

ARSET Advanced Webinar on Using NASA Remote Sensing for Flood Monitoring and Management: Week 1

Exercise: Texas Flood, 12-15 May 2015
Global Flood Monitoring System (GFMS)

Objective: Use GFMS rainfall and streamflow data for regional flood monitoring.

There are three parts to this exercise:

- 1) Learn GFMS features: navigation, zoom, selecting parameters
- 2) Analyze streamflow over Texas
- 3) Analyze flood detection/intensity at a given location

Part 1: Learn GFMS features: navigation, zoom, selecting parameters

- Go to <http://flood.umd.edu/>
- Scroll down and note three maps:
 - i) Flood Detection/Intensity (depth above threshold [mm])
 - ii) Streamflow 12 Km resolution [m3/s]
 - iii) Rainfall (7 – day accum) [mm]

The image shows a screenshot of the Global Flood Monitoring System (GFMS) interface. On the left is a world map titled "Flood Detection/Intensity (depth above threshold [mm]) 09Z14May2015". The map uses a color scale from 0.01 to 200 mm, with green representing lower values and red representing higher values. Below the map is a color legend and navigation controls including "Previous time step <<" and ">> Next time step". At the bottom, there are fields for "Start time: 09Z14May2015" and "End time: 21Z16May2015", along with a "Stop" button.

On the right is a control panel with several sections:

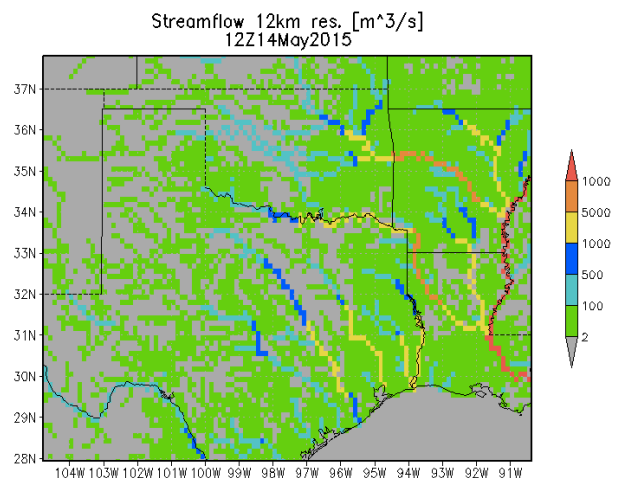
- Pan the map:** A green four-pointed star icon with arrows pointing in the cardinal directions. A blue arrow points from this section to a text box: "Navigate the Map Using the Arrows".
- Zoom in and out on the map:** Two green icons: one with a single upward arrow labeled "Zoom in" and one with three upward arrows labeled "Zoom out". A blue arrow points from this section to a text box: "Zoom in and out on the map".
- Plot time series for an individual point (lat, lon):** A section with a red tip: "(Tips: Zoom in enough to click the point or define it below)". It contains input fields for "0" (value), "26.375" (value), "T1: 09Z14May2015", and "T2: 21Z16May2015", along with a "See time series" button. A blue arrow points from this section to a text box: "Options for time series: click on the map for the location and enter T1 and T2 for desired time length".
- Plot different variable:** A section with a dropdown menu showing "Flood Detection (Depth)" and a "Plot" button. A blue arrow points from this section to a text box: "Select variable to plot".
- A "Reset" button is located at the bottom of the control panel.

At the bottom left, a blue box contains the text: "Start and End Times for Animation and 3-hour maps", with a blue arrow pointing to the "End time" field in the interface.

- Click on the drop down options in **'Plot different variables'** and note the variables available:
 - Flood Detection (Depth)
 - Streamflow 12km res.
 - Streamflow above Threshold
 - Streamflow 1km res.
 - Surface storage 1km res.
 - Inundation map 1km res.
 - Routed runoff 12km res.
 - Rainfall (inst.)
 - Rainfall (1-day)
 - Rainfall (3-day)
 - Rainfall (7-day)
- Select each variable and click on **'Plot'** and note the units of each variable
- Go to the middle map or select **'Streamflow 12 km res. [m³/s]'** from **'Plot different variables'**
- Using **'Zoom In / Zoom out'** and **'Pan the Map'** panel, zoom in over Texas and Oklahoma.

Part 2: Analyze streamflow over Texas and Oklahoma

- Enter **Start Time: 00Z12May2015 and End Time: 21Z15May2015**
- Click on **'Animate'**
- Observe the shaded river channels and the shaded areas outside the river channels that show on-surface runoff.
- Observe how the streamflow changes in the major rivers
- Note down the range of the streamflow amount (include units)
- Select **'Rainfall (3-day)'** from the drop-down options in **'Plot different variables'** and click on **'Plot.'** Repeat the animation for the same times as above.
- Note how the rainfall changes over Texas and how the streamflow animation relates to the rainfall change.



Part 3: Analyze flood detection/intensity at a given location

- Select **'Flood Detection (Depth)'** from the drop-down options in **'Plot different variables'** and click on **'Plot.'**
- Enter **Start Time: 00Z12May2015 and End Time: 21Z15May2015**
- Click on **'Animate.'**
- The shaded areas show where the streamflow is above flood threshold. Note how the flood depth changes in different rivers.
- Note the highest flood depth observed in the Texas rivers during this time period.
- To the right of the map, go to **'Plot time series for an individual point (lat,lon):'**

- Enter the following lat-lon in the boxes: 35.56 and -94.52
(This location is on the Red River)
 - T1: 00Z01May 2015
 - T2: 21Z15Jun2015
- Click on ‘See time series.’
- You will get a time series of flood intensity. Note how many flooding episodes occurred at this location during the selected period.
- Click on the map to select another lat-lon location over Texas, or enter another pair of lat-lon in the boxes and plot the **Flood Detection (Depth)** time series.

