NASA ARSET Training

Advanced Webinar on using NASA Remote Sensing for Flood Monitoring and Management
March 23, 2016

Inundation Mapping over Texas

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Objective: Visualize, acquire and import into GIS the MODIS near real time (NRT) inundation data product

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There are three parts to this exercise:

Learn to:

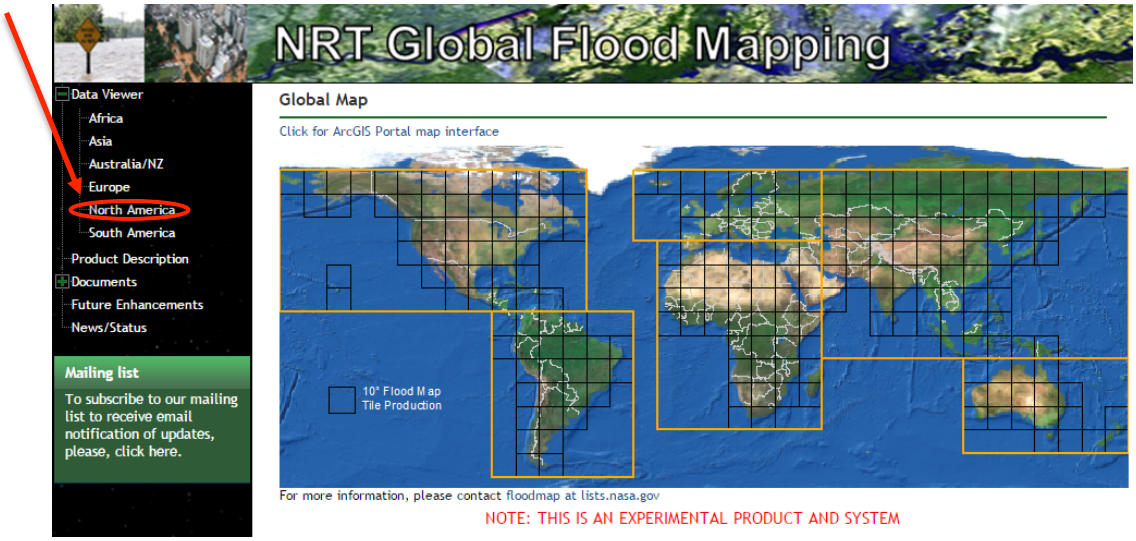
1) Access inundation data products through the MODIS Near Real-Time (NRT) Global Flood Mapping Product Portal.
2) Explore and acquire the available data products.
3) Import and visualize inundation data products into QGIS.

Part 1: Access MODIS NRT inundation data products through the MODIS Near Real-Time (NRT) Global Flood Mapping Product Portal

- Go to the MODIS Near Real-Time (NRT) Global Flood Mapping Portal:

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

- Click on the **plus icon** next in the **Data Viewer** (left hand menu)
- Click on **North America**



- Click on the tile that encompasses the targeted area of Texas **(100 W, 040N)**
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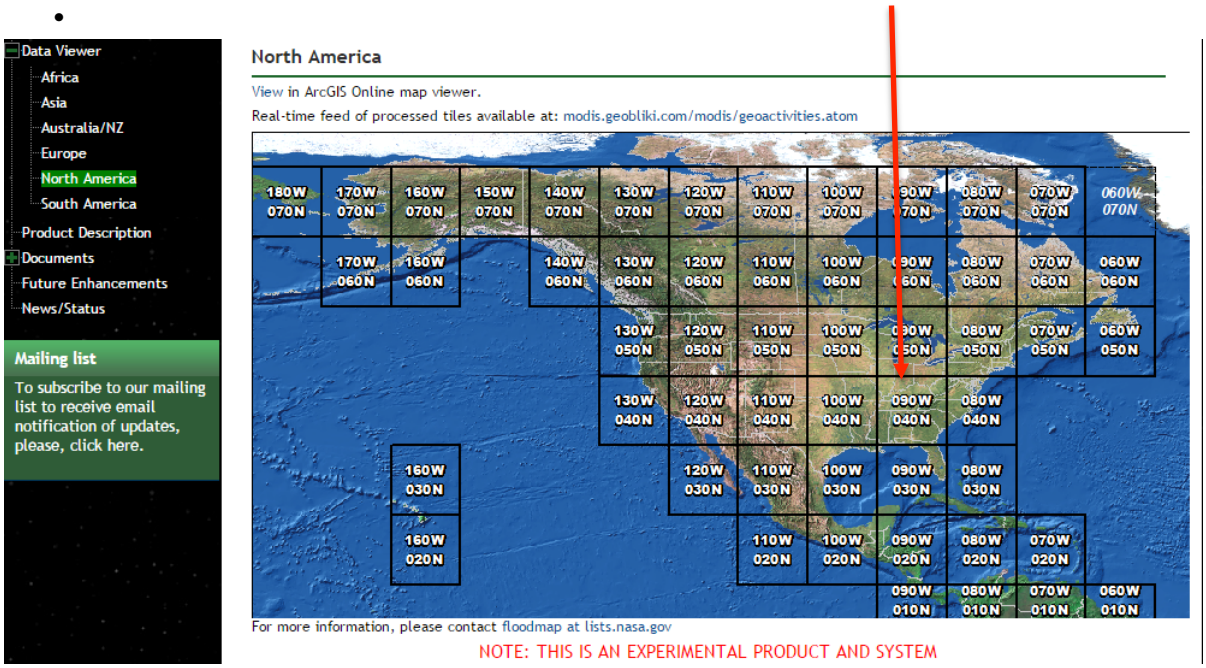
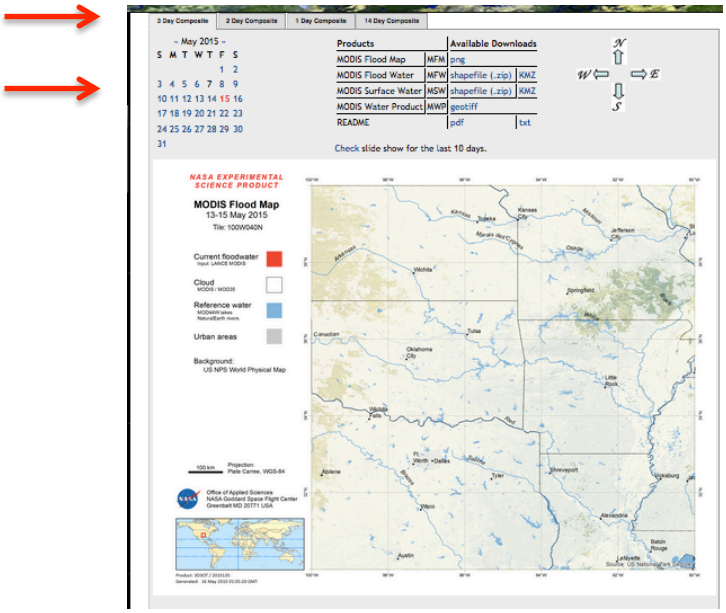
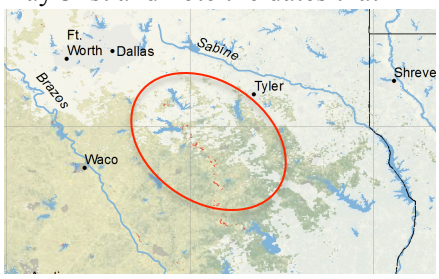


Heavy seasonal rainfall in May of 2015 created many acres of inundated land in Eastern Texas and surrounding areas.

- Using the calendar in the top upper left, select **'3 Day Composite'** for **May 15, 2015**.



- Explore the map and legend. Do you see the indications of current floodwater in the map?
- If so, using the pointer, click on those areas on the map and zoom in closer.
- Using the calendar, view scenes from May 15th through May 31st and note the dates that have the largest areas of floodwater.
- Next select **'14 Day Composite'** and see how the inundation maps change from 15-31 May. Please note that in the '14 Day Composite', color show occurnce of water as a percentage of clear observation within the 14 days. Do you see any differences between the inundated areas compared to '**3 Day Composite**'? Please explain your answer.



31 May 2015

Part 2: Explore and acquire the available inundation data products

a) Explore the data products

- Select **June 2, 2015** and **3 Day Composite** tab
- View the products and available downloads lists.

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

- Using the **README pdf** or **txt** file, answer the following questions.
- What is the format of the MODIS Flood Map (MFM)? What could you use this product for?
- What is the difference between the MFW and MSW data products?
- The MODIS Water Product (MWP) is available in geotiff raster format. How many different pixel values does this data product contain and what do each of them represent?

b) Acquire the data products

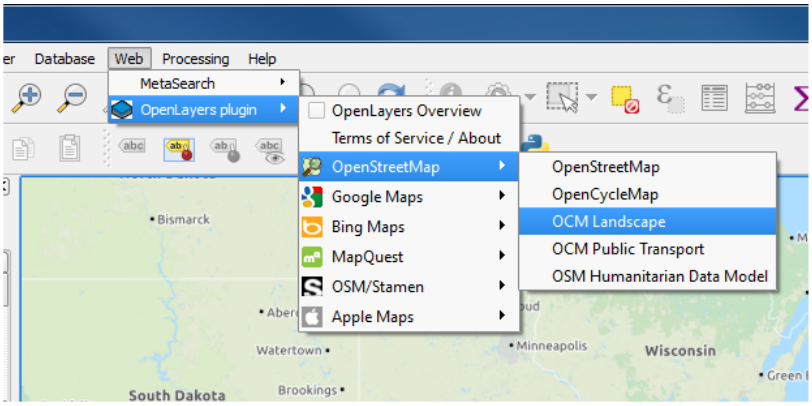
- Click the url links to the right of the data products to download to your computer. For **MODIS Flood Wate**r download the shapefile (.zip) and the KMZ files. For the **MODIS Water Product** download the geotiff file.

- Once the shapefile (.zip) has been downloaded and saved on your computer, you will need to unzip in order to complete Part 3 below.

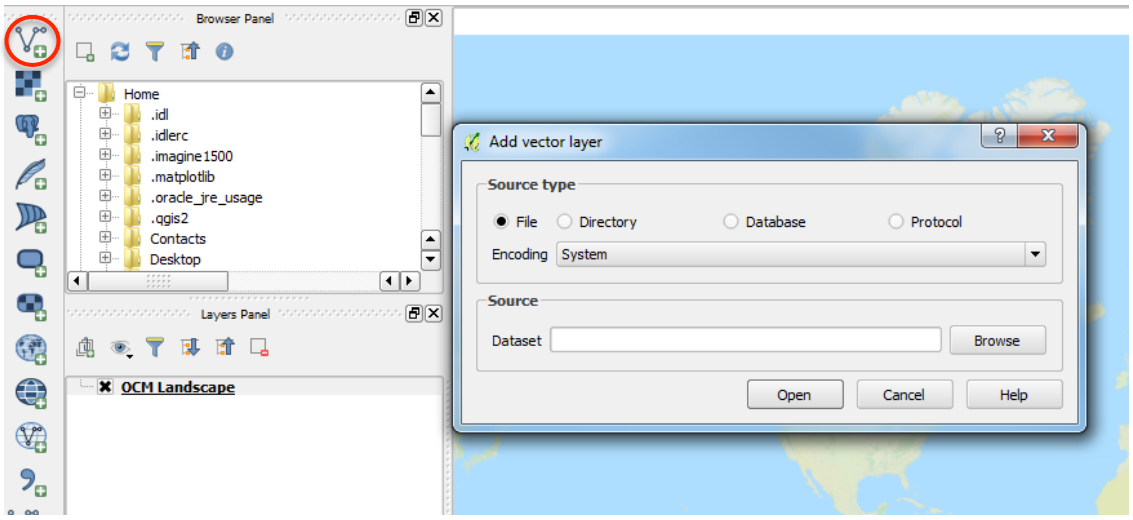
Part 3: Import inundation data products into QGIS

a) Import the MODIS Flood Water data product into QGIS

- Open QGIS Desktop and using the OpenLayers plugin



- Choose the Basemap of your choice (For example, OpenStreet Map).
- Zoom to eastern Texas.
- Using the **Add Vector Layer** icon, click **Add Vector**



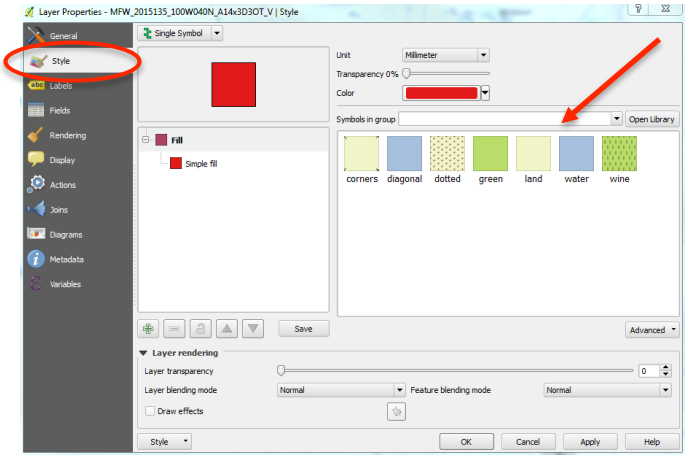
A window will open for you to navigate to the location of the downloaded MODIS Flood Water data product.

- Select the **shapefile '.shp'** and click **open**
  (For example: MFW_2015135_100W040N_A14x3D3OT_V.shp) click open.

[NOTE: pay close attention to the file naming convention used for the MODIS files. Refer to the README file referenced in section 2.a for more information -- For example, what date is associated with the data product **MFW2015135?]**

The shapefile has been imported. You may wish to adjust the **symbology color** in order to visualize the inundated lands better.

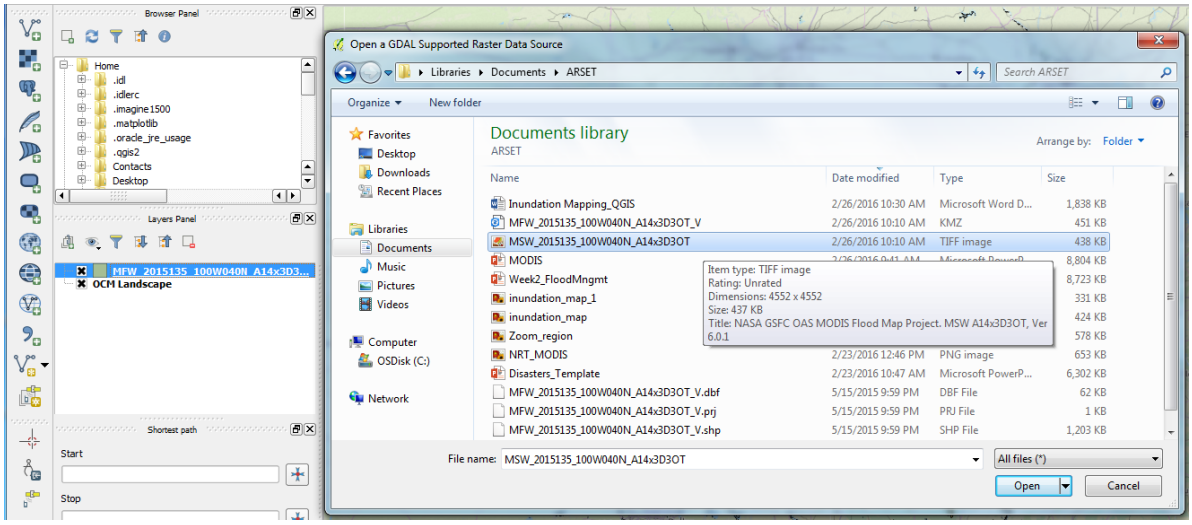
- Right click the **layer**, navigate to **layer properties** and the **Style** tab, click the **color** drop down and choose the desired color. Click ok.



- Repeat the process for all files for your chosen dates**.**

b) Import the MODIS Water Product (geotiff file) data into QGIS

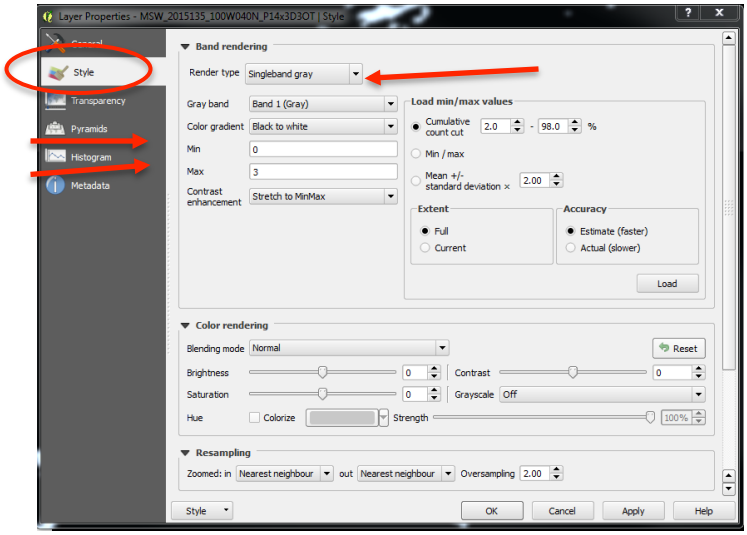
- Click **Add Raster Layer** and a window will open for you to navigate to the location of the downloaded MODIS Water Product. Click on the **Raster Dataset**.



(For example MWP_2015135_100W040N_3D3OT) and Click **Add**.

The raster dataset geotiff file has been imported onto the map. Once again, you can adjust the symbology of the geotiff file through the layer properties, style tab.

- Right click the **layer,** navigate to **layer properties** and the **Style** tab.
- Within the window, set the **'Render Type'** to **Singleband gray,** change the '**Min**' to 0 and '**Max**' to 3. This will allow you to visualize the areas with surface water. This will display non-water as black and water as white.



- Repeat the process for all files for other chosen dates**.**
  Assigning different colors for each of the shapefile dates can assist in visualizing inundated lands over time.
- Spatially analyze your map.

- How can this data be used for mitigation and planning activities?

We can download KMZ files from the MODIS site. These can be visualized in Google Earth. Locate the downloaded KMZ file and double click to open in Google Earth (requires Google Earth installed on your computer).

Optional - explore, visualize, download, and import MODIS NRT data for a region of your personal interest.