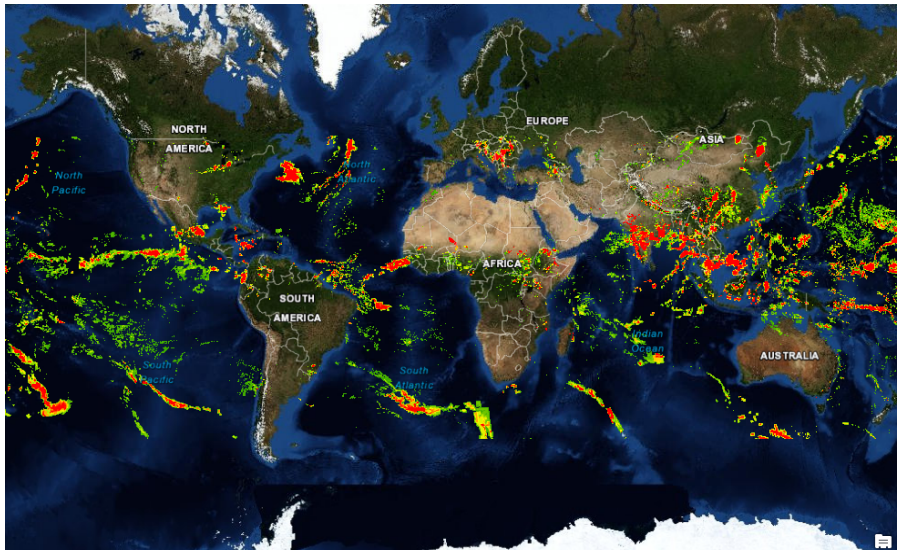
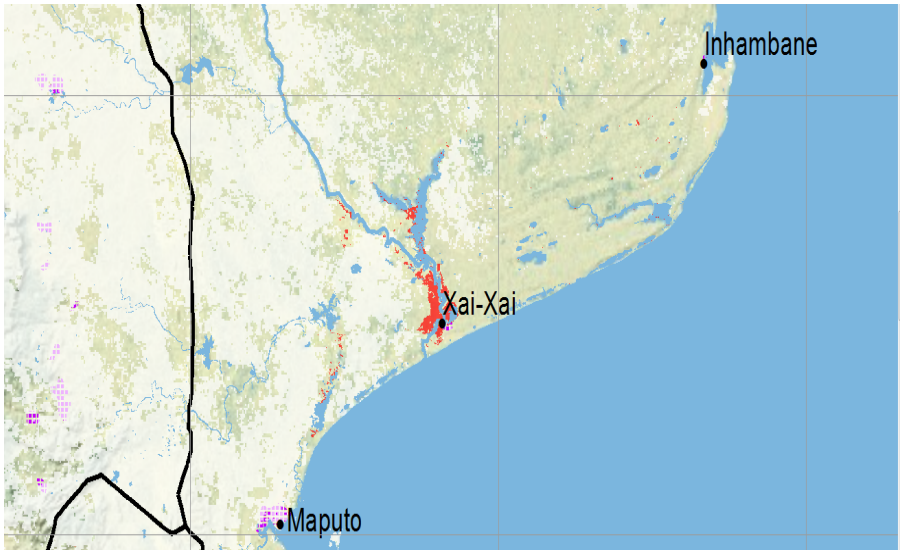
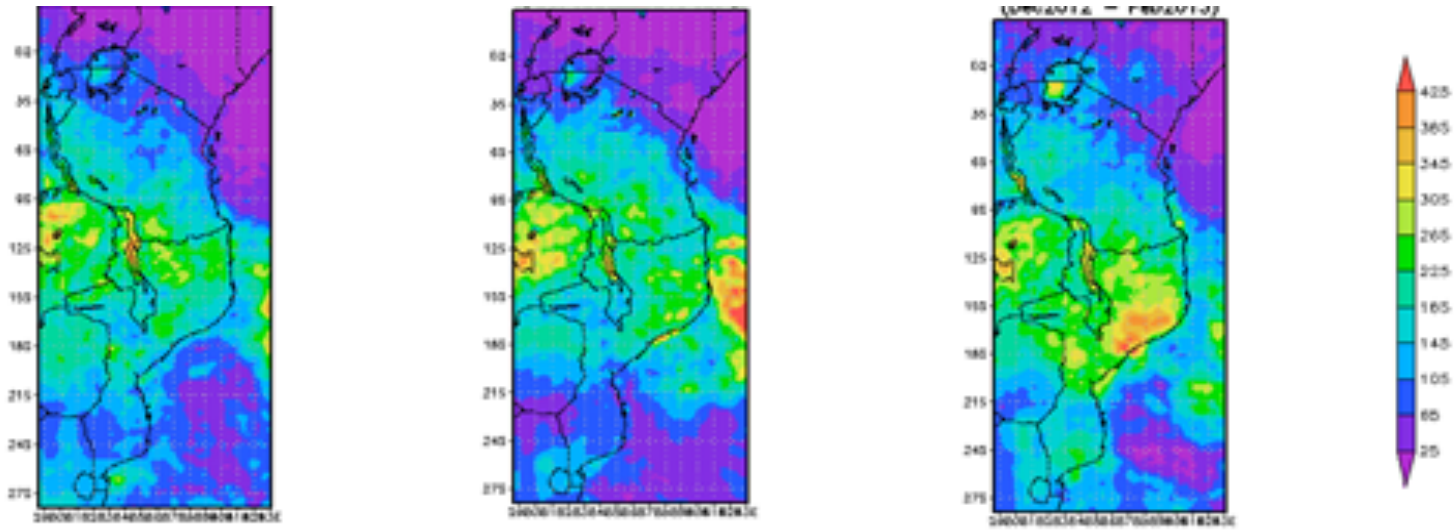
TRMM Rainfall and MODIS Flood Data Acquisition and Importation to ArcMap



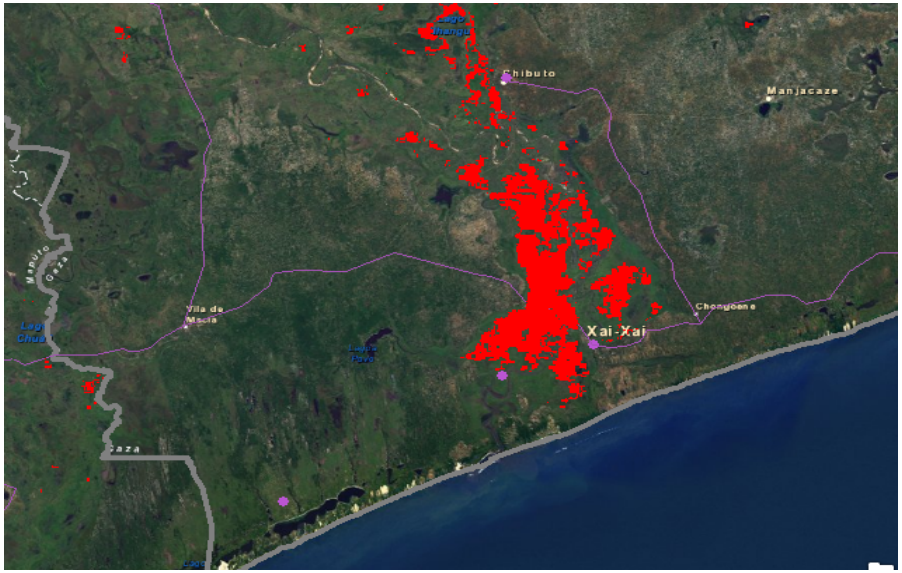


Case Study 1:
Heavy Precipitation Conditions over Limpopo River Basin (Southern Africa) in January 2013

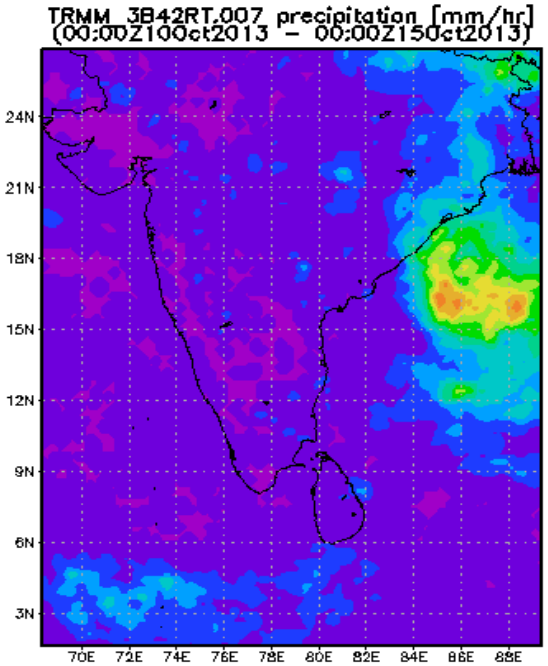
TRMM Precipitation

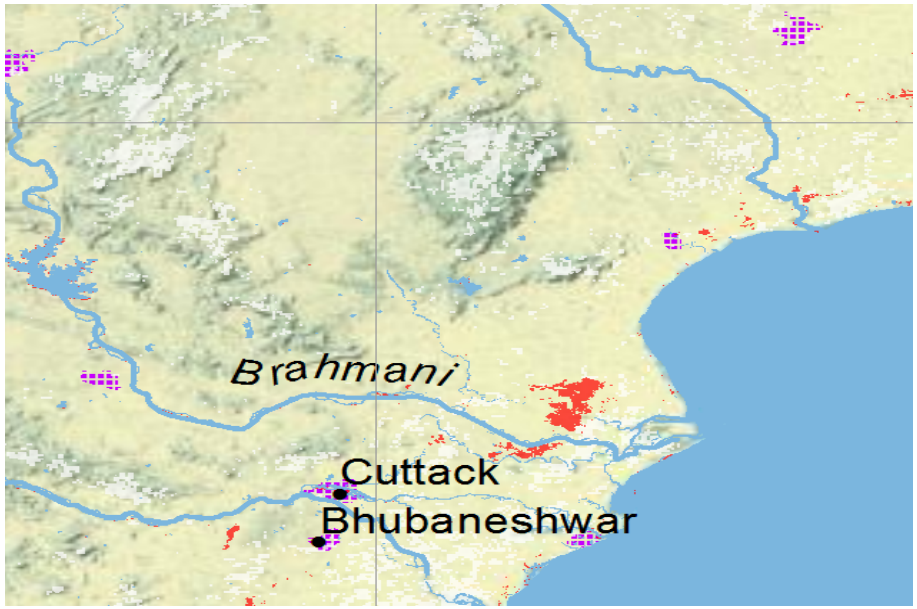


NASA data will be imported into GIS where it can be examined together with MODIS Flood Inundation data in a GIS environment.

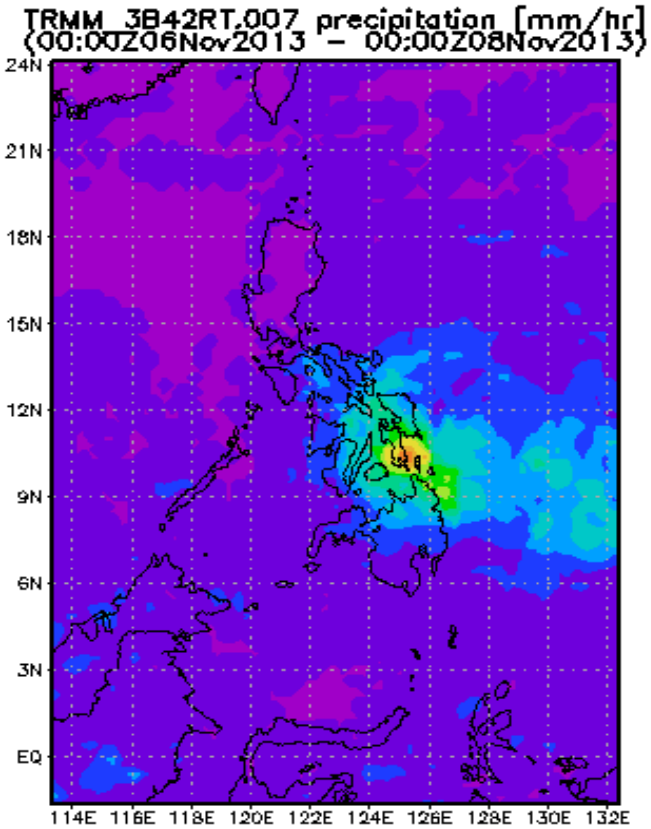


Case Study 2:
Cyclone Phailin
Flood Conditions in Northeastern India in October 2013





Case Study 3:
Typhoon Haiyan
Flood Conditions in over the Philippines in November 2013



Web Tools

TRMM Online Visualization and Analysis System (TOVAS)

http://disc.sci.gsfc.nasa.gov/precipitation/tovas

Global Flood Monitoring System

http://flood.umd.edu/

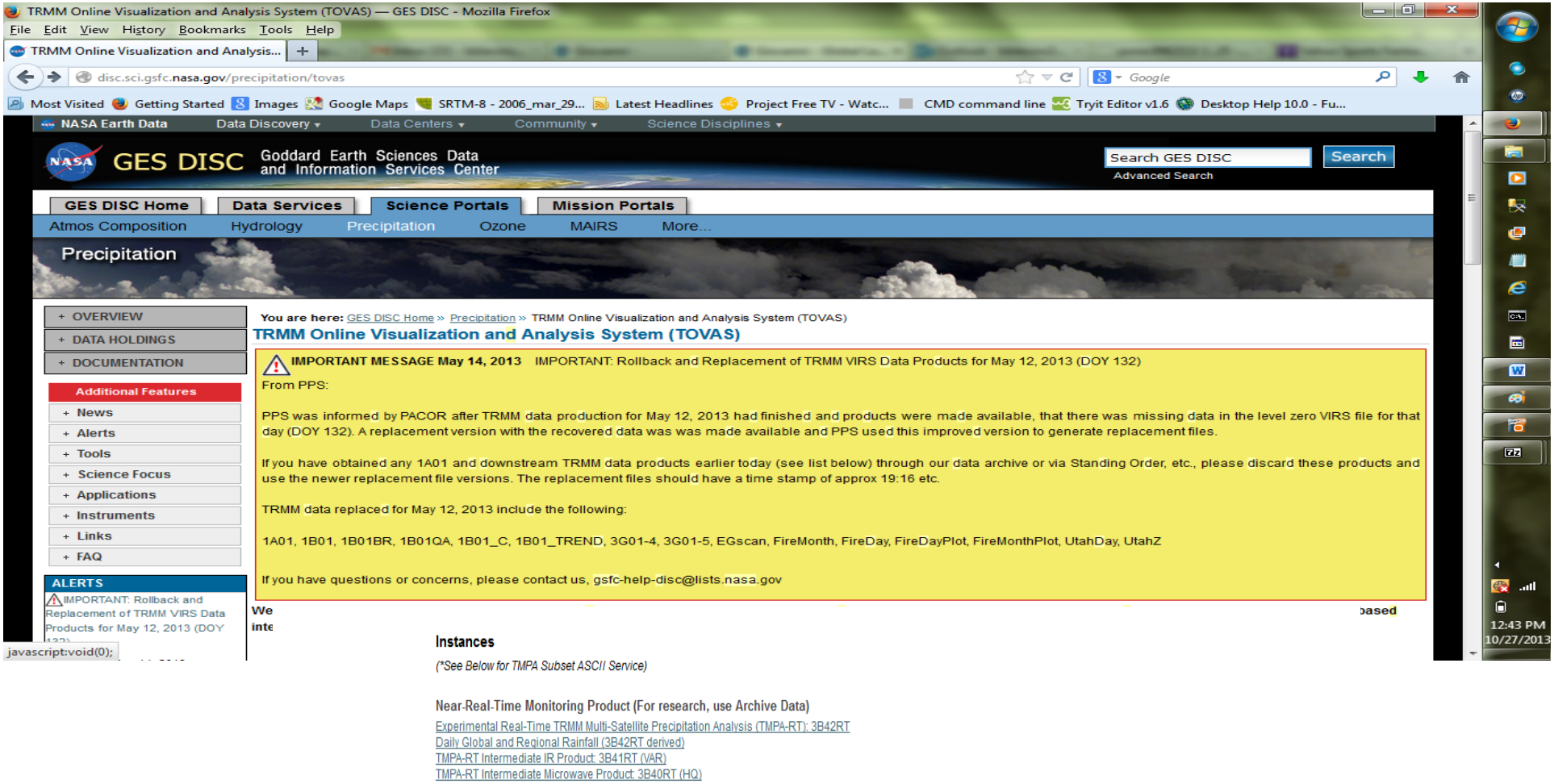
Near Real Time Global MODIS Flood Mapping

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

GIS Data Layers

Rivers/Basins	USGS HydroSHEDS	http://hydrosheds.cr.usgs.gov/
Population	NASA Socioeconomic Data and Applications Center (SEDAC)	http://sedac.ciesin.columbia.edu/
Global, National Administrative Areas	Global Administrative Areas	http://www.gadm.org/
Global Base Maps	ESRI Base maps	http://www.esri.com/data/basemaps
Health Supply Warehouses, Ports, Airports, Roads	ESRI + USAID GeoCenter	http://www.arcgis.com/home/
	Open Development	http://www.opendevelopmentcambodia.net/base-map/
	PhilGIS	http://philgis.org/
	Maptell	http://www.maptell.com

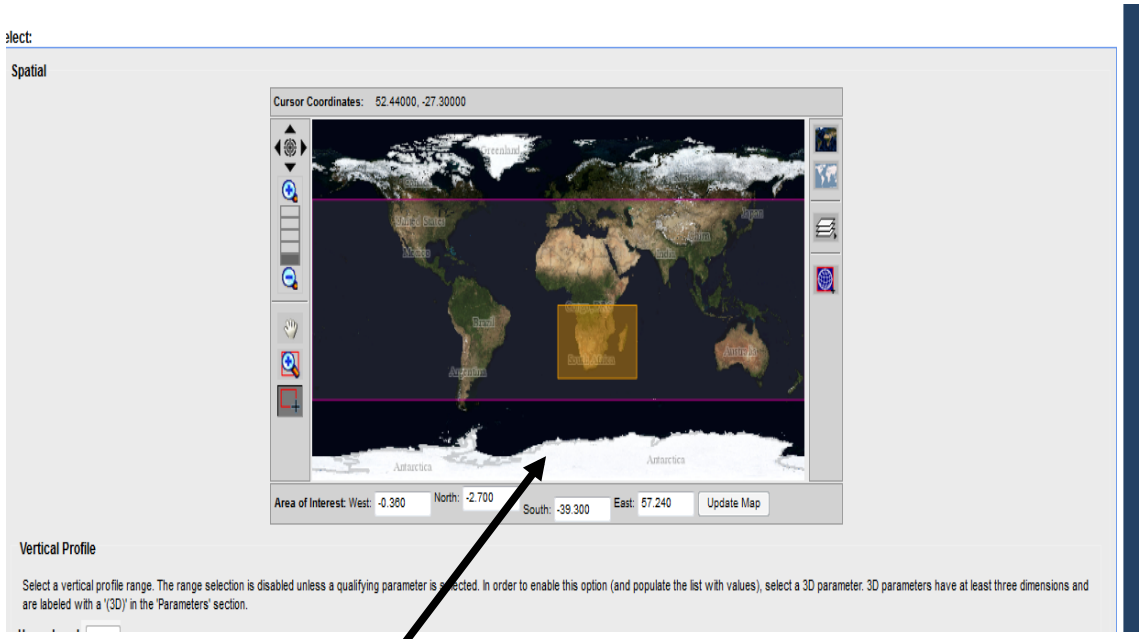
TRMM Online Visualization and Analysis System (TOVAS)
http://disc.sci.gsfc.nasa.gov/precipitation/tovas



Near-Real-Time Monitoring Product

[Experimental Real-Time TRMM Multi-Satellite Precipitation Analysis (TMPA-RT): 3B42RT]

Giovanni -TRMM 3B42RT



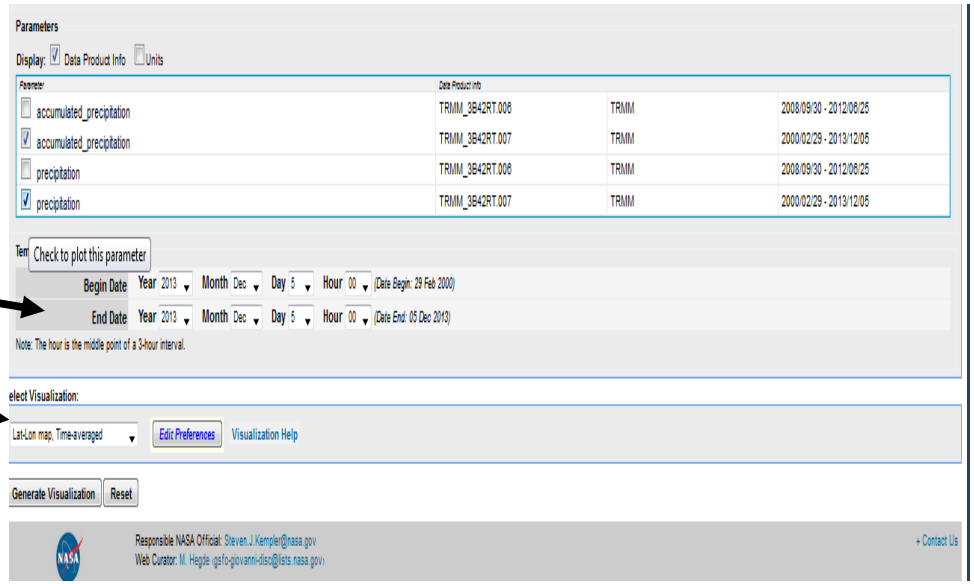
LIMPOPO RIVER BASIN

TRMM 3B42RT

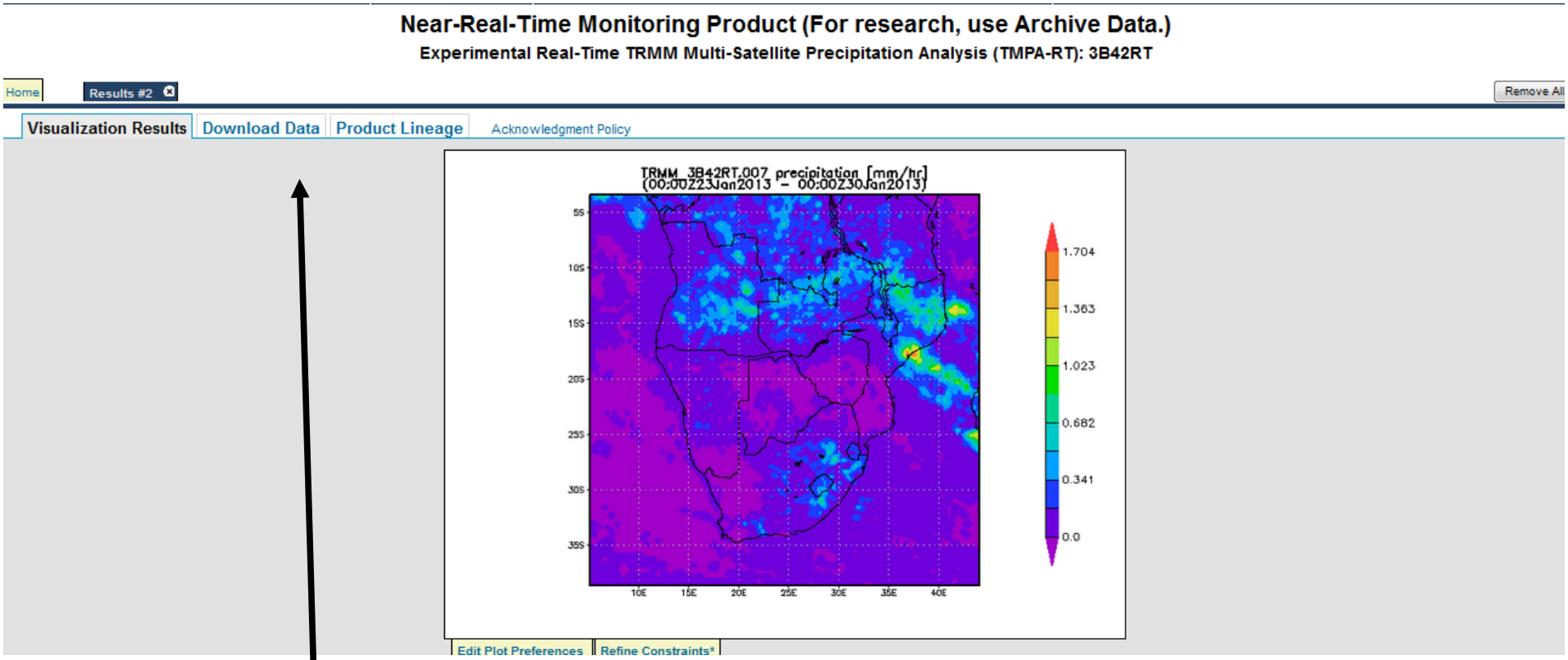
Choose accumulated rain and precipitation

Select region and time frame.

Generate Visualization.as Lat-Lon map, time-averaged.

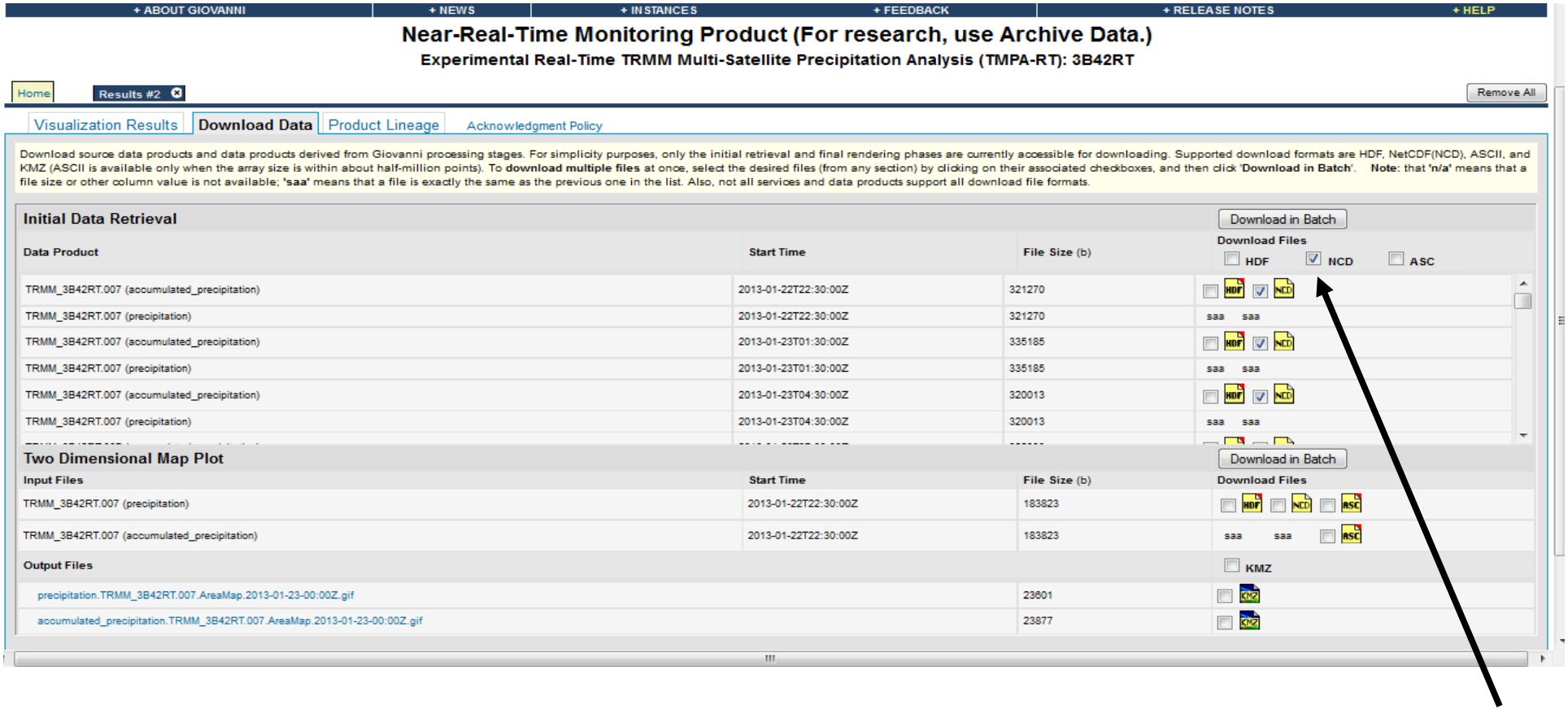


Visualization Results



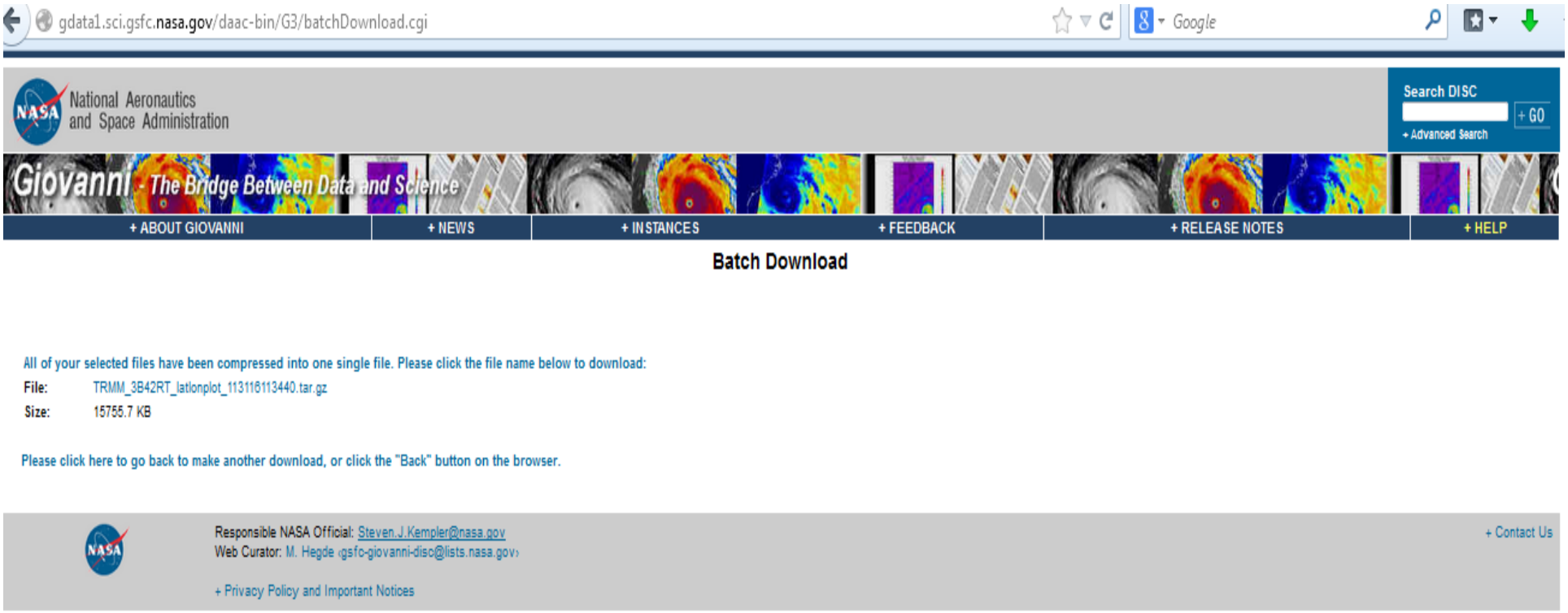
Open the Download Data tab.

Download NetCDF Files



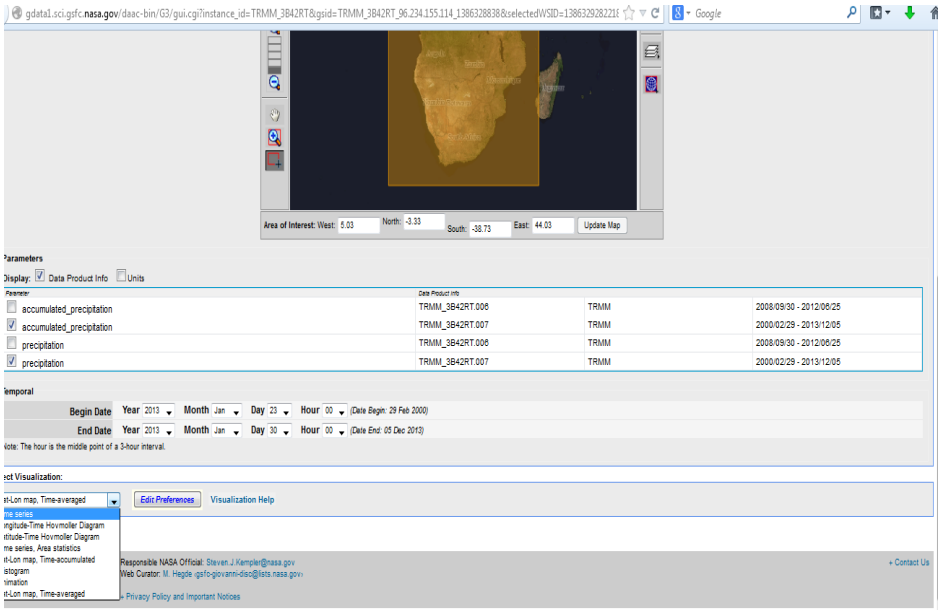
Check the NCD and Download in Batch

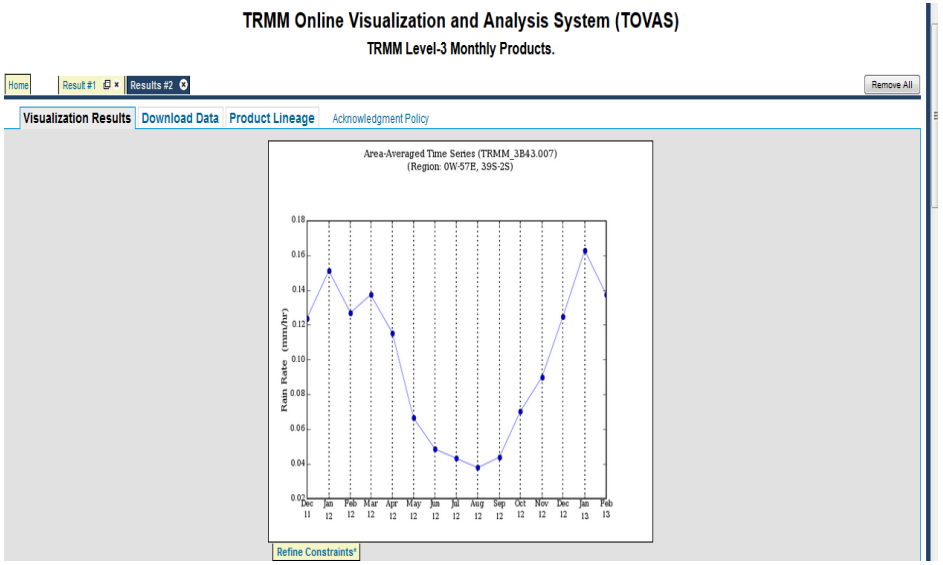
Downloaded zip file. Click link to save file to desired location.



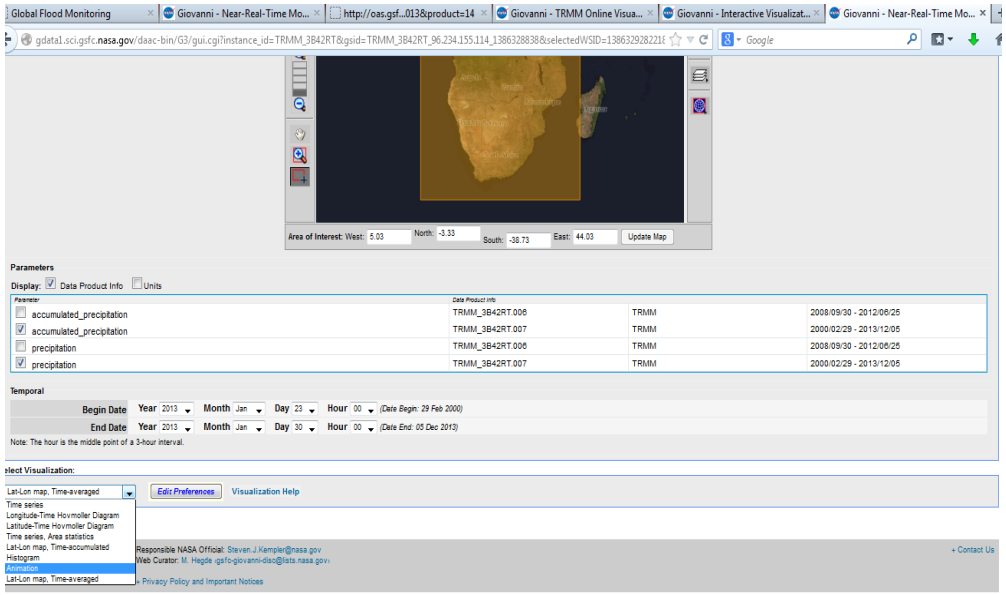
Alternatively, you may go back and choose various visualizations, including

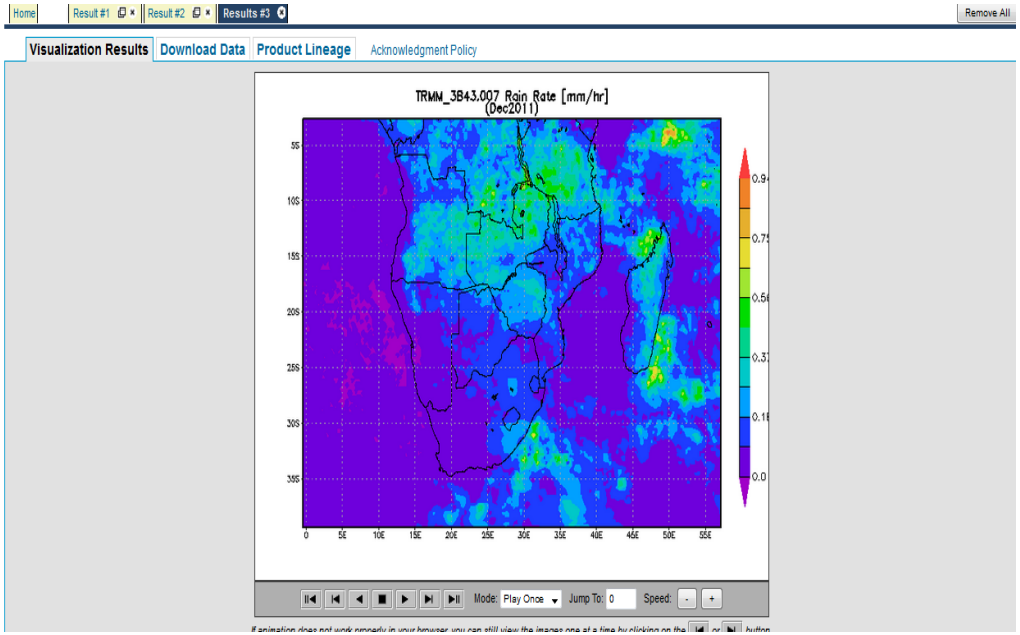
time series plots





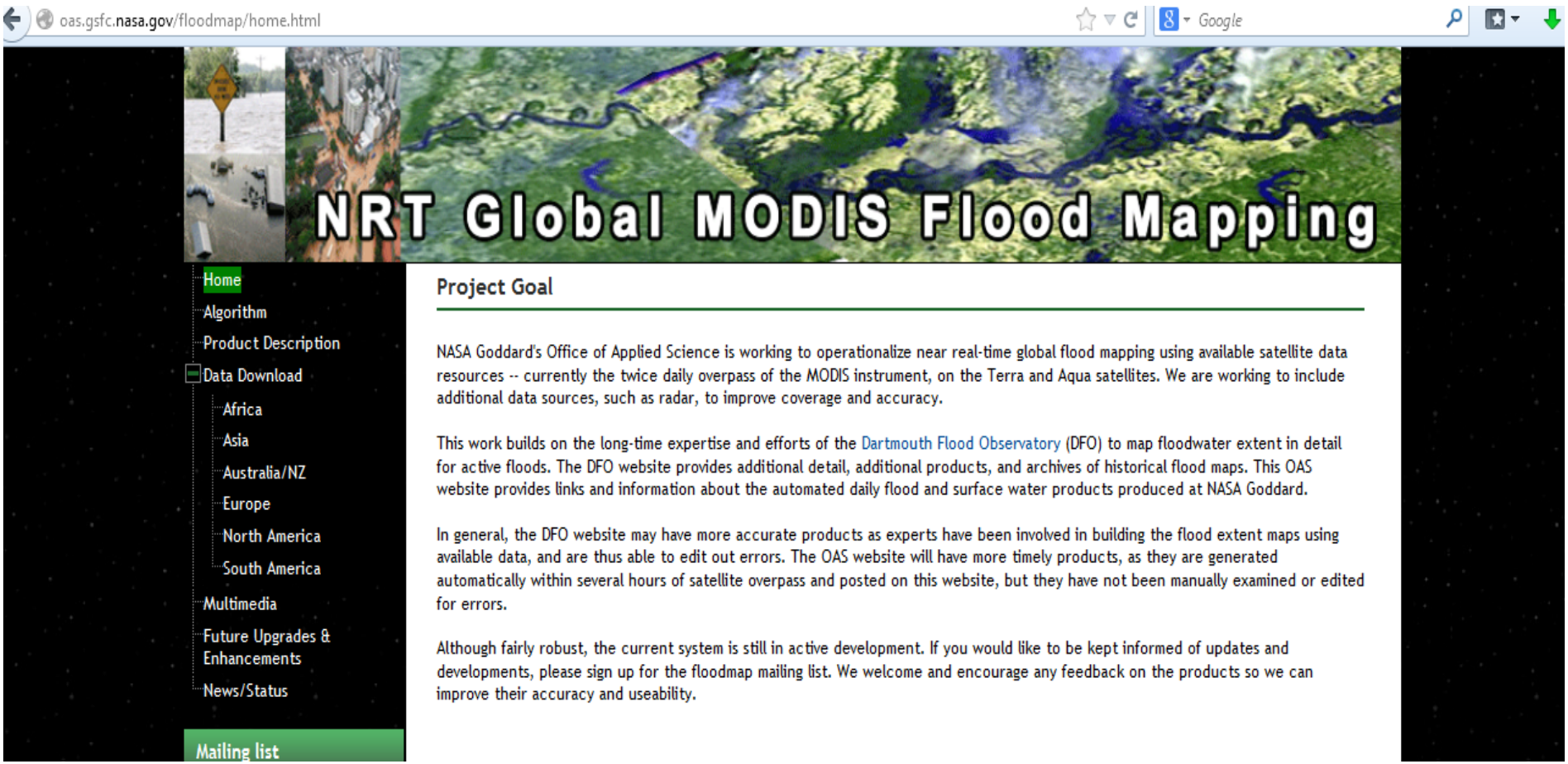
Animation visualization

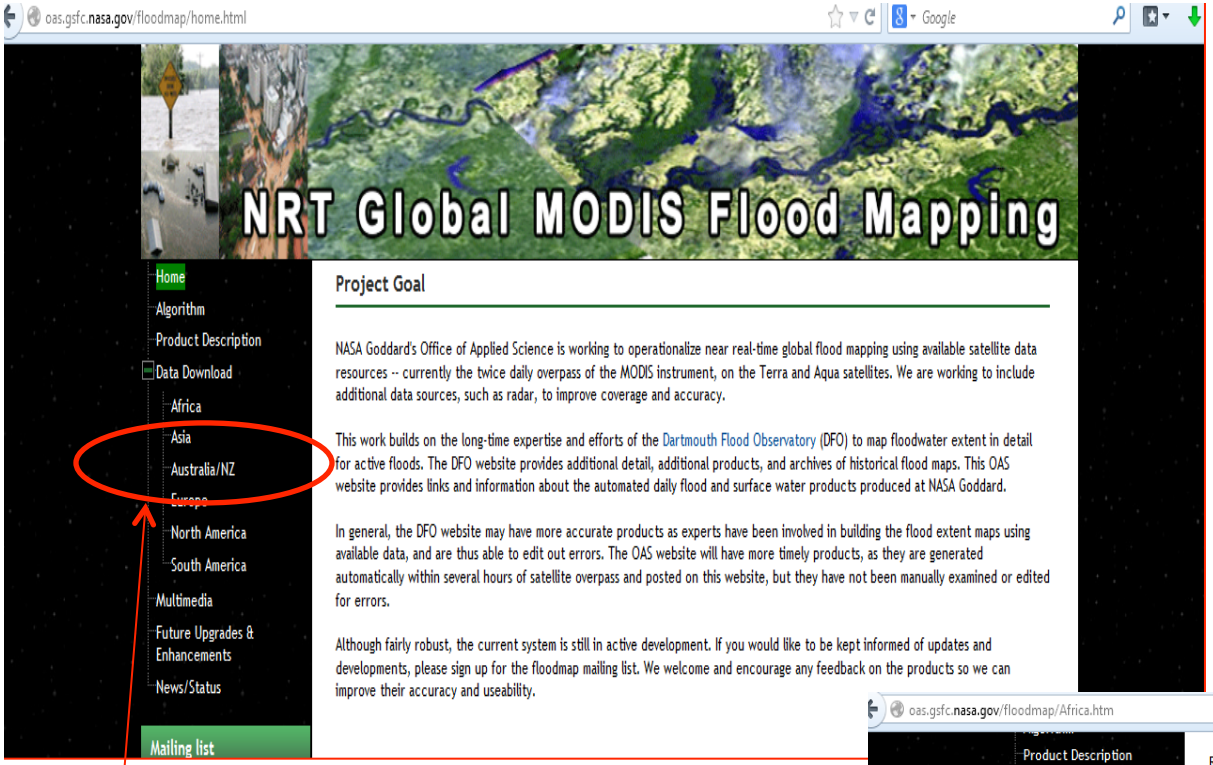




Near Real Time Global MODIS Flood Mapping

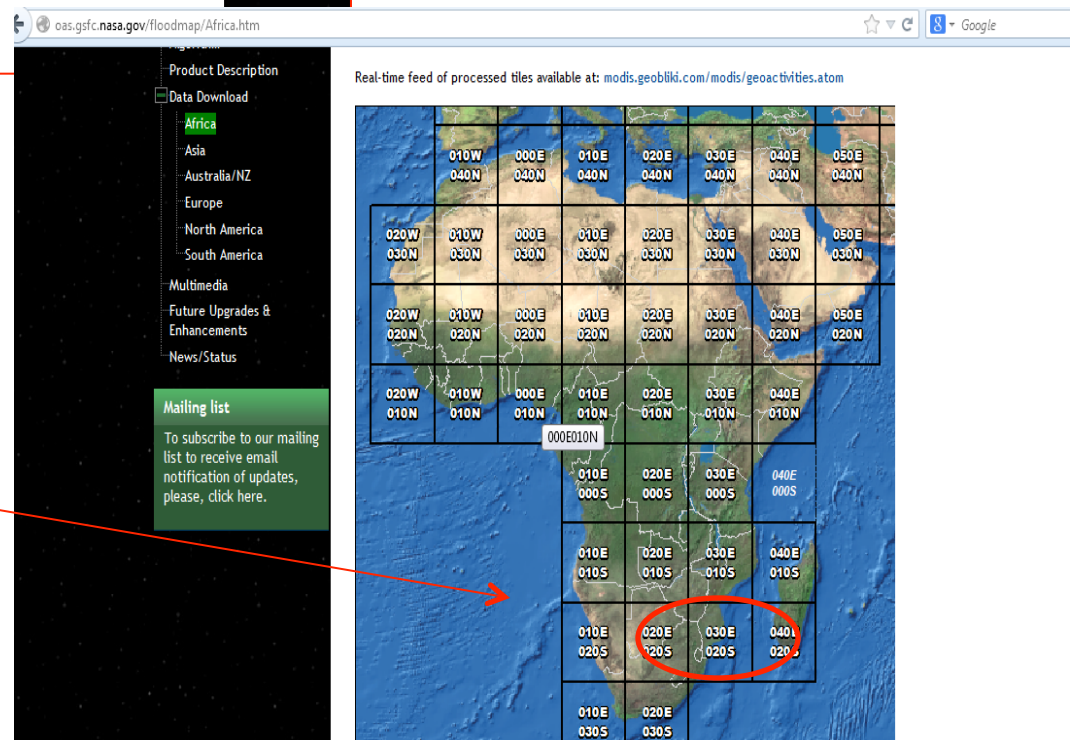
http://oas.gsfc.nasa.gov/floodmap/home.html





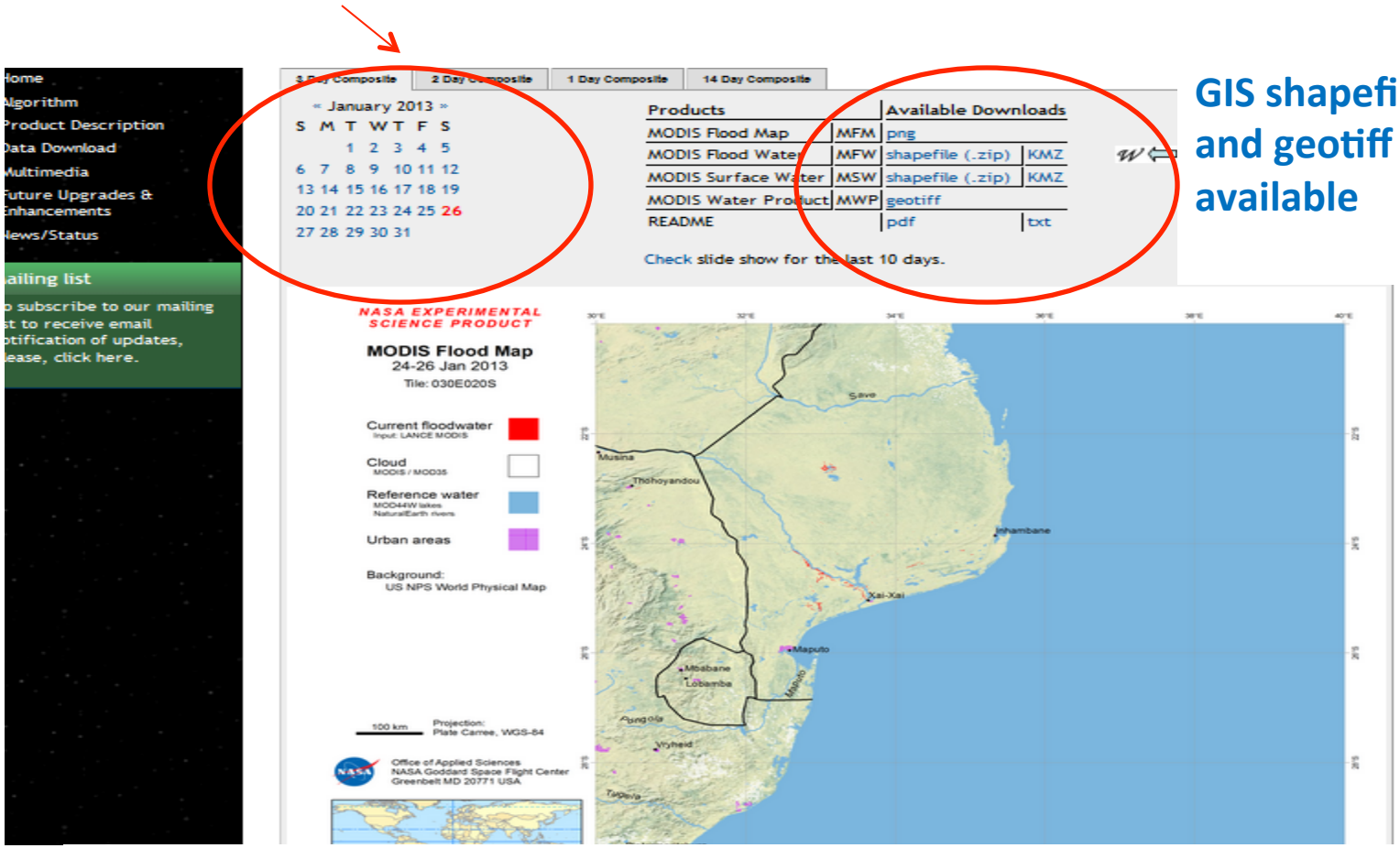
Open *Data Download* and choose your continent of interest.

Click on the tile that contains your region of interest



MODIS Inundation Mapping

Archive Available

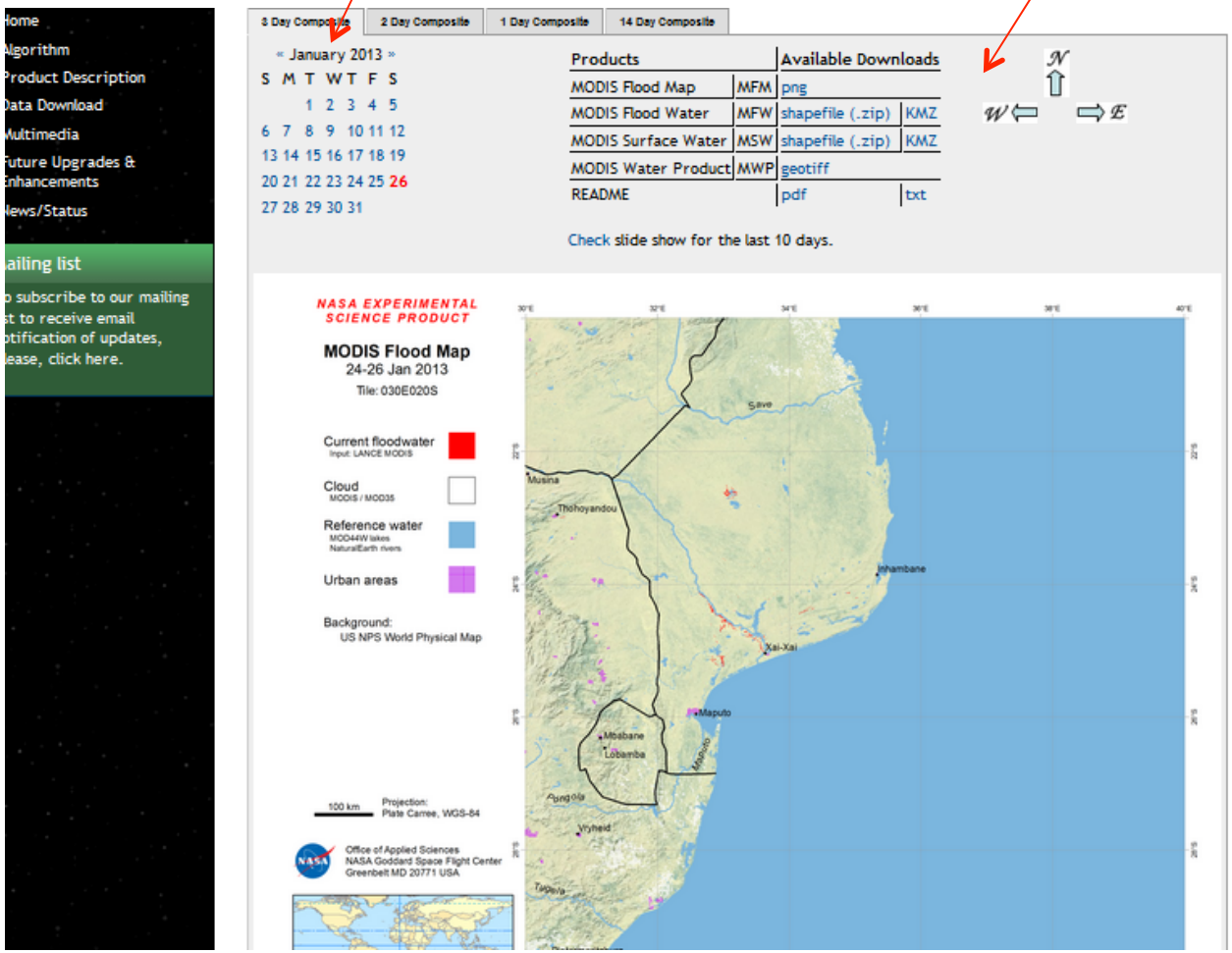


GIS shapefiles, png, kmz and geotiff files are available

produces global daily surface and flood water maps at approximately 250 m resolution, in 10x10 degree tiles.

You may choose your date(s) of interest in either 1, 2, 3 or 14 day composites.

Click the file you wish to download and save to desired location on your computer



PRODUCTS:

MFW: MODIS Flood Water

MSW: MODIS Surface Water (MFW before subtracting the reference water)

MWP: MODIS Water Product (combines both MFW and MSW)

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

DATE:

product date: YYYYDOY

YYYY: 4-digit year.

DOY: 3-digit day of year (001 to 365 or 366).

MWP (MODIS Water Product):

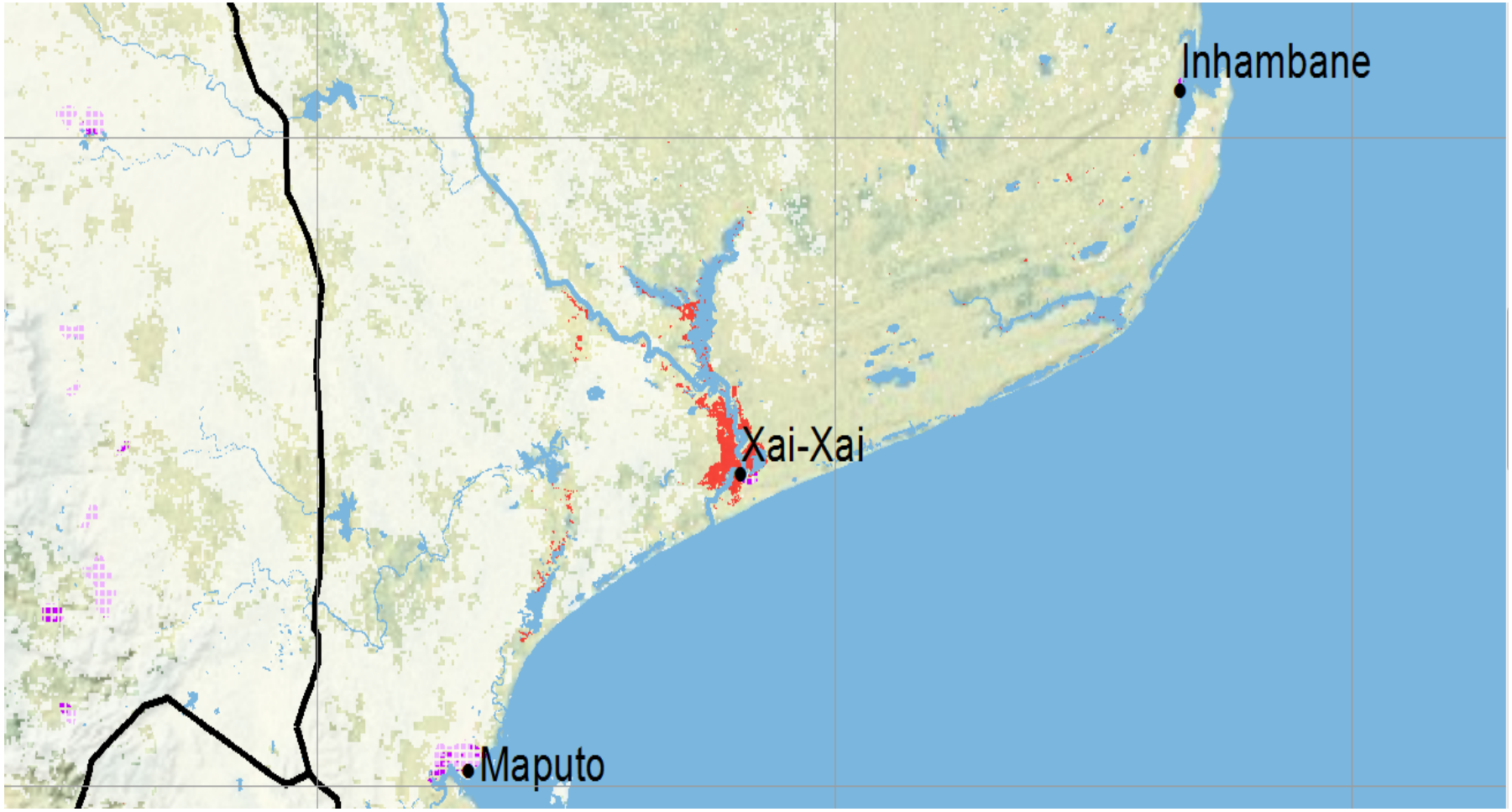
Introduced March 2012. Currently delivered only in geotiff raster format, with the following pixel values:

0 : Insufficient data to make water determination (cloudy, missing images, swath gaps swaths, or bad data values).
1 : No water detected.
2 : Water detected AND coinciding with reference water (e.g., not flood).
3 : Water detected, beyond reference water, so is likely flood.

To display all surface water (eg., MSW), use all pixels >= 2.

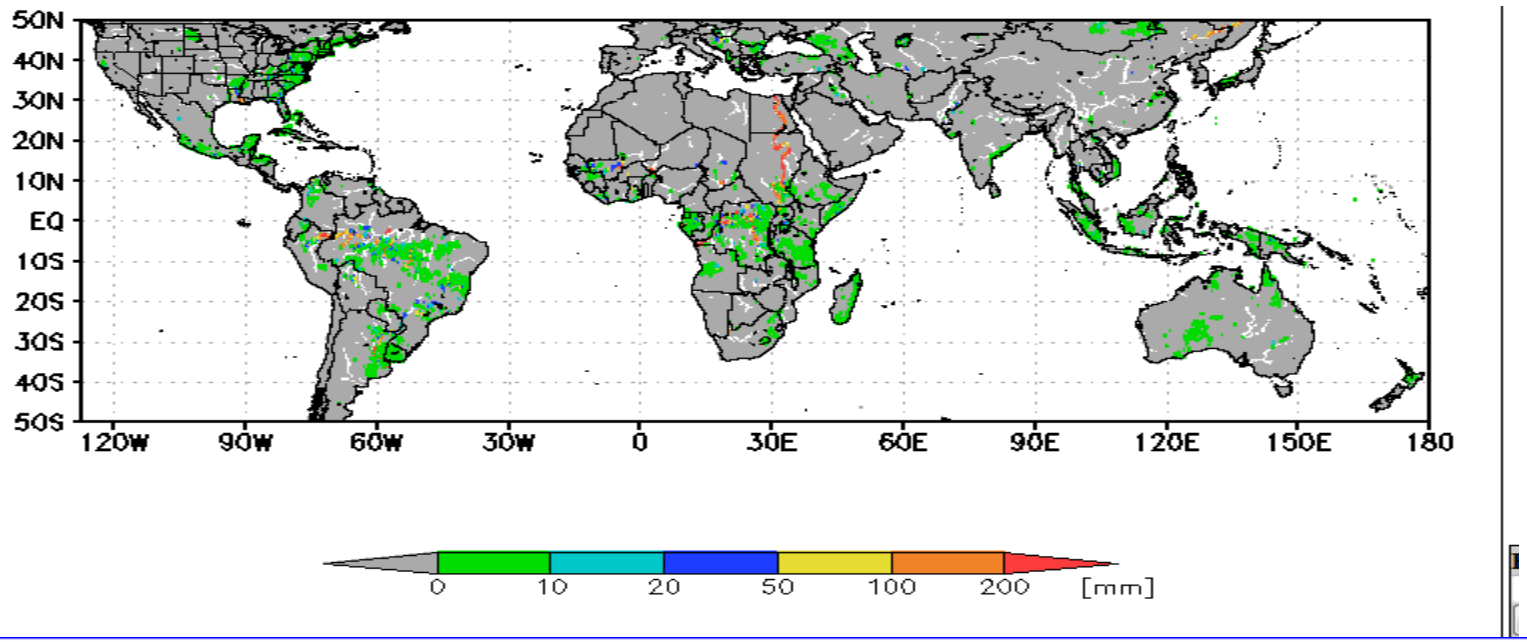
MODIS Flood Map (MFM) .png image

(3-day composite, 29-31 January, 2013)



Global Flood Monitoring System (GFMS)

http://flood.umd.edu/

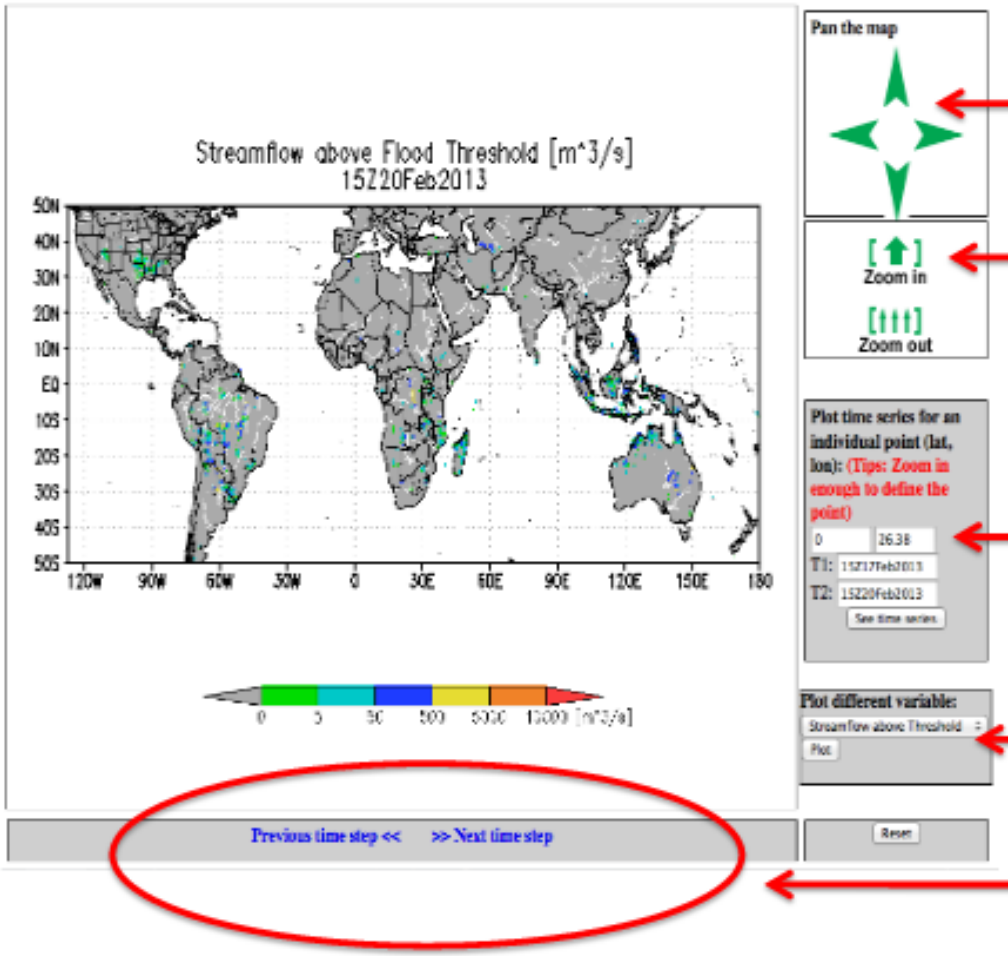


Provides global maps, time series, animation (50°S-50°N) of:

- **Instantaneous Rain**
- **Accumulated rain over 24, 72, and 168 hours**
- **Stream flow rates and flood detection at 1/8th degree (~12 km)**

Global Flood Monitoring System (GFMS)

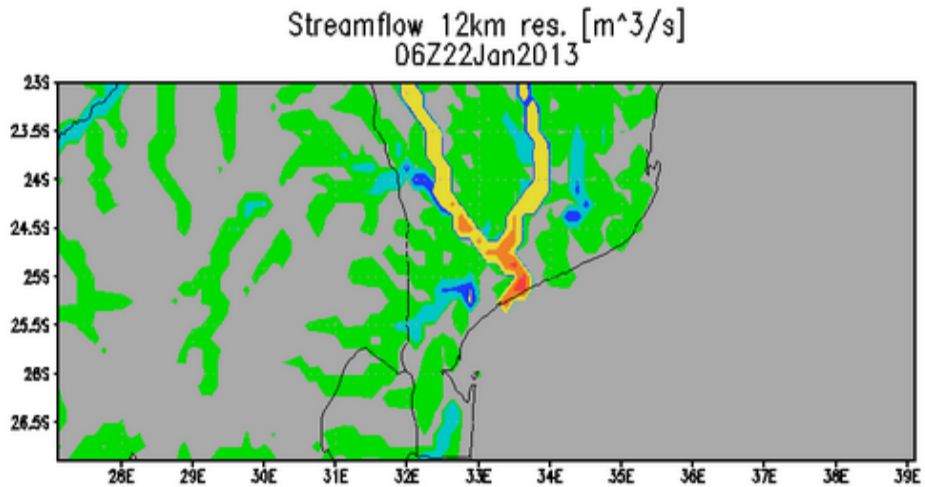
http://flood.umd.edu

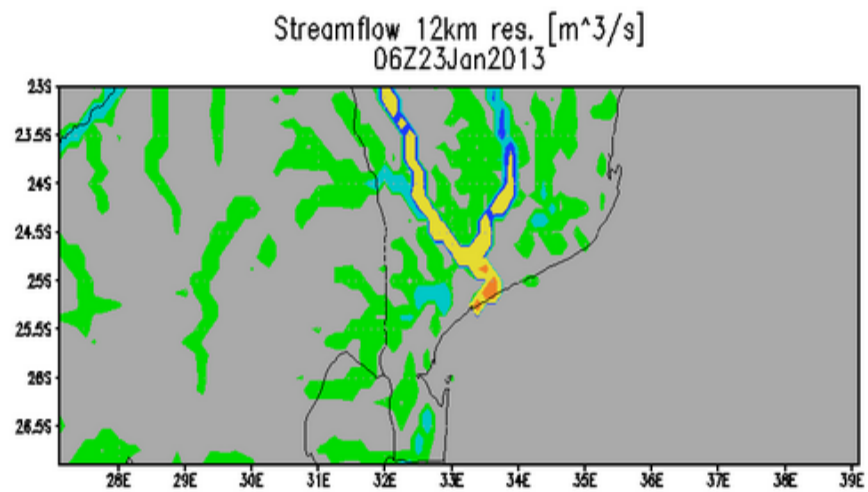


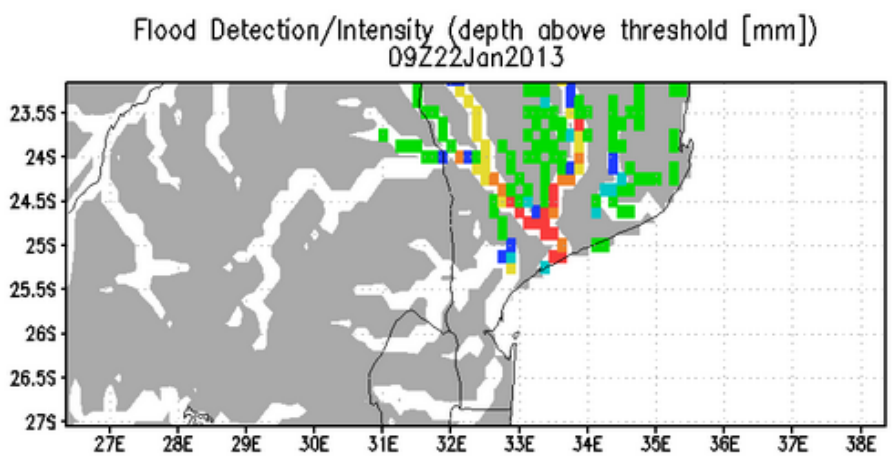
- Map navigation
- Zoom in/out
- Select individual grid point for data for time sequence
- Plot different variables
- 3-hourly output

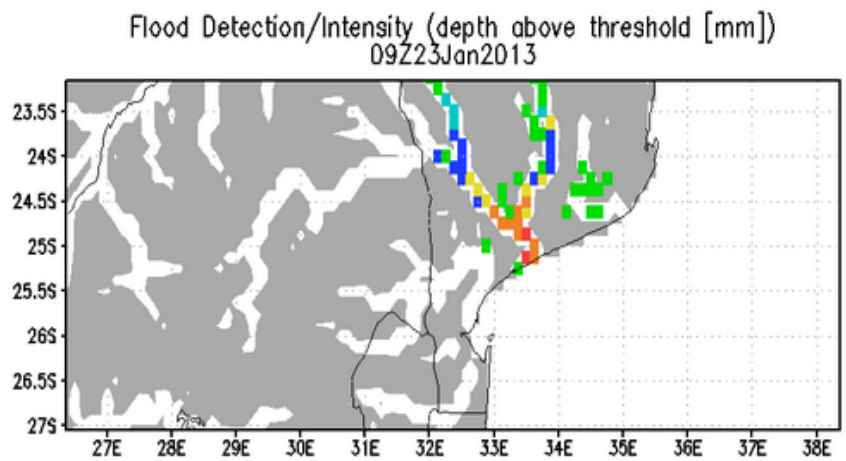
Global Flood Monitoring System (GFMS)

http://flood.umd.edu/

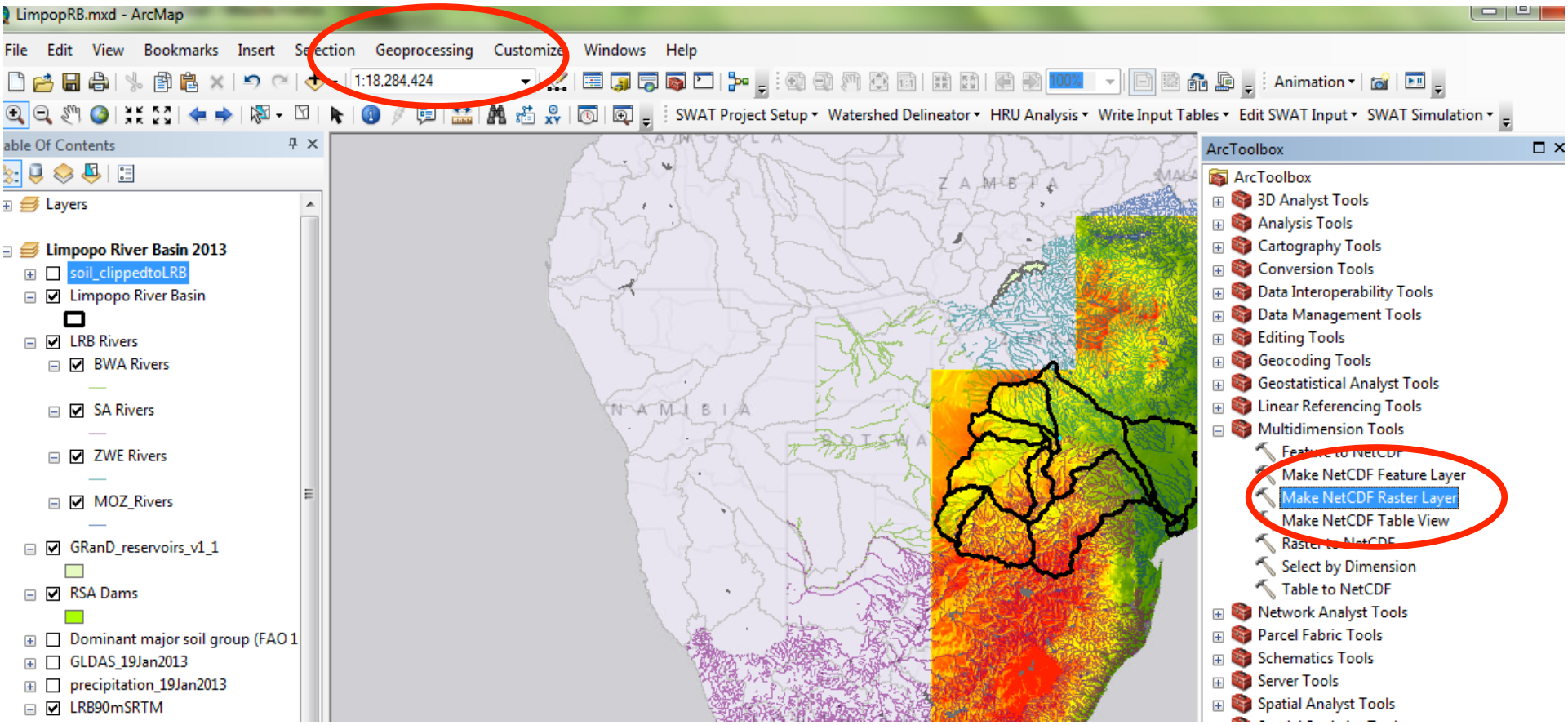




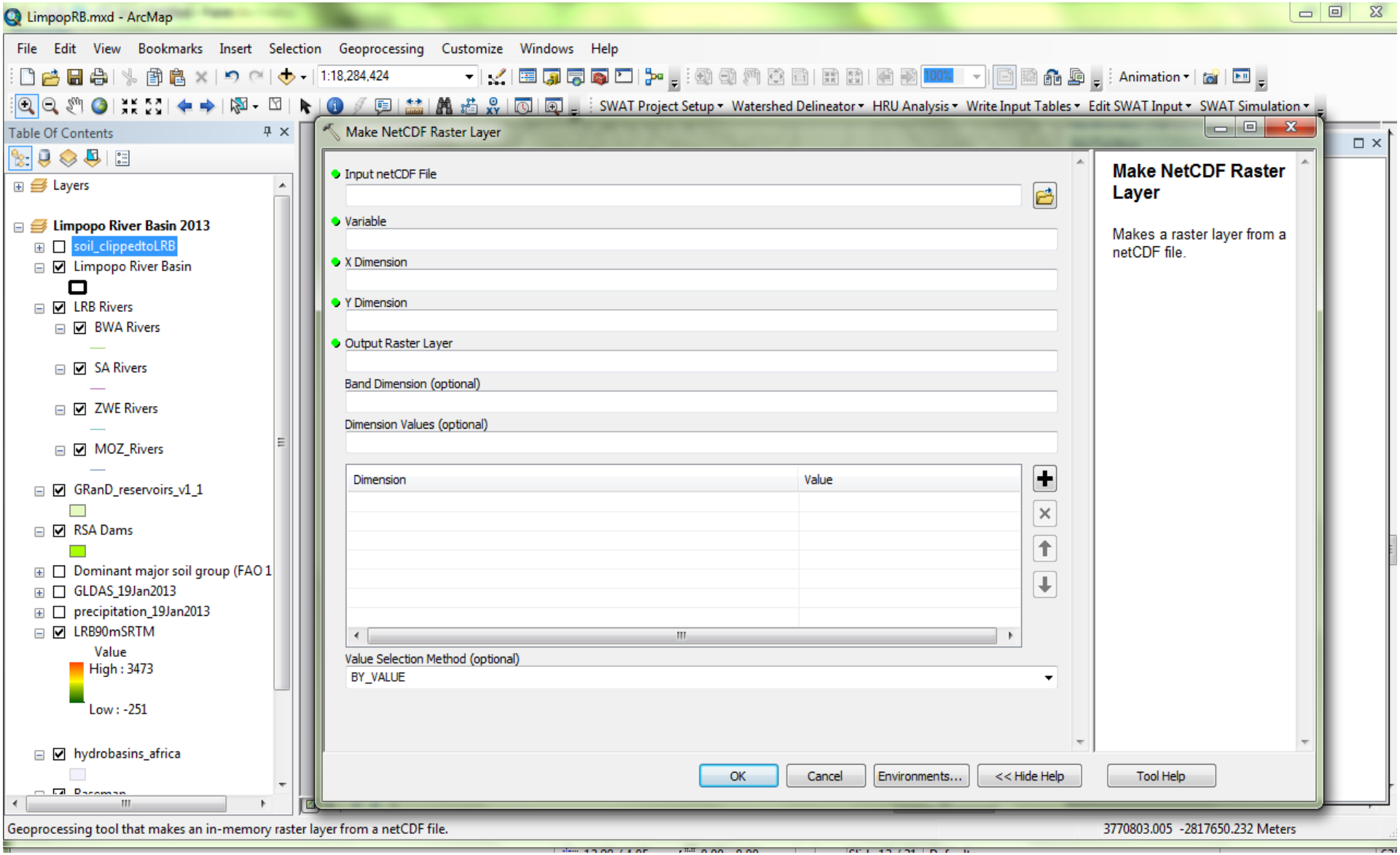




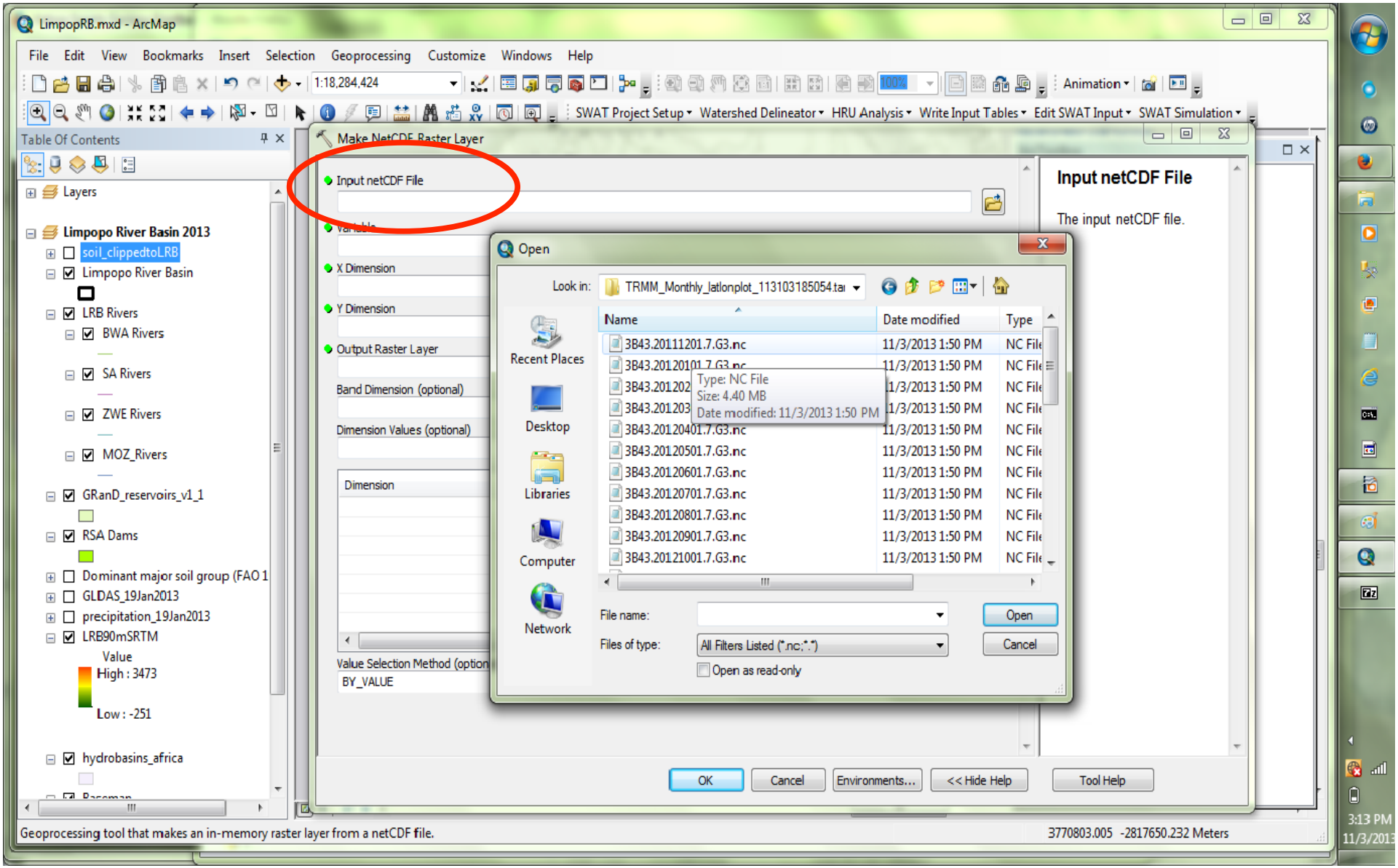
Import TRMM Data



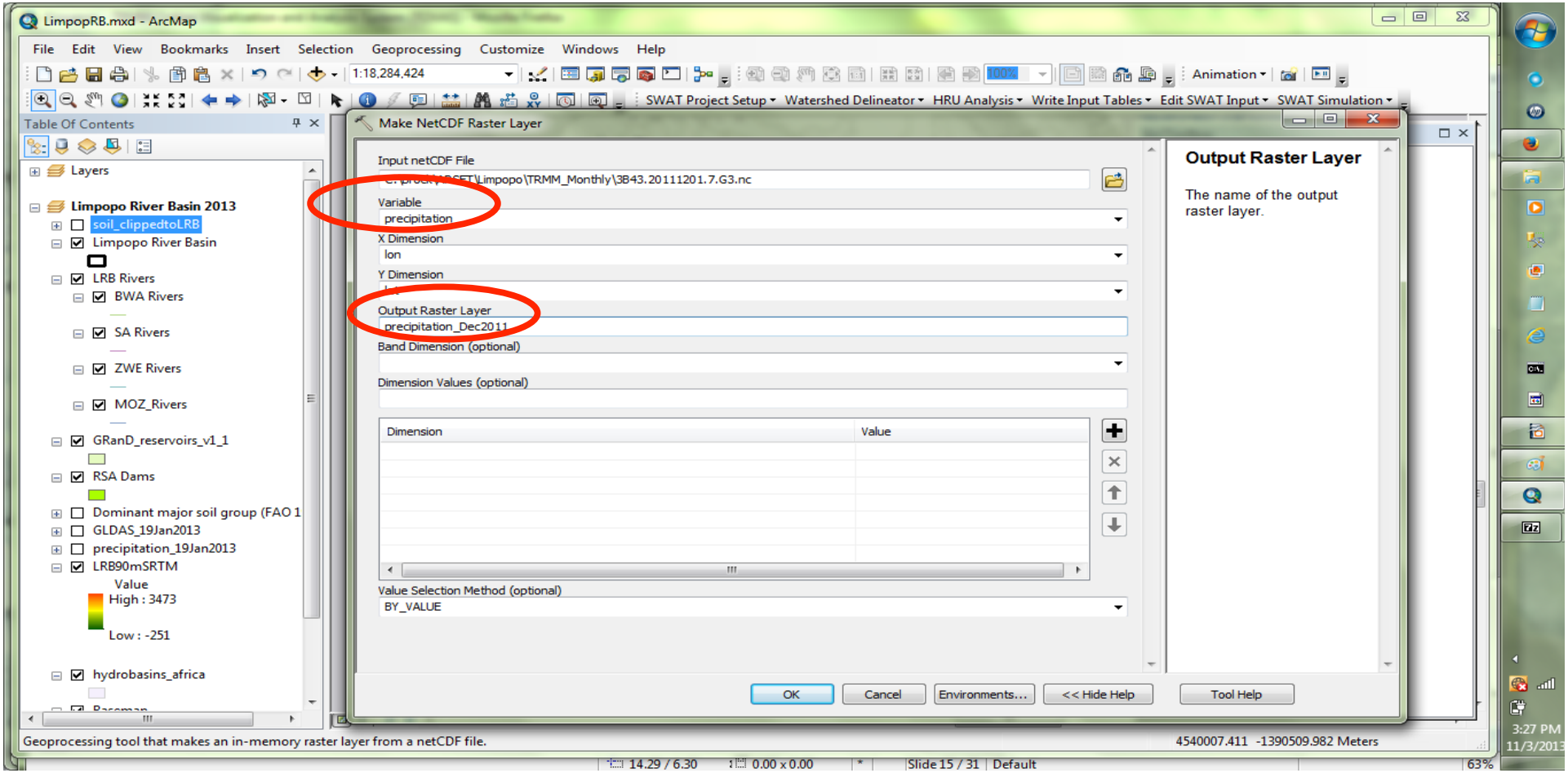
Under the Geoprocessing Tab, Open the ArcToolbox.Open the Multidemensional toolbox, choose the Make NetCDF Raster Layer tool



Make netCDF Raster Layer tool



Select your netCDF file for the Input netCDF File value



In the Variable field, under the dropdown menu, choose accumulated precipitation.

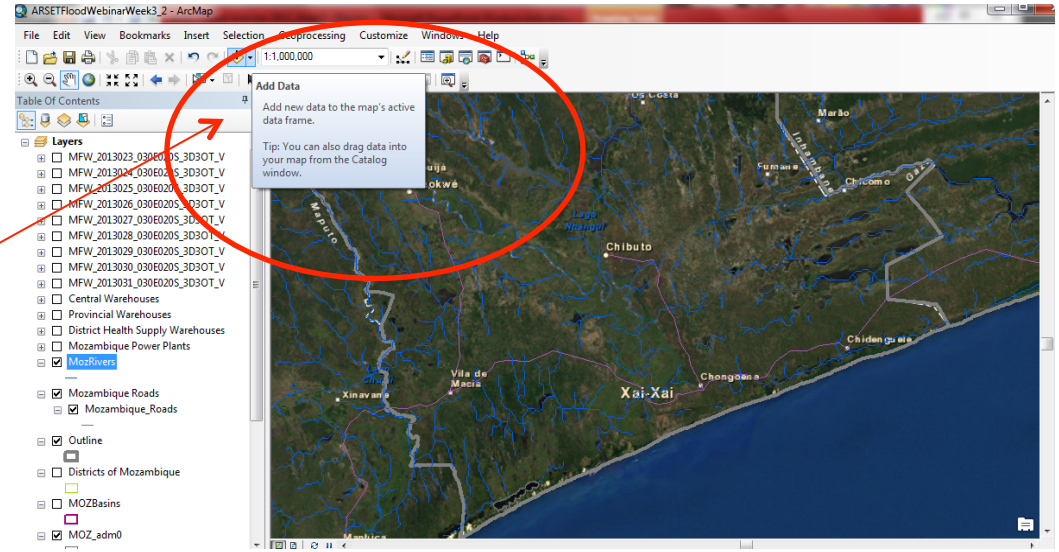
For the X Dimension field, choose longitude (lon). For the Y Dimension field, choose longitude (lat). These are the defaults settings.

For the Output Raster Layer, type an appropriate name for the resulting raster file to be created. The date, time and variable being displayed is suggested.

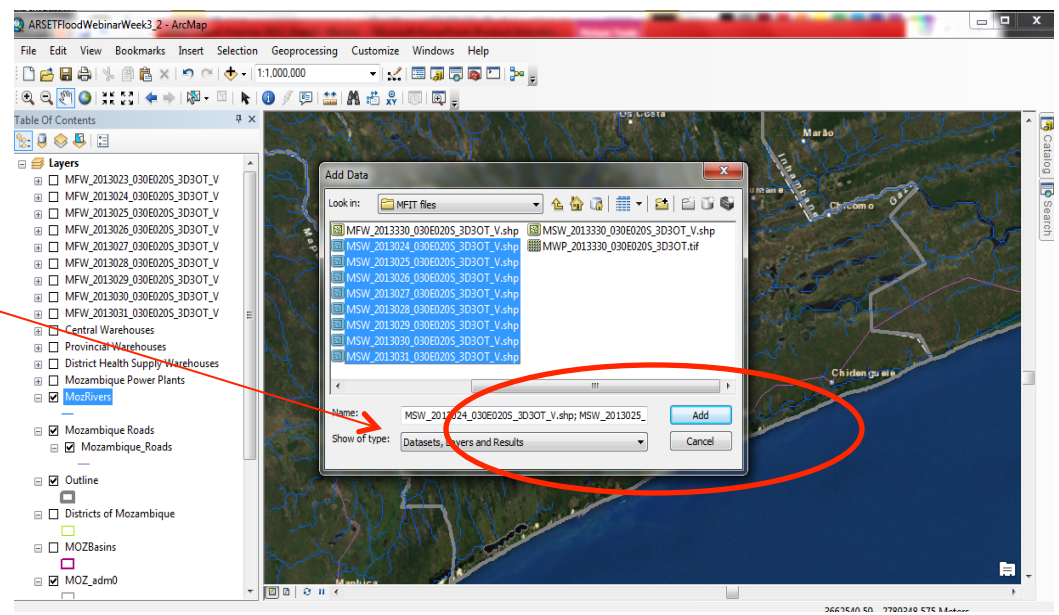
Click ok.

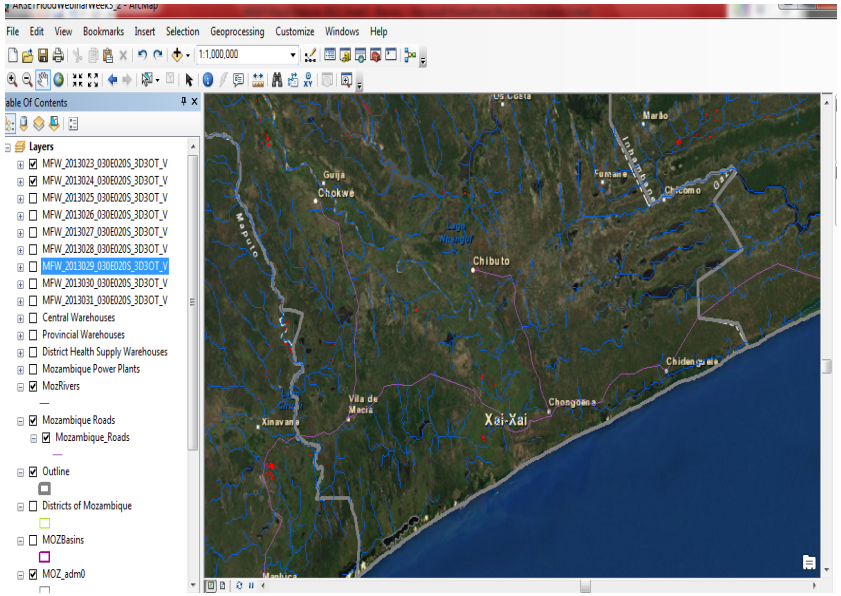
Display MODIS Inundation in ArcMap

- Open the Add data icon and choose Add Data..

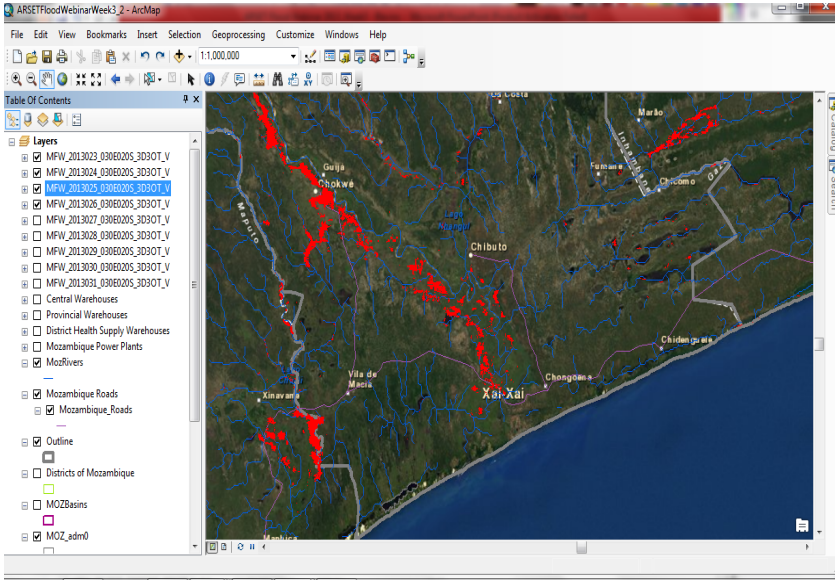


- Select the MFW (MODIS Flood Water) shapefile(s) and click Add.





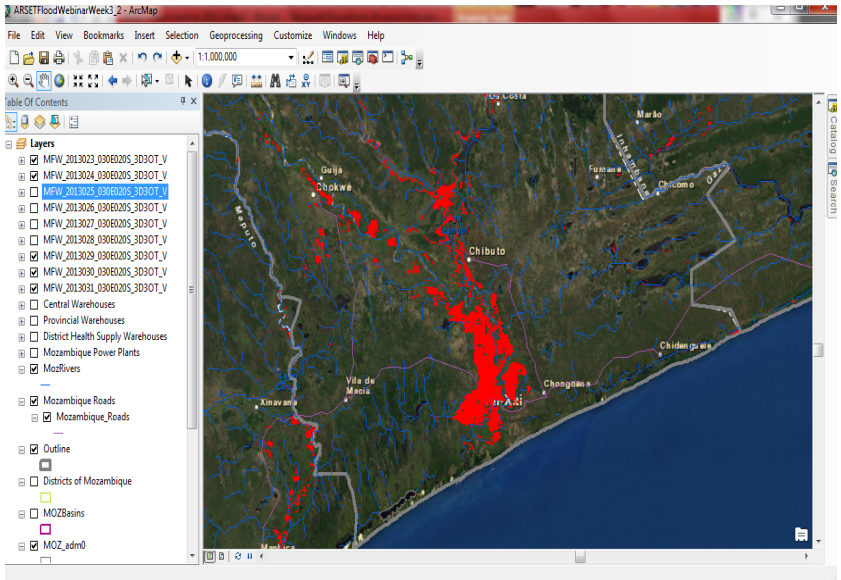
January 24, 2013



January 26, 2013

Flood Identification

Detected water is compared to a reference water layer that shows "normal" water extent, and any pixels found outside the normal water extent are marked as flood, and output in the MFW ("MODIS Flood Water") products.



January 31, 2013