TRMM Monthly Precipitation Data & MODIS Monthly Vegetation Index

Objective:

Learn to subset and download remote sensing-based data in NetCDF, GeoTIFF, and HDF5 format using Giovanni and Mirador.

Giovanni is a web-based application that allows for easy and quick analysis, visualization, and download of many NASA data products.
http://giovanni.gsfc.nasa.gov/

Mirador is a web-based data search and download tool for NASA Earth science data that allows for individual and bulk data download.
http://mirador.gsfc.nasa.gov/

There are two parts to this exercise:
1. Subset and Download TRMM Monthly Precipitation Data Using Giovanni
2. Subset and Download MODIS Monthly Vegetation Index Data Using Mirador

Part 1: Subset and Download TRMM Monthly Precipitation Data Using Giovanni

- Download IMERG early data using Giovanni
- Go to: http://giovanni.gsfc.nasa.gov/giovanni
- On the Giovanni page you'll see the following options:

Select Plot	Allows selection of analysis options
Select Date Range	Allows selection of time period
Select Region (Bounding Box or Shapefile)	Allows selection of a geographic region (by latitude-longitude, by map, or by shapefiles)

Keyword	Search data parameter by keyword
Plot Data (bottom right – not pictured above)	Make desired plot

- Enter the following options:
- **Keyword**: Enter TMPA, then click **Search**
- Select Precipitation Rate (TRMM_3B43 v7) Monthly
- Under the **Units** option, select 'mm/month'

Number of matching Variables: 3 of 1404   Total Variable(s) included in Plot: 1

Keyword : TMPA

	Variable	Source	Temp.Res.	Spat.Res.	Begin Date	End Date	Units
☑	**Precipitation Rate (TRMM_3B43 v7)**	**TRMM**	**Monthly**	**0.25 °**	**1998-01-01**	**2016-03-31**	mm/month
☐	Precipitation Rate (TRMM_3B42_daily v7)	TRMM	Daily	0.25 °	1997-12-31	2016-03-31	mm/day
☐	Precipitation (TRMM_3B42 v7)	TRMM	3-hourly	0.25 °	1998-01-01	2016-03-31	mm/hr

- Set **Select Plot** to **Maps: Time Averaged Plot**

Select Plot

⦿ Maps: Time Averaged Map ▼

- **Select Region (Bounding Box or Shapefile)**:
  - Draw a box around South America, or enter longitude and latitude:
    - (-90.0, -55.0, -35.0, 15.0)
  - **Note:** west longitudes and south latitudes are denoted as negative numbers whereas east longitudes and north latitudes are positive numbers.
  - Click on **Show Map** to see the region

Select Region (Bounding Box or Shapefile)

Format: West, South, East, North

-90, -55, -35, 15   Show Map   Show Shapes

- Under **Select Date Range**, set **Month or Season and YYYY Range** click the calendar icon and select January 2011

Select Date Range (UTC)

YYYY-MM   HH:mm

2011 - 01 - 01   00 : 00   to   2011 - 01 - 31   23 : 59

Valid Range: 1998-01-01 to 2016-03-31

  - 2011 was one of the wettest years over many countries in South America
- Click on **Plot Data** on the bottom right
- You will get a map of rain rates for January 2011
- You can click the upper left **+** symbol to zoom in
- On the right side of the plot under the **History** menu, click **Downloads**

History

- 1. User-Defined Climatology
  - User Input
  - **Plots**
  - Plot Options
  - Downloads
  - Lineage

- You will get a list of files to download
- Click on the two **.nc** files and two **.geotiff** files to save them on your computer, so that you can later import them into QGIS

Click on file links to download. Files contain data portrayed in the plot images.

NetCDF:
g4.timeAvgMap.TRMM_3B43_007_precipitation.20110101-20110131.90W_50S_35W_15N.nc

PNG:
g4.timeAvgMap.TRMM_3B43_007_precipitation.20110101-20110131.90W_50S_35W_15N.png

GEOTIFF:
g4.timeAvgMap.TRMM_3B43_007_precipitation.20110101-20110131.90W_50S_35W_15N.geotif
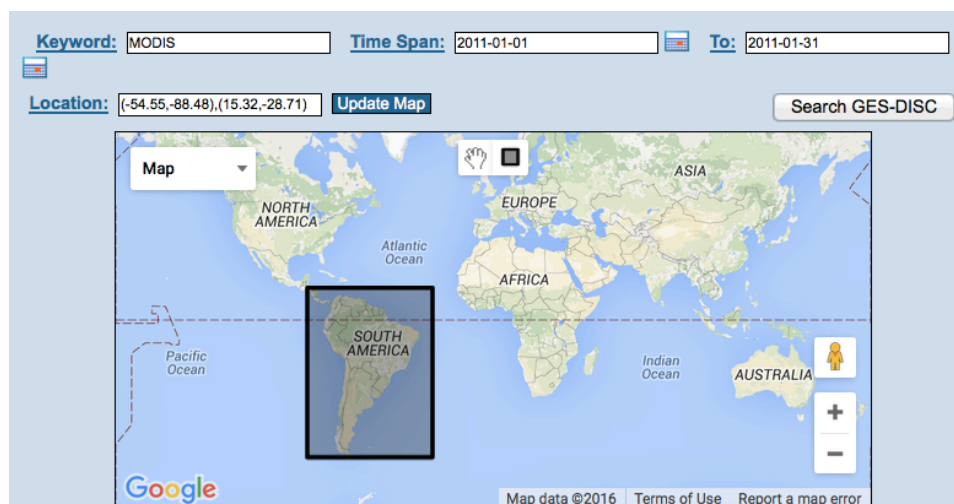
KMZ:
g4.timeAvgMap.TRMM_3B43_007_precipitation.20110101-20110131.90W_50S_35W_15N.kmz

Part 2: Subset and Download MODIS Monthly Vegetation Index Data Using Mirador

(The Normalized Difference Vegetation Index is a good indicator of dry/wet periods and is used to calculate evapotranspiration)
- Go to Mirador: http://mirador.gsfc.nasa.gov/
- Scroll down to **Keyword** and enter MODIS
- In the **Time Span**, using the calendar, choose January 1, 2011, as the start date and January 31, 2011, as the end date
- Draw a box around South America on the map (click on the gray box ▢ to draw on the map)
- **Note:** not all parameters can be subsetted spatially
- You will have the following options in the Mirador window

- Click on **Search GES-DISC**
- You will get a list of MODIS-derived variables
- Scroll through the list to **MODIS/Terra Monthly Vegetation Indices 1x1 degree V005**
- Click on **View Files**

☑ **MODIS/Terra Monthly Vegetation Indices Global 1x1 degree V005 (MODVI)**

| View Files | Info | Data Calendar

Approx. 4 files found (Avg Size: 0.99 MB)
Parameters: VEGETATION INDEX
Spatial Resolution: 1 degree x 1 degree
Temporal Resolution: 1 month

- You will see the following data file for January 2011 in HDF format

☑ **MODVI.201101.005.hdf** (**1.00** MB)   2011-01-01 00:00:00
One Click Download: Metadata

- Click on the file link to save on your computer, to be viewed with Panoply software in the next exercise