Active Fire Products

Burned Area Products

User Guides

Publications

Burned Area Products

Methodology

Validation

Description

- [EOS HDF product](#)
- [GeoTIFF Files](#)
- [Shapefiles](#)
- [Product Examples](#)

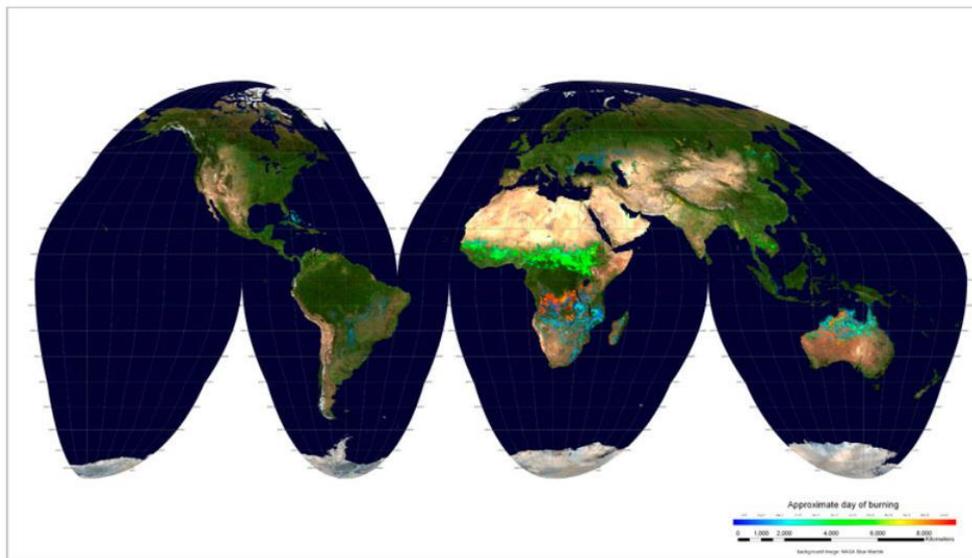
Get Data

- [Visualize the data](#)
- [Download the data](#)

User Guide

Burned Area Products

Burned areas are characterized by deposits of charcoal and ash, removal of vegetation, and alteration of the vegetation structure (Pereira et al. 1997, Roy et al. 1999). The MODIS algorithm used to map burned areas takes advantage of these spectral, temporal, and structural changes (Roy et al. 2005a). It detects the approximate date of burning at 500 m by locating the occurrence of rapid changes in daily surface reflectance time series data. The algorithm maps the spatial extent of recent fires and not of fires that occurred in previous seasons or years.



<https://modis-fire.umd.edu/pages/BurnedArea.php>

1 year of MCD45A1 burned areas; the day of burning is represented using a rainbow scale and is overlaid on MODIS surface reflectance to provide geographic context. Click on the image to see a full scale version.



MODIS Fires

EARTHDATA

Find a DAAC

EARTHDATA
Powered by EOSDIS

ABOUT DATA COMMUNITY RESOURCES

Feedback

Search datasets, news, articles, and information

Earth Observation Data > LANCE: NASA Near Real-Time Data and Imagery > Fire Information for Resource Management System (FIRMS) > Active Fire Data

Data

Disciplines:

Related Content

Fires continue in British Columbia, Canada

[EOSDIS Data News - 8/4/2017](#)

Super Typhoon Noru (07W) in the northern Pacific

Larsen C Ice Shelf Calving

User Profile: Dr. Brian Mapes

More Resources

[Common Metadata Repository \(CMR\)](#)

[Earthdata Search](#)

[Global Imagery Browse Services \(GIBS\)](#)

[LANCE: Land, Atmosphere Near Real-Time Capability for EOS](#)

[Worldview](#)

Active Fire Data

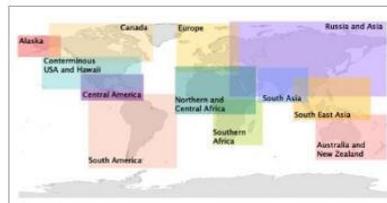


Download active fire products from the Moderate Resolution Imaging Spectroradiometer (MODIS) (MCD14DL) and the Visible Infrared Imaging Radiometer Suite (VIIRS) 375 m (VNP14IMGTDL_NRT) for the last 24, 48 hours and 7 days in shapefile, KML, WMS or text file formats. The VIIRS 375 m active fire product is the latest product to be added to the Fire Information for Resource Management System (FIRMS). VIIRS data complement the MODIS fire detections but the improved spatial resolution of the 375 m data provides a greater response over fires of relatively small areas. Read more about VIIRS...

Data older than 7 days can be obtained from the [Archive Download Tool](#). Users intending to perform scientific analysis are advised to download the data.

Please note:

- MODIS C6 is available from November 2000 (for Terra) and from July 2002 (for Aqua) to the present.
- VIIRS 375 m near real-time (NRT) data is currently available from 8 January 2016 (NRT data are distinct from standard quality data).



- Shapefile
- KML
- TXT
- WMS
- Archive Download Tool
- Global Fire Maps

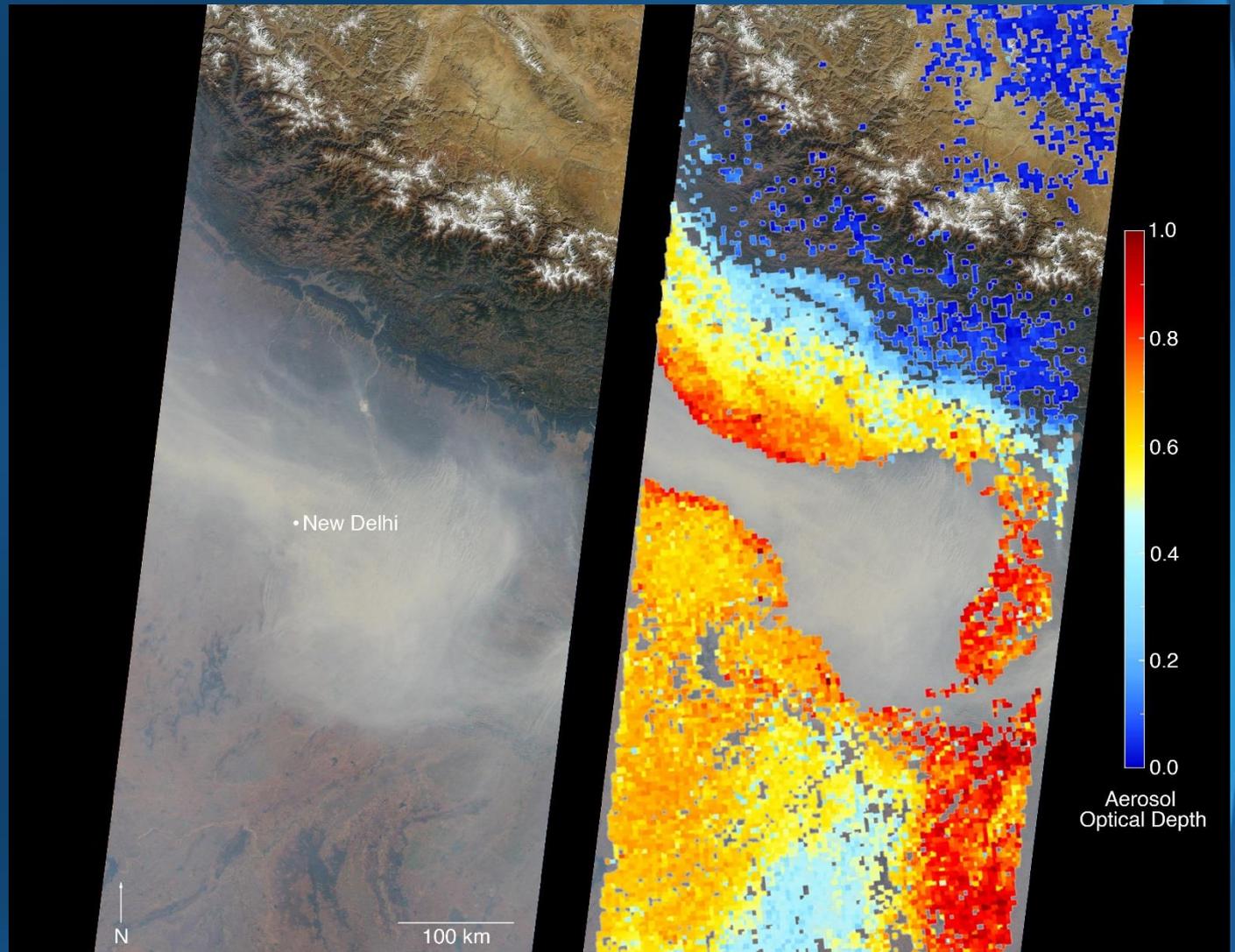
Last Updated: Jul 6, 2017 at 3:53 PM EDT

<https://earthdata.nasa.gov/earth-observation-data/near-real-time/firms/active-fire-data>



MISR Pollution

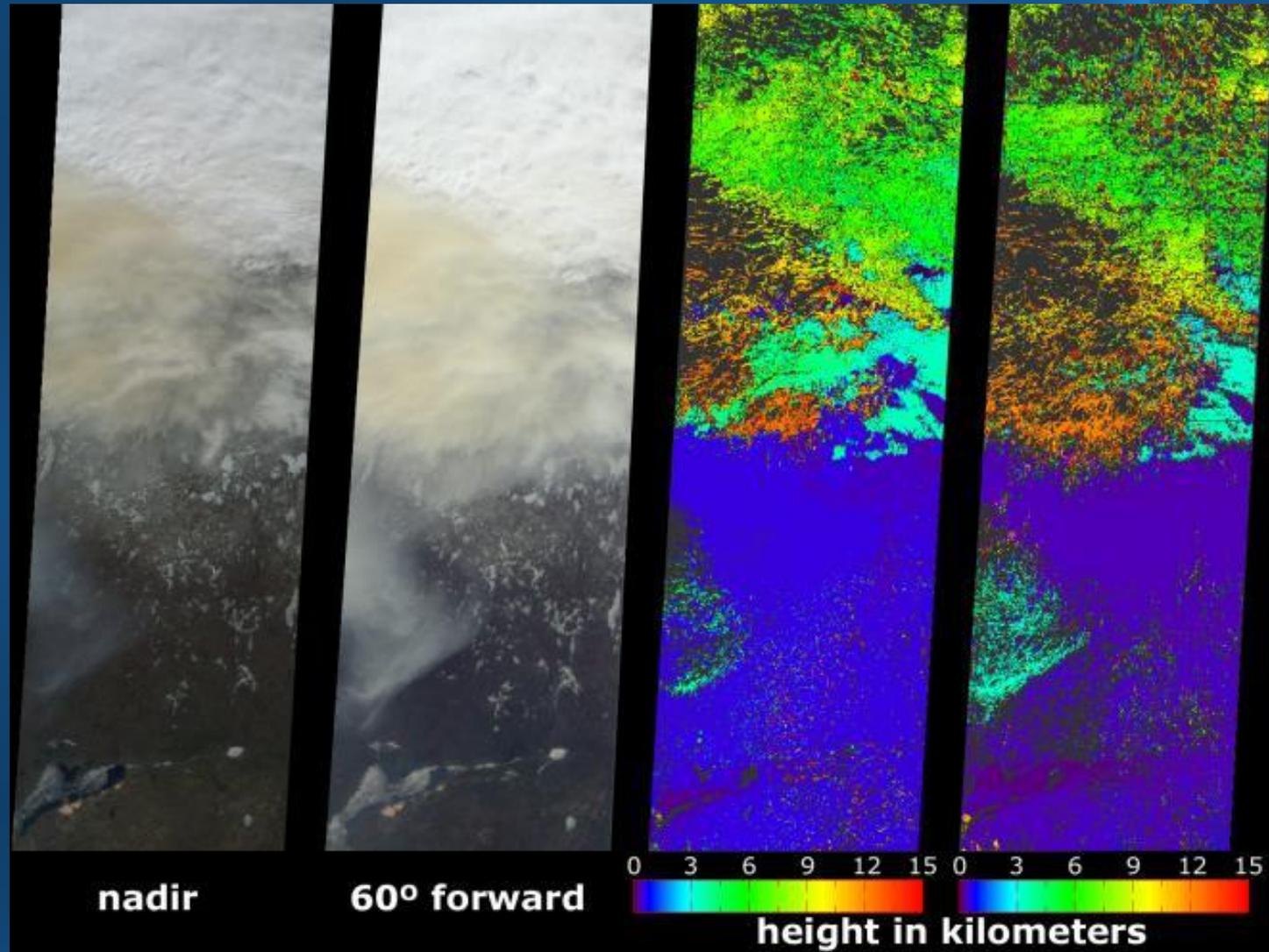
NE India: optical depth of air pollution trapped against Himalayas





MISR Smoke Height

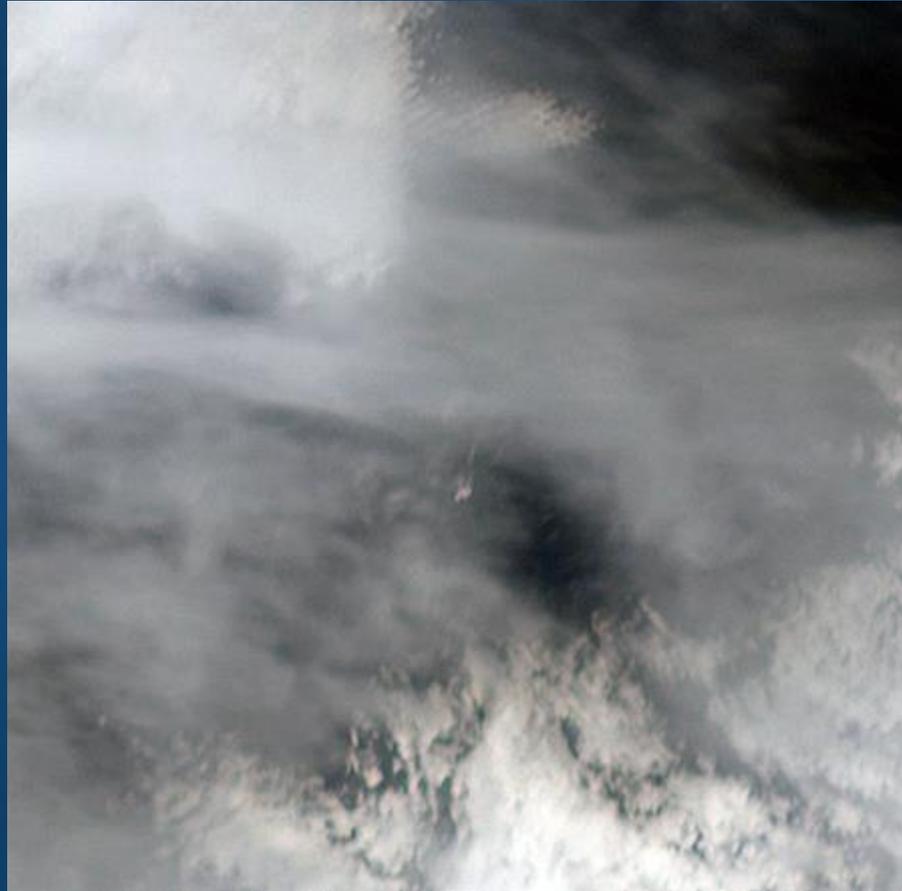
Canadian forest fire: smoke reaches to top of troposphere; long-range transport enhanced by height





MISR Volcanoes

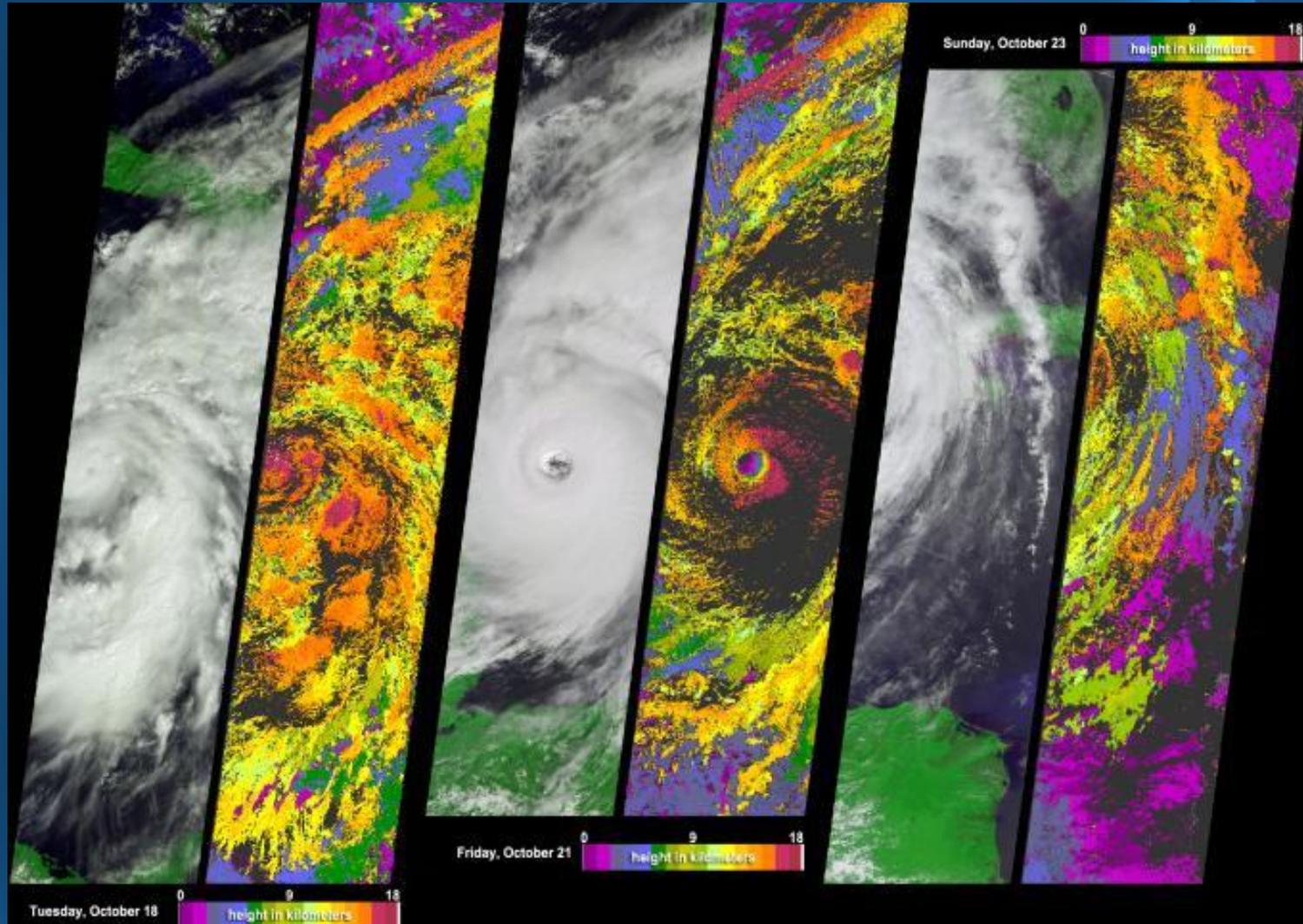
Time lapse from
9 cameras
reveals eruption
plume rising
from volcano





MISR Hurricane

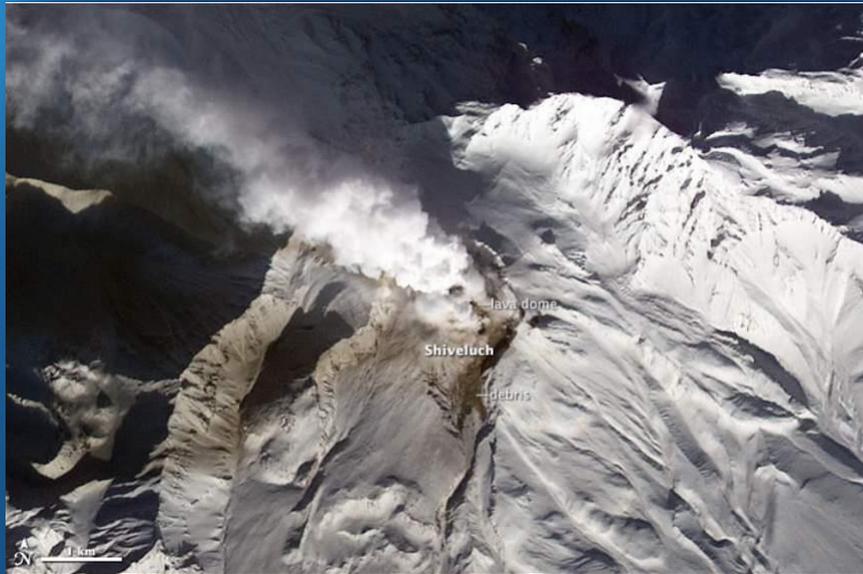
Cloud heights of
Category 5
Hurricane Wilma
over 5-day
period





ASTER Volcanoes

Four volcanoes erupt simultaneously in Kamchatka, Russia





ASTER Landslides

Ice avalanche in Tibet (top) killed 9. Warnings about future landslide (bottom) saved lives





ASTER Tsunami Damage

Tsunami damage assessment: Japan



After



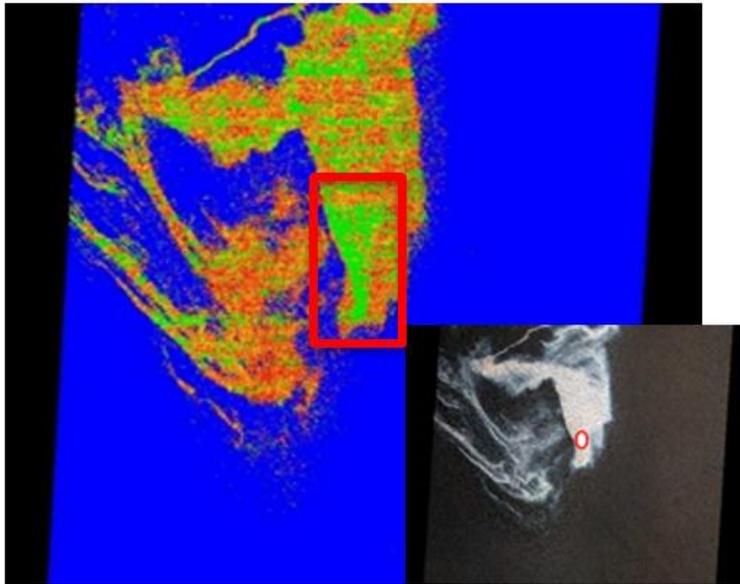
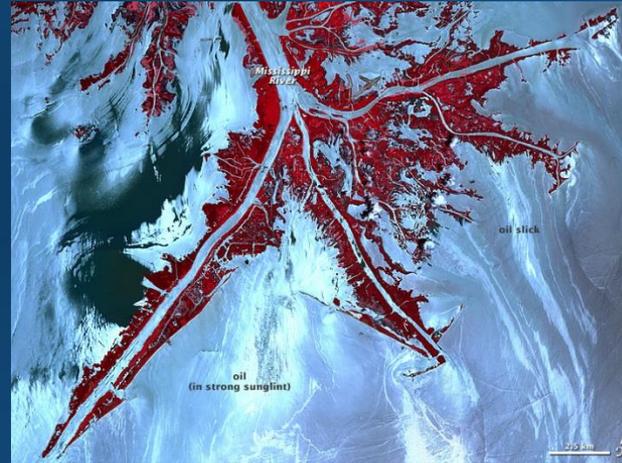
Before



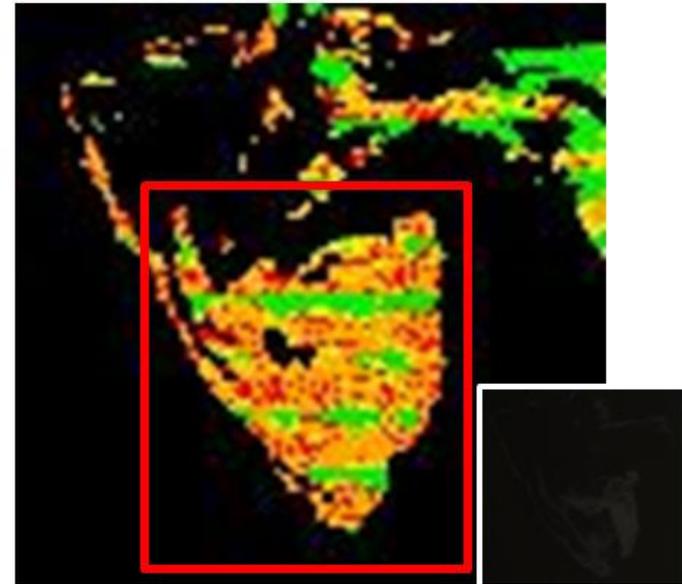


ASTER Oil Slick

Gulf of Mexico oil spill



Oil thickness by ASTER



Oil thickness by MODIS



ASTER Fires

Forest fire near Los Angeles. Active fire (red), burned areas (dark red) and smoke/ash plumes (gray) all detected

