

# WELCOME TO NASA APPLIED REMOTE SENSING TRAINING (ARSET) WEBINAR SERIES



## NASA REMOTE SENSING OBSERVATIONS FOR FLOOD MANAGEMENT

**COURSE DATES: EVERY MONDAY, JUNE 8, 15, 22, 29**  
**TIME: 8 TO 9 AM AND 1 TO 2 PM EDT**





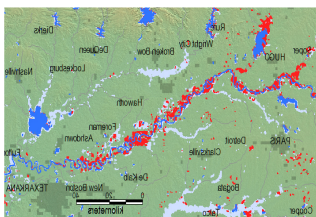
# Webinar Outline

## Week 1



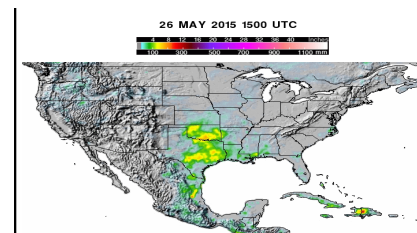
**NASA Remote Sensing Data for Flood Management, Introduction to Flood Monitoring Tools**

## Week 3



**Regional Flood Management over Africa, Demonstration of the MODIS-based Inundation Mapping**

## Week 2



**TRMM-based Flood Monitoring Web-tools**

## Week 4



**Floodplain Management of the Mekong River, Demonstration of Selected Flooding Cases using Multiple Web-Tools and GIS**



# Training Team

## Instructors:

- ❑ Amita Mehta (ARSET): [amita.v.mehta@nasa.gov](mailto:amita.v.mehta@nasa.gov)
- ❑ Brock Blevins (ARSET): [bblevins37@gmail.com](mailto:bblevins37@gmail.com)

## Guest Speakers:

- ❑ **Ashutosh Limaye (NASA):** [ashutosh.limaye@nasa.gov](mailto:ashutosh.limaye@nasa.gov) (Week-3)
- ❑ John Bolten (NASA): [john.bolten@nasa.gov](mailto:john.bolten@nasa.gov) (Week-4)

## Spanish Translation:

- ❑ David Barbato (ARSET): [barbato1@umbc.edu](mailto:barbato1@umbc.edu)

## General inquiries about ARSET:

- ❑ Brock Blevins (ARSET) [bblevins37@gmail.com](mailto:bblevins37@gmail.com)
- ❑ Ana Prados (ARSET) [aprados@umbc.edu](mailto:aprados@umbc.edu)



# Important Information

**Certificate of Completion (upon request):**

**You must attend all 4 live sessions**

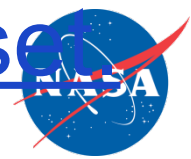
**You must submit the homework assignment**

(homework assignment link will be provided after Week-4)

Contact : Marines Martins

Email: [marines.martins@ssaihq.com](mailto:marines.martins@ssaihq.com)

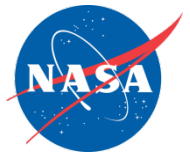
# Access to ARSET Trainings <http://arset.gsfc.nasa.gov>



The screenshot shows the ARSET website interface. At the top, there are navigation tabs for **DISASTERS**, **ECO FORECASTING**, **HEALTH & AIR QUALITY**, and **WATER RESOURCES**. A sidebar on the left contains a menu with items: **Webinars**, **Workshops**, **Apply for Training**, **Personnel**, **Links**, and **Upcoming Webinar**. The **Webinars** item is circled in red. A red arrow points from this menu item to a detailed view of a webinar titled **NASA Remote Sensing Observations for Flood Management**. This webinar details include the dates **Monday, June 8, 2015 to Monday, June 29, 2015**, the time **8 to 9 AM and 1 to 2 PM Eastern US Time (UTC - 4)**, the application area **Disasters**, keywords **Flooding, Tools**, and instruments/missions **Aqua, GPM, MODIS, Terra, TRMM**. Below the webinar details is a section for **Presentations and Recordings**, which contains a table with the following data:

Week	Date	Title	Presentation	Recording	Homework
1	June 8, 2015	NASA Remote Sensing Data for Flood Management, Introduction to Flood Monitoring Tools	<a href="#">English</a> <a href="#">Spanish</a>	<a href="#">View Week-1</a>	N/A

The **English** and **Spanish** links in the table are circled in red. A red arrow also points from the top navigation menu to the **Webinars** section of the page.



# Agenda for Week-3

## Overview of the TRMM-based Flood Tools

- 'Connecting Space to Village'
- Overview of MODIS:
  - i) MODIS Near-Real Time Global Flood Mapping*
  - ii) Dartmouth Flood Observatory*
  - iii) MODIS NRT (Live Demo)*



# Connecting Space to Village

Ashutosh Limaye

[http://www.nasa.gov/mission\\_pages/servir/index.html](http://www.nasa.gov/mission_pages/servir/index.html)

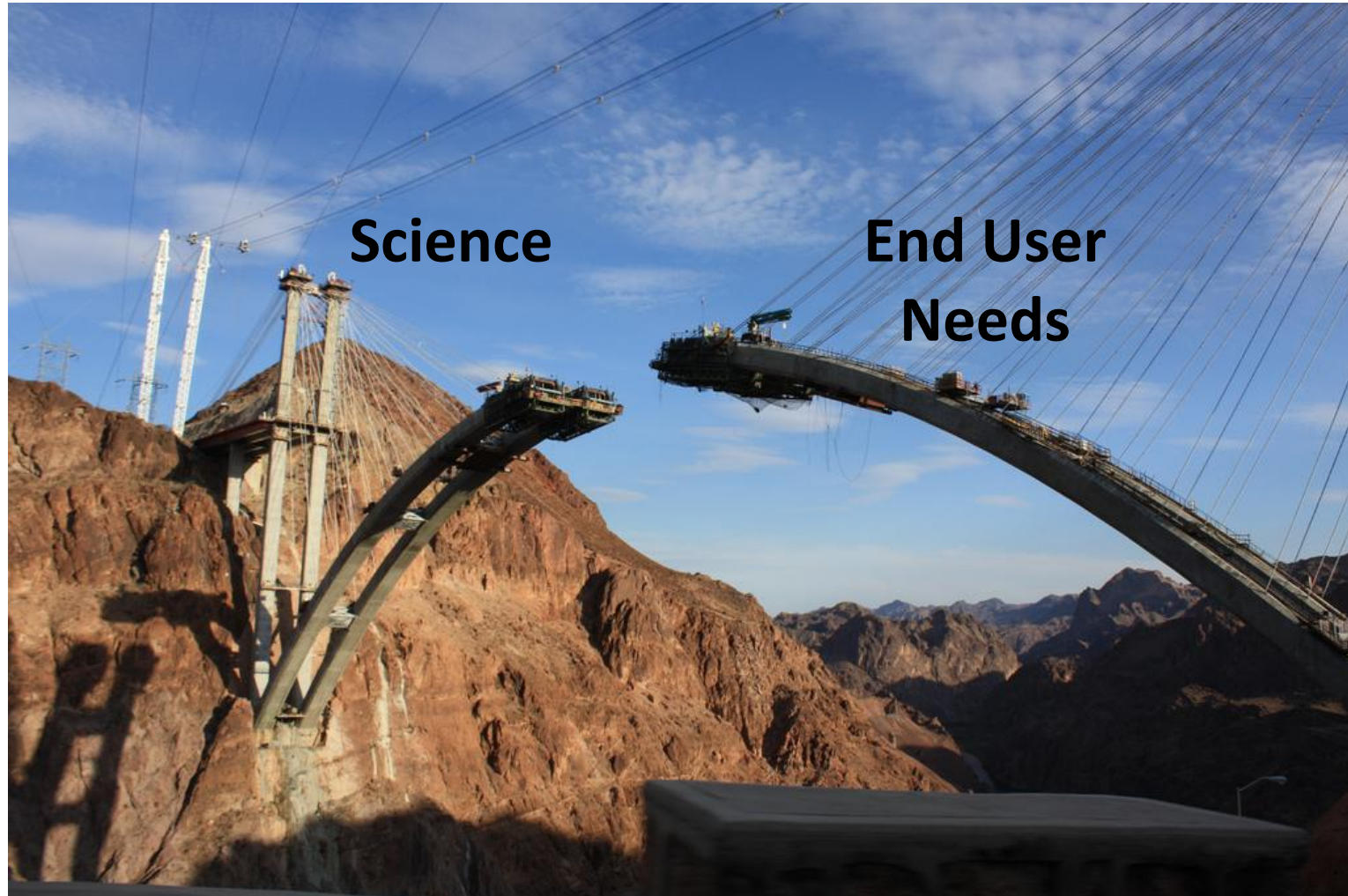
# Connecting Space to Village

Ashutosh Limaye  
SERVIR Project Scientist





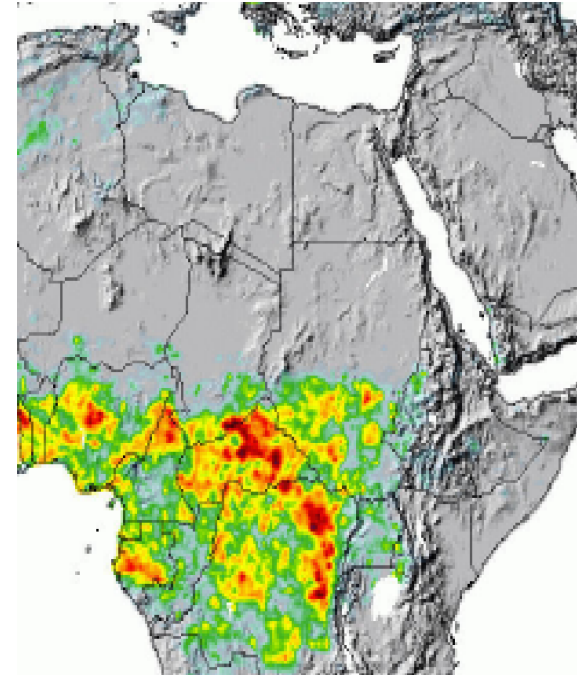
# Linking Science to End User Needs



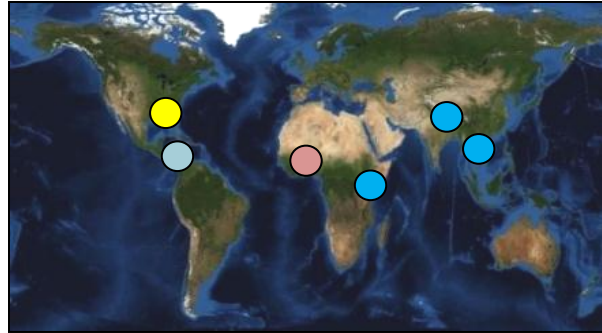
Courtesy: alifayre

# What We Do

- Identify needs in SERVIR regions
- Link science products from research institutions to meet those needs through improved access to data, models, online maps, and visualizations
- Build capacity of regional institutions, stakeholders, and young professionals
- Strengthen partnerships and foster collaboration across SERVIR network



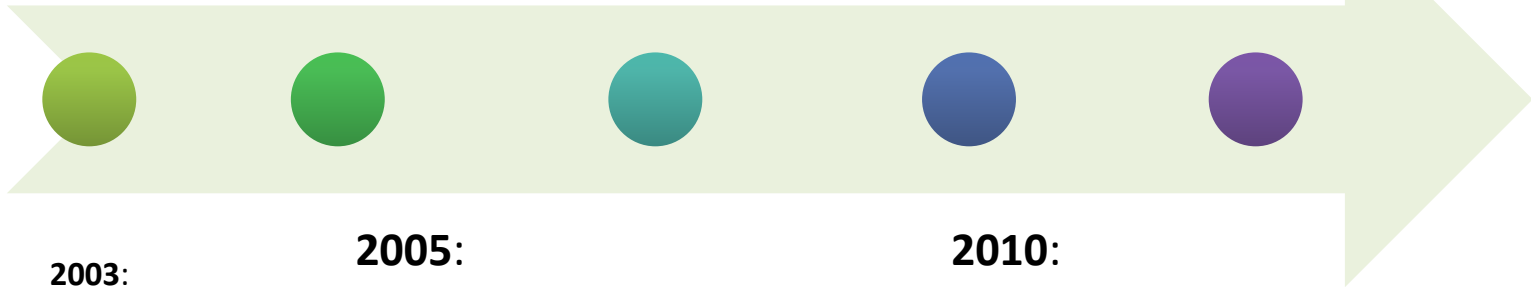
# Background - Timeline



## SERVIR Network

**2008:** SERVIR-  
Eastern and  
Southern Africa  
at RCMRD

**2014:** SERVIR-  
Lower  
Mekong



**2003:**  
SERVIR  
Concept

**2005:**  
SERVIR-Mesoamerica  
at CATHALAC

**2010:**  
SERVIR-Himalaya  
at ICIMOD



# Results Summary

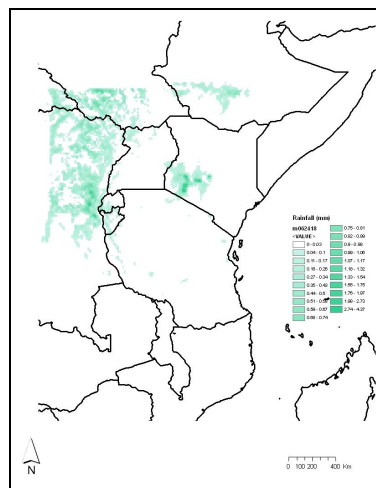
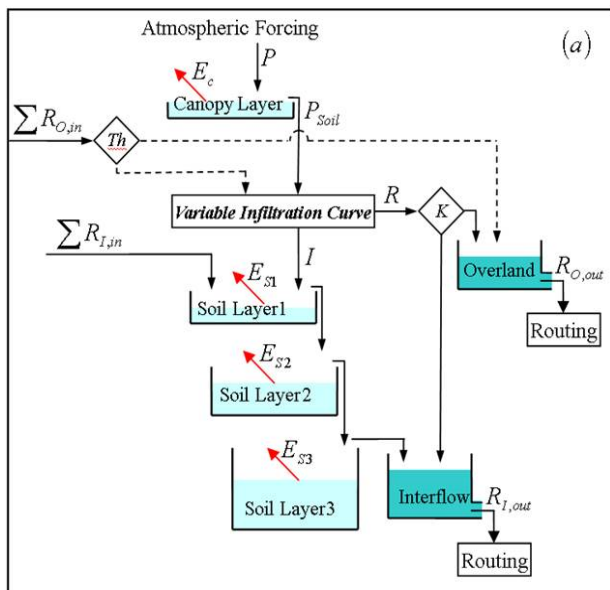


<b>Results (cumulative totals)</b>	<b>as of Feb 2014</b>	<b>as of Feb 2015</b>
People trained	1,800	2,060
Institutions with improved capacity to use Earth observations	223	322
Scientists or decision-makers participating in exchanges between SERVIR hubs or partner institutions	209	339
Stakeholders using climate information in their decision-making	976	1,139
Decision Support Tools developed	43	62
SERVIR activities in countries	29	38
SERVIR use of Earth observing sensors and products	19	22
Map Requests made	1,029,470	2,368,939
Data Layers Standardized	1,734	1,793

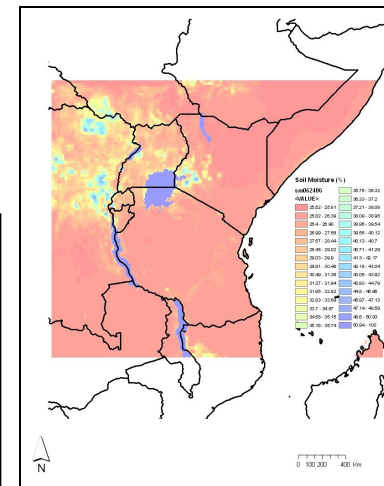
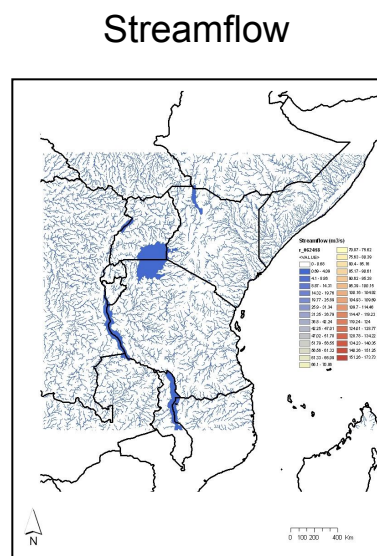
# SERVIR Eastern and Southern Africa Hydrological Modeling



- Ministry of Water in Kenya, Rwanda, Uganda, and Namibia did not have real time assessments of hydrologic conditions
- Spatially distributed hydrologic model CREST, developed by NASA Goddard Space Flight Center for one Kenyan watershed
- Spatial resolution 1km, run every 3 hours in the Amazon cloud infrastructure
- Uses near real-time satellite-derived rainfall estimates and rainfall forecasts from Kenya Meteorological Service (KMS) to produce streamflow



KMS QPF



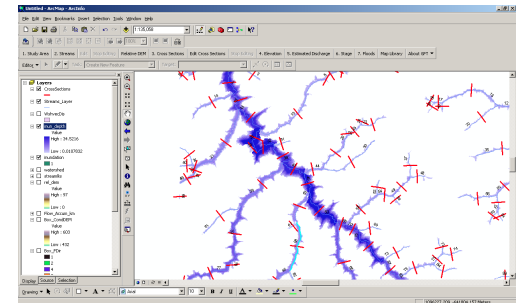
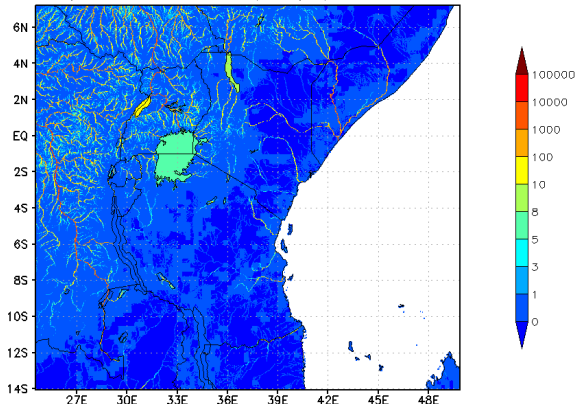
Soil Moisture

# Historical Data Perspective



- 10+ year historical satellite rainfall data to drive the CREST model, resulting in historical daily streamflow at 1 km resolution.
- 5<sup>th</sup>, 20<sup>th</sup>, 80<sup>th</sup> and 95<sup>th</sup> percentiles using historical data put the real time streamflow in context. Those historical and near real time data are shared with Kenya Department of Water Resources (KDWR).
- SERVIR has created additional tools for better uptake of hydrologic products from CREST. Flood mapping tool, a standalone version of USGS GIS Flood Tool, and CREST Viewer show continued use and interest.
- SERVIR is coordinating a joint working group within Kenya for hydrologic model product generation across government ministries and has resulted in wider use of model products.

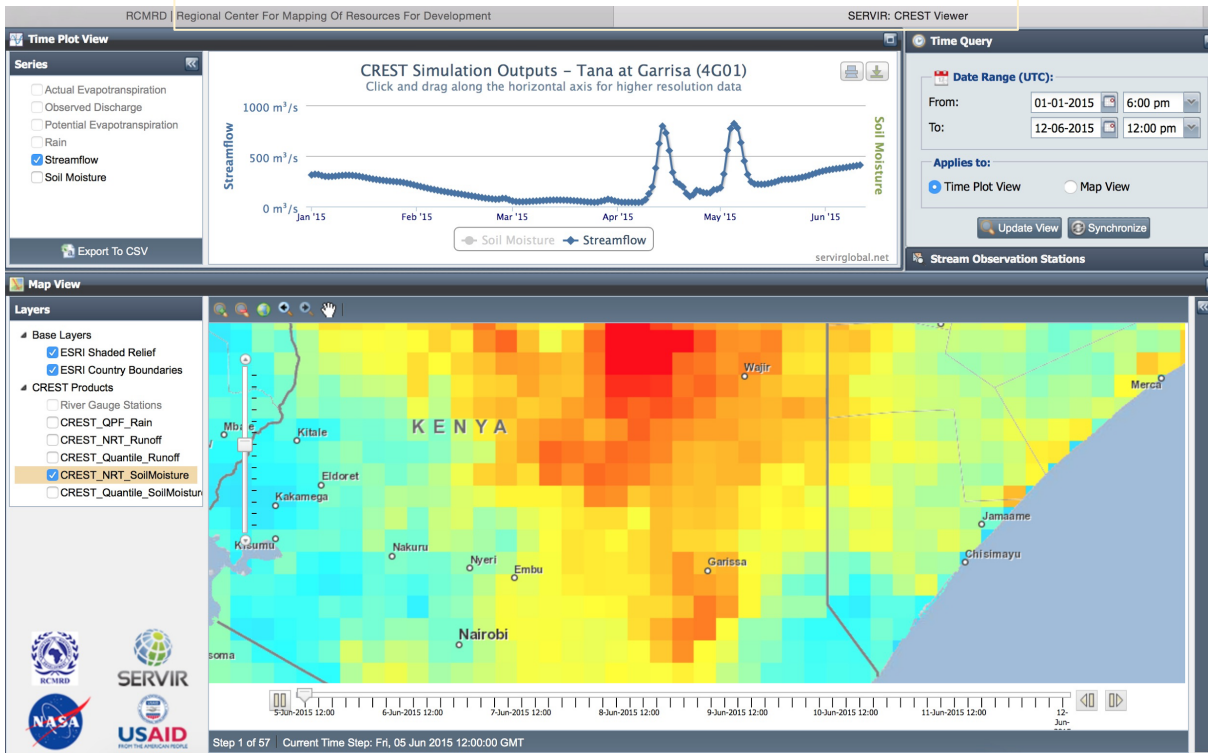
Latest 24h/3h Stream Flow (m<sup>3</sup>/s) 2013-09-19 15h



# CREST Viewer

- At the request of Ministries of Water in Kenya, SERVIR Eastern and Southern Africa developed a CREST Viewer – an online visualization tool for the CREST outputs.
- It can display near real time, as well as historical modeled streamflow for nearly 400 locations being monitored across Eastern Africa.
- The viewer is also available on mobile platforms.

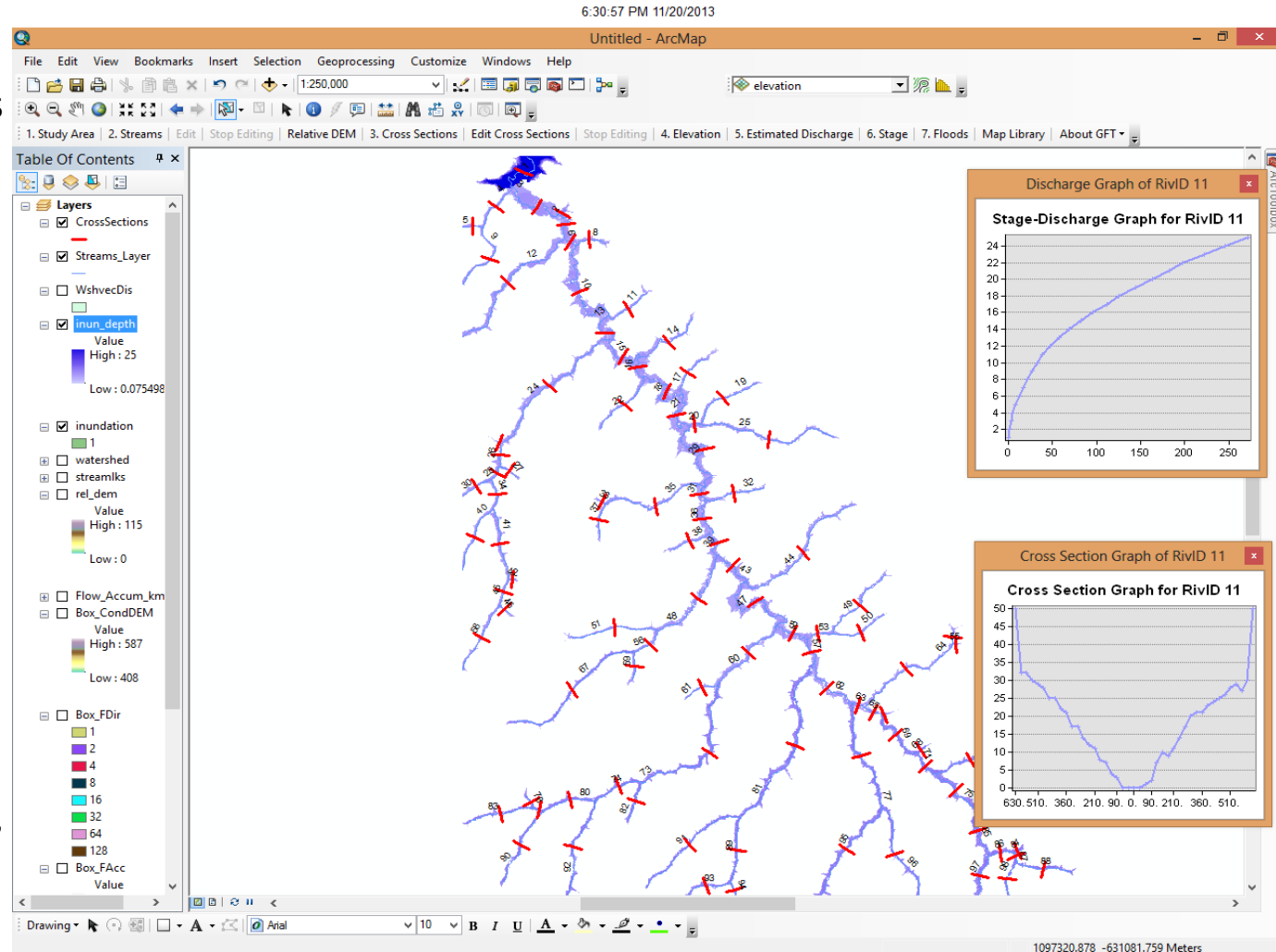
<http://ags.servirlabs.net/crestviewer/>



# Flood Inundation Mapping



- **Problem:** Kenya Dept of Water Resources (KDWR) needed high-res elevation maps with flooded areas marked, for faster and more accurate flood planning and preparedness.
- **SERVIR Tool:** Links with satellite rainfall data, generates streamflow estimates and sends daily email updates with modeled estimates of streamflow for selected locations.
- **Results:** This tool will be released in August 2015, in collaboration with KDWR personnel.

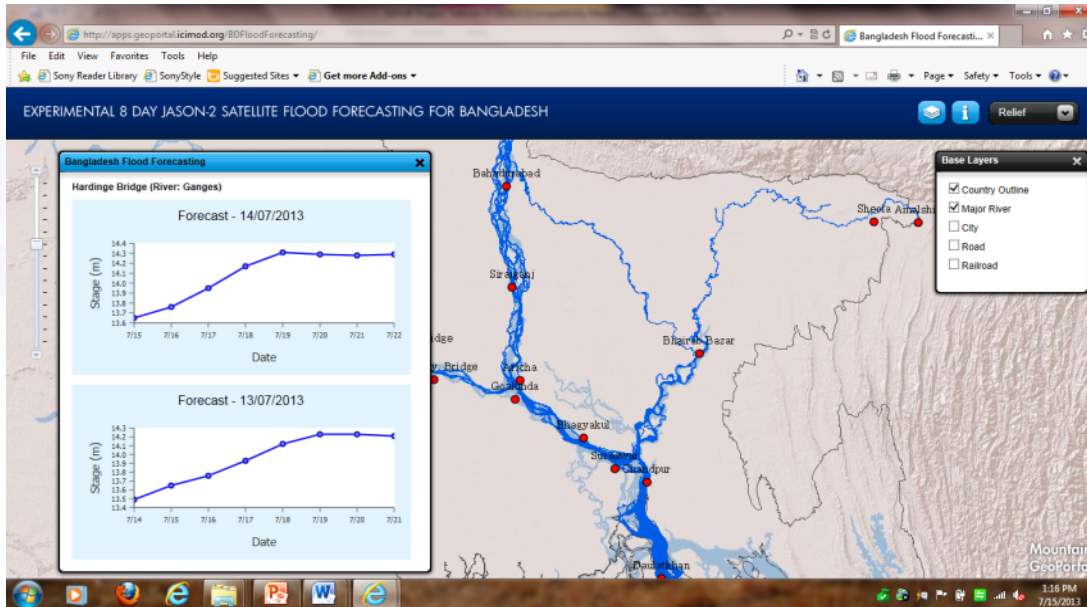




# Improved Flood Forecasting in Bangladesh



- **Problem:** Bangladesh's severe flooding affects millions of residents every year. The Flood Forecast Warning Center (FFWC) issues flood forecasts in Bangladesh just 3 days in advance – insufficient time for families and farmers to prepare.
- **What SERVIR did:** A SERVIR AST effort led by Faisal Hossain linked satellite altimetry data (JASON 2) to flood forecasts. SERVIR-HKH has trained FFWC scientists to generate flood forecasts 8 days in advance using this near real time satellite data.



- **Results:** FFWC has begun generating experimental 8-day forecasts representing river levels for the 2014 monsoon season. The satellite-derived system is being run independently by FFWC. It accurately predicted August 2014 flood wave. It is adopted as part of the official forecasting system for the 2015 monsoon season. The 8-day forecasts are providing 160 million impacted citizens with longer lead time for disaster preparedness.

Welcome to the SERVIR Global Product Catalogue, a searchable collection of user-tailored products and tools utilizing Earth Observations and NASA Products to inform resilient development.

LIST VIEW

MAP VIEW

NARROW BY: PRODUCT CATALOGUE

63 Results

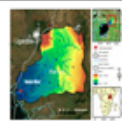
- ▶ Region ⓘ
- ▶ Theme ⓘ
- ▶ Status
- ▶ Data Source ⓘ
- ▶ Type



**Agricultural Monitoring to Support Food Security in the Eastern Himalaya**

Theme: Agriculture, Climate  
Region: Himalaya

Status: Active



**CREST Hydrologic Modeling Tool**

Theme: Adaptation, Agriculture, Climate, Disaster, Water, Weather  
Region: Eastern/Southern Africa, Himalaya



**CREST Streamflow Viewer - Eastern Africa and Bhutan**

Theme: Adaptation, Agriculture, Climate, Disaster, Water, Weather  
Region: Eastern/Southern Africa, Himalaya



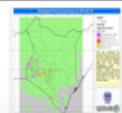
**Flood Mapper for African Basins**

Theme: Agriculture, Climate, Disaster, Water, Weather  
Region: Eastern/Southern Africa



**Forest Fire Detection and Monitoring System**

Theme: Disaster  
Region: Himalaya



**Frost Monitoring and Forecasting in Africa**

Theme: Agriculture, Weather  
Region: Eastern/Southern Africa

The screenshot shows the SERVIR Global Product Catalogue interface. At the top, there is a search bar and navigation options for 'LIST VIEW' and 'MAP VIEW'. Below the navigation, a map of Africa is displayed with a 'REGIONS' dropdown menu. To the right of the map, a list of product thumbnails is visible, including 'Africa Biodiversity Mappi...', 'Agricultural Monitoring T...', 'Clip Zip and Ship Prototy...', 'CREST Hydrologic Modeling...', 'CREST Streamflow Viewer', and 'Eastern Africa Drought an...'. Each thumbnail includes a small image and text describing the product's theme and region.



For more information on the SERVIR program, visit [www.servirglobal.net](http://www.servirglobal.net)



- SERVIR is a link between research institutions and end user decision making.
- SERVIR efforts are led by the needs of the region. Floods are common across the SERVIR regions. SERVIR builds capacity of technical institutions in the region to use Earth observations for improved decision making.
- Presence of SERVIR Hub, a technical institution with regional governmental support, makes the linkage sustainable.

## More information:

SERVIR Global: <http://www.servirglobal.net>

## SERVIR Contacts:

Nancy Searby – Applied Sciences Capacity Building Program Manager

Daniel Irwin – Project Director

Ashutosh Limaye – Project Scientist ([Ashutosh.Limaye@nasa.gov](mailto:Ashutosh.Limaye@nasa.gov))



# Overview of MODIS

# MODerate Resolution Imaging Spectroradiometer (MODIS)

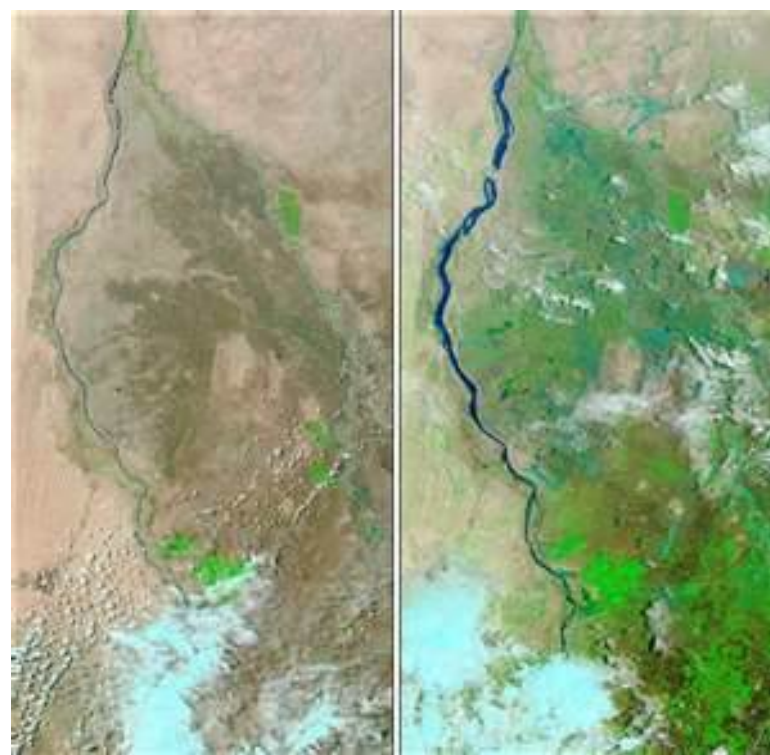


<http://modis.gsfc.nasa.gov>

- Flying on-board Terra and Aqua – polar orbiting satellites
- Global measurements, 1 to 2 times per day
- 36 spectral bands observing atmosphere, ocean, and land properties
- Measurement footprints vary from **250 m to ~1 km**

**Aqua**  
6/19/2003

**Terra**  
8/11/2003



Flooding along the White Nile, Sudan from the Natural Hazards page of [earthobservatory.nasa.gov](http://earthobservatory.nasa.gov)

# MODIS Data for Inundation Mapping



## MODIS Reflectance in Optical Bands 1, 2, and 7: (620-670 nm), (841-876 nm), and (2105-2155 nm)

- MODIS provides observations of land-surface. MODIS reflectance from these bands indicates the presence of water on land surface, previously not covered by water
- A global reference database of water bodies is formed – inundation is mapped with respect to the reference water

Spatial Resolution:	250m x 250m
Spatial Coverage:	Global
Temporal Resolution:	Daily, 8-day, 16-day
Temporal Coverage:	1998 to present

# MODIS Data for Inundation Mapping



## Strengths:

- High Resolution, Globally Consistent
- Can provide Coastal Inundation Mapping due to storm surge or tsunamis

## Limitations:

- MODIS provides surface inundation mapping only outside the water bodies, it does not provide information about water depth or water flow
- It can not view the surface in the presence of clouds
- Mountain and cloud shadows may be erroneously interpreted as water inundated surfaces



# MODIS-Based Interactive Flood Tools



- Near-Real Time Global MODIS Flood Mapping
- Dartmouth Flood Observatory (DFO)



# Near-Real Time Global MODIS Flood Mapping Tool

# MODIS Inundation Mapping

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



**NRT Global Flood Mapping**

**Global Map**

[View in ArcGIS Online map viewer.](#)

Real-time feed of processed tiles available at: [modis.geobliki.com/modis/geoactivities.atom](http://modis.geobliki.com/modis/geoactivities.atom)

10° Flood Map Tile Production

For more information, please contact [floodmap](mailto:floodmap@lists.nasa.gov) at [lists.nasa.gov](mailto:lists.nasa.gov)

**News/Status**

11-Nov-2014: ArcGIS Online Map avai  
10-Nov-2014: MODIS flood product ev

**10°x10°**

[Go to News/Status page](#)

**Data Viewer**  
Product Description  
**Documents**  
Future Enhancements  
News/Status

**Mailing list**  
To subscribe to our mailing list to receive email notification of updates, please, click here.

**View in ArcGIS Online Map Viewer**

# MODIS Inundation Mapping: Zoom on a region

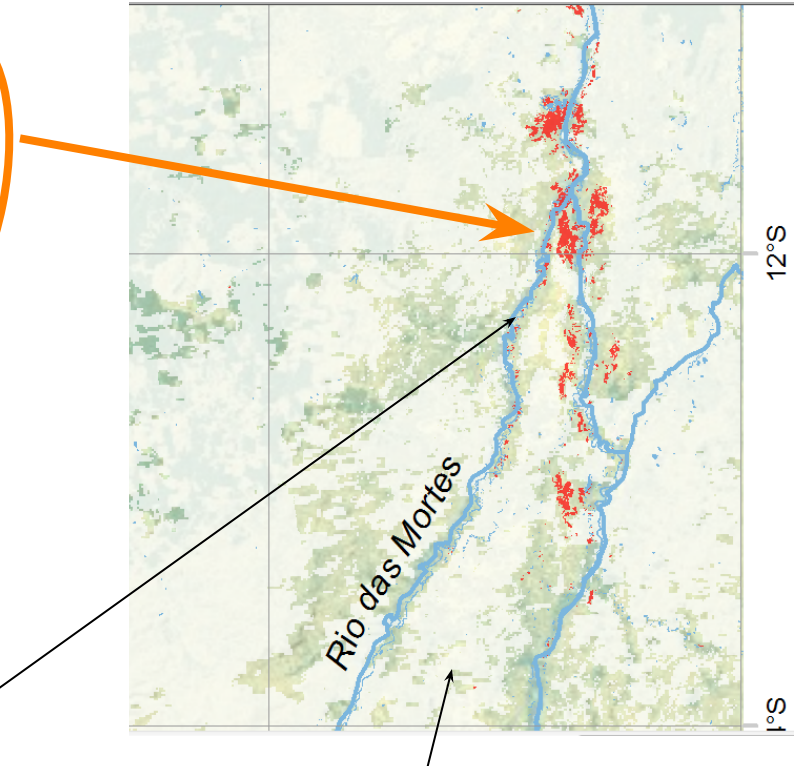
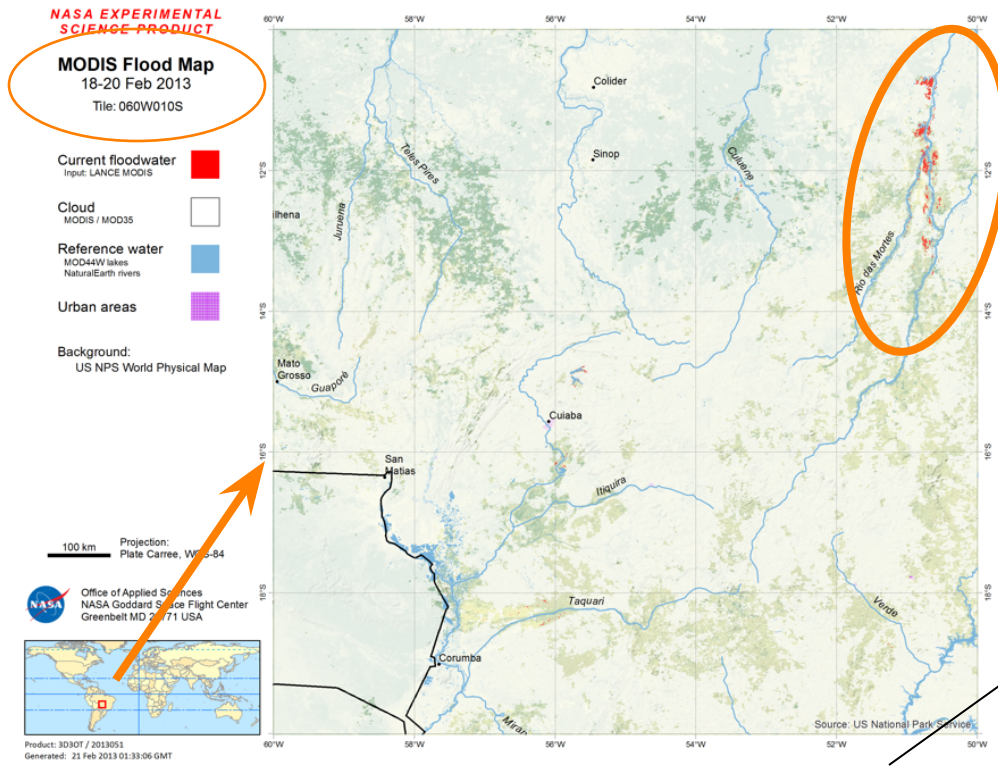


<http://oas.gsfc.nasa.gov/floodmap/>

Red Shading Shows Inundated Surface

## Regional Mapping

## Pixel size 250 m

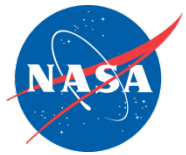


Blue Shading Shows Reference Water

White Shading Shows Cloud Cover

# MODIS Inundation Mapping

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



## PRODUCTS:

**MFM:** MODIS Flood Map = annotated 10x10 degree map/graphic product (currently available in png format).

**MSW:** MODIS Surface Water (Pixel classified with presence of water = Reference Water + Flood Water). This is based on a ratio of MODIS bands 1, 2, and 7 reflectance values.

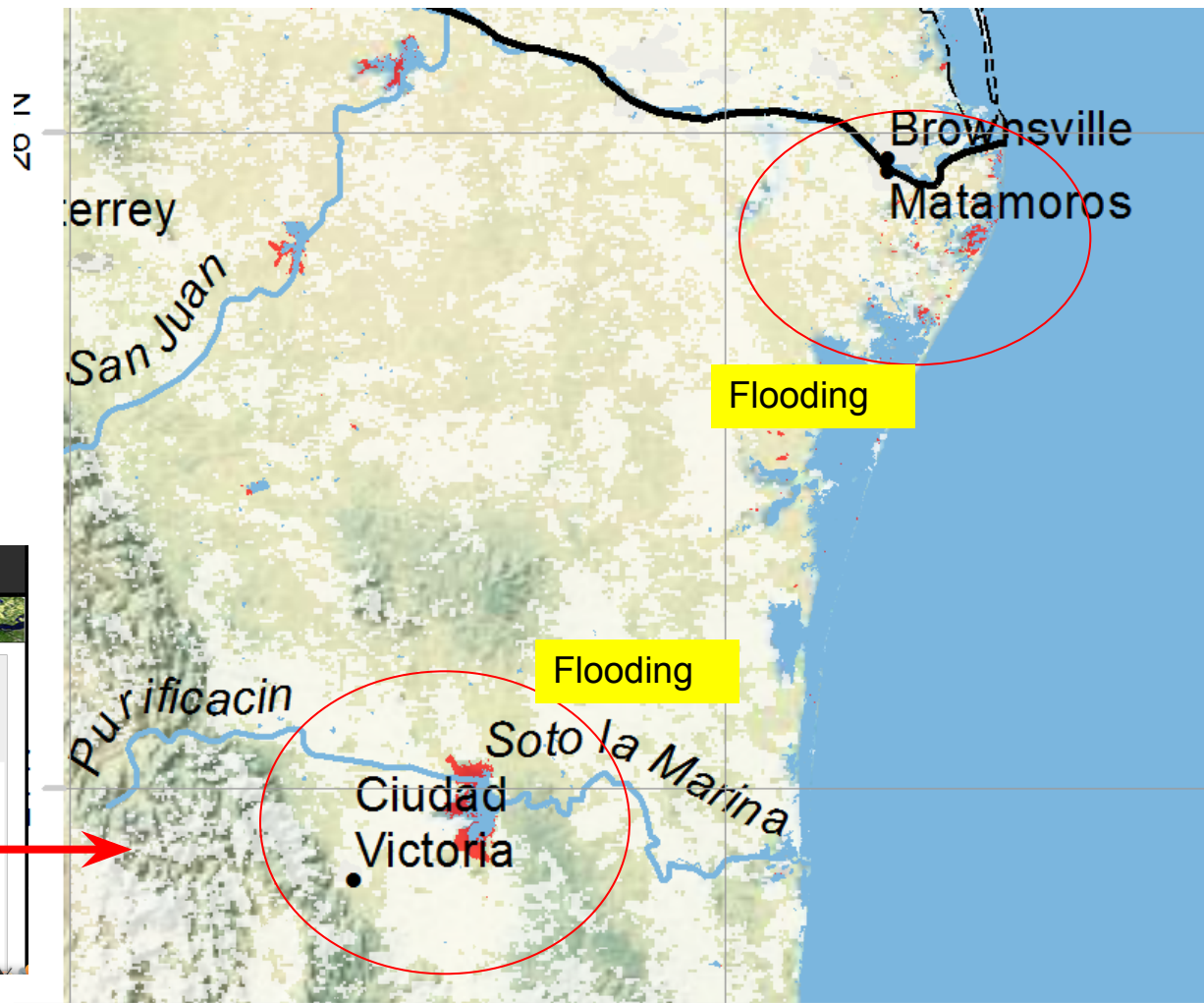
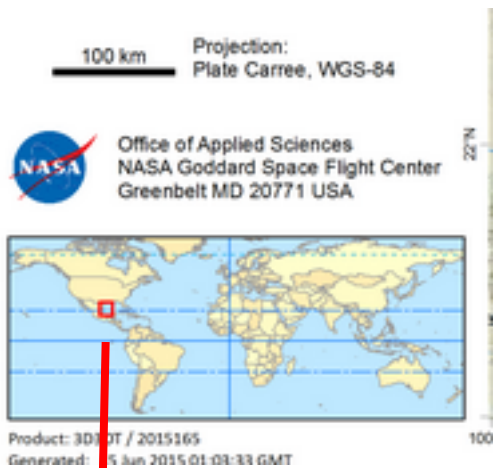
Reference Water: based on MODIS reflectance and Shuttle Radar Topography Mission Water Body Data.

**MFW:** MODIS Flood Water – Obtained by subtracting Reference Water from MSW.

**MWP:** MODIS Water Product (Each pixel is assigned a number to identify as either undecided, water not detected, reference water detected, flood water detected where there is no reference water present)



# MODIS Inundation Mapping



NASA National Aeronautics and Space Administration

### NRT Global Flood Mapping

3 Day Composite 2 Day Composite 1 Day Composite 15 Day Composite

June 2015  
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

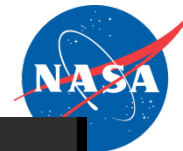
Products	Available Downloads
MODIS Flood Map	HPM <a href="#">png</a>
MODIS Flood Water	HPW <a href="#">shapefile (.zip)</a>   <a href="#">KML</a>
MODIS Surface Water	HSW <a href="#">shapefile (.zip)</a>   <a href="#">KML</a>
MODIS Water Product	MWP <a href="#">geotiff</a>
README	<a href="#">pdf</a>   <a href="#">txt</a>

Check slide show for the last 10 days.

**NASA EXPERIMENTAL SCIENCE PRODUCT**  
**MODIS Flood Map**  
13-14 Jun 2015  
the overview

- Current floodwater (see legend)
- Cloud (2000+ m)
- Reference water (modulated tone)
- Urban areas
- Background: US NPS World Physical Map

# MODIS Inundation Mapping



National Aeronautics and Space Administration

## NRT Global Flood Mapping

### Data Viewer

Product Description

### Documents

Future Enhancements

News/Status

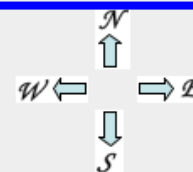
### Mailing list

To subscribe to our mailing list to receive email notification of updates, please, click here.

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

« June 2015 »  
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

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

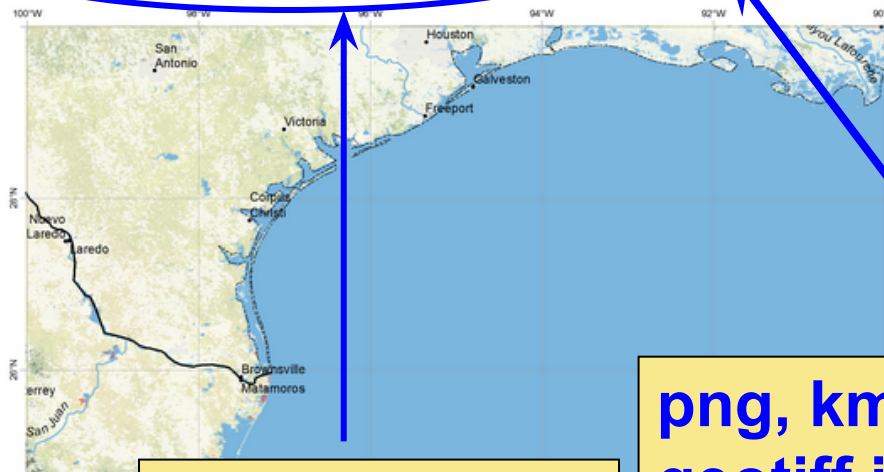


Check slide show for the last 10 days.

NASA EXPERIMENTAL  
SCIENCE PRODUCT

**MODIS Flood Map**  
12-14 Jun 2015  
Tile: 100W030N

- Current floodwater  
Input: LANCE MODIS
- Cloud  
MODIS / MOD35
- Reference water  
MOD44W lakes  
NaturalEarth rivers
- Urban areas
- Background:  
US NPS World Physical Map



Archive Available since 2010

Composite Map

10-day Sequencing

png, kmz, geotiff images available



# Dartmouth Flood Observatory



# DFO Objectives

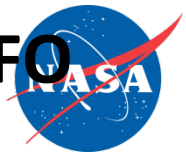


## An Interactive Web-tool Developed for Humanitarian, Water Resources Management Research and Applications

### The DFO Goals are to:

- Conduct global remote sensing-based fresh water measurement and mapping in “near real time” and record such information into a permanent archive.
- Collaborate with humanitarian and water organizations in partnerships for enabling the maximum utility of such information.
- Perform hydrological research in the area of surface water variability, using both remote sensing and modeling, and continue to develop new methods of measuring the Earth’s water.

Supported by: NASA, the U.S. Geological Survey, the World Bank, the Development Bank of Latin America, the UNISDR, and from the European Commission’s Global Disaster Alert and Coordination System (GDACS) at the Joint Research Centre



The DFO uses:

- the MODIS Inundation Mapping Information
- TRMM-TMI (and in the future GPM GMI) Observations, together with a model to derive river discharge
- Terrain data from Shuttle Radar Topography Mission (SRTM)

# Selected End-Users of the DFO



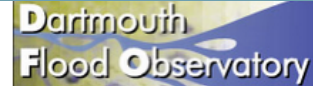
- [Flood Control 2015](#)
- [Global Risk Information Platform](#)
- [Malawi Spatial Data Portal](#)
- [PreventionWeb](#)
- [European Environment Agency](#)
- [Humanitarian Early Warning Service](#)
- [GeoSUR](#)

# The DFO Website



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

- [Home](#)
- [Active Archive of Large Floods, 1985-Present](#)
  - [Global and Regional Analyses](#)
- [Master Index of Inundation Maps](#)
- [The Surface Water Record](#)
- [River Watch](#)
- [Other Flood Detection Tools](#)
- [Sample Images and Maps](#)
- [Staff](#)
- [Publications](#)



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

[Flood Observatory Director](#)

[Observatory Mission Statement](#)

[Community Surface Dynamics Modeling System](#)

University of Colorado, Campus Box 450, Boulder, CO 80309 USA

[For latest data, flooding in E. Texas and region, DFO #4134, May-June, 2015](#)

[Tour the flooding Red River Valley, Arkansas and Oklahoma, June 17, 2015](#)

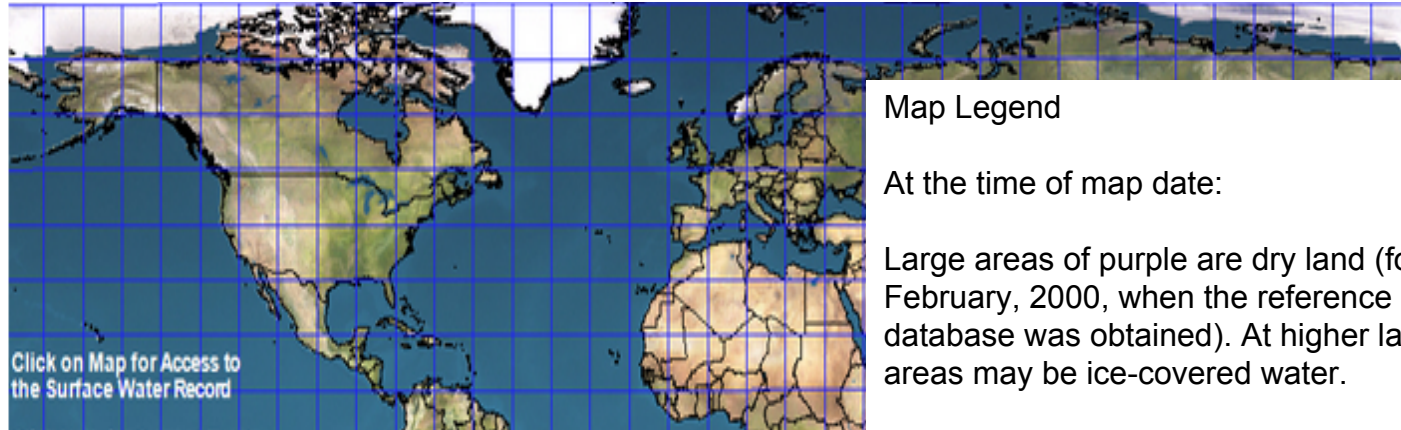


Featured Event of Regional Flooding - Updated Daily

# Global Flood Events Using MODIS Inundation



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



## Map Legend

At the time of map date:

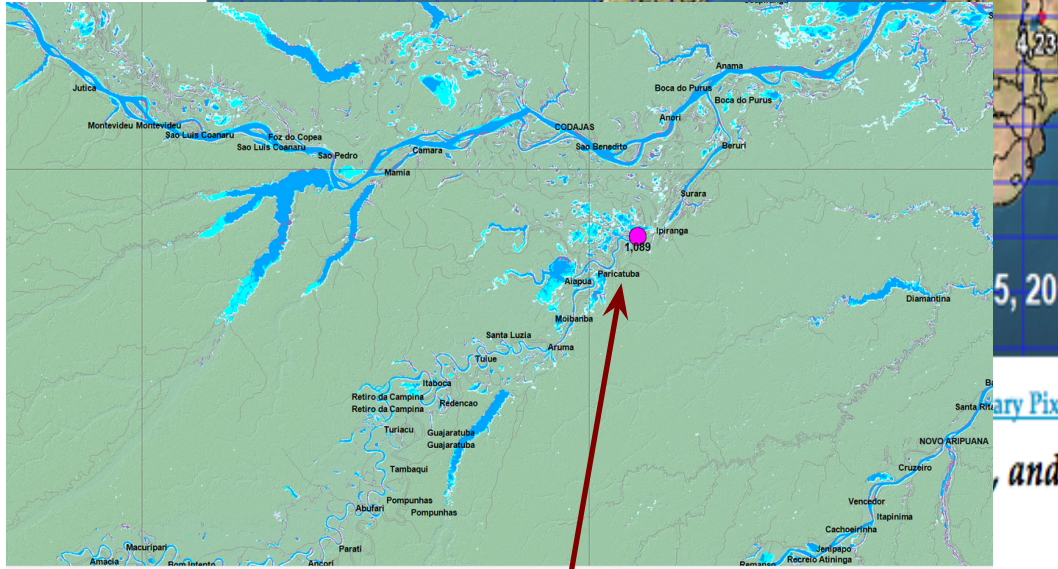
Large areas of purple are dry land (formerly water in February, 2000, when the reference SWBD water database was obtained). At higher latitudes, such areas may be ice-covered water.

Small areas of purple are water SWBD, mapped by but are too small to be mappable by MODIS.

Dark blue is current water, imaged by MODIS and by SWBD in 2000 ("permanent" water).

Bright blue is flooding: expanded water areas mapped by MODIS compared to reference water. Any post-2000 reservoir or new water body is also depicted in bright blue.

Light blue-gray is all previous flooding imaged and mapped by the Flood Observatory (now dry land). Note: in mountainous areas, local shadows are commonly mis-classified as water.



Select the  
Flood Event

# Regional Flooding Event Using the NASA MODIS Inundation Mapping Tool



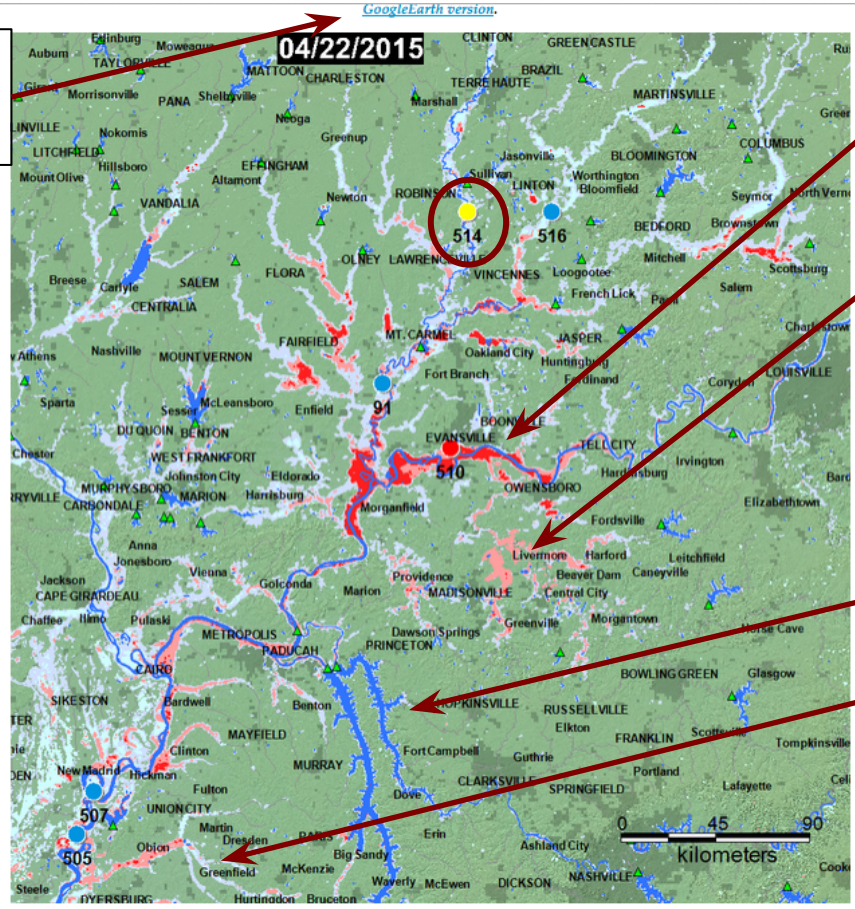
<http://floodobservatory.colorado.edu/>

Click for more information



*Featured Flood Event: #4230, Ohio and Wabash Valleys, USA*

View in Google Earth

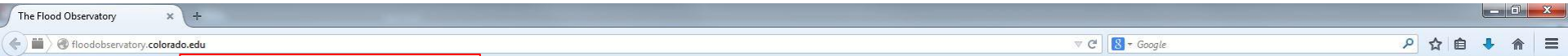
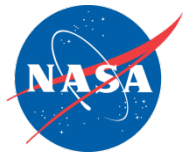


- Red:** Flooding within the past 14 days (MODIS automated product)
- Light Red:** Flooded during this event, from earlier MODIS coverage or non-automated MODIS mapping.
- Darker Red:** Flooded areas from high resolution Sentinel 1 or Landsat 8 data.
- Dark blue,** Permanent water, February, 2000 (SWBD).
- Very light blue,** All flooding mapped by DFO since year 2000.

*CLICK on the colored dots to access River Watch Site*

Featured Event of Regional Flooding – Updated Daily

# Global Flood Archives



[Home](#)

[Active Archive of Large Floods, 1985-Present](#)

- [Global and Regional Analyses](#)

[Master Index of Inundation Maps](#)

[The Surface Water Record](#)

[River Watch](#)

[Other Flood Detection Tools](#)

[Sample Images and Maps](#)

[Staff](#)

[Publications](#)

**Live Traffic Feed**

- A visitor from Silver Spring, Maryland viewed "The Flood Observatory" 14 secs ago
- A visitor from College Park, Maryland viewed "The Flood Observatory" 10 mins ago
- A visitor from Denver, Colorado viewed "The Flood Observatory" 47 mins ago
- A visitor from College Park, Maryland viewed "The Flood Observatory" 1 hr 1 min ago
- A visitor from Magdeburg, Sachsen-Anhalt viewed "The Flood Observatory" 1 hr 18 mins ago
- A visitor from Washington, District of Columbia viewed "The Flood Observatory" 1 hr 57 mins ago
- A visitor from Brighton, Brighton and Hove viewed "Dartmouth Flood Observatory" 2 hrs 23 mins ago
- A visitor from Dois Vizinhos, Parana viewed "The Flood Observatory" 2 hrs 32 mins ago
- A visitor from Capua, Campania viewed "The Flood Observatory" 3 hrs 14 mins ago

Click here to see the flood archive data



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

[Flood Observatory Director](#)

[Mission Statement](#)

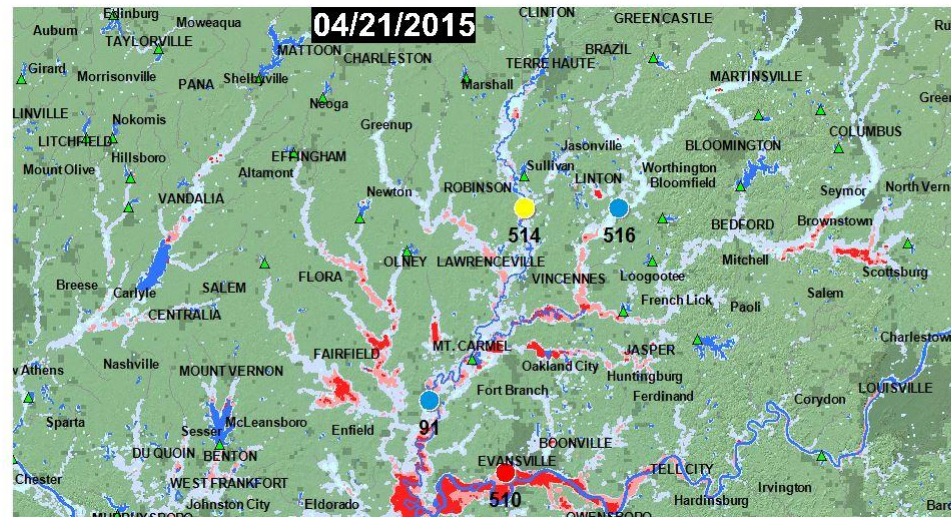
[Community Surface Dynamics Modeling System](#)

University of Colorado, Campus Box 450, Boulder, CO 80309 USA

[New: example of Inundation Prediction Maps using combined microwave and optical remote sensing](#)

[Featured Flood Event: #4230, Ohio and Wabash Valleys, USA](#)

**Red:** Flooding within past 14 days (MODIS automated product). **Light Red:** Flooded during this event, from earlier MODIS coverage or non-automated MODIS mapping. **Darker Red:** Flooded areas from high resolution Sentinel 1 or Landsat 8 data. **Dark blue,** Permanent water, February, 2000 (SWBD). **Very light blue,** All flooding mapped by DFO since yr 2000. Also, **CLICK** on the colored dots to access River Watch sites. See also [trial GoogleEarth version](#).



# DFO: Flood Archive Information



Dartmouth Flood Observatory Archives/index.html

## Global Active Archive of Large Flood Events

*Citation for the data:*  
G.R.Brakenridge, "Global Active Archive of Large Flood Events", Dartmouth Flood Observatory, University of Colorado, <http://floodobservatory.colorado.edu/Archives/index.html>

The information presented in this Archive is derived from news, governmental, instrumental, and remote sensing sources. The archive is "active" because current events are added immediately.

Each entry in the table and related "area affected" map outline represents a discrete flood event. However, repeat flooding in some regions is a complex phenomenon and may require a compromise between aggregating and dividing such events. The listing is comprehensive and global in scope. Deaths and damage estimates for tropical storms are totals from all causes, but tropical storms without significant river flooding are not included.

The Archive includes: 1) [an online .html table of recent events](#), only; 2) [Excel .xls](#) and [.xml](#) files for all events, 1985-present, updated as the recent events html is updated; 3) a GIS (MapInfo format) file set ([1,2,3,4,5](#)) and 4) a .shp format file set ([1,2,3,4](#)), each providing flood catalog numbers, centroids, area affected outlines, and other attribute information and updated as the recent events html is updated. The .shp files are generated from the MapInfo files.

Many floods have now been imaged by satellite and translated at the Dartmouth Flood Observatory into individual maps of inundation extents. To view these maps, follow any hyperlinks in the Archive .html, .xls, or .xml files in the "Country" column for a specific event.. Many other floods have been imaged and mapped but are instead shown as current or past flooding areas in the [Global Surface Water Record](#).

See Also: [Master Index of Rapid Response Inundation Maps](#)

You can visualize an [Interactive Map of the Global Flood Events 1985-2002](#). (If the map does not appear, you might download the Flash player (for free) on the Macromedia web site).

For additional information concerning how these maps and tables are created, please review the [Archive Notes](#).

Below: Geographic Centers of floods in the FloodArchive GIS file, 1985-2010

Geographic Centers of Floods in Archive, 1985-2010  
n = 9713

Real-time view - Get FeedIt!

Click here to view recent flood events

Click here to download the full archive as an excel file

Click here for an interactive map

Here is a map of flooding events in the archive

Show flood events by checking a box



# Flood Analysis



Flood Archive Atlas

floodobservatory.colorado.edu/archiveatlas/index.htm

World Atlas of Large Flood Events 1985-2002

The displays presented below are based on data derived from a wide variety of news, governmental, instrumental, and remote sensing source. They were produced by [Dr. Sebastien Caquard](#). For additional information concerning how these maps and tables are created, please review the [Archive Notes](#).

**Contents of the Atlas**

Part I - Evolution of the floods since 1985

Flood Number	<a href="#">Interannual evolution</a> <a href="#">Map of the floods number</a>
Flood Duration	<a href="#">Interannual evolution</a> <a href="#">Seasonal evolution</a> <a href="#">Map of the flood duration</a>
Flood Seasonality	<a href="#">Interannual and Seasonal evolution</a> <a href="#">Map of the flood seasonality</a>
Flood Causes	<a href="#">The different causes</a> <a href="#">Interannual evolution</a> <a href="#">Map of the flood causes</a>
Recurrence interval	<a href="#">Map of recurrence interval anecdotal</a>
Severity class	<a href="#">by YEAR</a>

Part II - Consequences of these floods

Fatalities	<a href="#">Interannual average evolution</a> or <a href="#">Sum/Max</a> <a href="#">Seasonal evolution total</a> or <a href="#">Average/Median</a> <a href="#">Map of the flood fatalities</a>
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For example, select interannual evolution

Select a type of analysis

Global and Regional Analyses

Master Index of Inundation

Maps

Global Surface Water Record

River Watch

Other Flood Detection Tools

Sample Images and Maps

Staff

Publications



# Live Demonstration of MODIS NRT Flood Mapping



Next Week:

- 1) Floodplain Management of the Mekong River
- 2) Demonstration of Selected Flooding Cases using Multiple Web-Tools and GIS



# Thank You!

**Amita Mehta**

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