

NASA ARSET Training  
Cartagena, May 19-22, 2015  
**Activity 1: Rainfall Rate Analysis Using Giovanni**

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

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

On the Giovanni page you will see the following options:

The screenshot shows the Giovanni web application interface. At the top, there is a 'Select Plot' section with a dropdown menu set to 'Maps: Time-Averaged' and several radio button options for 'Comparisons', 'Time Series', 'Vertical', and 'Miscellaneous'. Below this is a 'Select Date Range (UTC)' section with input fields for start and end dates and times, and a 'Valid Range: 1979-01-01 to 2015-04-08' note. To the right is a 'Select Region (Bounding Box or Shapefile)' section with a text input field containing '-180, -90, 180, 90' and 'Show Map' and 'Show Shapes' buttons. At the bottom, there is a search bar with the text 'Number of matching Variables: 0 of 331' and 'Total Variable(s) included in Plot: 0', and a 'Keyword:' label followed by a search input field and 'Search' and 'Clear' buttons.

- |   |  |
|---|--|
| <b>Select Plot:</b>                               | Allows selection of analysis options   |
| <b>Select Date Range:</b>                         | Allows selection of time period  |
| <b>Select Region (Bounding Box or Shapefile):</b> | Allows section of a geographic region<br>(By latitude-longitude, by map, or by shapefiles) |
| <b>Keyword:</b>                                   | Search data parameter by keyword   |
| <b>Plot data (bottom right):</b>                  | Make desired plot  |

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**Objective:** Learn data selection, analysis, visual display, and download options using NASA's Giovanni data portal

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**There are three parts to this exercise:**

**Learn to generate --**

- 1) seasonal climatology of rain rates over South America
- 2) animation of monthly climatological rain rate maps
- 3) map and time series of rain rates for a selected country

## **Part 1: Time-averaged Rain Map**

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

**Enter the following options**

### **Keyword:**

Enter TRMM, then click Search

Select Precipitation Rate (TRMM\_3B43 v7) Monthly

### **Select Plot:**

Maps: User-Defined Climatology

### **Select Region (Bounding Box or Shapefile)**

Enter the following latitudes and longitudes in the box (these are 90W, 55S, 35W, and 15N)  
-90.0,-55.0,-35.0,15.0

*(note that west longitudes and south latitudes are denoted as negative numbers whereas east longitudes and north latitudes as positive numbers)*

**Click on ‘Show Map’ to see the region**

### **Select Seasonal Dates:**

#### *Month or Season and YYYY Range*

Click the [calendar icon](#) and select ‘Seasons’, then select

DJF (for December-January-February)

JJA (for June-July-August)

Select 1998 as the start year

Select 2014 as the end year



The screenshot shows two sections: 'Select Seasonal Dates' and 'Select Region (Bounding Box or Shapefile)'. The 'Select Seasonal Dates' section has a dropdown menu with 'DJF,JJA' selected, a '1998' input field, a 'to' label, and a '2014' input field. Below these is a 'Valid Range: 1998-01-01 to 2014-10-31' label. The 'Select Region' section has a text input field with '-90, -55, -35, 15' and two buttons: 'Show Map' and 'Show Shapes'. A blue arrow points from the text 'Select 1998 as the start year' to the '1998' input field.

**Click on ‘Plot Data’ (at the bottom right)**

You will get two plots of rain rates for DJF and JJA (scroll down to see the bottom one).

You can click the upper left ‘+’ symbol to zoom in.

Click on ‘Options’ (at the top right for the DJF Plot)

Enter Minimum: 0.02

Maximum: 1.0

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

Scroll down to the second rain rate map for JJA and repeat the same [‘Options’](#) as above

Now you have to seasonal climatology over south America with the same values and colors

Click on [‘Image’](#) and choose ‘png’ for both the DJF and JJA climatology  
Save the Images on your computer

Study the maps and answer the following questions:

- 1) What is the unit of the rain rate plotted in the maps
- 2) Which season has higher rain rate over Brazil?
- 3) Which location (approximate latitude – longitude) has the maximum rain rate in the June-July-August season?

## **Part 2: Animation of Rain Rate Maps**

Click on [‘Back to Data Selection’](#)

**Select Plot:**

Maps: Animated

**Select Data Range:**

YYYY-MM to YYYY-MM

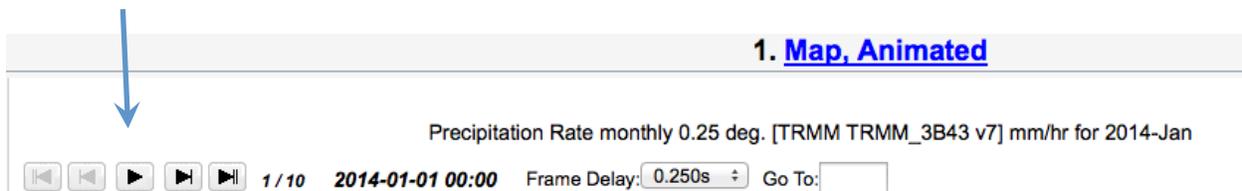
2014 01-Jan 2014 12-Dec

Keep all other option the same

Click on [‘Plot Data’](#) (at the bottom right)

You will get [‘Map, Animated’](#)

Click on the arrow to view the animation



1. [Map, Animated](#)

Precipitation Rate monthly 0.25 deg. [TRMM TRMM\_3B43 v7] mm/hr for 2014-Jan

1 / 10 2014-01-01 00:00 Frame Delay: 0.250s Go To:

↑  
View one frame at a time

↑  
Adjust the animation speed

↑  
go to a specific frame

Study the animation, try different options, and answer the following questions:

- 1) In which direction does the rain progress from January to July?
- 2) Where is the maximum rain rate in July and what is its magnitude?

### **Part 3a: Map of Rain Rate Over Bolivia**

Click on [‘Back to Data Selection’](#)

**Select Plot:**

Maps: Time-Averaged

**Select Data Range:**

YYYY-MM to YYYY-MM

2010 01-Jan 2014 12-Dec

Click on [‘Show Shape’](#) and select [‘Bolivia’](#)

Click on [‘Plot Data’](#)

Click on [‘Image’](#) and Save [‘Png’](#)

Study the map and note down the driest part of Bolivia

### **Part 3b: Time Series of Rain Rate Over Bolivia**

Click on [‘Back to Data Selection’](#)

**Select Plot:**

Time Series: Area-averaged

Click on [‘Plot Data’](#)

You will get a time series of monthly rain rates averaged over Bolivia between 2010 to 2014

Which month of the year has the highest rain rate?