



ARSET

Applied Remote Sensing Training

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

 @NASAARSET

Advanced Webinar on using NASA Remote Sensing for Flood Monitoring and Management

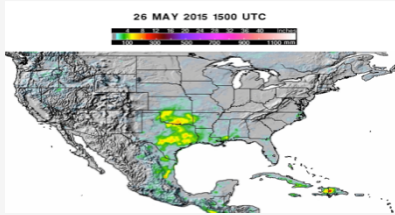
Instructors:

- Amita Mehta (ARSET)
- Kyle Peterson (ARSET)

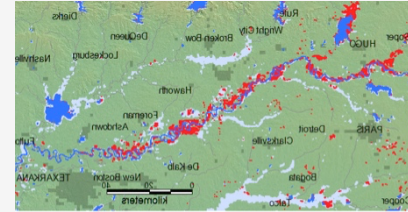
Week-4

Course Outline

Week 1: Demonstration of Flood Mapping Web Tools Based on NASA Remote Sensing Observations of Rainfall



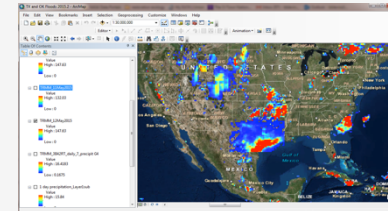
Week 2: Demonstration of Flood Mapping Web Tools Based on NASA Remote Sensing Observations of Land Cover



Week 3: Overview & Access to Ancillary NASA Data for Flood Management



Week 4: Flooding Case Studies Using NASA Web Tools and GIS



Acknowledgements

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- **QGIS Exercises**

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- **Spanish Translation**

David Barbato

Course Material

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

Webinar presentations, exercises, homework assignments, and recordings

Links will be available here

Date	Title	Presentations	Hands-on Exercises	Materials
March 15, 2016	Prerequisites (see above)			Due March 15: Homework
March 16, 2016	Demonstration of Flood Mapping Web Tools Based on NASA Remote Sensing Observations of Rainfall	Recording English Spanish	Malawi: English : ERDS , GFMS Spanish: ERDS , GFMS Texas: English : ERDS , GFMS Spanish: ERDS , GFMS	Due March 30: Homework QGIS Instructions
March 23, 2016	Demonstration of Flood Mapping Web Tools Based on NASA Remote Sensing Observations of Land Cover	Recording English Spanish	Malawi: English : MODIS NRT Spanish: MODIS NRT Texas: English : MODIS NRT Spanish: MODIS NRT	Due April 6: Homework (English) Homework (Spanish)

Homework and Certificate

- **Homework**

- Hands-on exercises
- Answers to homework questions via Google form
- Available at <http://arset.gsfc.nasa.gov/disasters/webinars/advfloodwebinar>

- **Certificate of Completion**

- Attend all 4 webinar sessions
- Complete all 4 homework assignments
- Certificates will be emailed approx. 2 months after the course finishes by Marines Martins (marines.martins@ssaihq.com)

Agenda: Week 4

- Flood Monitoring/Mapping Using GFMS, MODIS NRT, DFO and Flood Management and Relief Planning using Terrain (SRTM) and Socioeconomic (SEDAC) Data
- Hands-on Exercise and Demonstration of Case Studies:
 - India Flooding November – December 2015 (AM Session)
 - Mississippi Flooding December 2015 – January 2016 (PM Session)
- Near Real-Time Flood Management
- Course Summary
- Course Survey



Flood Monitoring/Mapping Using GFMS, MODIS NRT, DFO and Flood Management and Relief Planning using Terrain (SRTM) and Socioeconomic (SEDAC) Data

Exercise: November-December India Flooding

A satellite image of the Mississippi River basin, showing the river and surrounding land. A semi-transparent white rectangular overlay covers the central part of the image. The text "Near Real-Time Flood Management" is centered within this overlay, with a horizontal line underneath it. Various geographical labels are visible on the map, including Tyler, Longview, Streeveport, Ruston, Monroe, Wicksburg, Jackson, Natchez, Alexandria, Lake Charles, Lafayette, Baton Rouge, New Orleans, and others. The river is shown in a light brown color, and the surrounding land is in shades of green and brown.

Near Real-Time Flood Management

Flood Monitoring for Decision Support

Go to Global Flood Monitoring System (GFMS): <http://flood.umd.edu>

- Go through all the past major flood events in your area or river basin of interest and note down:
 - Rainfall amount
 - Streamflow
 - Flood depth data
 - Collect in situ data (if available)
 - Other flood damage reports
- This will help calibrate GFMS information for your area and help relate the flood depth data to flood-related damage

Flood Monitoring for Decision Support

Shuttle Radar Tomography Mission

<http://srtm.csi.cgiar.org>

- Find the terrain-based slope in the area of your interest
 - An important indicator of flood plains
- See Week 3, March 30 Presentation for details
- Note the flat (low slope) areas.

Socioeconomic Data & Application Center

<http://sedac.ciesin.columbia.edu>

- Note areas with:
 - High population density
 - Roads
 - Other important landmarks for planning food-relief
- See Week 3, March 30 Presentation for details

Flood Monitoring for Decision Support

Real Time

Flood Warning Forecast

- Go to Extreme Rainfall Detection System: <http://erds.ithacaweb.org>
 - Examine early warning (24-72 hours) maps
- Go to GFMS: <http://flood.umd.edu>
 - Zoom in on the area if/where ERDS shows likely flood warning
 - Monitor 7-day, 3-day, 1-day:
 - Rainfall
 - Streamflow
 - Flood depth

Flood Monitoring for Decision Support

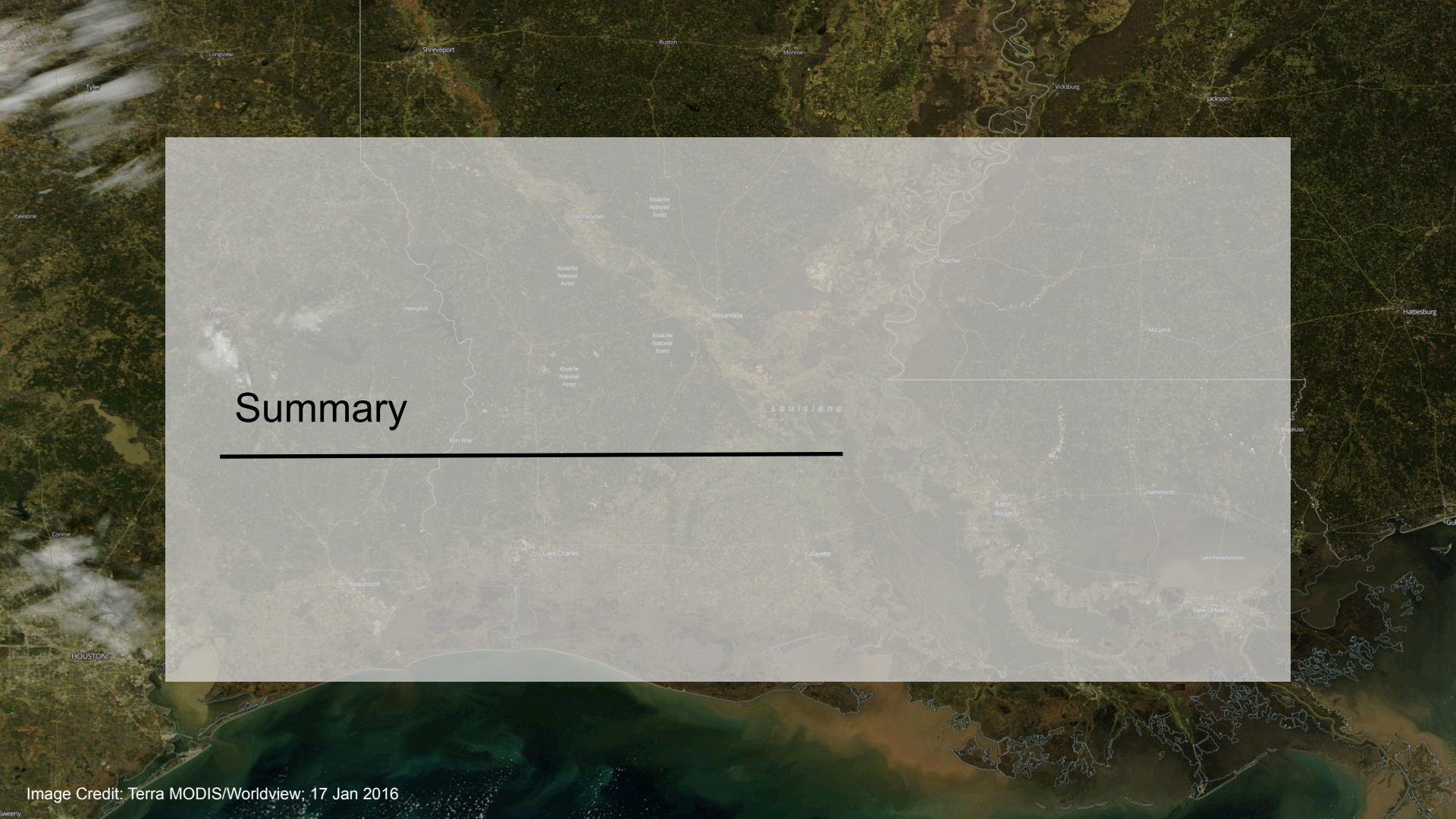
Real Time

Examine Inundation Mapping from:

Flood Observatory: <http://www.dartmouth.edu/~flood>

MODIS NRT Flood Mapping: <http://oas.gsfc.nasa.gov/floodmap>

- Identify sub-areas where flooding is likely to be intense and has a high likelihood of affecting urban areas, population centers and important infrastructure
- This information would be helpful in decision support for:
 - Providing early flood warning
 - Planning routes for relief and rescue options



Summary

Advanced Webinar on Using NASA Remote Sensing for Flood Monitoring and Management

- Covered information and hands-on exercises of NASA data & web-based tools relevant for flood management
- Focused on flood mapping tools based on:
 - TRMM rainfall & hydrology models
 - MODIS-derived land surface characteristics
- Provided demonstration of using QGIS analysis of MODIS flood maps, Shuttle Radar Tomography Mission (SRTM) terrain and slope data, and NASA socioeconomic data
- Overview of Synthetic Aperture Radar (SAR) data for high resolution flood detection

Summary of Flooding Web Tools Based on TRMM Rainfall

Flood Tool and Satellite, Instrument or Model	Quantities Used as Inputs	Hydrological Model	Output	Spatial/Temporal Coverage & Resolution
GFMS • TRMM/TMPA-RT • MERRA	• Rain Rate • Surface Temperature Winds	• VIC-UMD DRTR	• Flood Intensity • Streamflow • Accumulated Rainfall	• 50°S-50°N • 12km and 1km • January 2001-NRT 3 hour updates
ERDS • TRMM/TMPA-RT	• Rain Rate		• Flood Alerts • Accumulated Rainfall • Population Affected	• 50°S-50°N • 0.25°x0.25° • NRT & up to 72 hour forecast, 3 hour updates

Summary of Flooding Web Tools Based on MODIS

Flood Tool and Satellite, Instrument or Model	Quantities Used as Inputs	Output	Spatial/Temporal Coverage & Resolution
MODIS-NRT • Terra/Aqua MODIS	Reflectance Bands 1, 2, 7	<ul style="list-style-type: none"> • Inundation Map • Flood Water • Surface Water 	<ul style="list-style-type: none"> • Global 250m • NRT 2-, 3-, 14-day composites • 2013-present
Dartmouth Flood Observatory • Terra/Aqua MODIS	Reflectance Bands 1, 2, 7	<ul style="list-style-type: none"> • Inundation Map • SAR • EO-1 • Landsat-based Inundation (when available) 	<ul style="list-style-type: none"> • Global 250m • NRT

Upcoming Disaster Training

June 2016

Introductory Webinar: Using NASA Remote Sensing for Disasters Management

Objective:

Provide an overview of NASA remote sensing observations useful for monitoring natural disasters including: earthquakes, volcanoes, wildfires, oil spills, storms, flooding and landslides

Thank You

The recording of today's session will be available shortly at
<http://arset.gsfc.nasa.gov/disasters/webinars/advfloodwebinar>

ARSET ListServ:

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