

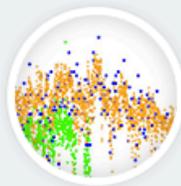
Welcome to NASA Applied Remote Sensing Training (ARSET) Webinar Series

Introduction to NASA Earth Science Data Products, Portals, and Tools

Course Dates: 16, 23, 30 September and 7, 14 October 2014



ATMOSPHERE



CALIBRATED RADIANCE AND
SOLAR RADIANCE



CRYOSPHERE



HUMAN DIMENSIONS



LAND



OCEAN

ARSET

Applied Remote SEnsing Training
A project of NASA Applied Sciences



Important Information

Presentations URL:

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

Contact for Requesting Recorded Link for the Webinars:

Marines Martins : marines.martins@ssaihq.com

Course Goal

To provide a broad overview of **environmental parameters** available from NASA Earth Science useful for monitoring and mapping global and regional air quality, water resources, disasters, and ecosystems **for decision support**

Why This Course?

- NASA Data are used in many societal applications
- There are multiple sources and data archives for these data sets from different satellite missions and sensors, and earth system models -- with varying features, strengths, and limitations
- Many web-based tools available for easy access, analysis, and visualization of the data
- This course is designed as a concise source of information about NASA data, locations, web-tools and examples of data usage to facilitate end-users' data needs

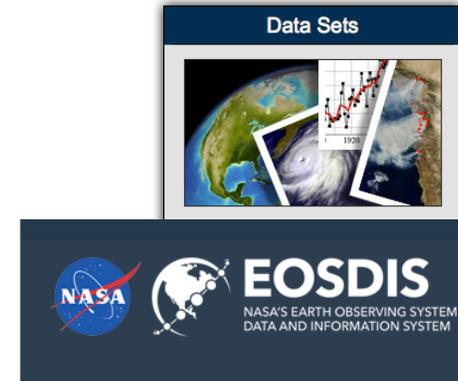
Course Outline

Week 1



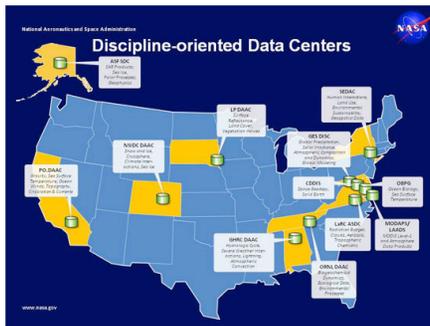
NASA Earth Science

Week 2



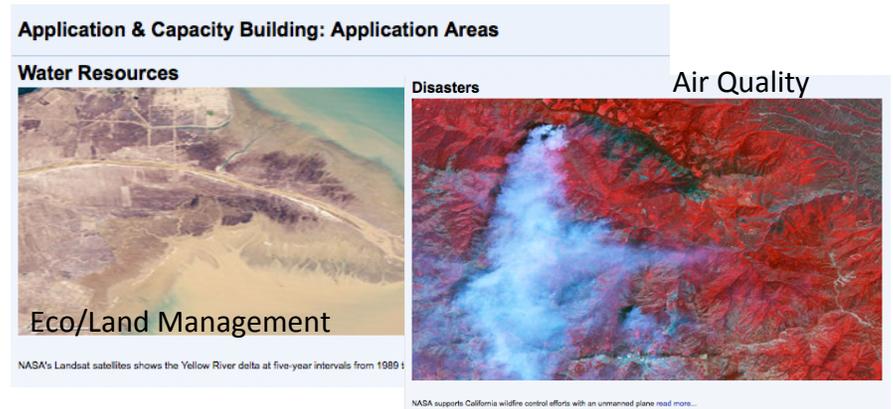
NASA Data Products

Week 3



NASA Data Centers and Tools

Weeks 4 & 5



NASA Data Applications with GIS

Week 1: Outline

- **NASA Earth Science**
 - *Applied Sciences and Capacity Building Program*
 - *Applied Remote Sensing Training Program (ARSET)*

- **NASA Earth Science: Observing and Modeling Capabilities**

- **Examples of Earth Science Data Applications**

NASA Earth Science

<http://science.nasa.gov/earth-science/>

Goals and Activities

The screenshot shows the NASA Earth Science website interface. At the top left is the NASA logo and the text "NATIONAL AERONAUTICS AND SPACE ADMINISTRATION". To the right are links for "Visit NASA.gov", "Connect", "Contact Us", "Glossary", and "Site Map". A search bar labeled "NASA Science Live Search" is on the right. Below this is a navigation bar with tabs for "Home", "Big Questions", "Earth", "Heliophysics", "Planets", "Astrophysics", "Missions", "Technology", and "Science News". A banner image with "NASA SCIENCE | EARTH" is displayed. Below the banner are dropdown menus for "NAC Science Committee", "NASA Science for ...", "NASA Celebrates ...", and "About Us". The main content area has a breadcrumb trail: "Home > Earth > Earth Science At NASA". On the left is a sidebar menu with "Earth" selected, and sub-items: "Big Questions", "Focus Areas", "Missions", "Earth Right Now", "Earth Science at NASA", "Earth Science Data", "Decadal Survey", "Applied Sciences Program", "Earth Science Technology", "Climate Policy Speaker Series", "Every Day is Earth Day at NASA", "NASA Oceanography", "Working Groups", and "Multimedia Links". The main content area is titled "EARTH SCIENCE AT NASA" and contains the following text:

The National Aeronautics and Space Administration (NASA) conducts a program of breakthrough research to advance fundamental knowledge on the most important scientific questions about the global integrated Earth system. NASA continues to lead the international scientific community to advance global integrated Earth system science using space-based observations.

The research encompasses:

- the global atmosphere;
- the global oceans including sea ice;
- land surfaces including snow and ice;
- ecosystems; and
- interactions among the atmosphere, oceans, land and ecosystems, including humans.

NASA's goal is to understand the changing climate, its interaction with life, and how human activities affect the environment. Through partnerships with national and international agencies, NASA enables the application of this understanding for the well-being of society. This document provides a descriptive inventory of NASA's research and observing activities in Earth system science, including climate science.

[Learn about earth observing capabilities, research programs and more.](#) Adobe PDF file - 508-compliant version to come.

NASA Earth Science

<http://science.nasa.gov/earth-science/>

Overarching Question:

“How is the Earth changing and what are the consequences for life on Earth”?

Major Goal:

- To understand the changing climate, its interaction with life, and how human activities affect the environment. Through partnerships with national and international agencies, NASA enables the application this understanding for the well-being of society.

NASA Earth Science

<http://science.nasa.gov/earth-science/>

Activities:

- Breakthrough research to advance fundamental knowledge on the most important scientific questions about the global integrated Earth system
- Continues to lead the international scientific community to advance global integrated Earth system science using space-based observations

NASA Earth Science: Research

<http://science1.nasa.gov/earth-science/focus-areas/>

- Conduct research that not only addresses challenging science questions, but drives the development of an Earth observing capability and associated Earth system models for the following six focus areas:

Atmospheric Composition

Weather

Climate Variability & Change

Water & Energy Cycle

Carbon Cycle & Ecosystems

Earths Surface & Interior

NASA Earth Science: Research

- Conduct and sponsor research, collects new observations, develops technologies and extends science and technology education to learners of all ages
- work closely with global partners in government, industry, and the public to enhance economic security, and environmental stewardship, benefiting society in many tangible ways
- conduct and sponsor research to answer fundamental science questions about the changes we see in climate, weather, and natural hazards, and deliver sound science that helps decision-makers make informed decisions.
- Strengthening science, technology, engineering and mathematics education nationwide.

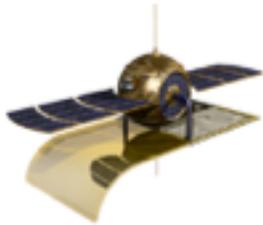
NASA Earth Science: Technology

<http://science1.nasa.gov/earth-science/earth-science-technology/>

<http://esto.nasa.gov/>

Earth System Technology Office (ESTO) :

Program Areas



Observation Technologies

The Advanced Sensors Group leads developments in Earth remote sensing technologies through the Advanced Component Technologies and Instrument Incubator Programs.



Information Technologies

The Advanced Information Systems Group pursues sensor webs, automation, interoperability, networking, communication protocols, and other technologies to enhance the production, collection, handling, transmission, analysis, and comprehension of data.



Technology Validation

The validation of emerging technologies is a critical step on the path to infusion. ESTO works in partnership with other programs to enable access to airborne and spaceborne platforms.

NASA Earth Science: Applied Sciences Program

<http://www.nasa.gov/applied-sciences/#.VBWqaY1DSlQ>

- Partners with public and private organizations on ways to apply data from NASA's environmental satellites and scientific findings in their decision-making activities and services, helping to improve the quality of life and strengthen the economy
- Promotes activities to discover and demonstrate innovative uses and practical benefits of NASA Earth science data, scientific knowledge, and technology

NASA Earth Science Applied Sciences Program

Earth Science Serving Society: Thematic Areas

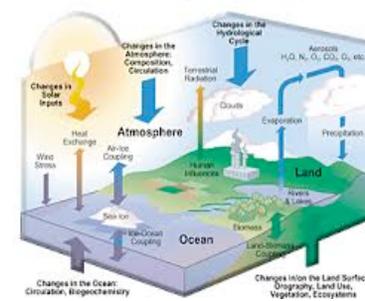


**Agricultural
Efficiency**



Air Quality

Global Climate System Components



Climate



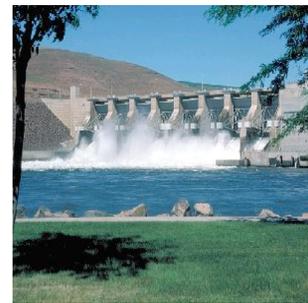
**Disaster
Management**



**Ecological
Forecasting**



Public Health



**Water
Resources**



Weather

NASA Applied Sciences and Capacity Building

<http://www.nasa.gov/applied-sciences/capacitybuilding.html#.U7r82I1DSIQ>

National and international activities to engage and train users applying NASA Earth Science satellites and modeling data in their decision making activities

Four Components:

- ARSET
- DEVELOP
- GOMI
- SERVIR



<http://kazu.org/post/nasa-satellite-images-will-help-farmers-conserve-water>

Capacity Building Program Components



Applied Remote SENSing Training, ARSET (GSFC)

On-line and hands on basic/advanced trainings tailored to end-users organizations



DEVELOP (LaRC national office)

Dual student/local government capacity building using collaborative projects



Gulf of Mexico Initiative, GOMI (SSC)

Building Gulf region's capacity for local environmental management



SERVIR Coordination Office (MSFC)

Building international capacity with hubs in

- East Africa
- Hindu Kush - Himalaya
- Mesoamerica

Applied Remote Sensing Training (ARSET)

Applied Remote Sensing Training Program (ARSET) (part of NASA Applied Sciences)

GOAL:

Increase utilization of NASA observational and model data for decision-support

Online and hands-on courses:

- **Who:** policy makers, environmental managers, modelers and other professionals in the public and private sectors.
- **Where:** U.S and internationally
- **When:** throughout the year. Check websites.
- Do NOT require prior remote- sensing background.
- Presentations and hands-on guided computer exercises on how to access, interpret and use NASA satellite images for decision-support.



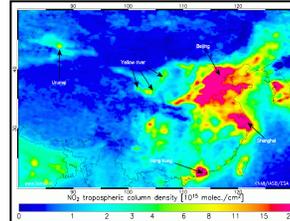
NASA Training for California Air Resources Board, Sacramento

Applied Remote Sensing Training Program (ARSET)

Health (Air Quality)

- 2008 – present
- 26 Trainings
- +700 end-users
- Analysis of dust, fires and urban air pollution.
- Long range transport of pollutants
- Satellite and regional air quality model inter-comparisons.
- Support for air quality forecasting and exceptional event analysis

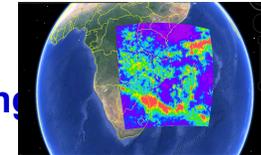
Nitrogen Dioxide over China



Water Resources and Flood Monitoring

- April 2011 – present
- 6 Trainings
- +300 end-users
- Flood/Drought monitoring
- Severe weather and precipitation
- Watershed management
- Climate impacts on water resources
- Snow/ice monitoring
- Evapotranspiration (ET), ground water, soil moisture, and runoff.

Satellite derived precipitation



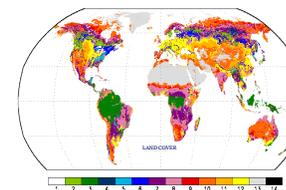
Inundation mapping



Land Use/Change and Ecology

- May 2014 - present
- Webinars and in-person courses
- Topics to be informed by ongoing end-user needs assessment
- GIS applications
- Land use/change and vegetation indices
- Fire products

Land Cover



Gradual Learning Approach

Basic Courses

Webinars

Hands-on

Assumes no prior knowledge of RS



Advanced Courses

Hands-on

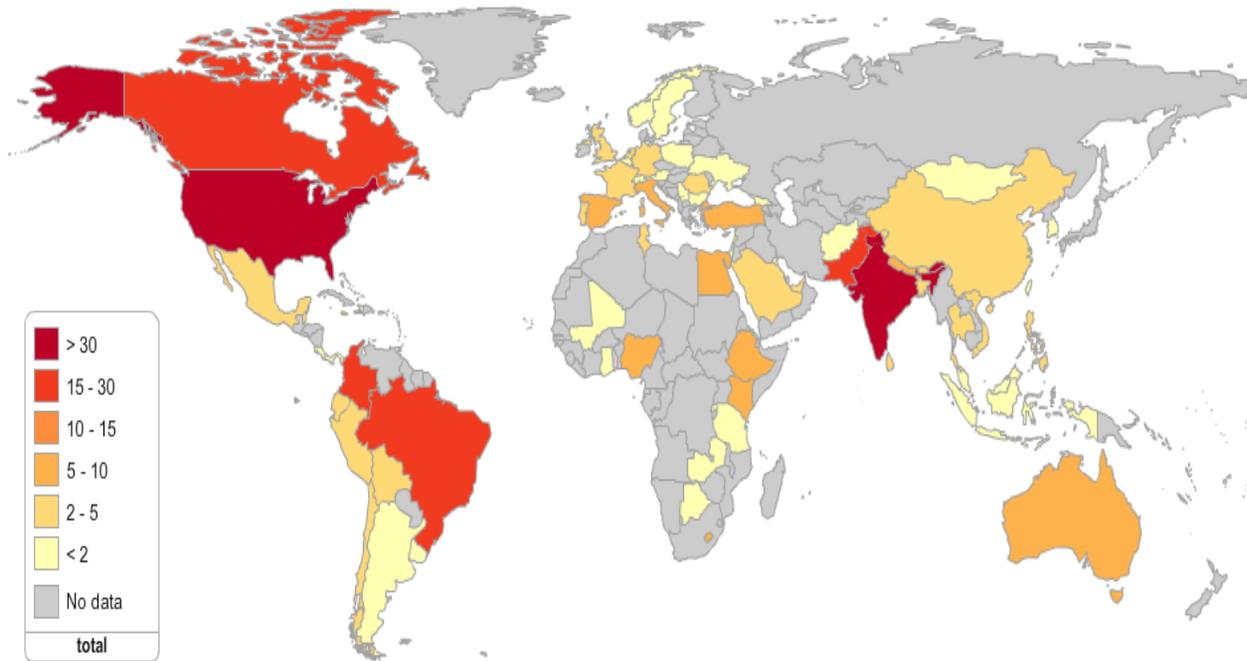
Webinar course generally required
Focused on a specific application/problem:
for example dust or smoke monitoring in a
specific country or region



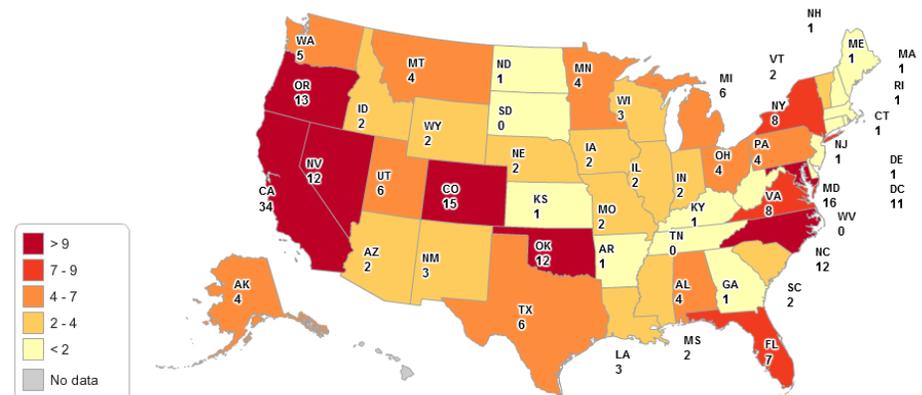
ARSET: 2009 – 2013

+1500 End-users Reached

552 Organizations



Number of participating organizations per country: Air Quality, Water Resources, Flood Monitoring.



ARSET Webinar: Land Management Using NASA Remote Sensing Data: May 20-June 17, 2014

- **Relevance:** supports decision support in land management applications including conservation, climate change assessments and habitat monitoring.
- New ARSET webinar series aimed at building applied remote sensing skills among NGOs and Federal agencies.
- **100 participants, 48 organizations, 20 countries, 27 states.**
- **23 International and National Conservation organizations:** The Wildlife Conservation Society has representatives from 6 different countries including Bolivia, Tanzania, Mongolia, Madagascar, Nigeria and the US
- **13 US Federal and State agencies:** There are over 20 participants from US Fish and Wildlife Service, National Park Service and EPA
- **Future Training Partners:** The next Land Management webinar (Fall 2014) will include participation from the LPDAAC

Course oversubscribed (+300 registrants) in just one week !

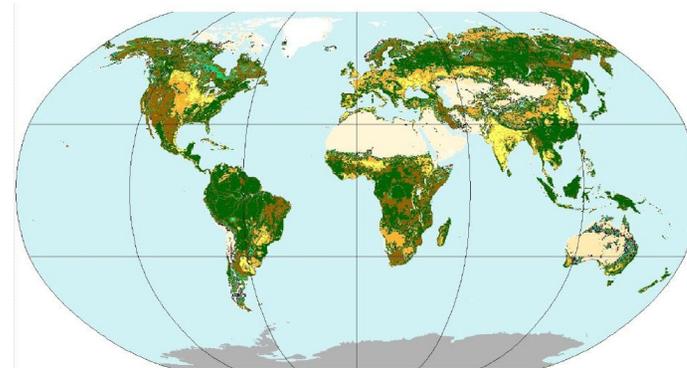
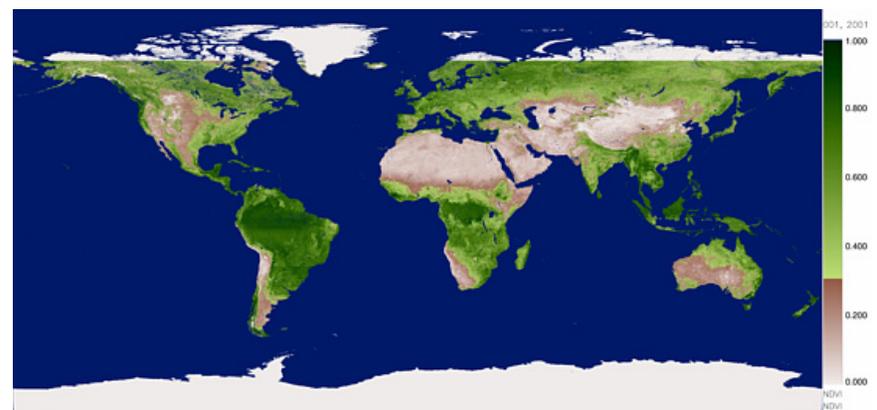


Figure 3 - Distribution of dominant GLC-SHARE Land Cover Database.

01 Artificial Surfaces	04 Tree Covered Area	07 Mangroves	10 Snow and Glaciers + Antarctica
02 Cropland	05 Shrubs Covered Area	08 Sparse Vegetation	11 Water bodies
03 Grassland	06 Herbaceous Vegetation	09 Barren	Antarctica

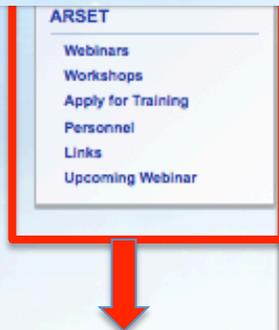
FAO Global Land Cover



MODIS Global NDVI

ARSET Web Page

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



Applied Remote Sensing Training

The goal of the NASA Applied Remote Sensing Training (ARSET) is to increase the utility of NASA earth science and model data for policy makers, regulatory agencies, and other applied science professionals in the areas of Health and Air Quality, Water Resources, Eco Forecasting, and Disaster Management.

The two primary activities of this project are webinars and in-person courses.

Webinars (Free)

Webinars are offered throughout the year in all four application areas, generally 4-5 weeks in duration, 1 hour per week. They are intended for those new to remote sensing. For more information and to register please go to the webinars section of the website.

In-Person Courses

In-person courses are a combination of lectures and computer hands-on activities that teach analysts how to access, interpret, and apply NASA data at regional and global scales with an emphasis on case studies. ARSET works with organizations who will host the training for groups within a geographical region, tailoring the curriculum to the needs of the projected participants. NASA does not charge an attendance fee, but attendees must make their own arrangements to travel to the course location.

Teaching:

Search, access, and download of NASA data products and imagery
Appropriate use and interpretation of satellite imagery
Visualization and analysis of NASA imagery using NASA, EPA, and NOAA webtools and other resources such as GIS, Google Earth, Panoply, RSIG, and HDFLook

ARSET is sponsored by the Applied Sciences Program within NASA's Earth Sciences Division. We would like to thank Nancy Searby, Applied Sciences' Capacity Building Program Manager for her support of this program.

ARSET

[Webinars](#)

[Workshops](#)

[Apply for Training](#)

[Personnel](#)

[Links](#)

[Upcoming Webinar](#)

August 18, 2014
Kenneth Pickering
Jasminah Pearce
Archie

- Sciences and Exploration
- Atmospheric Laboratory
- Hydropheric & Biospheric Laboratory

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ARSET Web Page

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



ARSET

Webinars

Workshops

Apply for Training

Personnel

Links

Upcoming Webinar

Webinars

Introduction to NASA Earth Science Data Products, Portals, and Tools

Tuesday, September 16, 2014 to Tuesday, October 14, 2014

Tuesdays (5 one-hour sessions), 8-9 AM U.S. Eastern Standard Time (13 PM UTC)

Application Area: **Air Quality, Disasters, Eco Forecasting, Water Resources**

Keywords: **Satellite Imagery, Tools**

Instruments: **Aqua, Landsat, Terra, TRMM**

[Read more](#)

NASA Remote Sensing for Land Management

Tuesday, May 20, 2014 to Tuesday, June 17, 2014

Every Tuesday at 12 pm EDT (4 pm UTC).

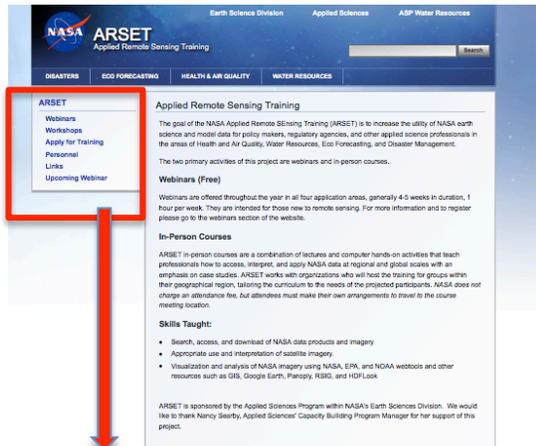
Application Area: **Eco Forecasting**

Instruments: **Landsat, MODIS**

[Read more](#)

Apply for a Training on ARSET Web Page

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



ARSET

Webinars

Workshops

Apply for Training

Personnel

Links

Upcoming Webinar

Apply for Training

The NASA Applied Remote Sensing Training Program provides webinars and in-person courses. The goal of these training activities is to build the capability and skills to utilize NASA earth science observations and model data for environmental management and decision-support. Courses are primarily intended for applied science professionals and decision makers from local, state, federal agencies, NGOS, and the private sector. ARSET also offers a Train the Trainers program, which is recommended for establishing or growing your organizations' capacity in applied remote sensing.

ARSET trainings are NOT designed for research but for operational and application driven organizations.

To apply for a training email Ana Prados at Ana.I.Prados@nasa.gov

The program offers four types of courses. For in-person courses, applicants must provide a computer laboratory or similar facility.

1. Overview webinar course: held over a period of 4-5 weeks, 1 hour per week
2. Basic hands-on: In person applied remote sensing course for those new to remote sensing. Generally 2-3 days in length held. It is highly recommended that attendees first take the webinar course.
3. Advanced hands-on: In person applied remote sensing course that builds the skills to use NASA data for a specific environmental management problem. Intended for those who have already taken the basic course or have previous experience using NASA data and resources. Generally 1-2 days in length.
4. Train the Trainers: In person applied remote sensing course intended for existing remote sensing/geospatial trainers within the organization/institution/agency.

Sign up to the **listserve** for more information and program updates

<https://lists.nasa.gov/mailman/listinfo/arset>

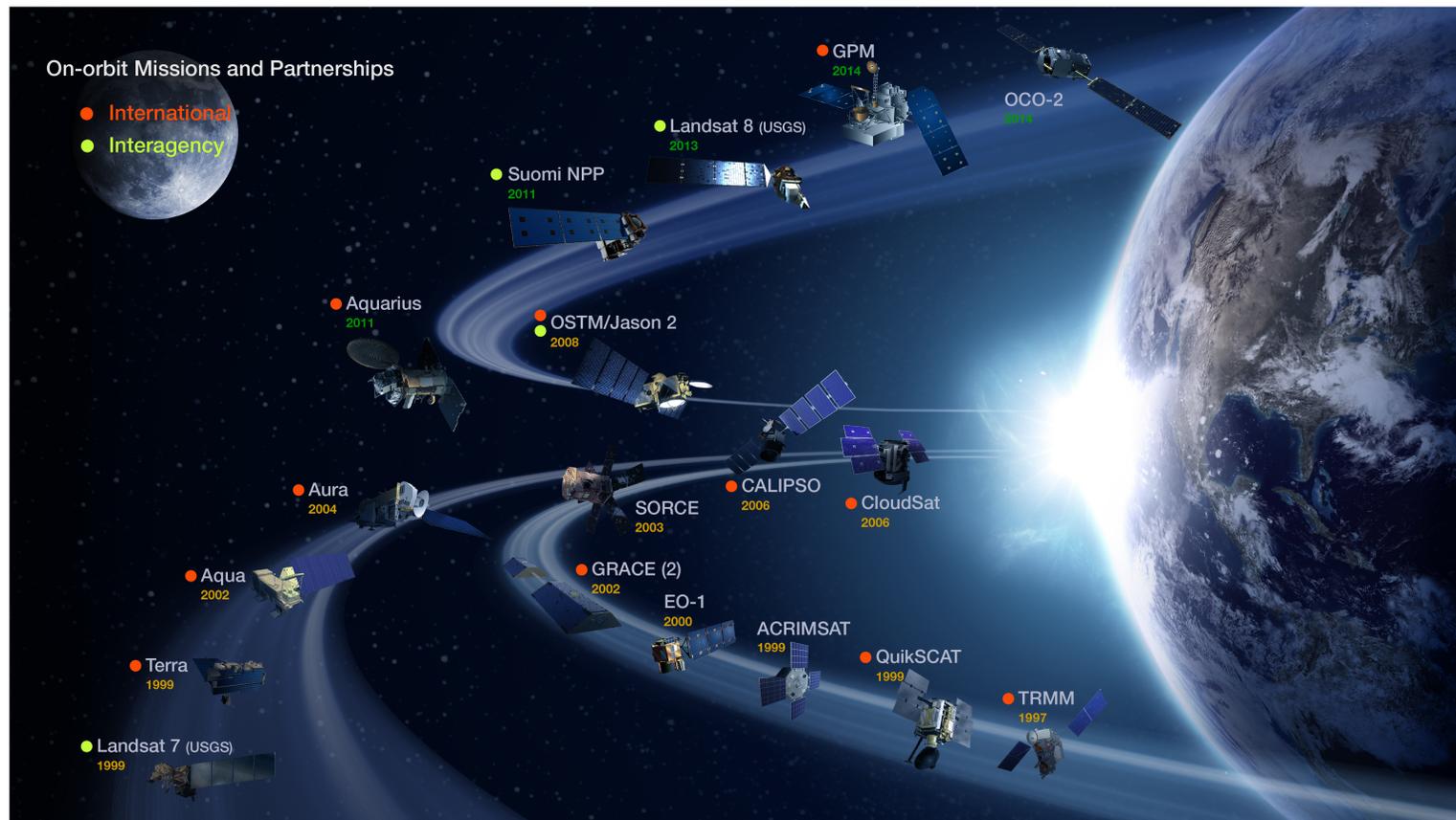
ARSET Contact Information

ARSET Program:	Ana Prados	Ana.I.Prados@nasa.gov
Air Quality:	Pawan Gupta	pawan.gupta@nasa.gov
Disasters (Extreme Weather, Flooding):	Amita Mehta	amita.v.mehta@nasa.gov
Eco Forecasting/Land Management:	Cynthia Schmidt	cynthia.l.schmidt@nasa.gov
Train the Trainers:	Brock Blevins	bblevins37@gmail.com
Water Resources:	Brock Blevins/Amita Mehta	(As Above)

NASA Earth Science Observing and Modeling Capabilities

NASA Earth Science: Observing Capability

Earth Observing NASA Satellites with Multiple Sensors/Instruments to Observe the Climate System for Research and Applications



Soil Moisture Active Passive (SMAP) to be launched in November 2014

NASA Earth Science: Observing Capability

Satellites Provide Measurements for Environmental Applications

Air Quality	Water Resources/ Disasters*	Land Management
Terra	TRMM	Landsat
Aqua	GPM	Aqua
Aura	Terra	Terra
CALIPSO Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations	Aqua	
Soumi-NPP National Polar-orbiting Partnership	GRACE	
	Landsat	
*Extreme Precipitation, Flooding/Droughts, Storms, Landslides, Fire		

From Observations to Applications



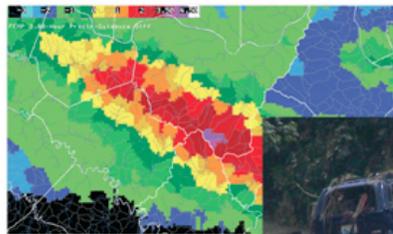
Satellite Measurements



Satellite Products



Environmental Applications



**Flash Flood
Warning**

NASA Earth Science: Modeling Capability

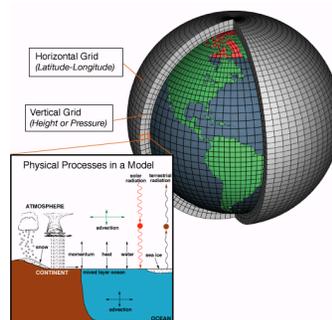
Models are Value-added Information Systems
Remote Sensing + Surface Observations + Numerical Models



Satellite
Data



Surface Measurements
and In-Situ Data



Numerical
Models

NASA Earth Science: Modeling Capability

➤ **GEOS-5 :** The Goddard Earth Observing System Version 5

➤ **GISS GCM:** Goddard Institute for Space Studies General Circulation Model (coupled ocean-atmosphere Climate Model)

➤ **MERRA:** Modern Era Retrospective-analysis for Research and Application

➤ **GLDAS :** Global Land Data Assimilation System

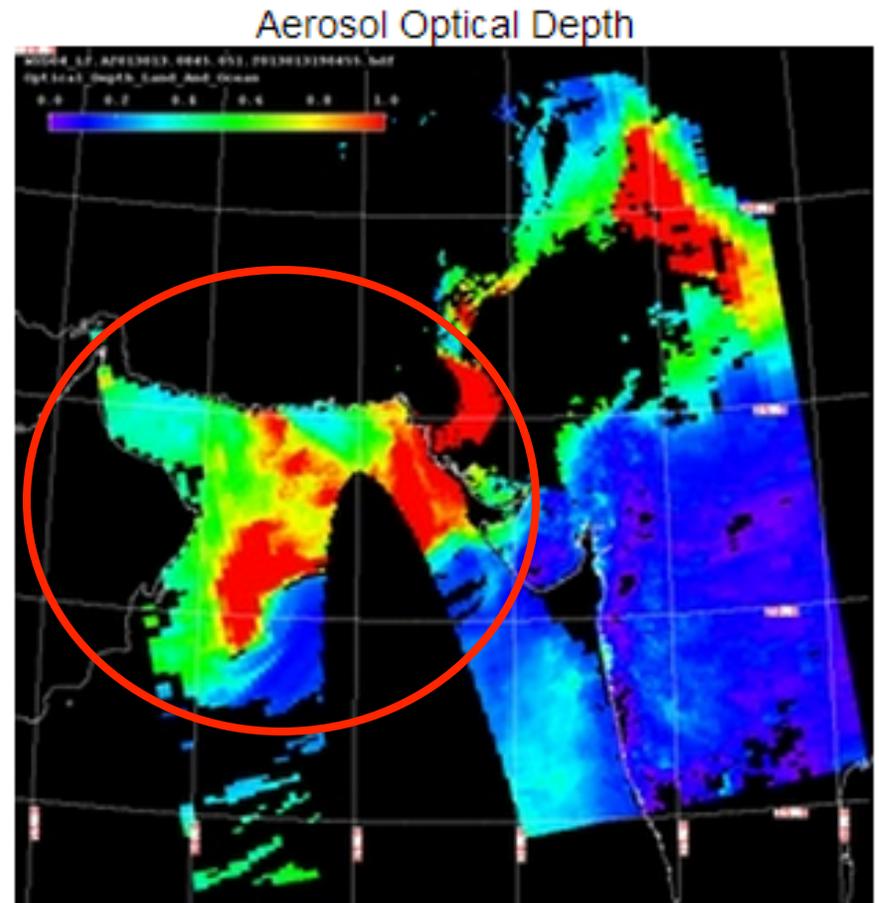
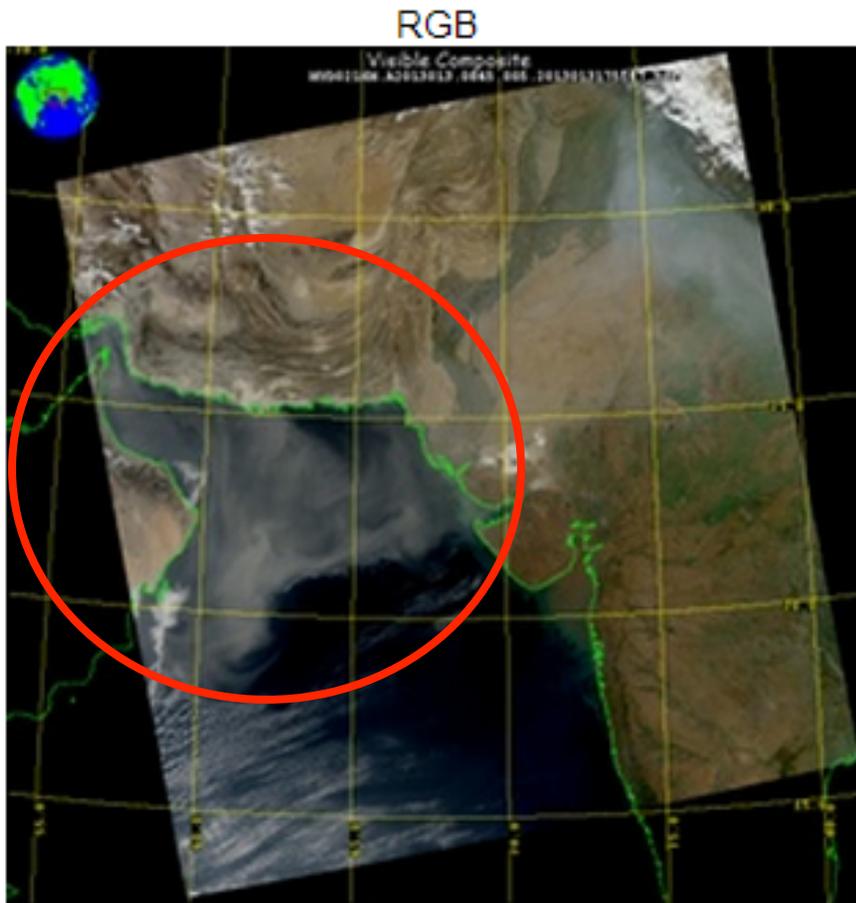
➤ **NLDAS :** North American Land Data Assimilation System

Examples of Data Applications

NASA satellite images, remote sensing and modeling data, along with other sources of data, are used directly or in statistical or physical modeling tools for a variety of applications

Air Quality

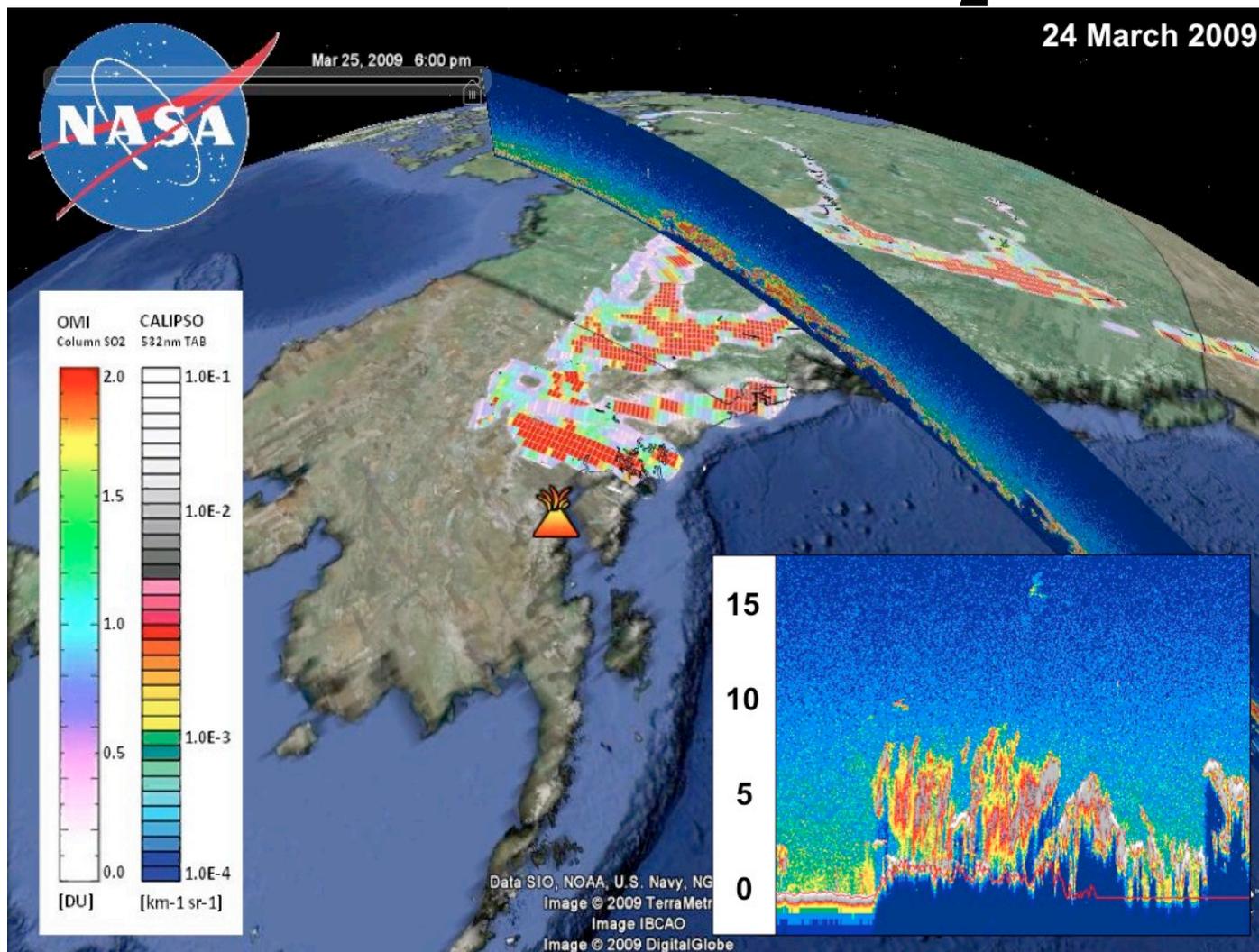
Dust over Arabian Sea



Created using LADSWeb

http://ladsweb.nascom.nasa.gov/browse_images/granule_browser.html?form=AADS&browseType=Granule

Monitoring Volcanic Ash from Aura/OMI SO₂



Source: <http://sun.aos.wisc.edu/research>

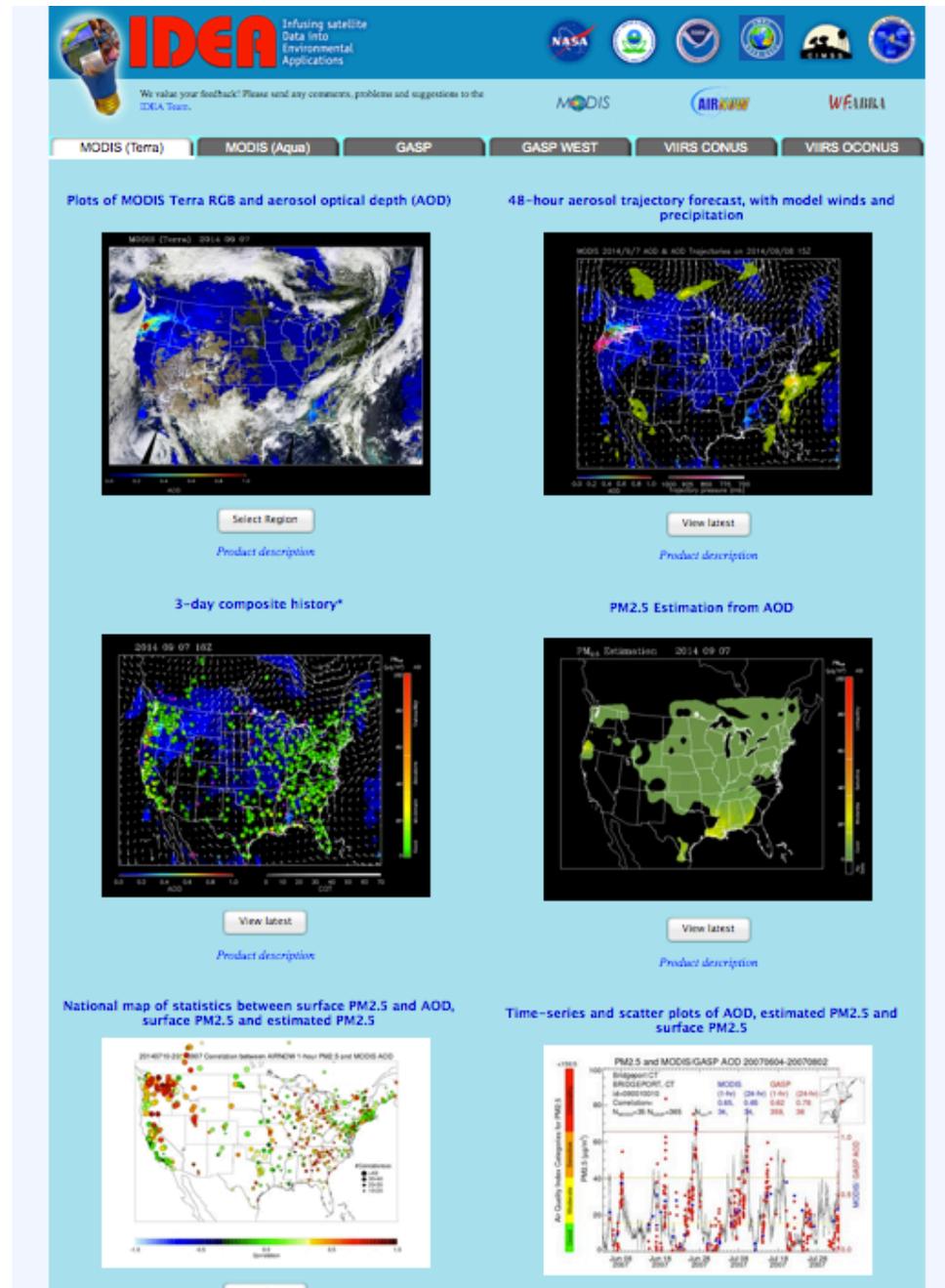
A case study of the 2009 eruption of Mt. Redoubt, Alaska, US

The dispersion of volcanic ash was monitored using OMI column SO₂ and CALIPSO backscatter data.

IDEA: Infusing satellite Data into Environmental air quality Applications

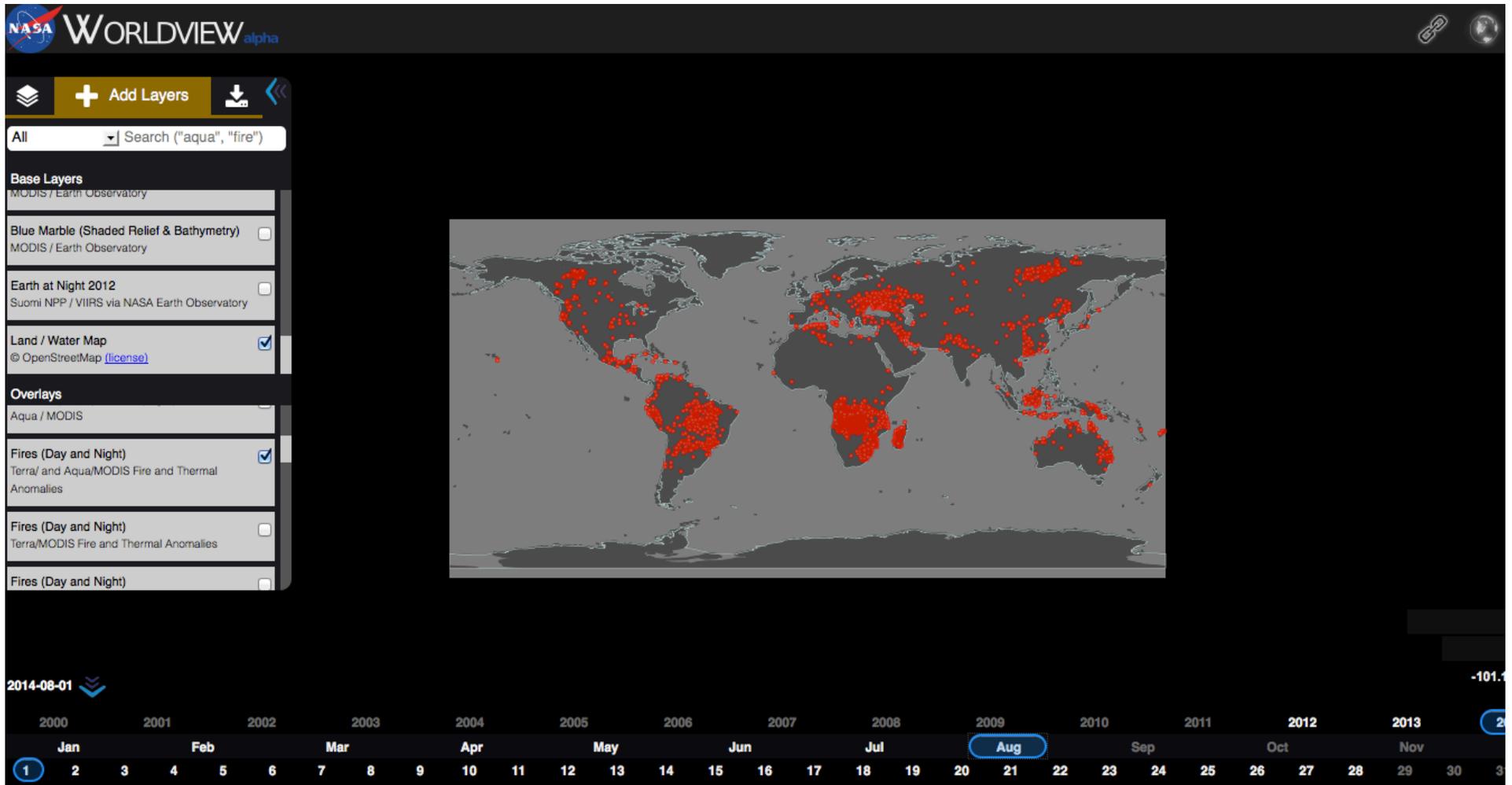
A multi-agency program for air quality monitoring

Also see:
[http://earthobservatory.nasa.gov/
Features/IDEA/idea2.php](http://earthobservatory.nasa.gov/Features/IDEA/idea2.php)



Global Fire Detection (Terra & Aqua)

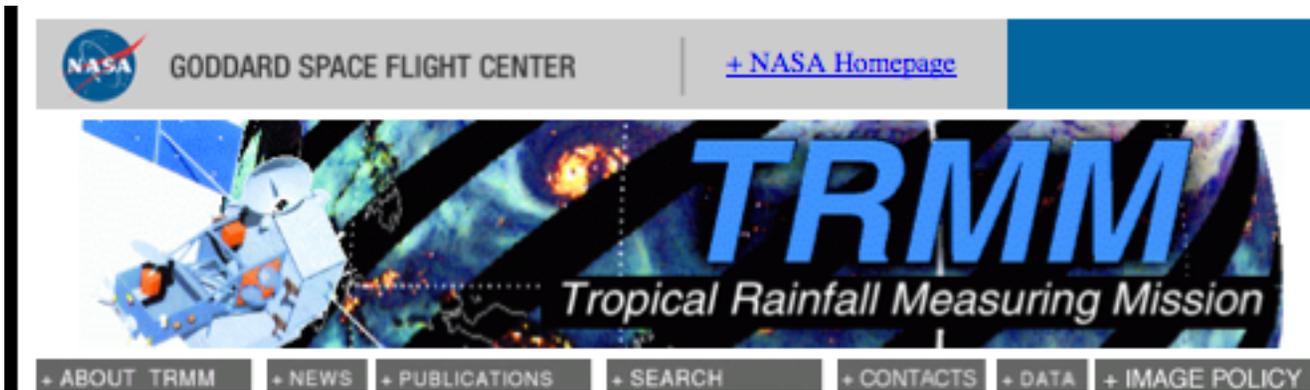
<https://earthdata.nasa.gov/labs/worldview/>



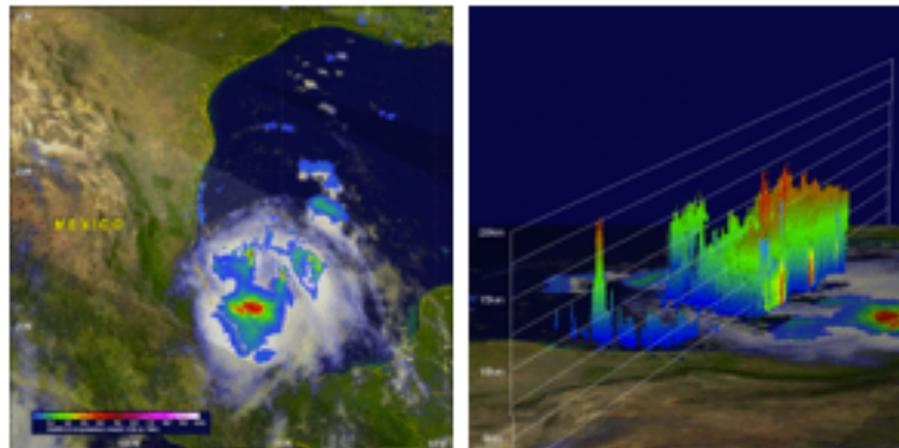
Extreme Rain, Flooding

Tropical Rainfall Measuring Mission

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



shown in a strong band of showers moving ashore north of Dolly's center.



Hurricane Dolly moving ashore on eastern Mexico on 9/2/2014

The TRMM satellite had a good daylight look at Dolly yesterday on September 2, 2014 at 1616 UTC (11:16 AM CDT). Strong north-northwesterly vertical shear was pushing powerful convective thunderstorms to the south of the tropical cyclone's center. Some of these storms were dropping rain at a rate of almost 83 mm (3.3 inches) per hour. These intense storms are shown in the 3-D view derived from TRMM's Precipitation Radar (PR) reflectivity data values. Some tops of these storms are shown towering to heights of over 15km (about 9.3 km).
 Images and captions by Hal Pierce (SSAI/NASA GSFC)

A vertical sidebar of resource links, each with a small thumbnail image. The links are: 'Extreme Event Archives', 'Realtime 3 Hourly & 7 Day Rainfall', 'Global Flood & Landslide Monitoring', 'Hurricanes & Typhoons', 'Rain Averages & Anomalies + ESPI', 'TRMM based Climatology', '"QUICKLOOKS" at TRMM Orbits', and 'Educational Resources'. The top of the sidebar is labeled 'RESOURCES'.

Missouri River Flooding Seen from Landsat

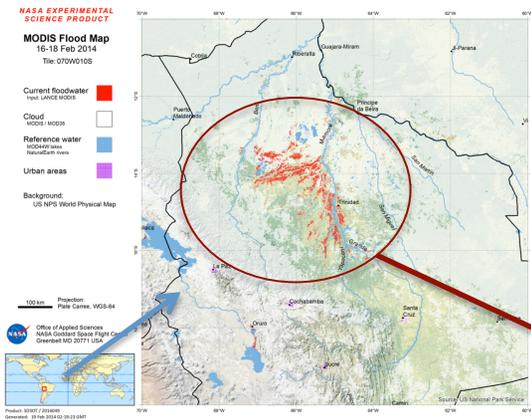


Heavy rains and snow pack resulted in record releases from dams in Montana and the Dakotas, and near-record flooding along parts of the Missouri River. The left image, acquired on Sept. 24, 2010, was taken by the Thematic Mapper sensor aboard Landsat 5. The right image, acquired on Aug. 2, 2011, was taken by the Enhanced Thematic Mapper Plus on Landsat 7.

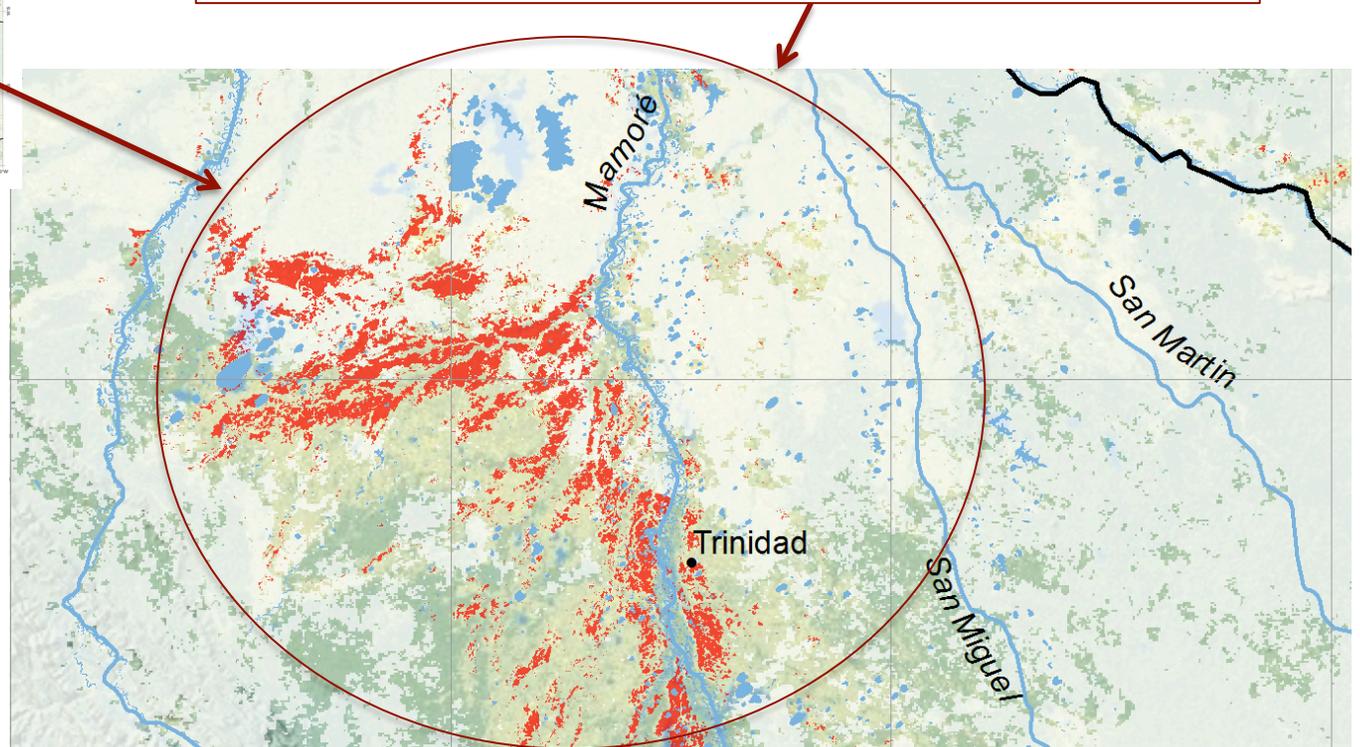
Image Credit: U.S. Department of the Interior/USGS, NASA

Near-real Time Inundation Mapping from (Terra Aqua)

<http://oas.gsfc.nasa.gov/floodmap/>



Flooding over Bolivia on February 16-18, 2014
Red Shading Shows Surface Inundation around the River Chanel



MODIS Inundation Mapping

Water Resources and Land Management

Famine Early Warning Systems Network (FEWS NET)

<http://www.fews.net/>

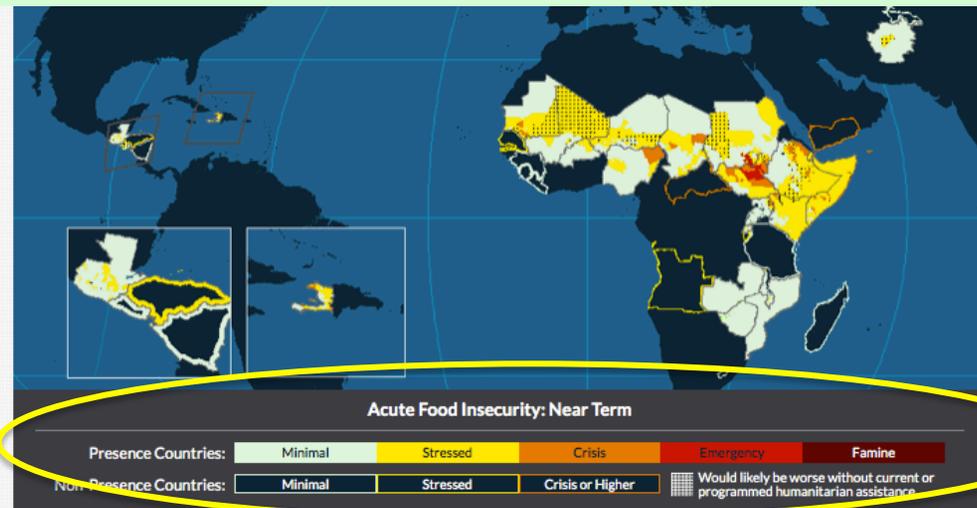
FEWS NET, the Famine Early Warning Systems Network, is a leading provider of early warning and analysis on acute food insecurity.

Created in 1985 by the [US Agency for International Development](#) (USAID) after devastating famines in East and West Africa, FEWS NET provides objective, **evidence-based analysis** to help government decision-makers and relief agencies plan for and respond to humanitarian crises.

Use MODIS Normalized Difference Vegetation Index (NDVI)

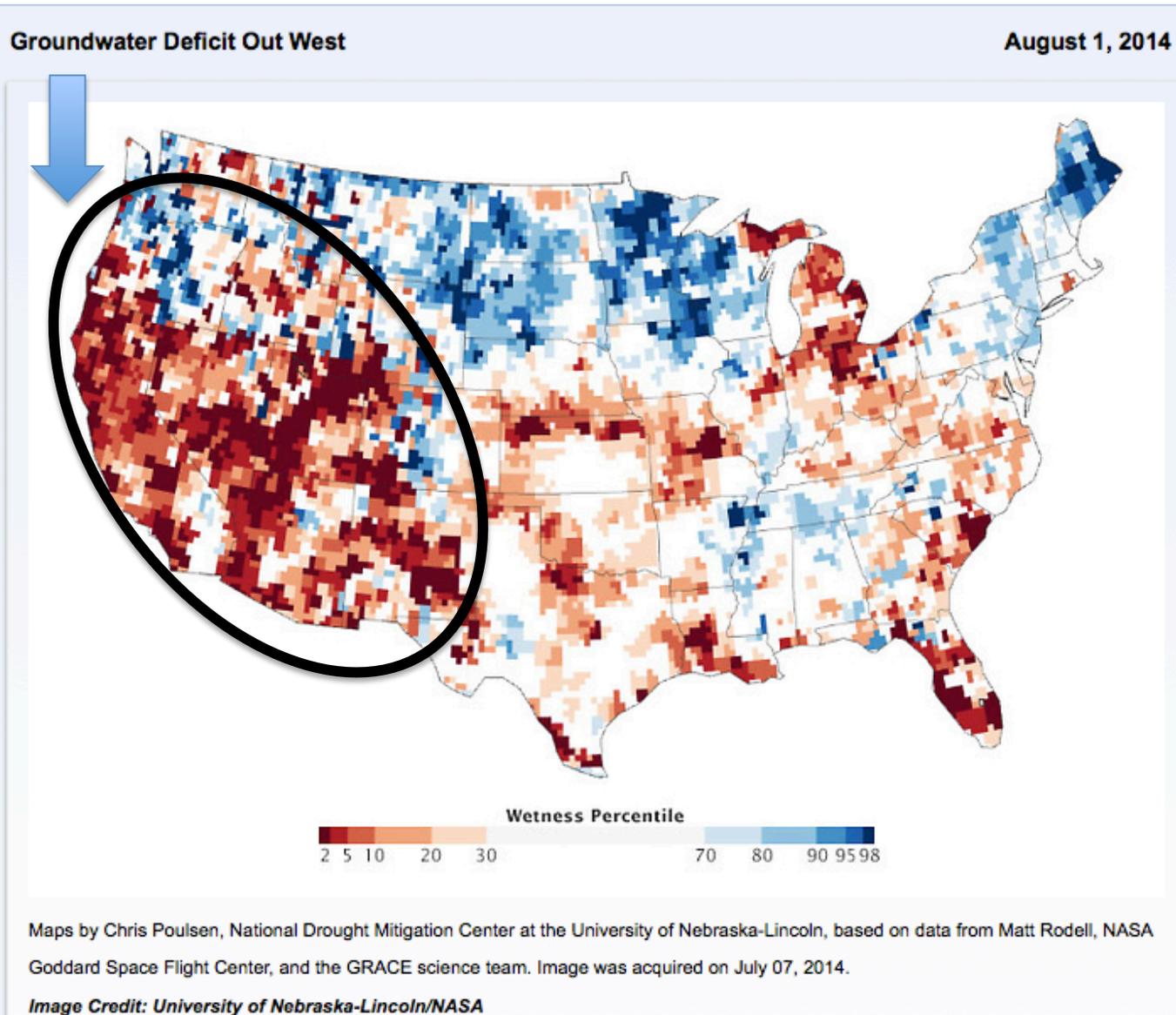
And TRMM - rainfall

Food Insecurity



Data from TRMM, Terra and Aqua, GLDAS

Ground Water Deficit Monitored by GRACE



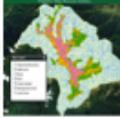
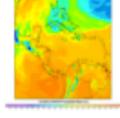
Used by National Drought Mitigation Center to Monitor Hydrological Drought

SERVIR Global

(<https://www.servirglobal.net/>)

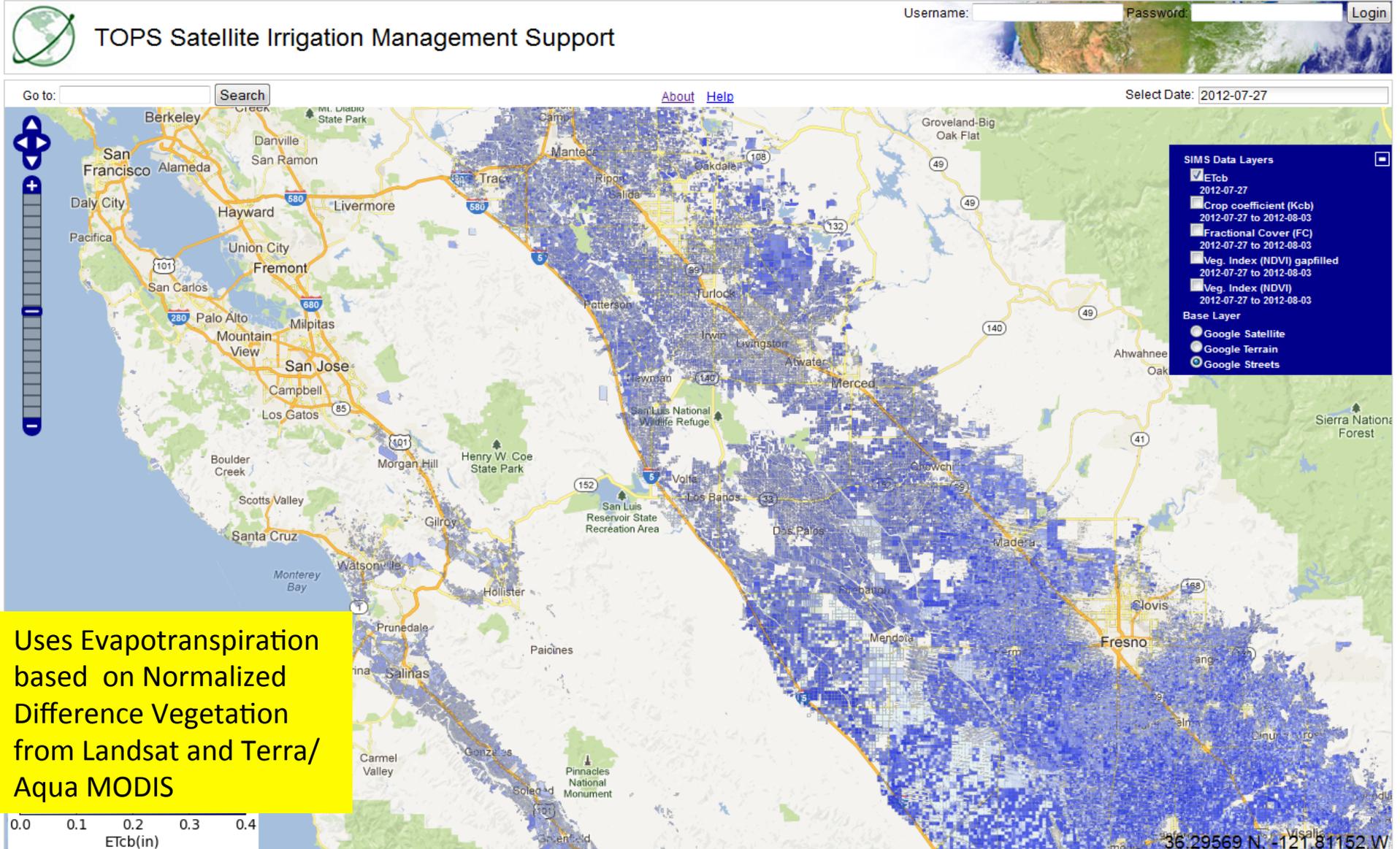
NARROW BY:

- Region
- Theme
- Status
- Data Source
 - LANDSAT 7
 - LANDSAT 8
 - LIS
 - MODIS
 - PERSIANN
 - RADARSAT-2
 - RFE
 - SeaDAS
 - SMAP
 - SMOS
 - SRTM
 - TAMSAT
 - TMPA
 - TRMM
- Type

	Leveraging CMIP5 and NASA GMAO Coupled Modeling Capacity for Climate Prediction Theme: Climate Region: Mesoamerica, Himalaya, East/Southern Africa	Status: In Development
	Long Time-Series Indicator of Agricultural Drought for the Greater Horn of Africa Theme: Agriculture, Water, Climate, Health Region: East/Southern Africa	Status: In Development
	MODIS Algal Bloom Monitoring Products for Mesoamerica Theme: Health, Ecosystems/Biodiversity Region: Mesoamerica	Status: Active
	Resource Inventory and Assessment of Phobjikha Wetlands Ecosystem Theme: Climate, Ecosystems/Biodiversity Region: Himalaya	Status: Active
	Satellite-Based Visualization System for Water Resources in the Hindu Kush-Himalaya Region Theme: Water, Agriculture, Adaptation, Disaster Region: Himalaya	Status: Active
	SERVIR CREST Models Mobile App Theme: Water, Weather, Climate, Disaster, Adaptation, Agriculture Region: Mesoamerica, Himalaya, East/Southern Africa	Status: Active
	SERVIR Water Africa-Arizona Team Theme: Water, Weather, Climate Region: East/Southern Africa	Status: In Development
	Using Earth Observation Data to Improve REDD+ Policy Theme: Water, Climate, Adaptation Region: Mesoamerica	Status: In Development
	Weather Forecast Modeling Using WRF Model for Mesoamerica Theme: Weather Region: Mesoamerica	Status: Active

TOPS Satellite Irrigation Management Support

<http://www.ecocast.org/dgw/sims>



Uses Evapotranspiration based on Normalized Difference Vegetation from Landsat and Terra/Aqua MODIS

Disclaimer: This data is for research and evaluation purposes only.

NASA Official: [Ramakrishna R.Nemani](#)

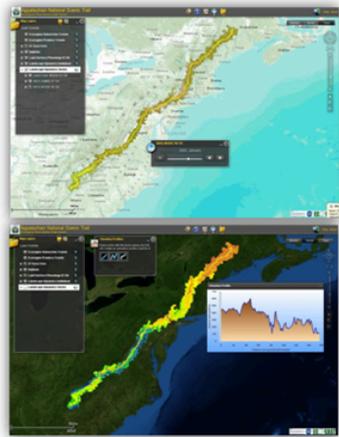
Curator: [Forrest Melton](#)

[Privacy Statement](#)

A Decision Support System for Monitoring, Reporting, and Forecasting Ecological Conditions of the Appalachian National Scenic Trail (<http://www.edc.uri.edu/atmt-dss/>)

A.T.-DSS Toolsets and Interfaces

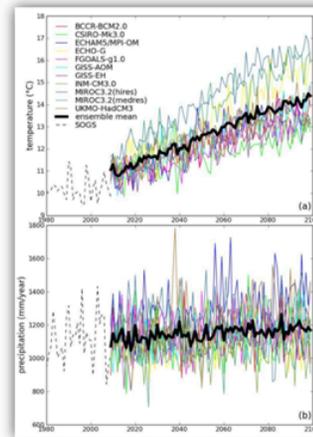
Mapping Viewer



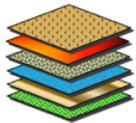
Viewshed Monitoring



Report & Forecast



Data Gateway



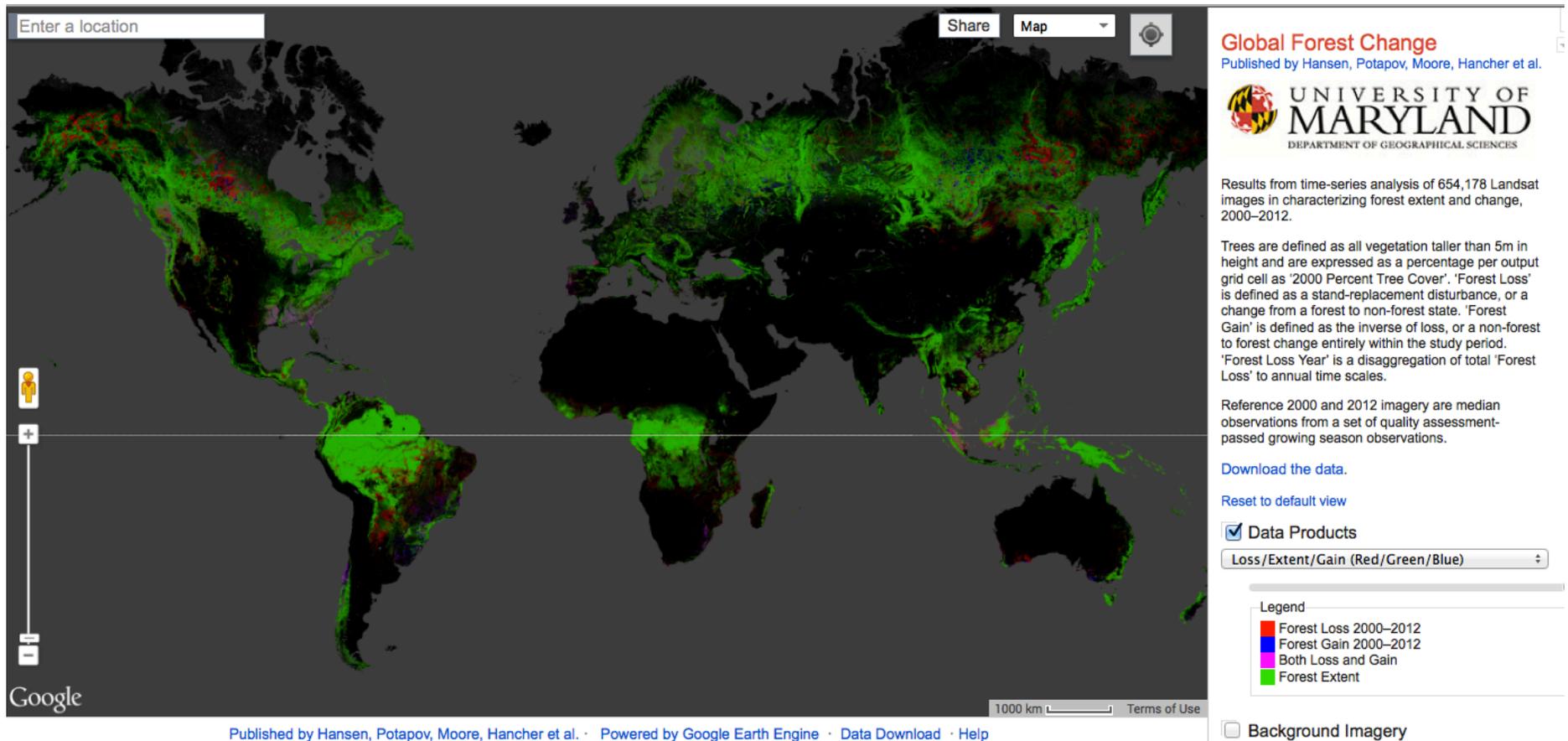
TOPS Data: MODIS Products, GIMMS, NACP, SOGS ...
 A.T. Geospatial Data: HUC-10 Shell, NED, NWI, NLCD, LANDFIRE ...



Uses NASA Terrestrial Observation and Prediction System (TOPS) based on MODIS, Landsat, SRTM products: Terrain, Land Cover, Fire

Change Detection in Global Forest

<http://earthenginepartners.appspot.com/science-2013-global-forest>



NASA Landsat data are used to map loss/gain of forests around the world

Global Crop Production Analysis

<http://www.pecad.fas.usda.gov/>

USDA United States Department of Agriculture
Foreign Agricultural Service

Linking U.S. Agriculture **FAS** to the World

About a fourth of total farm cash receipts come from exports. [Show Factoids](#)

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You are here: [Home](#) / [Commodities and Products](#) / **Global Crop Production Analysis**

Global Crop Production Analysis

- **Commodity and Country Analysis**
 - World Agricultural Production (WAP – Current Report)
 - World Agricultural Production (WAP – Archived Reports Index)
 - Production and Trade Maps
 - [Corn](#) | [Wheat](#) | [Oilseeds](#) | [Cotton](#)



- **Special Articles/Presentations**
 - Peru Wheat Production Limited by Competition from Corn and Quinoa (Aug 21, 2014)
 - Southeast Asia: Historical El Niño-Related Crop Yield Impact (Jun 19, 2014)
 - Search Articles and Reports (1999 to Present)
- **FAS Data and Information**
 - Global:
 - [Crop Area, Production, Supply and Distribution \(PSD Online\)](#)
 - [Weather, Soil Moisture, and Satellite Image Maps and Data \(Crop Explorer\)](#)
 - [Satellite Imagery Archive \(SIA\) for USDA Subscribers \(Archive Explorer\)](#)
 - [Monthly Crop Growth Stage and Harvest Calendars](#)
 - [MODIS Satellite Image Gallery](#)
 - [Global Agricultural Information Network](#)
 - [Global Agricultural Monitoring \(GLAM\)](#)
 - [Global Reservoir and Lake Monitor](#)
 - [Satellite Imagery](#)
 - [RSS News Feeds—Headlines, Archives, and World Agricultural Production](#)
 - [Vegetation Index Monitor](#)

NASA Remote Sensing Data



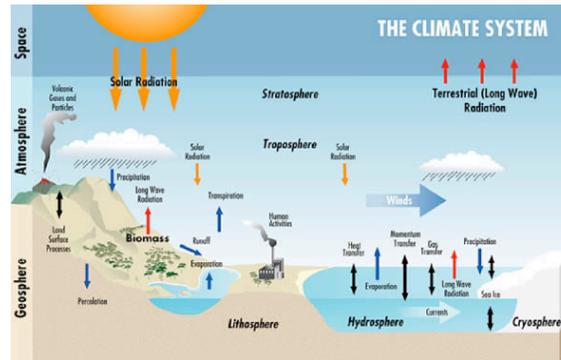
NASA Earth Science



Climate System
Research Questions

Observational Needs

- Missions and Sensors Design and Development,
- Validation Strategy,
- Information Technology Development



- Data Analysis
- Data Assimilation in Models,
- Model Validation

Summary

- Mission Launch,
- Sensor Measurements to Climate Data Parameters,
- Data Validation

- Data Distribution for Research and Applications, for Environmental Decision Support,
- Capacity Building

Coming Up Next Week --

NASA Data for Applications and Environmental Decision Support

Data Products and Attributes :

Spatial Resolution

Spatial Coverage

Temporal Resolution

Temporal Coverage

Data Format

Data Latency

Data Accuracy

Data Strengths/Limitations

Data Products for:

Air Quality

Disasters

Eco-forecasting and Land Management

Water Resources

Thank You!

Amita Mehta

email: amita.v.mehta@nasa.gov