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# **AMAZON RIVER BASIN PRECIPITATION, 1972-1992**

**Get Data** 

# Summary:

The Amazon River Basin precipitation grids were derived from data that were collected daily by the gauging network operated by the Divisao Nacional de Aguas e Energia Eletrica (DNAEE, SGAN 603 Modulo J, Anexo DNC, CEP 70.830-030 Brasilia DF, Brazil). The DNAEE provided the Earth Observing System (EOS) Regional Amazon Model (EOSRAM) project with this data for cooperative analysis. The project includes both empirical and modeling studies of rainfall and runoff from sample hillslopes to the entire Amazon basin. The precipitation data are 0.2-degree gridded monthly precipitation data and are available in HDF, ASCII, and TIF formats. The data span the period from January 1972 to December 1992.

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1.

## **Data Set Identification:**

AMAZON RIVER BASIN PRECIPITATION, 1972-1992

#### **Data Set Introduction:**

The Amazon River Basin precipitation data were derived from data that were collected daily by the gauging network operated by the Divisao Nacional de Aguas e Energia Eletrica (DNAEE, SGAN 603 Modulo J, Anexo DNC, CEP 70.830-030 Brasilia DF, Brazil). The DNAEE provided the EOS Regional Amazon Model (EOSRAM) project with this data for cooperative analysis. The monthly total precipitation is in a 126 by 151 element array. The data is based on monthly rain data sets from Peru and Bolivia and daily rain data sets from Brazil. The extent of the gridded data ranges from latitudes of 20.0S to 5.2N and longitudes from 79.6W to 49.4W.

#### Objective/Purpose:

The purpose of this research project is to understand biogeochemistry, hydrology, and sedimentation of the Amazon River and its drainage basin. The Amazon was chosen as the first target in the study of Earth's continental scale river systems, which represent some of the largest and most dynamic environmental units on the planet. The researchers involved in this project, while located at various institutes, share a common focus, the Patterns and Processes of Change in the Amazon River Basin.

# **Summary of Parameters:**

The precipitation data is 0.2 degree gridded monthly precipitation in millimeters per month. The precipitation data are based on monthly rain data sets from Peru and Bolivia and daily rain data sets from Brazil. The data were derived from a linear interpolation of all stations within one degree from a minimum of four stations.

# Discussion:

The extent of the gridded data ranges from latitudes of 20.0 degrees South to 5.2 degrees North and longitudes of 79.6 degrees West and 49.4 degrees West. The data were extropolated to the edge of the Amazon River Basin and are much less reliable outside Brazil and Bolivia.

#### **Related Data Sets:**

Another data set from the EOSRAM project which is related to the Amazon River Basin precipitation data is the Carbon in the Amazon River Experiment (CAMREX) data set. The CAMREX study is establishing a baseline needed for assessing any future anthropogenic perturbations, with the main goal being to gain a broad mechanistic understanding of the river system that also can be applied to other large rivers.

# 2. Investigator(s):

## Investigator(s) Name and Title:

Dr. Thomas Dunne Project Management, United States Team Leader

## Title of Investigation:

Earth Observing System Regional Amazon Model Project

# **Contact Information:**

Please direct all queries to the ORNL DAAC User Services Office:

ORNL Distibuted Active Archive Center User Services Office Oak Ridge National Laboratory Voice: (865) 241-3952

Fax: (865) 574-4665 Email: ornldaac@ornl.gov

# 3. Theory of Measurements:

This information is not available at this time.

# 4. Equipment:

## **Sensor/Instrument Description:**

#### **Collection Environment:**

The precipitation measurements were derived from data which was collected daily by gauging network throughout the Amazon River Basin region.

#### Source/Platform:

The source for this data set is a ground station.

# Source/Platform Mission Objectives:

The source mission objective was to provide quality precipitation observations to support the study of the Amazon River and its drainage basin.

# **Key Variables:**

The key variable is precipitation.

# **Principles of Operation:**

This information is not available at this time.

# Sensor/Instrument Measurement Geometry:

This information is not available at this time.

# Manufacturer of Sensor/Instrument:

This information is not available at this time.

# Calibration:

## **Specifications:**

This information is not available at this time.

#### Tolerance:

This information is not available at this time.

# Frequency of Calibration:

This information is not available at this time.

## Other Calibration Information:

This information is not available at this time.

# 5. Data Acquisition Methods:

This information is not available at this time.

#### 6. Observations:

## **Data Notes:**

This data set depends highly on the procedures used to collect the rain gauge data.

#### **Field Notes:**

No field notes are available at this time.

# 7. Data Description:

## **Spatial Characteristics:**

# **Spatial Coverage:**

The precipitation grid extends from 20.2 degrees South to 5.6 degrees North and 79.8 degrees West to 45.6 degrees West. This area covers the Amazon River Basin region.

### **Spatial Coverage Map:**

The 0.2 degree gridded data directly maps to the area in which the measurements were taken.

#### **Spatial Resolution:**

The spatial resolution of the precipitation data is 0.2 degrees

# Projection:

No projection was used to process the data since the data are directly related to geographic areas.

## **Grid Description:**

Rain is derived from monthly data sets for Peru and Bolivia, and daily data sets for Brazil. It is inter/extrapolated, taking a linear interpolation of all stations within one degree, but using at least four stations. Topographic and other information is not used in the interpolation. Data are extrapolated to edges of the basin, but should not be trusted in the Andes.

## **Temporal Characteristics:**

# **Temporal Coverage:**

The data spans the period from January, 1972 to December, 1992.

## **Temporal Coverage Map:**

The data set spans the period from January, 1972 to December, 1992 with data for each month during that time period. During each month, the number of stations within the gauging network that were used to compute the monthly precipitation data can vary. The following table is an example of the number of stations used to compute the data for each month for the year of 1986.

Month (in 1986)	Number of Stations
Jan	387
Feb	382
Mar	380
Apr	378
May	383
Jun	383
Jul	384
Aug	385
Sep	384
Oct	382
Nov	377
Dec	378

# **Temporal Resolution:**

The temporal resolution is monthly.

#### **Data Characteristics:**

# Parameter/Variable:

The key parameter is precipitation.

# **Variable Description/Definition:**

Precipitation - Any or all forms of liquid or solid water particles that fall from the atmosphere and reach the surface of the Earth. It includes drizzle, rain, snow, snow pellets, snow grains, ice crystals, ice pellets, and hail. Precipitation is also defined as a measurement of the quantity, expressed in centimeters or milliliters of liquid water depth, of the water substance that has fallen at a given location in a specified amount of time.

# **Unit of Measurement:**

The monthly precipitation data are in millimeters per month.

# **Data Source:**

The source of the data was a ground station that collected the precipitation measurements gathered by the rain gauging network

# Data Range:

The data ranges from 0 millimeters per month to approximately 800 millmeters per month. Some monthly values may exceed 800 mm/month.

# Sample Data Record:

Item HDF Ref	Numbe	er HDF Object Type
Numeric Data Group	0	Jan86based_on_387_stations
Numeric Data Group	1	Feb86based_on_382_stations
Numeric Data Group	2	Mar86based_on_380_stations
Numeric Data Group	3	Apr86based_on_378_stations
Numeric Data Group	4	May86based_on_383_stations
Numeric Data Group	5	Jun86based_on_383_stations
Numeric Data Group	6	Jul86based_on_384_stations
Numeric Data Group	7	Aug86based on 385 stations
Numeric Data Group	8	Sep86based_on_384_stations
Numeric Data Group	9	Oct86based on 382 stations
Numeric Data Group	10	
Numeric Data Group	11	
Version Descriptor	1	(No label)
File Identifier 2		(No label)
File Descriptor	3	(No label)
Scientific Data	4	(No label)
Number Type	4	(No label)
SciData dimension record		,
SciData labels	4	(No label)
		,
SciData units SciData formats	4	(No label)
	4	(No label)
SciData coordsys	_ 4	(No label)
Scientific Data	5_	(No label)
Number Type	5	(No label)
SciData dimension record		,
SciData labels	5	(No label)
SciData units	5	(No label)
SciData formats	5	(No label)
SciData coordsys	5	(No label)
Scientific Data	6	(No label)
Number Type	6	(No label)
SciData dimension record	1 6	(No label)
SciData labels	6	(No label)
SciData units	6	(No label)
SciData formats	6	(No label)
SciData coordsys	6	(No label)
Scientific Data	7	(No label)
Number Type	7	(No label)
SciData dimension record		,
SciData labels	7	(No label)
SciData units	7	(No label)
SciData formats	7	(No label)
SciData coordsvs	7	(No label)
Scientific Data	8	(No label)
Number Type	8	(No label)
* '		,
SciData dimension record		(/
SciData labels	8	(No label)
SciData units	8	(No label)
SciData formats	8	(No label)
SciData coordsys	8	(No label)
Scientific Data	9	(No label)
Number Type	9	(No label)
SciData dimension record		, , , , , , , , , , , , , , , , , , , ,
SciData labels	9	(No label)
SciData units	9	(No label)
SciData formats	9	(No label)
SciData coordsys	9	(No label)
Scientific Data	10	(No label)
Number Type	10	(No label)
SciData dimension record	l 1	0 (No label)
SciData labels	10	(No label)
SciData units	10	(No label)
SciData formats	10	(No label)
SciData coordsys	10	(No label)
Scientific Data	11	(No label)
Number Type	11	(No label)
SciData dimension record		1 (No label)
SciData labels	11	(No label)
SciData units	11	(No label)
SciData formats	11	(No label)
SciData coordsys	11	(No label)
_ 5.24.4 000.40 9 0		(

Scientific Data	12	(No label)
Number Type	12	(No label)
SciData dimension record	12	(No label)
SciData labels	12	(No label)
SciData units	12	(No label)
SciData formats	12	(No label)
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Number Type	13	(No label)
SciData dimension record	13	(No label)
SciData labels	13	(No label)
SciData units	13	(No label)
SciData formats	13	(No label)
SciData coordsys	13	(No label)
Scientific Data	14	(No label)
Number Type	14	(No label)
SciData dimension record	14	(No label)
SciData labels	14	(No label)
SciData units	14	(No label)
SciData formats	14	(No label)
SciData coordsys	14	(No label)
Scientific Data	15	(No label)
Number Type	15	(No label)
SciData dimension record	15	(No label)
SciData labels	15	(No label)
SciData units	15	(No label)
SciData formats	15	(No label)
SciData coordsys	15	(No label)

# 8. Data Organization:

# **Data Granularity:**

A general description of data granularity as it applies to the IMS appears in the EOSDIS Glossary.

The data for the entire period of record is contained in a single file. This file is in UNIX tar and compress format. When the file is uncompressed and untarred, 21 HDF files are generated. Each HDF file corresponds to a single year in the period of record and contains 12 images, one for each month. The precipitation total for each month is stored in a 126 by 151 element array.

#### **Data Format:**

The data are stored using the Hierarchical Data Format (HDF), developed at the National Center for Supercomputing Applications (NCSA) at the University of Illinois, Urbana-Champaign.

ASCII and TIF formats of the data are also available.

- The ASCII data (ascii\_newrain.tar.gz) are stored as individual text files in 16-bit integer format. There is one ASCII text file per year per month. See the companion file ascii\_newrain\_readme.txt for more information.
- The tif data (tif\_newrain.zip) have one tif file per year. Each tif file has 12 bands; one for each month:
  - Band 1 -- January precipitation data
  - ۰ ...
  - Band 12 -- December precpitation data

World files (tfw) are also provided for geo-referencing the data set.  $\label{eq:constraint}$ 

To view the HDF files, try the OpenSource free software (OpenEV) available for download at <a href="http://openev.sourceforge.net/">http://openev.sourceforge.net/</a>. OpenEV is a software library and application for viewing and analyzing raster and vector geospatial data.

# 9. Data Manipulations:

# Formulae:

## **Derivation Techniques and Algorithms:**

The precipitation data are based upon monthly rainfall data from Peru and daily rainfall data from Brazil. The gridded precipitation data are derived from a linear interpolation of all stations within a one degree grid box, with data from a minimum of four stations.

## **Data Processing Sequence:**

# **Processing Steps:**

This information is not available at this time.

# **Processing Changes:**

This information is not available at this time.

# Calculations:

## **Special Corrections/Adjustments:**

No special corrections were made to this data set.

#### **Calculated Variables:**

The monthly gridded precipitation values are computed from the daily observations.

#### **Graphs and Plots:**

This information is not applicable to this data set.

#### 10. Errors:

#### Sources of Error:

There are sources of error for the collection of precipitation measurements from a gauging network. These errors could include: human error in reading the measurement on the gauges, the location and orientation of each gauge in the network, and changes in the time at which measurements are collected from each gauge.

# **Quality Assessment:**

# **Data Validation by Source:**

This information is not available at this time.

## **Confidence Level/Accuracy Judgement:**

This information is not available at this time.

#### **Measurement Error for Parameters:**

This information is not available at this time.

# **Additional Quality Assessments:**

This information is not available at this time.

#### **Data Verification by Data Center:**

The verification of this data set was performed by the Marshall Space Flight Center Distributed Active Archive User Services Team. This verification included access of the information using standard HDF viewers and visual inspection of the images to determine if the spatial coverage was approriate and if the data was within the expected range of values. Contact the ORNL DAAC User Services Office for additional verification information.

## 11. Notes:

#### Limitations of the Data:

The data set is limited to the Amazon River Basin region. The data are extrapolated to the edge of the region but are much less reliable outside Brazil and Bolivia. Cells outside the Amazon River Basin are coded zero.

## **Known Problems with the Data:**

There are no known problems with the data at this time.

# **Usage Guidance:**

This information is not available at this time.

# Any Other Relevant Information about the Study:

This data set was collected as part of the EOS Amazon Project at the University of Washington. The Amazon region was the first target area of the study of the Earth's continental scale river systems. Other programs within the project include biogeochemistry and land cover change.

# 12. Application of the Data Set:

The primary application of the data is to study the hydrologic aspects of the Amazon River and it's drainage basin.

## 13. Future Modifications and Plans:

There are no future modifications or plans at this time.

# 14. Software:

# **Software Description:**

The data set is stored in HDF format. The HDF library and software tools can be used to access the data.

### **Software Access:**

The HDF library and tools are available from the National Center for Supercomputing Applications at the University of Illinois in Urbana-Champaign. The HDF library may be accessed via anonymous ftp at the site of ftp.ncsa.uiuc.edu. Information on the HDF may be accessed through the HDF Information Server.

# 15. Data Access:

# **Contact Information:**

ORNL Distibuted Active Archive Center User Services Office

Voice: (865) 241-3952 Fax: (865) 574-4665 Email: ornldaac@ornl.gov

These data are available online via the ORNL DAAC's WWW search and order system.

#### **Data Center Identification:**

ORNL Distributed Active Archive Center

# **Procedures for Obtaining Data:**

These data are available online via the ORNL DAAC's WWW search and order system. The data is also available via the EOSDIS V0 IMS or by contacting the ORNL DAAC User Services Office.

#### **Data Center Status/Plans:**

The ORNL Distributed Active Archive Center will include any updates to the data set that are generated by the EOSRAM project.

# 16. Output Products and Availability:

These products are available via HTTP or on CD-ROM.

# 17. References:

No publications for this data set to date.

# 18. Glossary of Terms:

# **Ground station**

A site located on the surface of the earth that collects various meteorological parameters from a variety of instruments.

#### Rain gauge

An instrument that measures the amount of precipitation in the location of the instrument since the last collection was made from the rain gauge.

A Glossary of Terms for biogeochemical dynamics data is available, as is the EOSDIS Glossary.

# 19. List of Acronyms:

**URL** 

Uniform Resource Locator

## **DNAEE**

Divisao Nacional de Aguas e Energia Eletrica

# **EOSRAM**

Earth Observing System Regional Amazon Model

A List of Acronyms for biogeochemical dynamics data is available, as is the list of EOSDIS acronyms

#### 20. Document Information:

March 26, 1996 (Note: Citation revised on June 26, 2002)

#### **Document Review Date:**

March 26, 1996

#### **Document ID:**

ORNL-AMZ-001

#### Citation:

Cite this data set as follows (citation revised on June 26, 2002):

Dunne, T. 1999. Amazon River Basin Precipitation, 1972-1992. Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/228.

#### **Document Curator:**

DAAC Staff

#### **Document URL:**

http://daac.ornl.gov













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