

NASA ARSET Training
Cartagena, May 19-22, 2015
Activity S2_A1: Multi-year Rainfall Analysis

Giovanni is a web-based application that allows for easy and quick exploration of many NASA data products

(<http://giovanni.gsfc.nasa.gov/giovanni/>)

Objective: Analysis of TRMM and GPM rainfall over Colombia

There are two parts to this exercise:

- 1) Construct a rainfall time series from 1998 to 2014 using TRMM TMPA (3B43 monthly data) over Colombia
- 2) Examine the spatial distribution and histogram of extreme rainfall

Part 1: Time Series of rainfall

Go to (<http://giovanni.gsfc.nasa.gov/giovanni/>)

Enter the following options

To Select the Variable

Scroll down the **Select Variables** menu to the left until you get to Platform/Instrument, and Select TRMM

Alternatively, go to **Keyword (center of page)**

Type the word TRMM and then click 'Search'

Under 'Variable Name', select Precipitation Rate (TRMM_3B43 v7) Monthly

Select Plot:

Time Series: Area-Averaged

Select Region (click on - Show Shapes)

Select Colombia

Select Date Range:

YYYY-MM (1998-01) to YYYY-MM (2014-12)

Click on **'Plot Data' (at the bottom right)**

You will get a plot of rain rate time series

Click on **'Image'** and it opens a png

Save the Images on your computer

Study the time series and answer the following questions:

- 1) When averaged over Colombia, typically which months have the highest and lowest rain rate? How do the rain rate values vary from year-to-year (note down the range of highest rain rates and lowest rain rates across the years)
- 2) Note down the year/month with the maximum rain rate out of the entire time series)
- 3) Note down the year/month when the minimum rain rate out of the entire time series

Part 2: Examine The Spatial Distribution of Rain Rate for Extreme Months

a) Click on '[Back to Data Selection](#)' (**lower right**)

Select Plot:

Maps: Accumulated

Select Data Range:

Set the same YYYY-MM to YYYY-MM equal to the year and month noted in Part 1, answer 2 (year/month of maximum rain rate)

Click on '[Plot Data](#)' (**at the bottom right**)

You will get a map of accumulated rain, then Click on '[Options](#)' (at the top right of the plot)

Enter Minimum: 40

Maximum: 700

Click on '[Re-Plot](#)' (at the bottom right)

You will get a map of accumulated rain

Choose '[Downloads](#)' from the '[History](#)' at the top right of the window



Click on the netCDF Format data files (ending in .nc) to download and save on your computer (you will be using this in the next exercise).

Click on '[Back to Data Selection](#)' (**lower right**)

Click on '[Miscellaneous: Histogram](#)' (**last option in the 'Select Plot' section**)

Click on **'Plot Data'** (at the bottom right)

b) Repeat the steps in part a) using the YYYY-MM noted in answer-3 of Part 1 (year/month of minimum rain rate)

c) Repeat the steps in part a) YYYY-MM for a month where the peak rain rate was the smallest

You will have 3 netCDF files at the end of Part-2. These files will be used in the next exercise.

Discussion:

- 1) What does 'Accumulated Rain' mean? How is it related to the 'Rain Rate' in the time series?
- 2) Compare the spatial distribution and values of rain in the three maps.
- 3) Are the spatial patterns similar in the maps for parts a and c ?
- 4) What do the histograms represent? How do they differ in cases a, b, and c ? How could this information be used for decision support related to climate variability ?