



ARSET

Applied Remote Sensing Training

<http://arset.gsfc.nasa.gov>

 @NASAARSET

Introduction and Logistics

NASA ARSET Training in conjunction with:

Opportunities to Apply Remote Sensing in Boreal/Arctic Wildfire Management and Science

April 3rd, 2017

Agenda

- **8:30 – 10:00 am Introductions**

- Cindy Schmidt and Amber McCullum NASA ARSET
- Vince Ambrosia, Associate Program Manager for Wildfires

- **10:00 – 10:15 am Break**

- **10:15 – 12:00 Near Real-Time Tools**

- Wilfrid Schroeder – VIIRS Active Fire
- Anita Leroy – NASA SPoRT

- **12:00 – 1:00pm Lunch Break**

- **1:00 – 2:30 pm Potential Fire Risk**

- Tom Maiersperger, LP DAAC
- Mary Ellen Miller, Michigan Tech, SMAP

- **3:00-3:15 pm Break**

- **3:15 – 4:30 pm Post Fire Restoration**

- Mary Ellen Miller, Michigan Tech, Water Erosion Prediction Project
- Cindy Schmidt for Josh Picotte, Burn Severity Mapping tool

- **4:30 – 5:00 pm Wrap up and Evaluation**



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 @NASAARSET

About ARSET

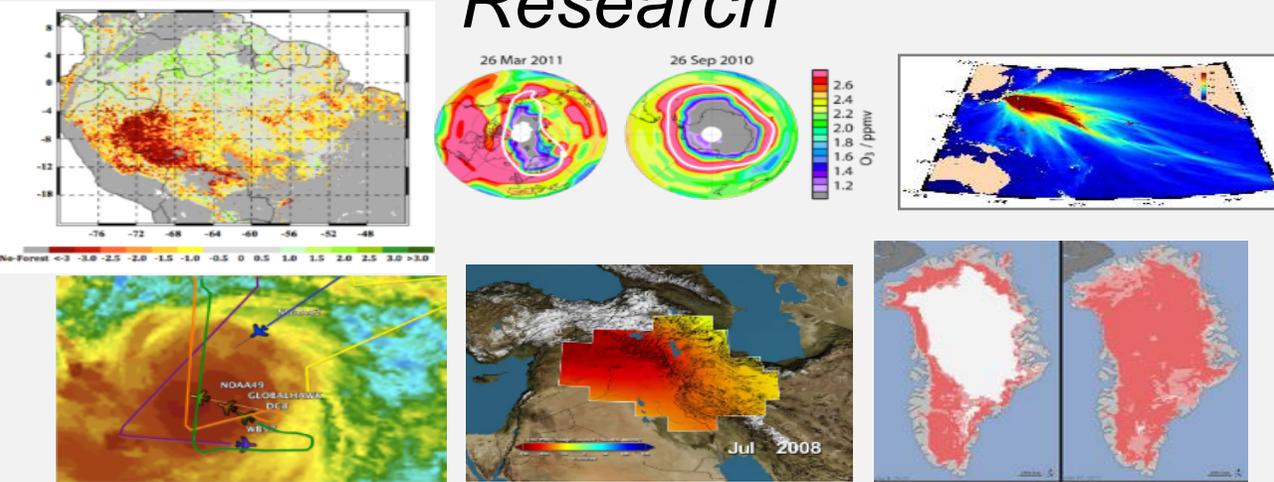
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Earth Science Program

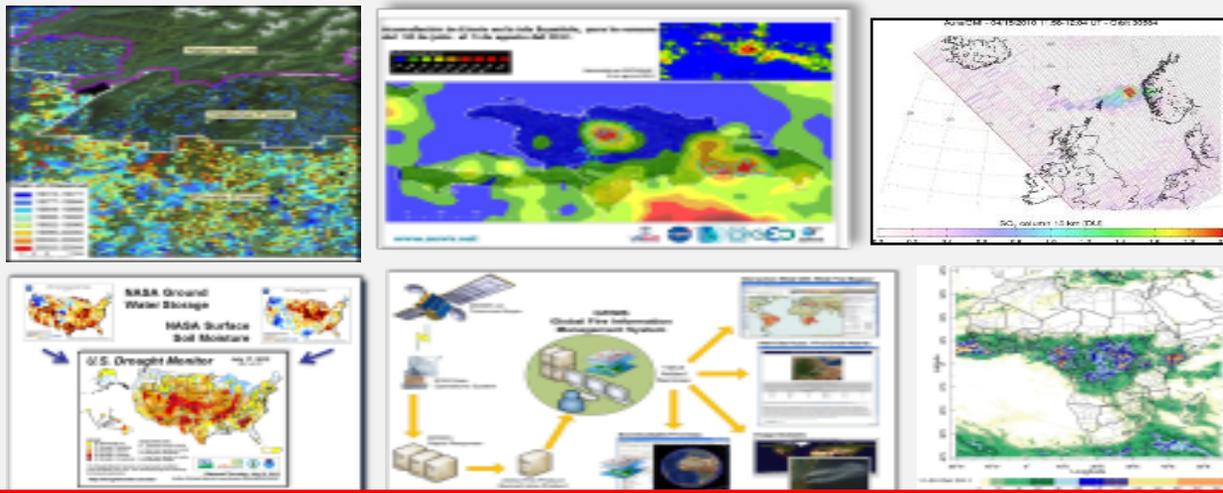
Research



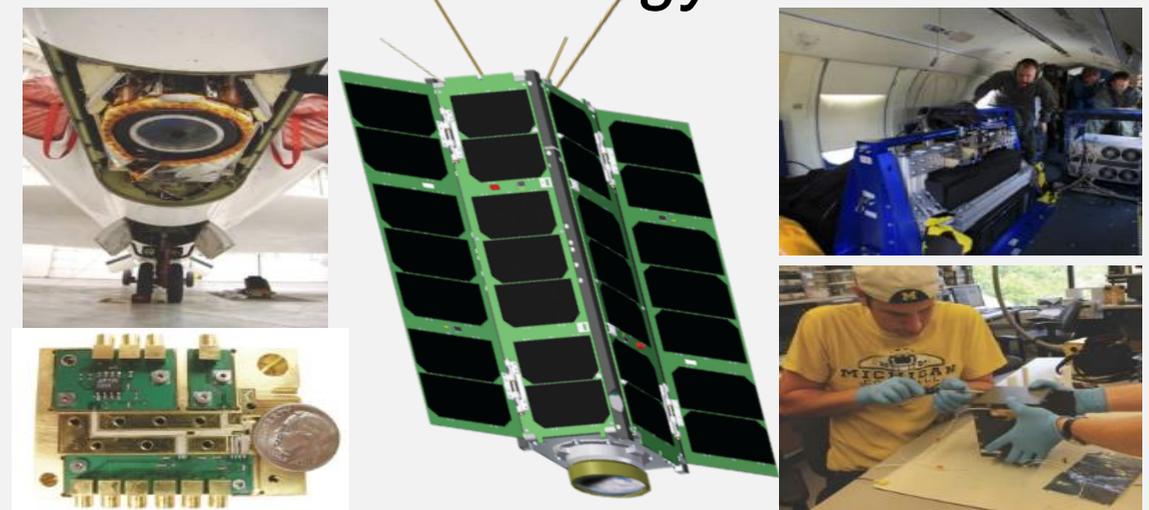
Flight (incl. Data Systems)



Applied Sciences



Technology



Applied Sciences Program



Applications in Mission Planning

Identify applications early and throughout mission lifecycle, integrate end-user needs in design and development, enable user feedback, and broaden advocacy.



Societal & Economic Applications

Generate, test, develop, enable adoption, and extol applications ideas for sustained uses of Earth obs. in decisions and actions.



Capacity Building

Build skills, workforce, and capabilities in US and developing countries to apply Earth obs. to benefit society and build economies.

Capacity Building Program Elements



SERVIR: Building international capacity with hubs in East Africa, Hindu Kush-Himalaya, Mesoamerica, Southeast Asia



Applied Remote SENSING Training, ARSET: Online and hands on basic/advanced training to build skills



DEVELOP: Dual workforce/local government capacity building using collaborative feasibility projects, internships

NASA's Applied Remote Sensing Training Program (ARSET)

<http://arset.gsfc.nasa.gov/>

- Goal: increase the use of Earth Science in decision-making through training for:
 - policy makers
 - environmental managers
 - other professionals in the public and private sector
- Online and in-person trainings offered focusing on applications in:



Disasters



Land



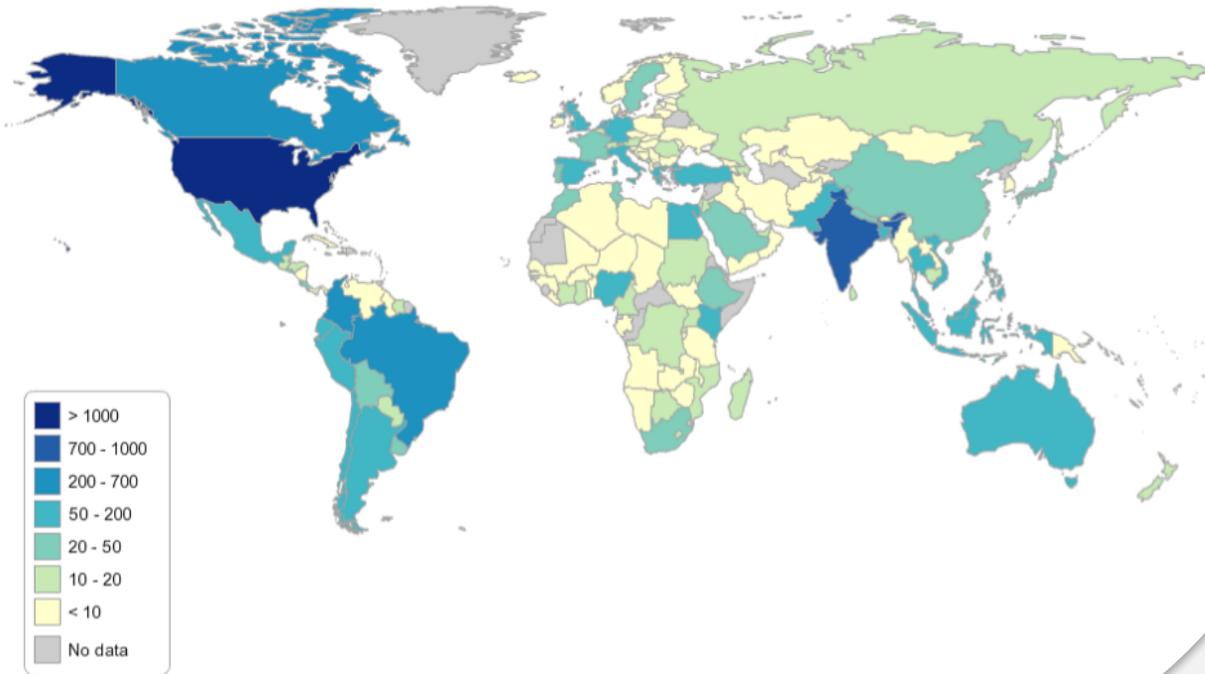
Health & Air Quality



Water Resources

ARSET's Global Footprint

**ARSET Participants by Country
2009 – 2016**



83 ARSET Trainings

8,000+ participants reached

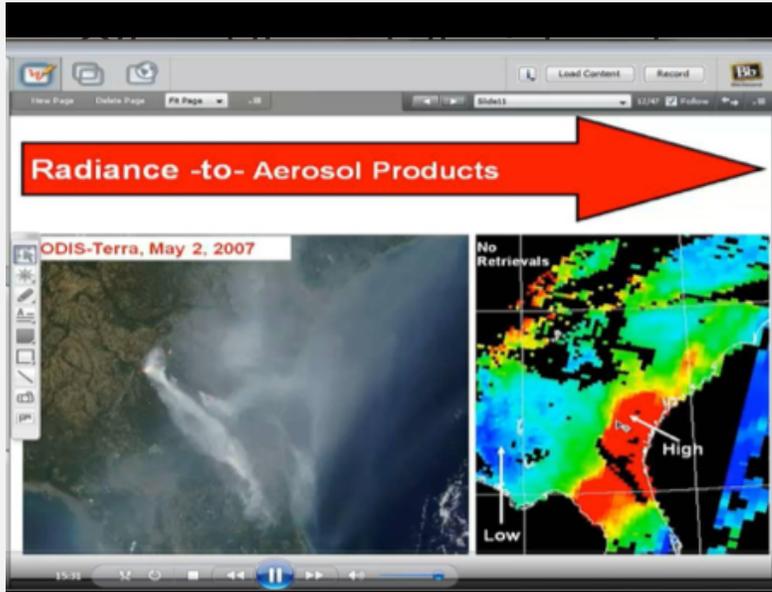
2,600+ organizations reached

160 + countries reached

55 U.S. States, Territories, and D.C. reached

ARSET Training Formats

Online



In-Person



Train the Trainers



ARSET Training Levels



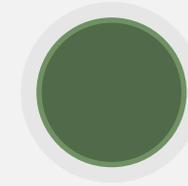
Fundamentals: Level 0

- Online only
- Assumes no prior knowledge of remote sensing



Basic Training: Level 1

- Online and in-person
- Requires level 0 training or equivalent knowledge
- Specific applications



Advanced Training: Level 2

- Online and in-person
- Requires level 1 training or equivalent knowledge
- More in-depth or focused topics

Fundamentals of Remote Sensing: Satellites, Sensors, Data, and Tools for Land Management & Wildfire Applications

Basic Training: Remote Sensing of Forest Cover and Change Assessment for Carbon Monitoring

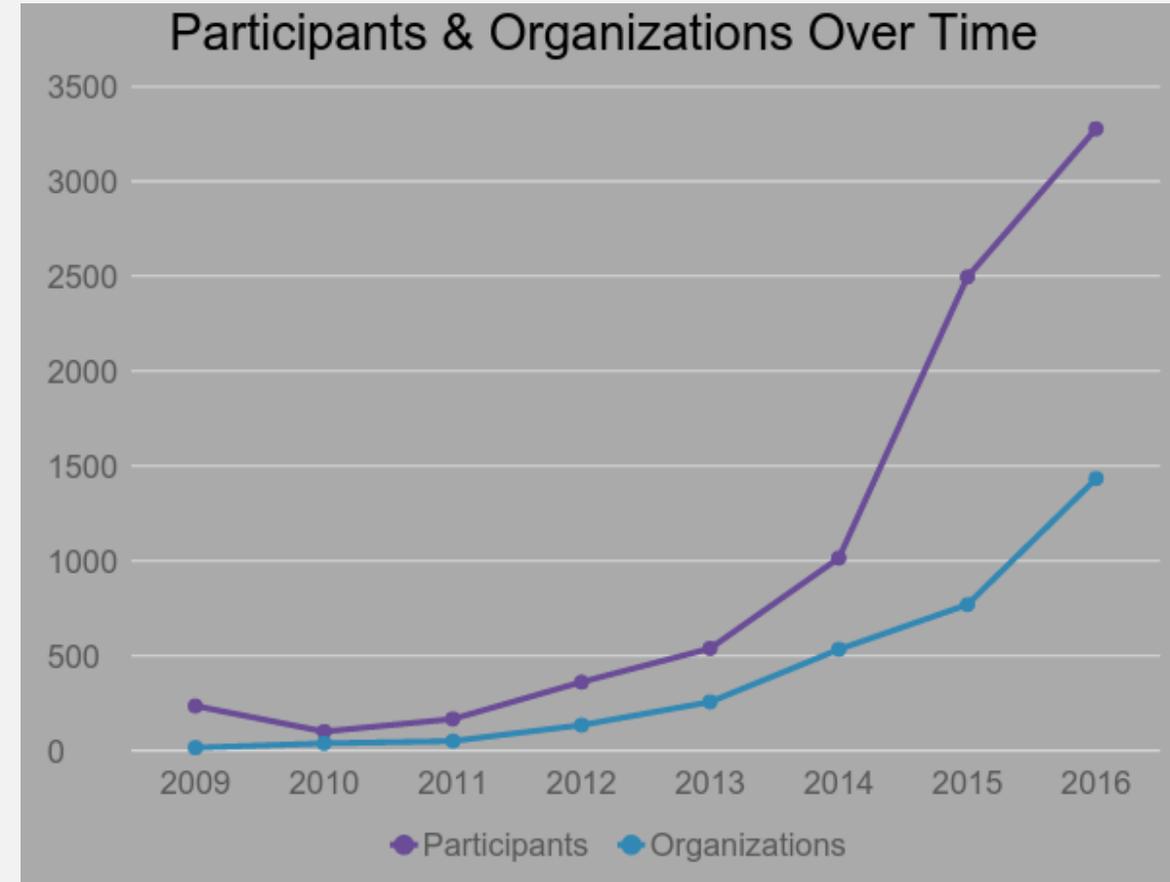
Advanced Training: Advanced Webinar: Land Cover Classification with Satellite Data

ARSET Trainings and Participants

 8,000+ participants
  160+ countries
  2,600+ organizations

 38 online trainings
  45 in-person trainings

<p>Disasters</p>  <p>7 trainings</p>	<p>Land</p>  <p>10 trainings</p>	<p>Water Resources</p>  <p>15 trainings</p>	<p>Health and Air Quality</p>  <p>49 trainings</p>	<p>Train the Trainers</p>  <p>1 training</p>
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ARSET Website: View Webinars

<http://arset.gsfc.nasa.gov/webinars>

ARSET-Dev
Applied Remote Sensing Training

Home About Trainings

Applied Remote Sensing Training

Using NASA Remote Sensing for Disaster Management

June 9-30, 2016
Thursdays
11:00 a.m.-12:00 p.m. and 6:00-7:00 p.m. EDT

Learn More

ARSET

- Webinars**
- Workshops
- Suggest a Training
- Personnel
- Resources

Upcoming Training

Disasters

Using NASA Remote Sensing for Disaster Management
06/09/2016 to 06/30/2016

Airquality

Fundamentals of Satellite Remote Sensing for Health Monitoring
06/02/2016 to 06/30/2016

Land

Remote Sensing of Forest Cover and Change Assessment for Carbon Monitoring
06/09/2016 to 07/07/2016

ARSET-Dev
Applied Remote Sensing Training

Home About Trainings

Webinars

ARSET offers online webinars throughout the year. Each training lasts four to five weeks, one hour per week, and are often offered twice a day to accommodate attendees in different time zones. Webinars are appropriate for professionals engaged in applied environmental management.

These online courses help beginners and advanced professionals use NASA Earth science data and modeling in areas of air quality, disaster management, land management, water resources, and wildfire detection and modeling.

ARSET hosts both introductory and advanced webinars. Check the individual webinar page for its level and more information. Most webinars have materials available in English and Spanish.

Introductory Webinars

Trainings are appropriate for applied professionals with no remote sensing experience.

Advanced Webinars

Trainings are appropriate for professionals with experience in remote sensing or NASA data and resources. Advanced topics will detail specific data or applications by region or discipline. These advanced trainings have case studies and hands-on exercises for participants on data access and processing.

Introduction to Satellite Remote Sensing for Air Quality Applications

Wednesday, July 6, 2016 to Wednesday, August 3, 2016
8:00 - 9:00 a.m. EDT (UTC-4)

Application Area: Airquality

Instruments/Missions: Aqua, Aura, CALIPSO, MISR, MODIS, NPP, Terra

Keywords: Aerosols, Air Pollution, Pollution Transport, Satellite Imagery, Tools, Trace Gases

Read more

Introduction to Remote Sensing for Coastal and Ocean Applications

Wednesday, July 6, 2016 to Wednesday, July 27, 2016
1:00-2:00 p.m. EDT (UTC-4)

Application Area: Land, Water

Instruments/Missions: Aqua, MODIS, NPP, Terra, VIIRS

Keywords: Satellite Imagery, Tools, Water Quality

Read more

Remote Sensing of Forest Cover and Change Assessment for Carbon Monitoring

Thursday, June 9, 2016 to Thursday, July 7, 2016

ARSET

- Webinars**
- Workshops
- Suggest a Training
- Personnel
- Resources

Upcoming Training

Disasters

Using NASA Remote Sensing for Disaster Management
06/09/2016 to 06/30/2016

Airquality

Fundamentals of Satellite Remote Sensing for Health Monitoring
06/02/2016 to 06/30/2016

Land

Remote Sensing of Forest Cover and Change Assessment for Carbon Monitoring
06/09/2016 to 07/07/2016

Previous Wildfire Trainings

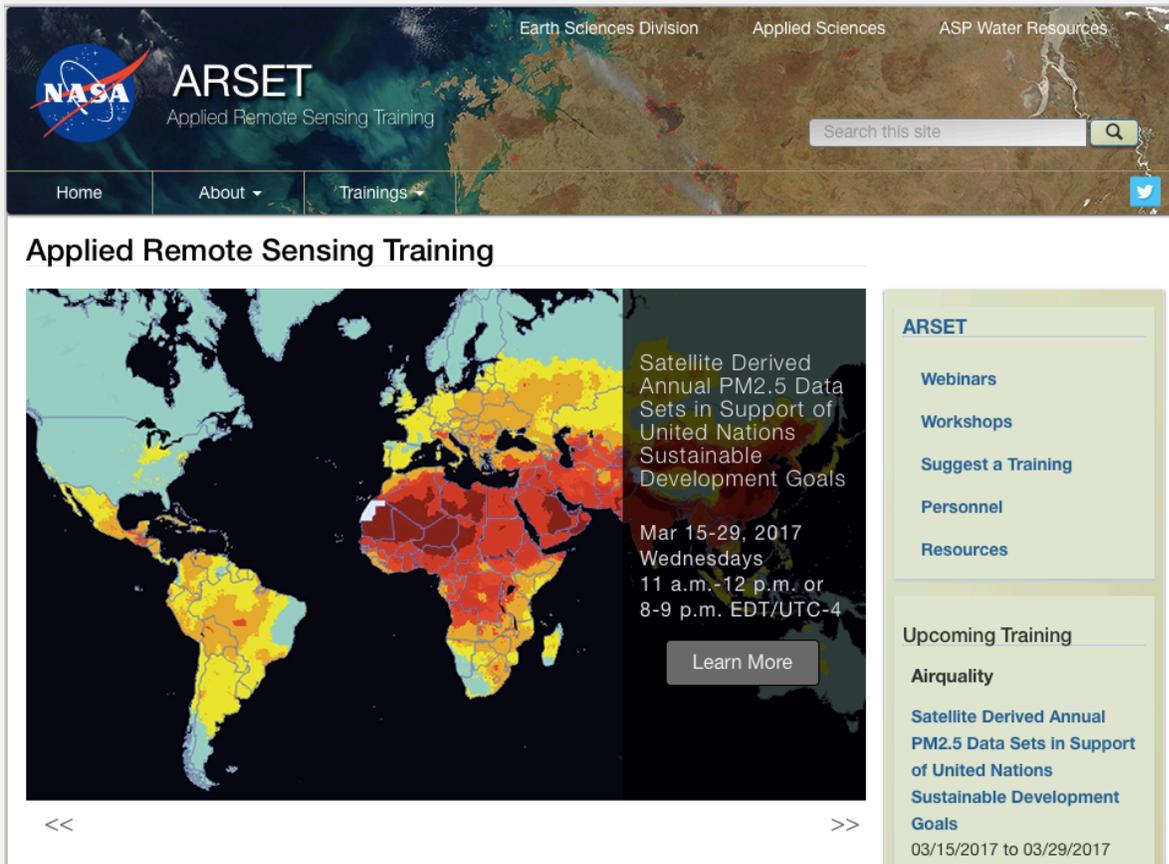
- *Introduction to Remote Sensing for Wildfire Applications (Webinar):* March 31 – April 28, 2015
- *NASA Remote Sensing for Wildfire Applications (In-person):* October 6 – 8, 2015
- *Application of Satellite Remote Sensing Data for Fire & Smoke Monitoring (In-person):* November 14, 2016



Webinars and In-Person Trainings 2017 (partial list)

- **Advanced Webinar:** Land Cover Classification with Satellite Imagery, Jan 31-Feb. 7
- **Intro Webinar:** Overview of the Global Disaster and Coordination System, February 21
- **Intro Webinar:** Satellite Derived Annual PM2.5 Data Sets in Support of UN Sustainable Development Goals, March 15 – 29
- **In-Person Training:** Remote Sensing in Arctic/Boreal Wildfire Management and Science, April 3, Fairbanks, AK
- **In-Person Training:** NASA Remote Sensing for Flood Monitoring and Management, April 18-20, Fairfax, VA
- **In-Person Training:** Satellite Remote Sensing of Air Quality, May 23-26, India
- **Intro Webinar:** Remote Sensing of Drought, June 2017
- **Intro Webinar and In-Person Training:** Species Distribution Modeling, June and August 2017
- **In-Person Training:** Remote Sensing of Water Resources, August, Brazil

More Information



The screenshot shows the ARSET website homepage. At the top, there is a navigation bar with the NASA logo, the text "ARSET Applied Remote Sensing Training", and links for "Earth Sciences Division", "Applied Sciences", and "ASP Water Resources". A search bar is also present. Below the navigation bar, there are menu items for "Home", "About", and "Trainings". The main content area features a large world map with a color-coded overlay representing PM2.5 data. To the right of the map, there is a text box with the following information: "Satellite Derived Annual PM2.5 Data Sets in Support of United Nations Sustainable Development Goals", "Mar 15-29, 2017 Wednesdays 11 a.m.-12 p.m. or 8-9 p.m. EDT/UTC-4", and a "Learn More" button. To the right of the map and text box, there is a sidebar with a list of links: "ARSET", "Webinars", "Workshops", "Suggest a Training", "Personnel", and "Resources". Below this list, there is a section titled "Upcoming Training" with the following details: "Airquality", "Satellite Derived Annual PM2.5 Data Sets in Support of United Nations Sustainable Development Goals", and "03/15/2017 to 03/29/2017".



The cover of the 2016 Annual Report for NASA's Applied Remote Sensing Training Program. The background is a satellite image of Earth. The text on the cover reads: "National Aeronautics and Space Administration" (with the NASA logo), "NASA's Applied Remote Sensing Training Program", "Train. Empower. Advance.", and "2016 Annual Report".

<http://arset.gsfc.nasa.gov>
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 @NASAARSET

Wildfire Satellites and Products

NASA ARSET Training in conjunction with:

Opportunities to Apply Remote Sensing in Boreal/Arctic Wildfire Management and Science

April 3rd, 2017

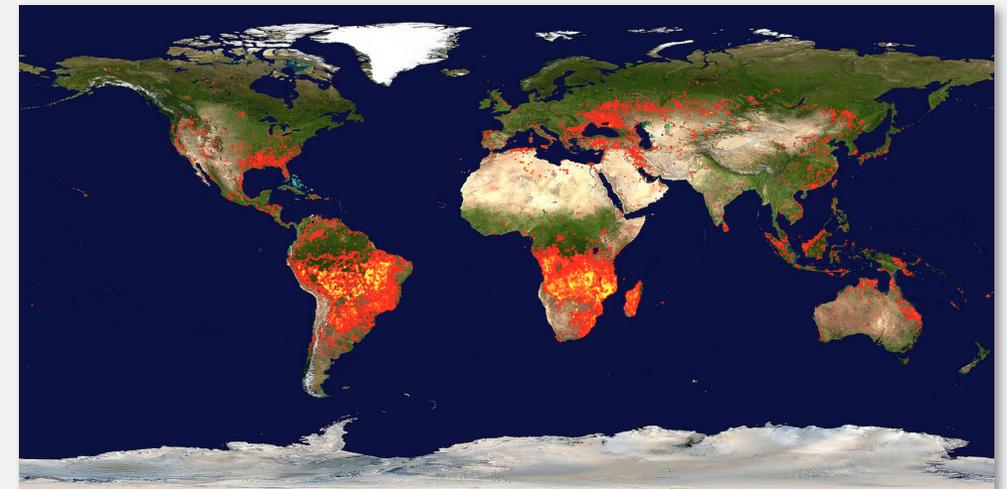
Lecture Outline

- Wildfire Satellites Review
 - Landsat
 - MODIS
 - Suomi NPP (VIIRS)
 - SMAP
- Landsat Imagery for Wildfires
 - Fire Mapping
 - NBR & dNBR
 - MTBS
- NASA Fire and Smoke Products
 - MODIS Products
 - VIIRS Active Fire Mapper
 - FIRMS
- NOAA Fire and Smoke Products
 - HMS
- Additional Products and Tools
 - USFS Active Fire Mapping
 - LANDFIRE



Left: Smoke and wildfire locations in Northern California from the MODIS satellite on August 5, 2015

Below: Fire hot spot locations globally from MODIS

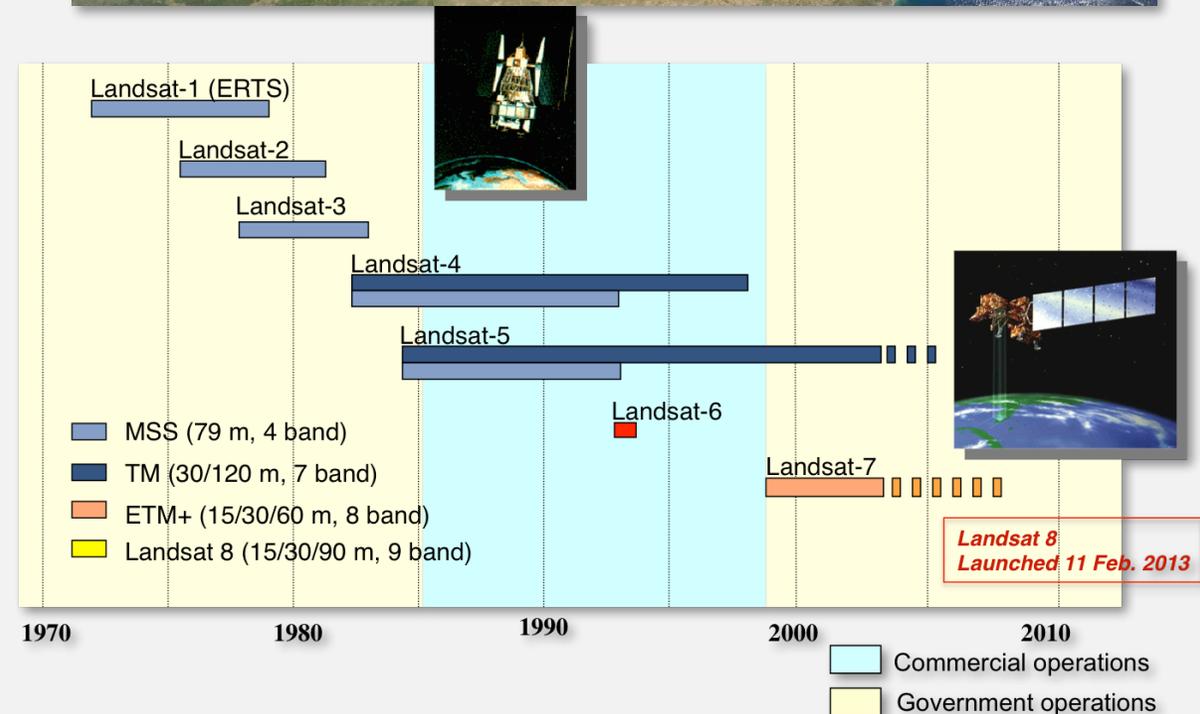
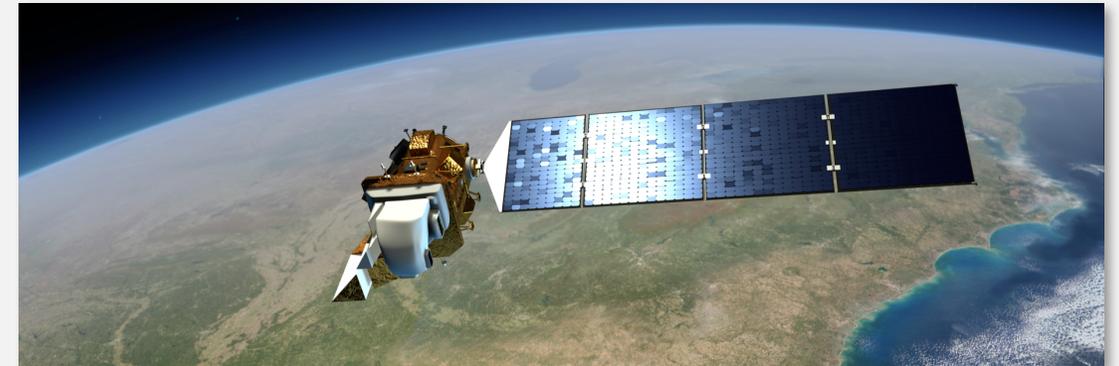


An aerial satellite view of a forested landscape. A large, dense plume of white smoke or ash rises from the center of the image, partially obscuring the terrain below. The surrounding area is a mix of green forest and brownish, possibly charred or cleared land. A winding river or road is visible on the right side. The overall scene suggests a major wildfire event.

Wildfire Satellites and Sensors

Landsat

- First Landsat launched in 1972
- Landsat 8 launched in 2013
- NASA created and launched
 - USGS maintains data
- Passive sensor: obtains values of reflectance from Earth's surface
- 30 meter pixels, 15 meter panchromatic band
- Entire image of the Earth every 16 days

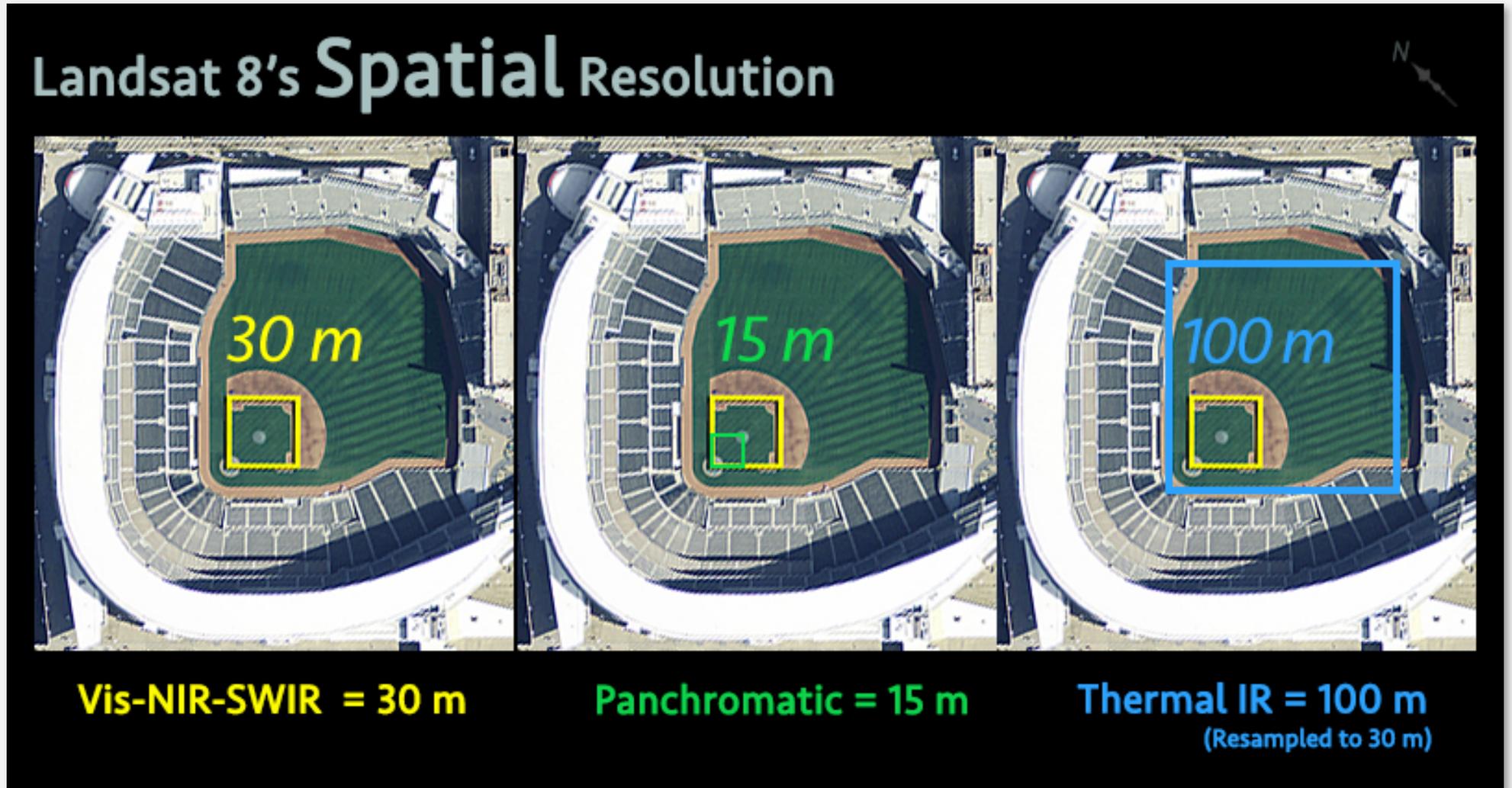




Landsat Bands

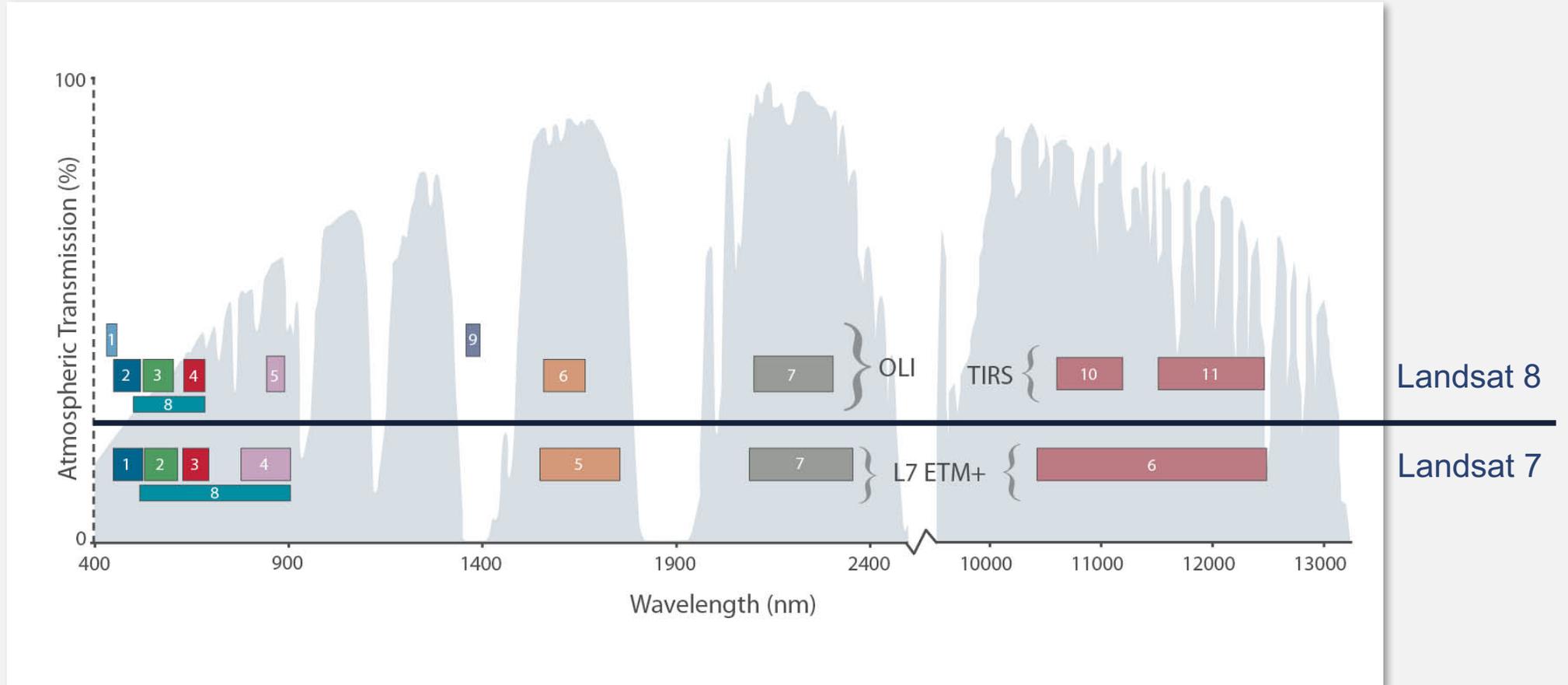
Landsat-7 ETM+ Bands (μm)			Landsat-8 OLI and <i>TIRS</i> Bands (μm)		
			30 m Coastal/Aerosol	0.435 - 0.451	Band 1
Band 1	30 m Blue	0.441 - 0.514	30 m Blue	0.452 - 0.512	Band 2
Band 2	30 m Green	0.519 - 0.601	30 m Green	0.533 - 0.590	Band 3
Band 3	30 m Red	0.631 - 0.692	30 m Red	0.636 - 0.673	Band 4
Band 4	30 m NIR	0.772 - 0.898	30 m NIR	0.851 - 0.879	Band 5
Band 5	30 m SWIR-1	1.547 - 1.749	30 m SWIR-1	1.566 - 1.651	Band 6
Band 6	60 m TIR	10.31 - 12.36	<i>100 m TIR-1</i>	<i>10.60 - 11.19</i>	Band 10
			<i>100 m TIR-2</i>	<i>11.50 - 12.51</i>	Band 11
Band 7	30 m SWIR-2	2.064 - 2.345	30 m SWIR-2	2.107 - 2.294	Band 7
Band 8	15 m Pan	0.515 - 0.896	15 m Pan	0.503 - 0.676	Band 8
			30 m Cirrus	1.363 - 1.384	Band 9

Landsat Spatial Resolution





Landsat Bands



Where to Obtain Landsat Images



LandsatLook Viewer: <http://landsatlook.usgs.gov/>



GloVis: <http://glovis.usgs.gov/>



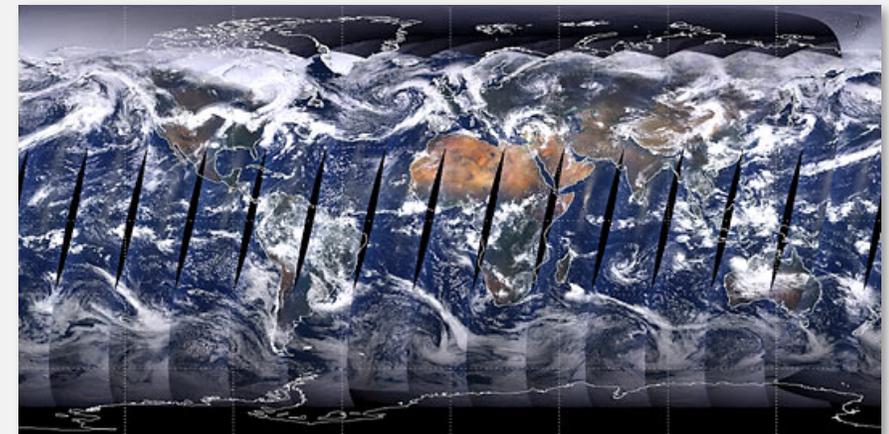
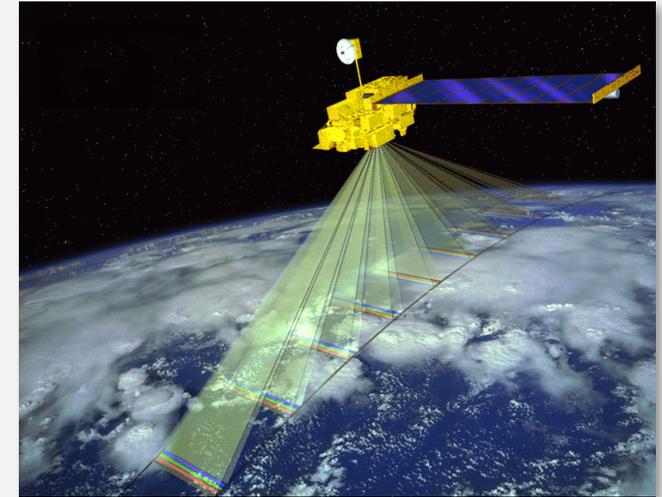
Global Land Cover Facility: <http://glcf.umd.edu/data/landsat/>



Earth Explorer: <http://earthexplorer.usgs.gov/>

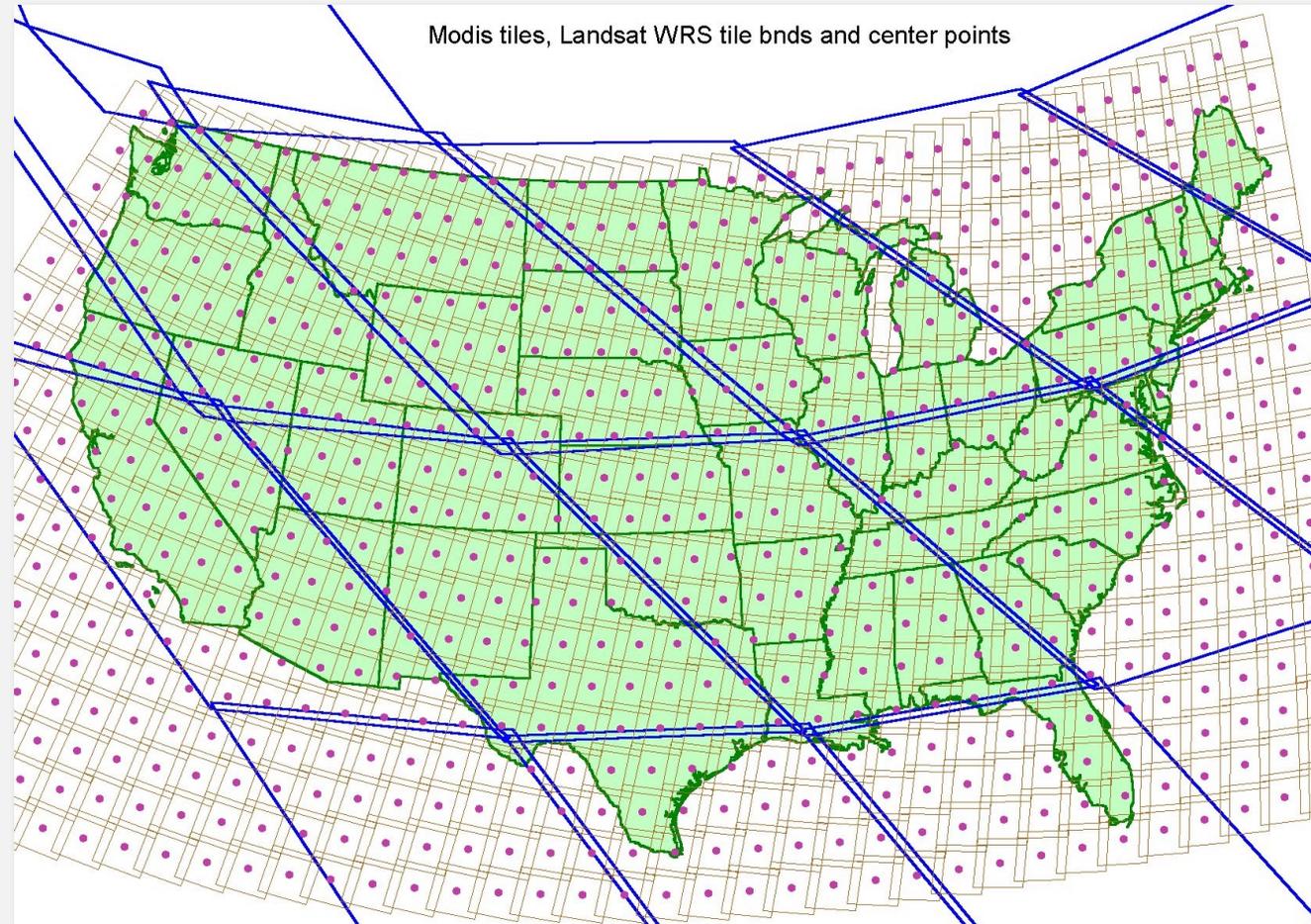
MODIS

- Spatial Resolution
 - 250 m, 500 m, 1 km
- Temporal Resolution
 - Daily, 8 day, 16 day, monthly, quarterly, yearly
 - 2000–present
- Data Format
 - Hierarchical data format – Earth Observing System Format (HDF–EO8)
- Spectral Coverage
 - 36 bands (major bands include red, blue, IR, NIR, MIR)
 - Bands 1-2: 250 m
 - Bands 3-7: 500 m
 - Bands 8-36: 1000 m



MODIS vs. Landsat Images

Large swaths!



Where to Obtain MODIS Products



Land Process Distributed Active Archive (LPDAAC)

<http://lpdaac.usgs.gov/>



ECHO Reverb: <http://reverb.echo.nasa.gov>



Worldview (Fires, Land Surface Temperature and Snow Cover): <https://earthdata.nasa.gov/labs/worldview>



Fire Information for Resource Management System (FIRMS): <https://earthdata.nasa.gov/data/near-real-time-data/firms>

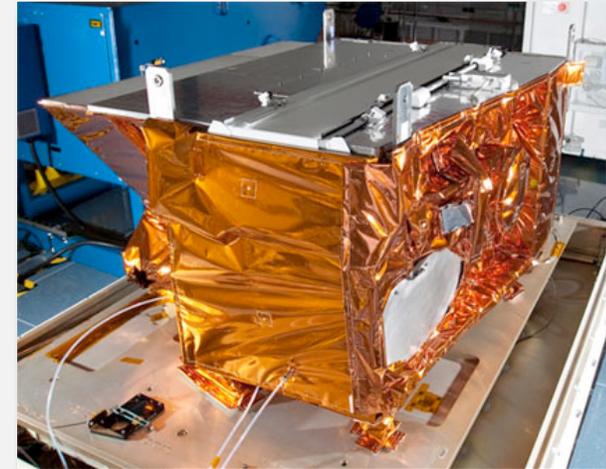


National Snow and Ice Data Center:

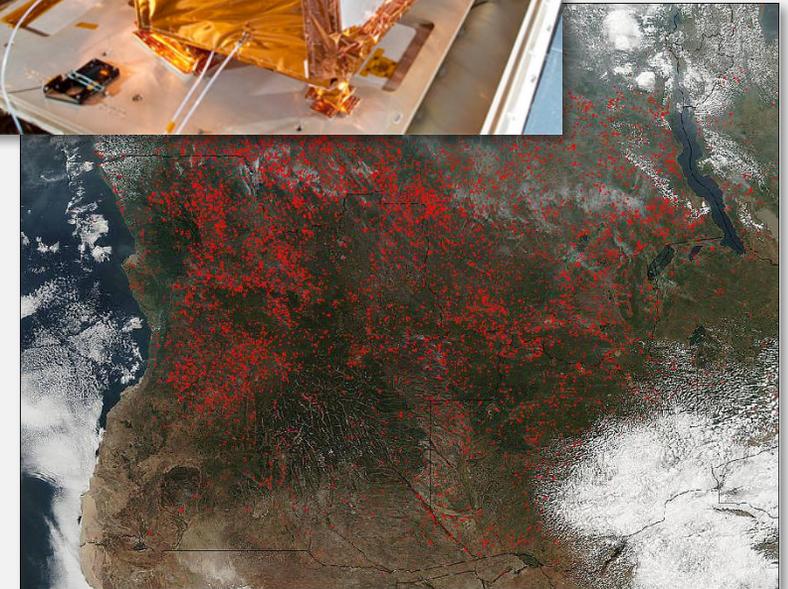
http://nsidc.org/data/modis/data_summaries#snow

Suomi NPP: VIIRS

- Visible Infrared Imaging Radiometer Suite (VIIRS): instrument aboard Suomi National Polar-orbiting Partnership (NPP)
- Collects visible and infrared imagery and radiometric measurements
- Launched 2012
 - NOAA took control of operations in 2013
- Daily temporal resolution
 - Global coverage
- Spatial resolution
 - 5 high resolution bands: 375 m
 - 16 moderate resolution bands: 750 m
 - 1 day/night band: can observe fires at night
- Active Fires
 - Detects thermal anomalies (day & night)
 - Fire radiative power (FRP)



VIIRS sensor on Suomi-NPP



Fires in Central Africa acquired with VIIRS on Suomi-NPP on June 13, 2016 (Image credit: NASA, courtesy of Jeff Schmaltz)

Where to Obtain VIIRS Land Products



Worldview (Fires, Land Surface Temperature and Snow Cover): <http://earthdata.nasa.gov/labs/worldview>

VIIRS Active Fire

VIIRS Active Fire:
<http://viirsfire.geog.umd.edu/pages/about.php>



NOAA Comprehensive Large Array-Data Stewardship System (CLASS): <http://www.class.ngdc.noaa.gov/saa/products/welcome>

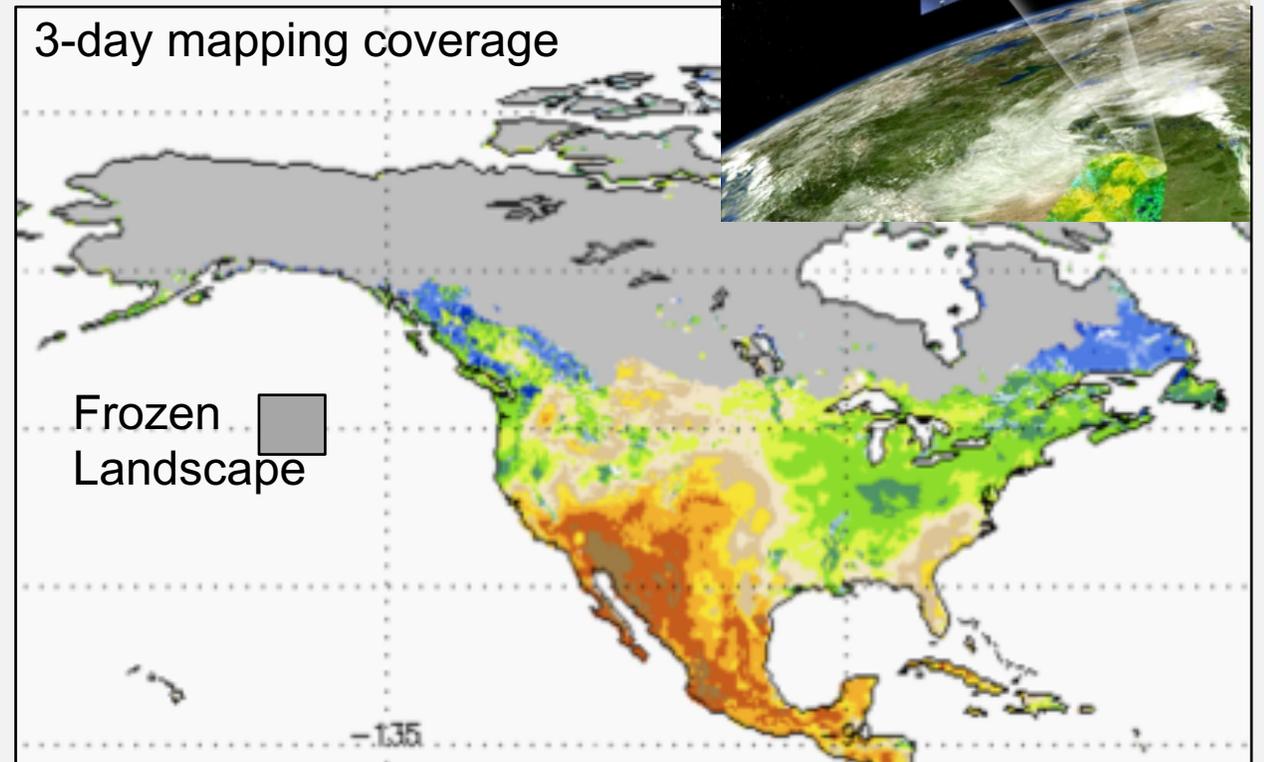
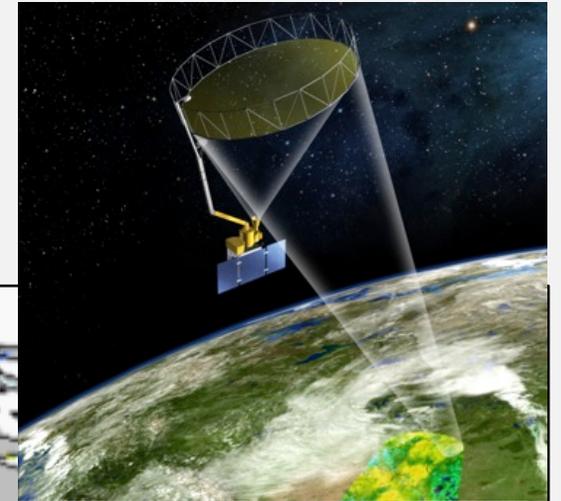


Level-1 and Atmosphere Archive & Distribution System Website: <http://ladsweb.nascom.nasa.gov>

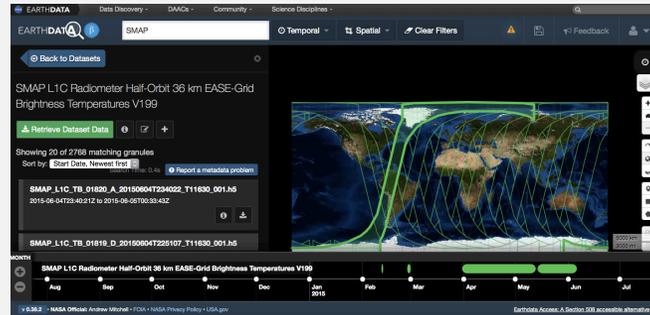


Soil Moisture Active Passive (SMAP)

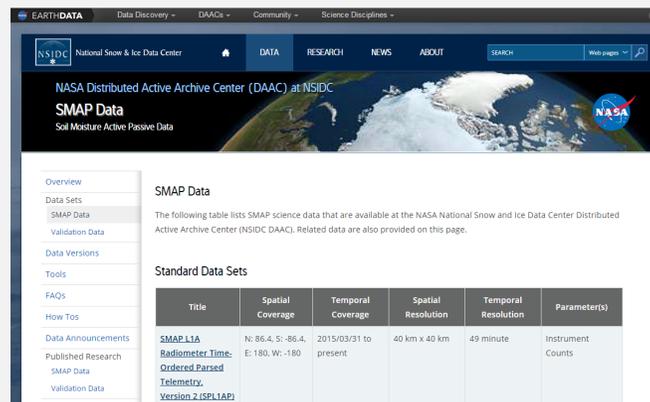
- Measures the moisture in the top 5 cm of the soil globally every 3 days
- Launched January 2015
- Radar (No longer working)
- Radiometer
 - Resolution: ~40km
 - Penetrate through clouds and vegetation, operate day and night
- Uses
 - Estimating global surface water and energy fluxes
 - Quantifying net carbon flux in boreal landscapes
 - Flood protection and drought mitigation



Accessing SMAP



NASA Earthdata: <https://earthdata.nasa.gov/>



NSIDC: <https://nsidc.org/data/smap/smap-data.html>



ASF Vertex: <https://vertex.daac.asf.alaska.edu/>

The background is a satellite image of a forested area. A semi-transparent white rectangular box is centered over the image. Inside the box, the text "Landsat Imagery for Wildfires" is written in a black, sans-serif font. Below the text, a solid black horizontal line spans the width of the text.

Landsat Imagery for Wildfires

Landsat for Fire Mapping

- Burn Severity:
 - Degree to which a site has been altered or disrupted by fire
 - Loosely, a product of fire intensity and residence time
 - The effect of a fire on ecosystem properties, often defined by the degree of mortality of vegetation
- How do we connect pixels in a satellite image to burn severity?
 - Use spectral properties

Left: Landsat image from September 15, 2016. False color image shows extent of the Soberanes Fire in California

Right: Post-wildfire landscape. Image Credit: Bcasterline

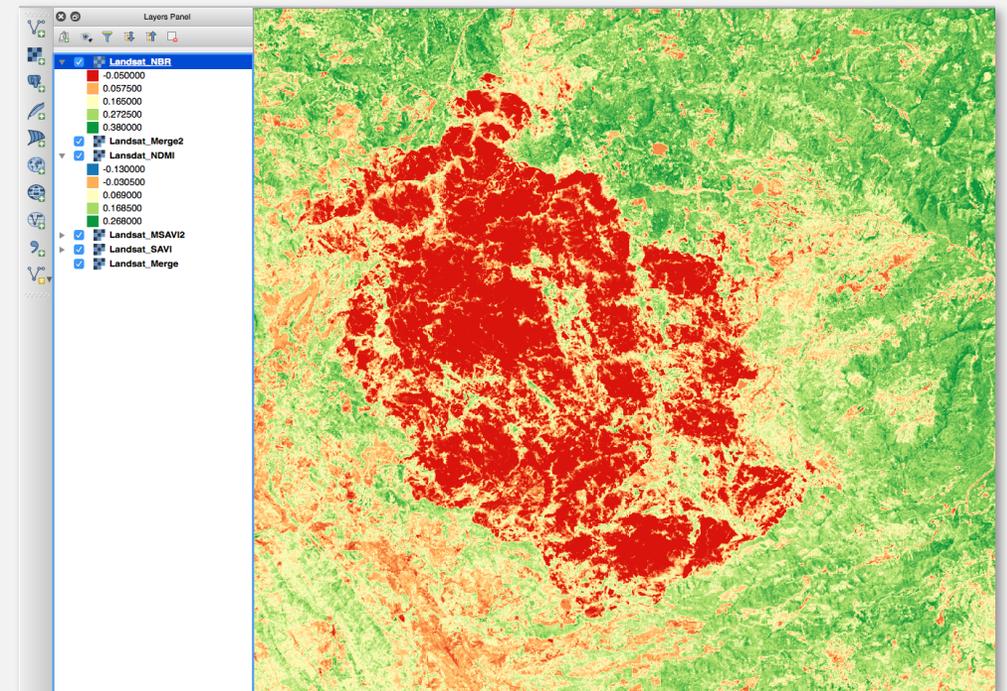


Normalized Burn Ratio

- Used to identify burned areas
- Compare pre- and post-burn to identify burn extent and severity
- Use Band 7 for SWIR in Landsat 8 images
- Can be used to create a Burned Area Reflectance Classification (BARC)
 - Input to a Burn Severity Map

$$NBR = \frac{(NIR - SWIR)}{NIR + SWIR}$$

Example of NBR using Landsat in QGIS software. This is the NBR of the Rim Fire in California from August 2013

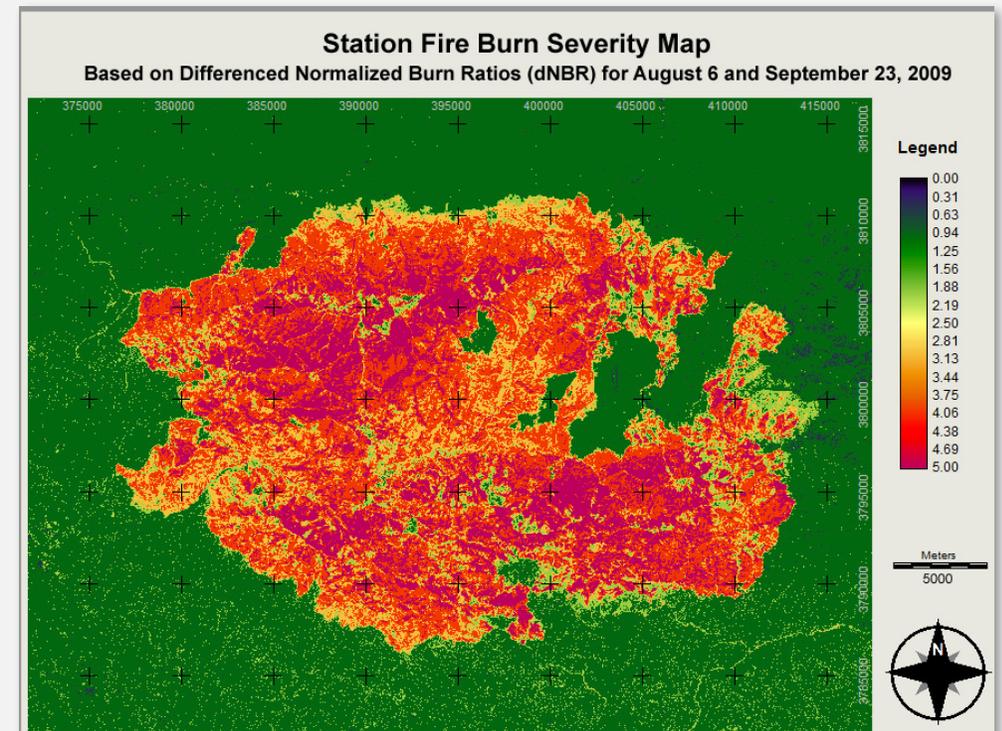


Landsat for Post-Fire Mapping

- Need at least 2 images:
 - One pre-burn
 - One post-burn
1. Create NBR for each image
 2. Subtract post-fire image from pre-fire image
 3. Evaluate differenced map

Example of dNBR from the Station fire in Angeles National Forest from August-September 2009.
Image Credit: Irene Nester

$$dNBR = NBR_{prefire} - NBR_{postfire}$$



Monitoring Trends in Burn Severity

<http://www.mtbs.gov/>

- Project designed to consistently map burn severity and fire perimeters across the U.S.
 - Partnership between USGS & USDA Forest Service
- Remote sensing and ground-based assessments
- Outputs
 - NBR from Landsat (pre- and post-fire)
 - Differenced NBR (dNBR)
 - Classification of burn severity
 - Based on pre and post imagery, plot data, & analyst's experience with fire behavior
 - Fire Perimeter
 - Geospatial Metadata

MTBS Data search

A satellite image of a forest fire. The background shows a dense green forest with a large, irregularly shaped area of brown and tan, indicating a fire. A semi-transparent white rectangular box is overlaid on the center of the image. Inside the box, the text "NASA Fire Products" is written in a bold, black, sans-serif font. Below the text, a thin black horizontal line extends across the width of the text.

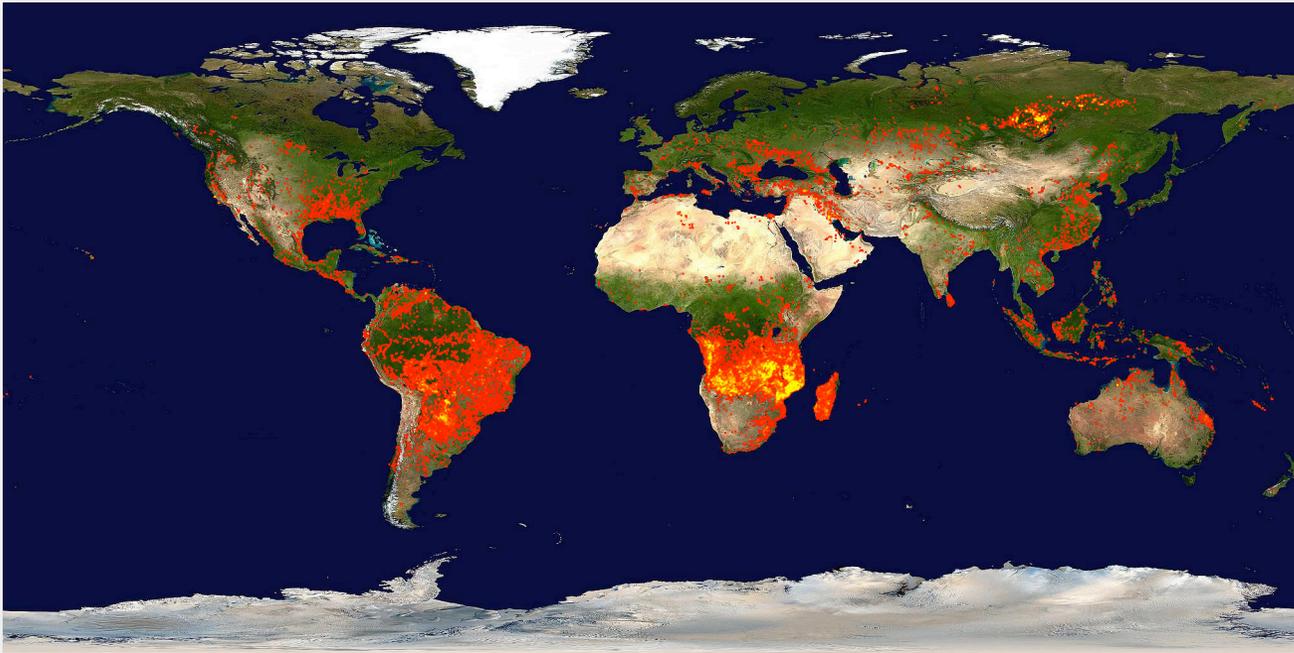
NASA Fire Products

Relevant MODIS Products

MODIS Name (Short)	Product Name	Spatial Resolution (m)	Temporal Resolution
MOD 09	Surface Reflectance	500	8-day
MOD 11	Land Surface Temperature	1000	Daily, 8-day
MOD 12	Land Cover/Change	500	8-day, Yearly
MOD 13	Vegetation Indices	250-1000	16 day, Monthly
MOD 14	Thermal Anomalies/Fire	1000	Daily, 8-day
MOD 45	Burned Area	500	Monthly
MOD 10	Snow Cover	500	Daily, 8-day, Monthly
MOD 09GA	MODSCAG (modeled MODIS snow product)	500, 1000	Daily

MODIS Fire Products

- Near Real-Time Thermal Anomalies and Fire Locations
- Provides snapshots of active burning fires and burned areas
- The Active Fire product delivers actively burning locations on a daily basis at 1 km resolution (additional 8 day and monthly products)

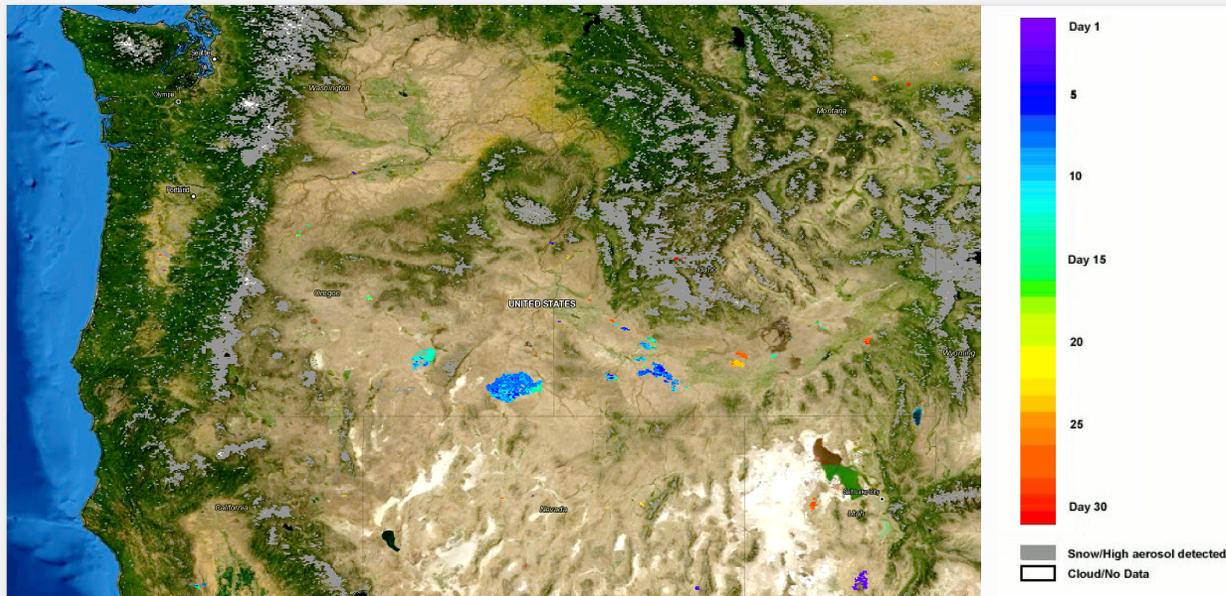


**Global Fire Map
(September 17–
September 26, 2016)**

Colors range from red, where the fire count is low, to yellow where the number of fires is large

MODIS Land Products: Burned Area (MCD45A1)

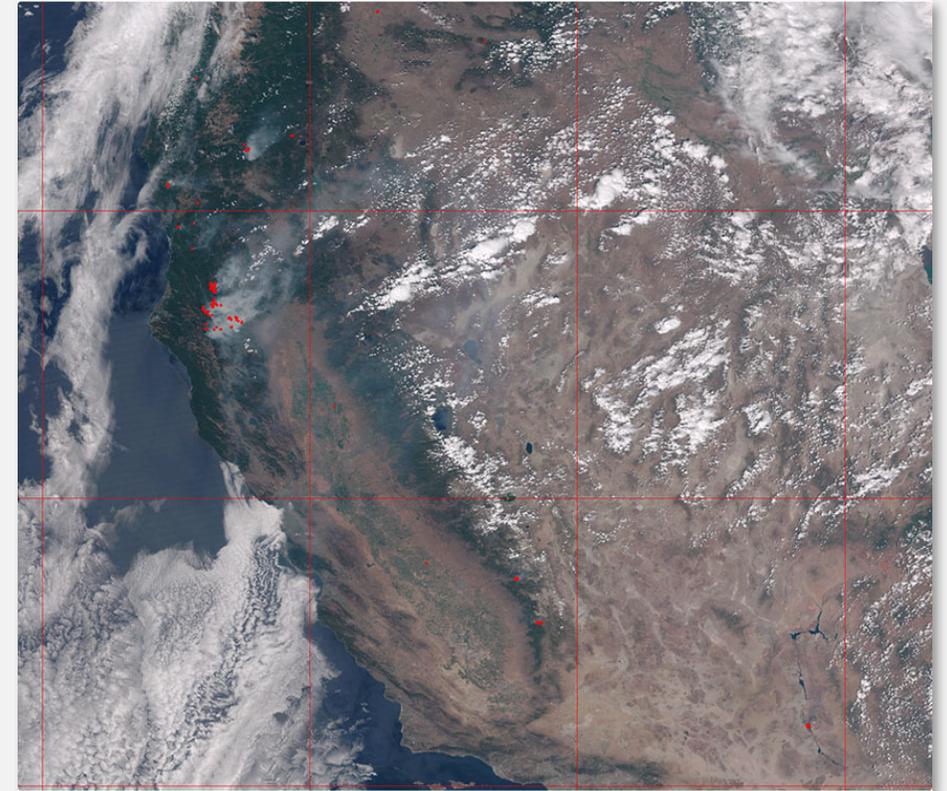
- The combined Terra & Aqua MODIS Burned Area Product is a monthly gridded 500m product
- MODIS detects the approximate date of burning at 500m resolution
- Maps include the spatial extent of recent fires
- For more information: <http://modis-fire.umd.edu>



This image shows the extent of the Long Draw fire that occurred in southeastern Oregon. The colors represent the approximate day of the burning from July 8 (start of fire) to July 12, 2012 (end of fire)

VIIRS Active Fire Product

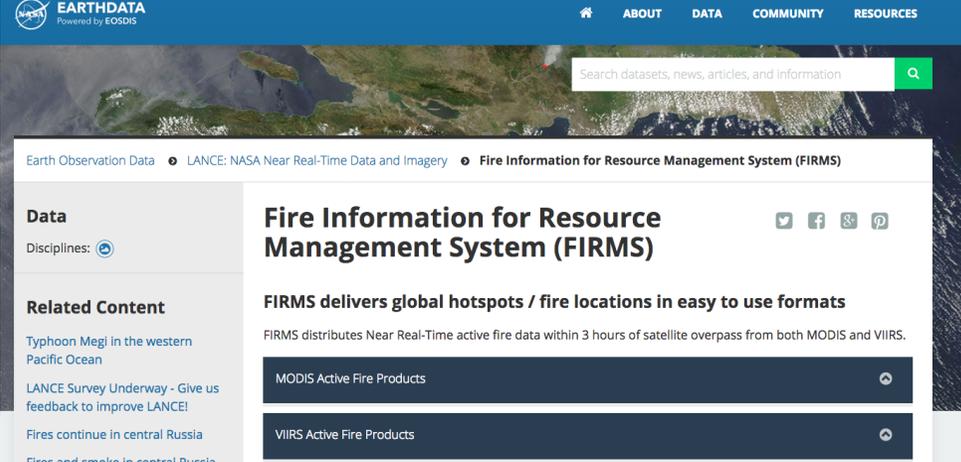
- Released October 22, 2012
- Spatial resolution:
 - 750m (M-band)
 - 375m (I-band)
- Data available as:
 - ASCII – PNG (I-band only)
 - KMZ – GeoTIFF (I-band only)
 - TIFF – KML (I-band only)



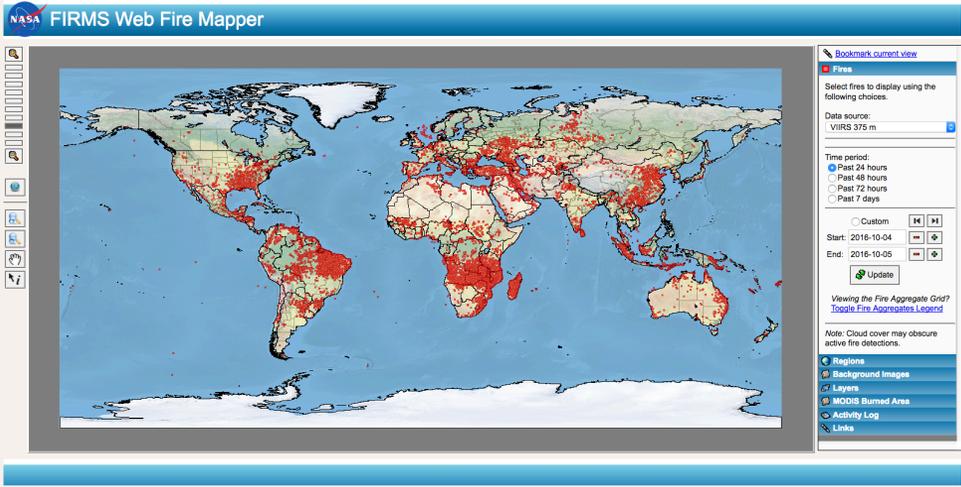
Northern California fires 2015

Fire Information for Resource Management System (FIRMS)

- Distributes near real-time (NRT) active fire data within 3 hours of satellite overpass
- Delivers global MODIS and VIIRS hotspots/fire locations and MODIS burned area images
- Provides historical data (older than 7 days) using the Archive Download Tool
- Available in various formats:
 - Email alerts
 - GIS-friendly file format
 - Visualization in **Web Fire Mapper** or **Worldview**
- Exercise on this tool in upcoming session



The screenshot shows the EarthData website interface. At the top, there is a navigation bar with 'ABOUT', 'DATA', 'COMMUNITY', and 'RESOURCES'. A search bar is located below the navigation bar. The main content area features a breadcrumb trail: 'Earth Observation Data > LANCE: NASA Near Real-Time Data and Imagery > Fire Information for Resource Management System (FIRMS)'. The page title is 'Fire Information for Resource Management System (FIRMS)'. Below the title, there is a sub-header: 'FIRMS delivers global hotspots / fire locations in easy to use formats'. A paragraph follows: 'FIRMS distributes Near Real-Time active fire data within 3 hours of satellite overpass from both MODIS and VIIRS.' There are two buttons: 'MODIS Active Fire Products' and 'VIIRS Active Fire Products'. On the left side, there is a 'Data' section with 'Disciplines: [icon]' and a 'Related Content' section with links to 'Typhoon Megi in the western Pacific Ocean', 'LANCE Survey Underway - Give us feedback to improve LANCE!', 'Fires continue in central Russia', and 'Fires and smoke in central Russia'.



The screenshot shows the FIRMS Web Fire Mapper interface. The main map displays a global view of active fire detections, with red and orange colors indicating fire locations. The map is overlaid on a grid. On the right side, there is a control panel with the following options: 'Bookmark current view', 'Fires', 'Select fires to display using the following choices.', 'Data source: VIIRS 375 m', 'Time period: Past 24 hours (selected), Past 48 hours, Past 72 hours, Past 7 days', 'Start: 2016-10-04, End: 2016-10-05', 'Update', 'Viewing the Fire Aggregate Grid? Toggle Fire Aggregates Legend', 'Note: Cloud cover may obscure active fire detections.', and a list of layers: 'Regions', 'Background Images', 'Layers', 'MODIS Burned Area', 'Activity Log', and 'Links'.

MODIS Snow Products

- **Freshwater Components:**
 - Snow Cover
 - Normalized Difference Vegetation Index (NDVI) - used for ET Estimation
- **Two snow cover products based on MODIS Spectral Reflectance**
 - Standard MODIS Product
 - Fractional Snow Cover
 - MODIS Snow Covered Area and Grain size (MODSCAG) Product
 - Fractional Snow Cover
 - Grain Size
 - Snow Water Equivalence

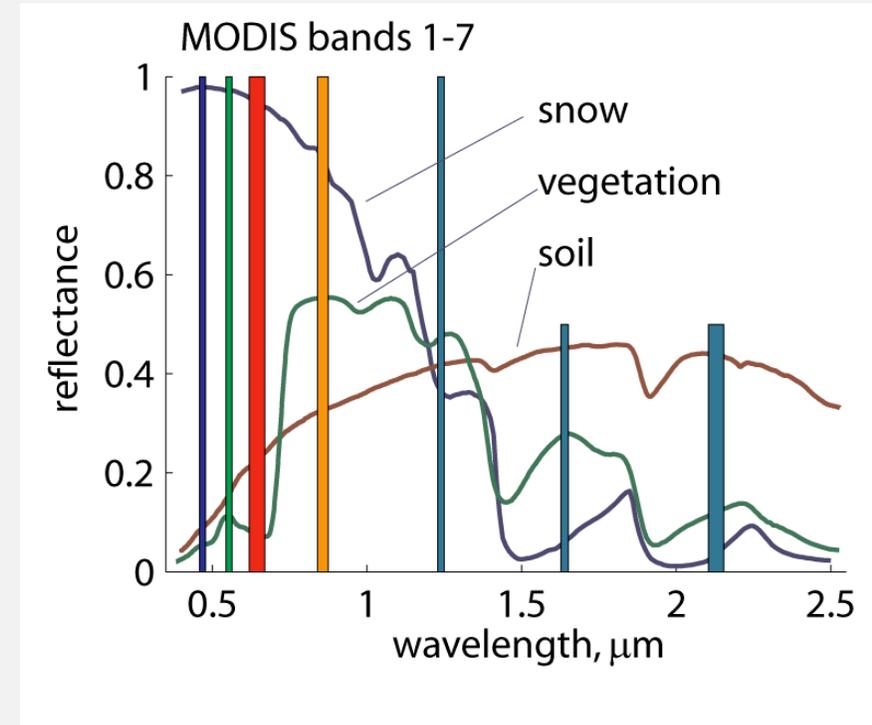
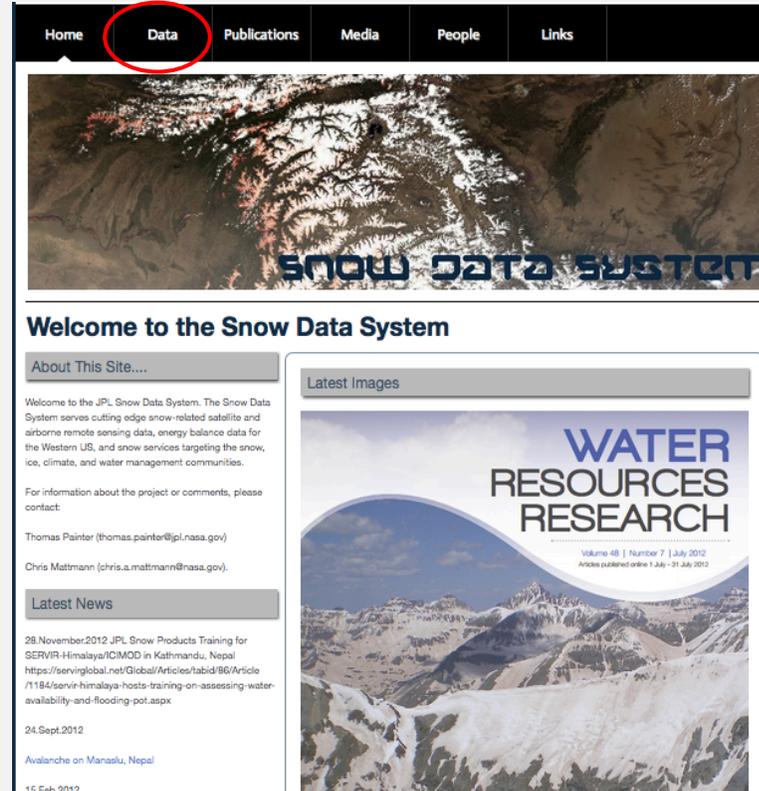


Image Credit: <http://cimss.ssec.wisc.edu/>

Where to get MODSCAG Snow Data?

Available from JPL Snow Data Server: <http://snow.jpl.nasa.gov/portal/>



Home **Data** Publications Media People Links

SNOW DATA SYSTEM

Welcome to the Snow Data System

About This Site...

Welcome to the JPL Snow Data System. The Snow Data System serves cutting edge snow-related satellite and airborne remote sensing data, energy balance data for the Western US, and snow services targeting the snow, ice, climate, and water management communities.

For information about the project or comments, please contact:

Thomas Painter (thomas.painter@jpl.nasa.gov)
Chris Mattmann (chris.a.mattmann@nasa.gov)

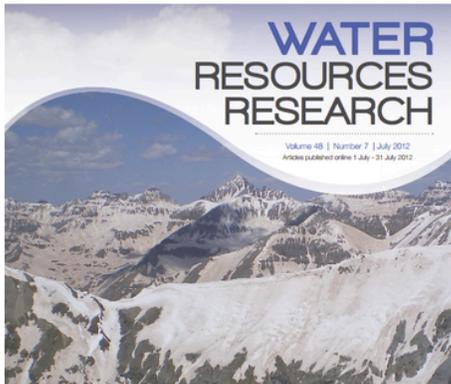
Latest News

28.November.2012 JPL Snow Products Training for SERVIR-Himalaya/ICMOD in Kathmandu, Nepal
<https://servirglobal.net/Global/Articles/tabid/66/Article/1184/servir-himalaya-hosts-training-on-assessing-water-availability-and-flooding-pot.aspx>

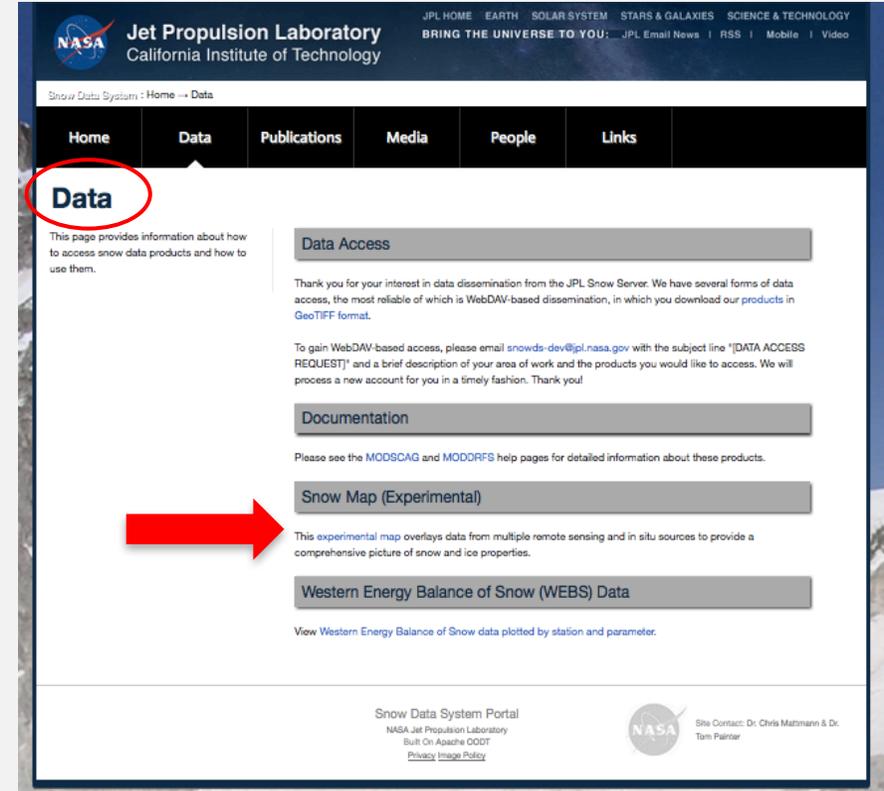
24.Sept.2012
Avalanche on Manasku, Nepal

15.Feb.2012

Latest Images



Volume 48 | Number 7 | July 2012
First published online 1 July 2012



NASA Jet Propulsion Laboratory
California Institute of Technology

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Snow Data System : Home → Data

Home **Data** Publications Media People Links

Data

This page provides information about how to access snow data products and how to use them.

Data Access

Thank you for your interest in data dissemination from the JPL Snow Server. We have several forms of data access, the most reliable of which is WebDAV-based dissemination, in which you download our products in GeoTIFF format.

To gain WebDAV-based access, please email snowdev-dev@jpl.nasa.gov with the subject line "[DATA ACCESS REQUEST]" and a brief description of your area of work and the products you would like to access. We will process a new account for you in a timely fashion. Thank you!

Documentation

Please see the **MODSCAG** and **MODRRFS** help pages for detailed information about these products.

Snow Map (Experimental)

This experimental map overlays data from multiple remote sensing and in situ sources to provide a comprehensive picture of snow and ice properties.

Western Energy Balance of Snow (WEBS) Data

View Western Energy Balance of Snow data plotted by station and parameter.

Snow Data System Portal
NASA Jet Propulsion Laboratory
Built On Apache OODT
[Privacy](#) [Image Policy](#)

NASA Site Contact: Dr. Chris Mattmann & Dr. Tom Painter

An aerial photograph of a forest fire. The ground is covered in green and brown vegetation, with a large area of dark brown, charred ground in the lower right. A thick plume of white smoke rises from the fire, spreading across the upper half of the image. The smoke is dense and billowing, partially obscuring the landscape below. The overall scene is a dramatic depiction of a natural disaster.

NOAA Fire and Smoke Products



NOAA Hazard Mapping System Fire & Smoke Product (HMS)

<http://www.ospo.noaa.gov/Products/land/hms.html>

- Shows detected hot spots, smoke plumes and estimated smoke concentrations
- Blended product from GOES, POES AVHRR and MODIS
- Spatial resolution: 4 km
- Product provided once daily

NOAA OFFICE OF SATELLITE AND PRODUCT OPERATIONS
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

ORGANIZATION SERVICES PRODUCTS OPERATIONS

Hazard Mapping System Fire and Smoke Product

Current HMS Analysis

Analysis for day 9/28/2016 last updated at 9/28/2016 15:48:09 GMT

GISpreview
Download GIS files from
<ftp://satopsanone.nesdis.noaa.gov/FIRE/HMS/GIS/>

Current HMS Fire and Smoke Analysis

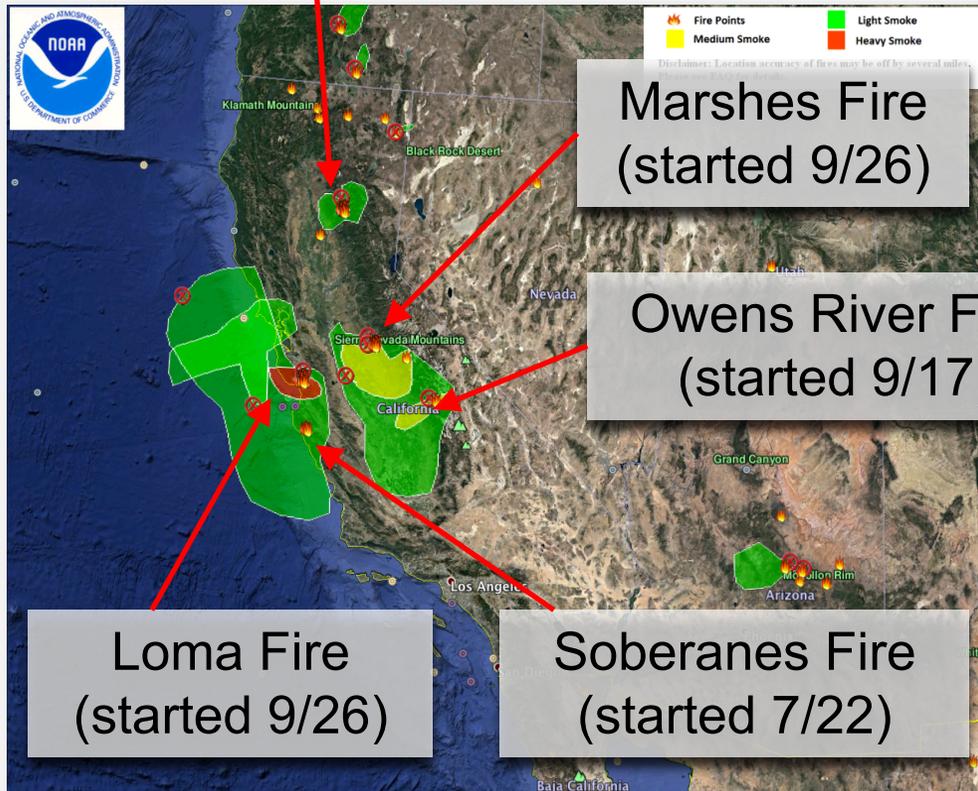
Google KML files: [Fire](#) | [Smoke](#)

Real-Time Satellite Imagery Loops

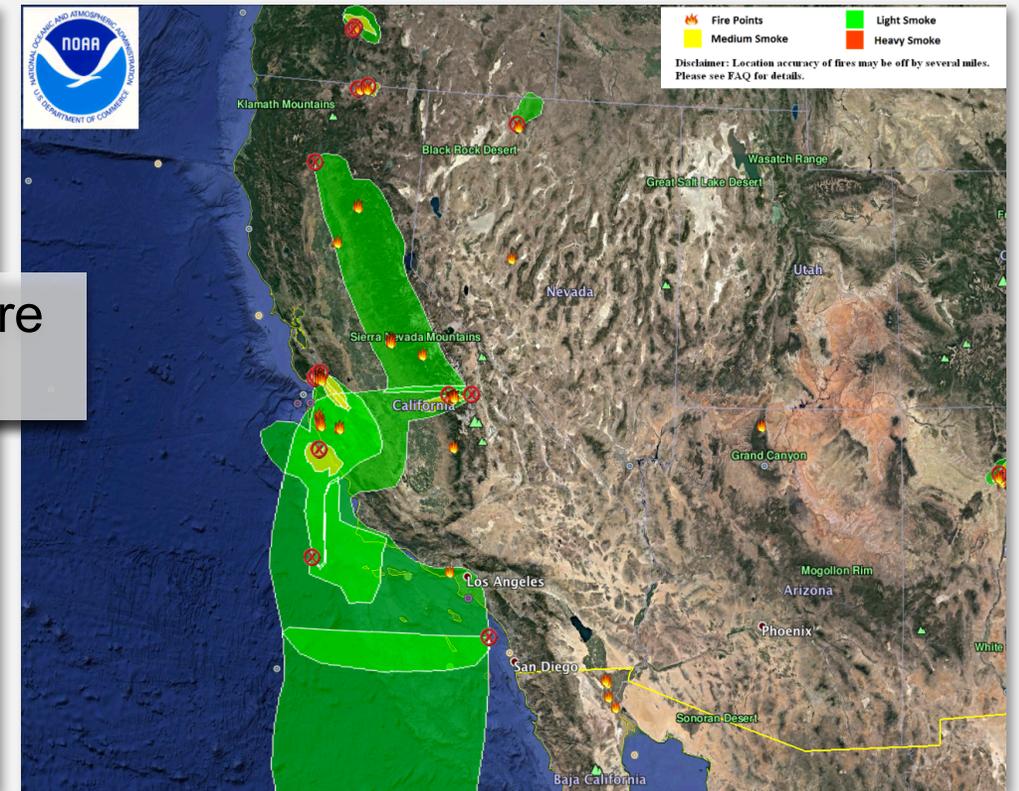
[GOES West](#) [GOES East](#) [Active Fire Floater Imagery](#) [NASA MODIS Rapid Response](#)

HMS Fire & Smoke Analysis: Example

Tobin Fire (started 9/26)



September 26, 2016



September 27, 2016

An aerial satellite view of a landscape, showing a mix of green vegetation, brownish-yellow fields, and dark blue/black water bodies. A semi-transparent white rectangular box is overlaid in the center of the image, containing the text 'Additional Products and Tools'.

Additional Products and Tools



U.S. Forest Service Active Fire Mapping Program

<http://activefiremaps.fs.fed.us/index.php>

- Satellite detection and monitoring of wildfire activity in CONUS, Alaska, Hawaii and Canada
- Leverage NASA and NOAA assets:
 - GOES, AVHRR, MODIS, VIIRS
- Provision of comprehensive, NRT data are essential
- Facilitates decision support for strategic planning and response for U.S. and Canadian fire agencies

USDA FOREST SERVICE REMOTE SENSING APPLICATIONS CENTER

Active Fire Mapping Program

Current Large Incidents (Home)
New Large Incidents
Fire Detection Maps
MODIS Satellite Imagery
VIIRS Satellite Imagery
Fire Detection GIS Data
Fire Data in Google Earth
Fire Data Web Services
Latest Detected Fire Activity
Other MODIS Products
Frequently Asked Questions
About Active Fire Maps

Remote Sensing Applications Center
2222 West 2300 South
Salt Lake City, UT 84119 - 2020
voice: (801) 975-3737
fax: (801) 975-3478

Current Large Incidents October 05, 2016

Fire locations are based on data provided by the National Interagency Coordination Center and are subject to change.

IMSR Summary
October 5th, 2016

National Preparedness Level
Level 1
National Fire Activity
Initial attack activity: Light (130 new fires)
New large incidents: 1
Large fires contained: 1
Uncontained large fires: 11
Area Command Teams Committed: 0
NIMOs committed: 0
Type 1 IMTs committed: 1
Type 2 IMTs committed: 3

Source:
[Incident Management Situation Report](#)

Active Fire Mapping News
August 24, 2016

WARNING

Data Access Alert: Due to the significant wildfire activity, access to WMS and WFS services will be restricted to ensure their availability for operational fire management needs and maintain availability of other active fire mapping/data products.

View Printable Map | View High Resolution Map | Definition of Map Terms | Download KMZ File

Select a Fire [] Go

[Feedback](#) | [Disclaimers](#) | [Privacy Policy](#)

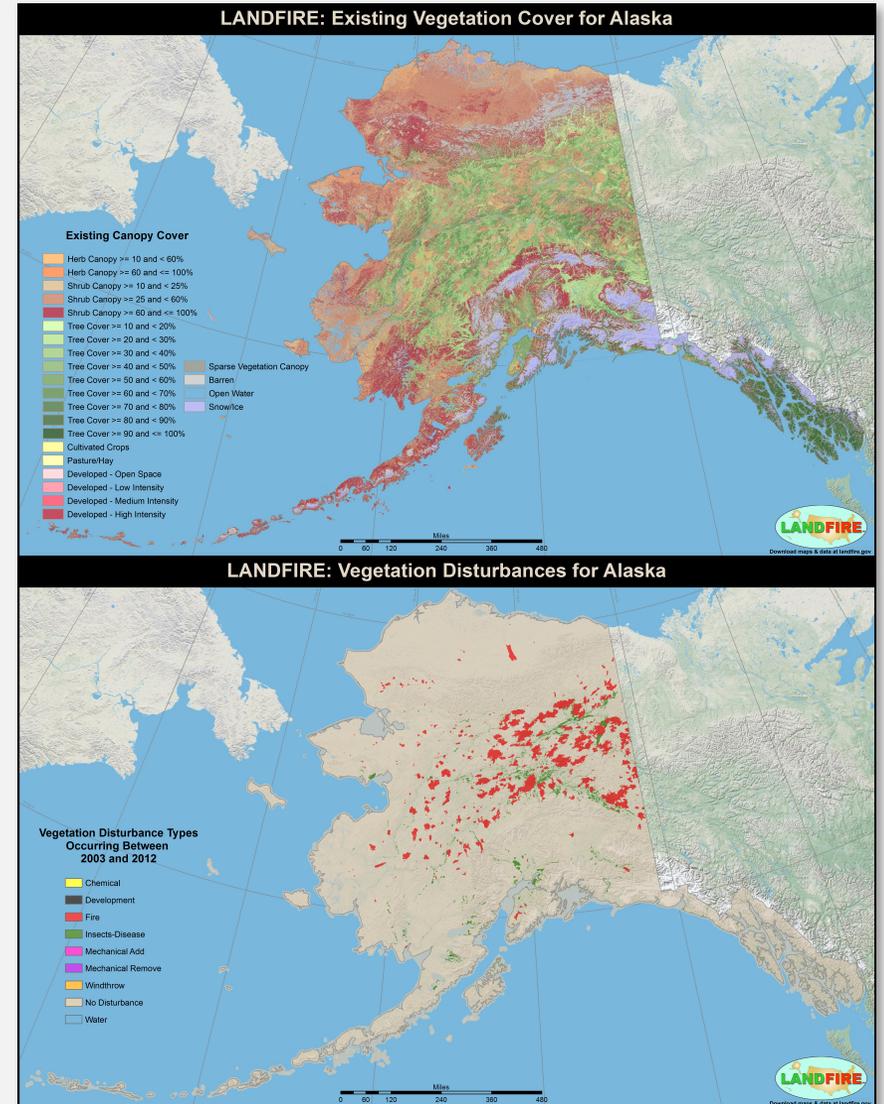


LANDFIRE

<http://www.landfire.gov>

- Products
 - Delivered at 30 m spatial resolution
 - Available from 1999-present
- Vegetation data layers using Landsat imagery
- Fuel and Fire Regime data layers
 - Fire behavior and fuel loading models
- Disturbance data
 - Fuel, vegetation, natural, and prescribed disturbance by type and year

Current vegetation cover map (top) and vegetation disturbances map from 2003 to 2012 (bottom) available at LANDFIRE. Image Credit: U.S. Forest Service.



An aerial satellite photograph of a forested landscape, showing a dense network of green trees and dark, winding water bodies. A large, semi-transparent white rectangle is centered over the image, serving as a background for the text.

Thanks!
