

GPM/TRMM Data reading program guide (IDL version)



2026/06/01

9th ed.

This document describes how to create a program (IDL) to read data from the Global Precipitation Measurement (GPM) satellite.

The sample programs described in this document have been tested with product version 08 for GPM/TRMM and with product version 5 for GSMaP.

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1. Introduction

This document explains how to read in GPM/TRMM data using IDL.

The GPM and TRMM formats have been unified since version 06 products (equivalent to TRMM version 8), and the latest algorithm is version 08, which can be read in the same way in this sample program. In addition to IDL, there are other methods to read GPM data as shown in Table 1.1. To determine which method to use, please refer to the "Read Method Judgment Flow" on the next page.

Table 1.2 lists the operating systems on which the sample programs used in this document were tested.

Table 1.1 Data loading methods

	Data loading method	Name of material	remarks
1	Using THOR	GPM/TRMM Data Loading Program Guide (THOR Edition)	
2	Using Commercial off-the-shelf (COTS) tools such as QGIS, Panoply, and HDFView	GPM/TRMM Data reading program guide (COTS version)	
3	Use GeoTIFF	GPM/TRMM Data reading program guide (GeoTIFF Conversion)	
4	Use IDL	GPM/TRMM Data Loading Program Guide (IDL version)	
5	Use C	GPM/TRMM data reading program guide (C language version)	
6	Using FORTRAN	GPM/TRMM Data Loading Program Guide (FORTRAN Edition)	
7	Using Python	GPM/TRMM data reading program guide (Python version)	

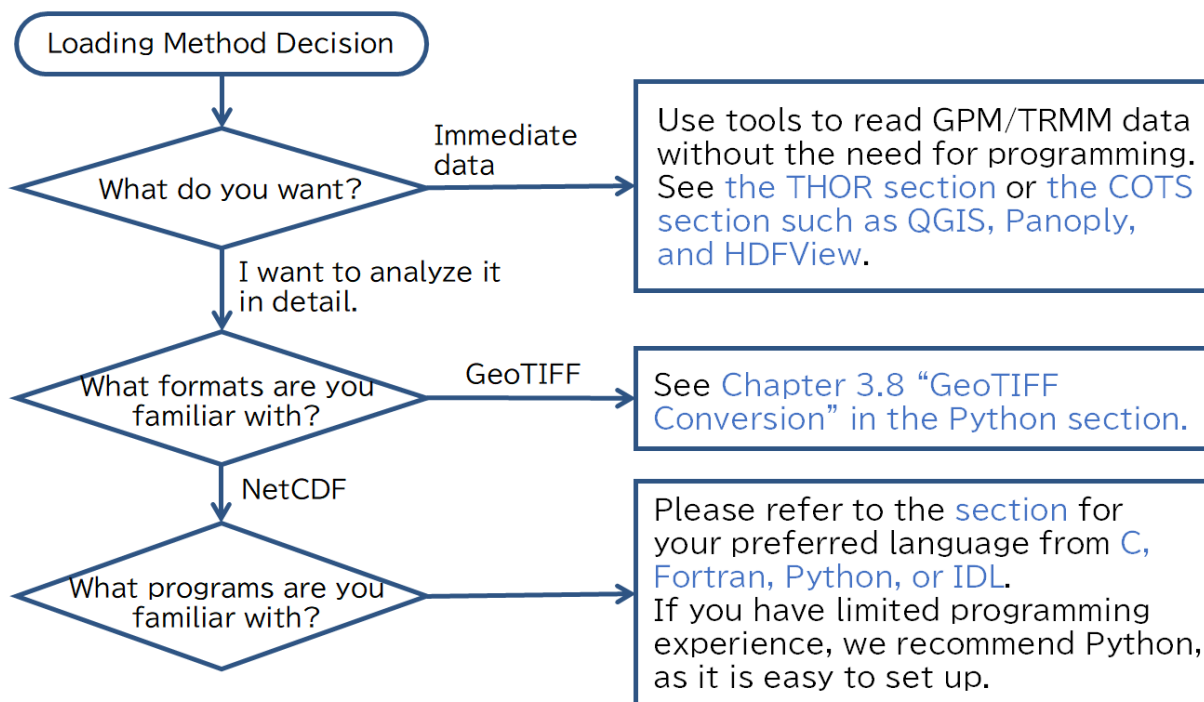


Table 1.2 Sample Program Operation Check Table

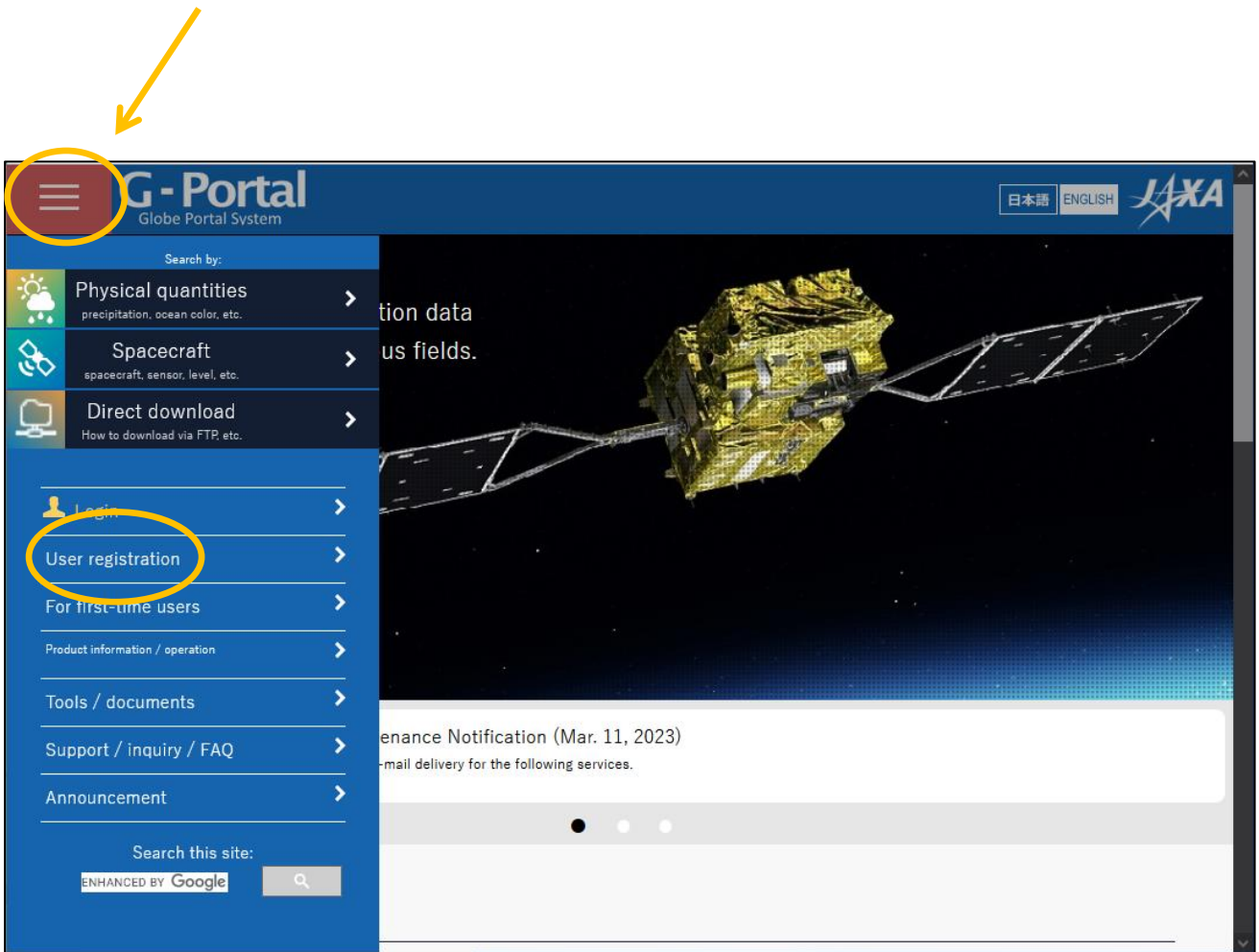
	sample program	Linux	Windows	remarks
1	c	○	-	
2	FORTRAN	○	-	
3	Python	○	○	
4	IDL	○	○	

○ : Operation is confirmed. - : Operation is unconfirmed.

2. how to obtain GPM/TRMM data

GPM/TRMM data can be obtained from the G-Portal site (<https://www.gportal.jaxa.jp/gp/top.html>). User registration is required to obtain the data. Please select "User Registration/Terms of Use" from the menu at the top of the G-Portal site to register as a user.

Click here to view menu



Read the terms and conditions and click "Agree and Next."

The screenshot shows the G-Portal registration interface. At the top, there is a blue header with the G-Portal logo and the text "Globe Portal System". To the right of the header are language selection buttons for "日本語" and "ENGLISH", and the JAXA logo. Below the header is a progress indicator with five steps: 1. Terms of Use, 2. Enter registration information, 3. Confirm registration information, 4. Temporary registration completed, and 5. Registration completed. Step 1 is currently active.

The main content area is titled "User Registration STEP1/5: G-Portal Terms of Use". Below the title, a message states: "You need to register as a user to download products from G-Portal. Please read and accept the following terms and proceed to the next step:"

The "Terms of Use" section is displayed in a scrollable box. It begins with "G-Portal Terms of Use" and states: "G-Portal is a free service providing data of spaceborne sensors that Japan Aerospace Exploration Agency (JAXA) has developed/involved. This Terms of Use states the terms and conditions under which you may use G-Portal. [JAXA Site Policy](#) is applied to the matter which is not specified in this Terms of Use. Please read carefully and make sure you accept this Terms of Use before using G-Portal. In order to use G-Portal, the user must agree to this Terms of Use. You can accept the Terms by clicking to agree to this Terms of Use, where this option is made available to the user by JAXA; or by actually using the services. In the latter case, the user understands and agrees that JAXA will treat the user's use of G-Portal as acceptance of the Terms of Use from that point onwards."

Section 1, "User Registration", explains that a user account and password are required for login. It lists the required information: a username, a valid e-mail address, the name of a user's affiliation, country or region of a user, and a user's purpose of use. It also notes that for security reasons, G-Portal requires a valid e-mail address that identifies the user's affiliation (e.g., @jaxa.jp, @XX.edu, @companyname.com, or @XX.org). It states that using free email services like Gmail or Yahoo may prevent the user from completing registration or receiving emails from G-Portal.

At the bottom of the scrollable box, there is a checkbox labeled "I agree to the above terms of service". Below the scrollable box, there are two buttons: "I Agree - Continue" and "Do Not Agree".

You will be taken to the user registration screen.

G-Portal
Globe Portal System

日本語 ENGLISH JAXA

1 Terms of Use 2 Enter registration information 3 Confirm registration information 4 Temporary registration completed 5 Registration completed

User Registration STEP2/5: G-Portal Registering User Information

Please complete all the following items and press "Confirm Registration Information":

User account (Required):

Password (Required) ⓘ :

Password (reconfirm) (Required):

Name (Required):

Email address (Required) ⓘ :

Email address (reconfirm) (Required):

Organization:

Department:

Country:

Language (Required) ⓘ : Japanese English

Analysis

Algorithm Development

Data Validation

Applied Research

Education

Calibration

Order-made

Other

Purpose (Required):

Email Delivery Preference (Required) ⓘ : By order By preparation

***Handling of email addresses**

On this site, we strongly recommend using your corporate or institutional mail address (such as @jaxa.jp), to ensure you receive URL information of ordered products and user registration. If you do not receive such email, or if you receive an unexpected email, please contact the Support Desk. If you use a free email address (like @gmail.com, icloud.com) or private email, our email may not reach you.

***Be aware of phishing scams**

Avoid filling out forms contained in email messages that request personal information. We will never send any email requesting your user account or password.

Next

Cancel

For the subsequent procedures and how to obtain data after user registration, please refer to "5.2 How to Use the Data Providing Service" in the "GPM Data Users Handbook. For information on how to obtain the "GPM Data Users Handbook," please refer to "3.

3. how to obtain related documents and sample programs

There are two types of documents related to GPM/TRMM data: documents related to data use and documents related to products. Both documents can be downloaded from the GPM website (<https://www.eorc.jaxa.jp/GPM/index.html>). You can also download the sample codes described in this document from Top Page > Data Utilization

Documentation for GPM data use includes

GPM Data Application Handbook

file naming convention

The image shows two screenshots of the GPM website. The top screenshot is the 'Archives' page, which features a navigation menu with 'Archives' selected. Below the menu, there are several buttons for different data products, including 'TRMM/GPM V08'. The main content area is titled 'TRMM/GPM Products (Version08)' and contains a table with columns for 'TRMM' and 'GPM' products. The bottom screenshot is the 'Data Utilization' page, which has 'Data Utilization' selected in the navigation menu. It features a 'Data Download' section with a link to 'GPM products "G-Portal Earth observation satellite data providing system"' and a 'Data Utilization' section with links to 'Data Utilization Handbook', 'Documents related to products are here', 'Papers related to products are here', 'GSMaP Guidelines (PDF)', and 'GSMaP Guidelines slide (ppt)'.

		TRMM	GPM	
	PR/DPR L1B	V08	V08	2026/03/01-current V08
	PR/DPR L2/L3	V08	V08	2026/03/01-current V08
	SLH	V08	V08	2026/03/01-current V08
NASA	PR/DPR comb.(CSH)	V08	V08	---
	VIRS/TMI/GMI	V08	V08	---

Click "TRMM/GPM V08" to see the list of documents for product version 08.

The products, programs, and sample data described in this document are as follows

Table 3.1 List of Sample Programs

product	sample program	sample data
L2DPR	sample_L2_DPR_IDL.pro	GPMCOR_DPR_2604010211_0345_068594_L2S_DD2_08A.nc
L3DPR	sample_L3_DPR_IDL.pro	GPMCOR_DPR_2603_M_L3S_D3M_08A.nc

4. installation of library tools

When reading GPM/TRMM data in IDL, you only need to install IDL itself.

No installation of related libraries is required.

This manual has been tested in the following environments

Table 4.2 Operating Environment

(data) item	environment
calculator	Intel(R) Xeon(R) CPU E5-2665 0 @ 2.40GHz
OS	AlmaLinux release 8.8
IDL	Version 8.8.1

5. GPM/TRMM data read (IDL)

IDL (Interactive Data Language) is a programming language for data analysis commonly used in scientific and technical computing.

5.1 L2 data reading

5.1.1 Source Programs

The following is an example program that reads L2DPR. It reads the data Latitude, Longitude, and precipRateESurface from the NetCDF file specified by fnL2.

```

PRO sample_L2_DPR_IDL

  fnL2 = '../data/GPM/DPR/GPMCOR_DPR_2604010211_0345_068594_L2S_DD2_08A.nc'

  print, ' '
  print, '+ Input file name +'
  print, fnL2

;Read Dataset Sample
  fileID = H5F_OPEN(fnL2)

  dataSetLat = '/FS/Latitude'

  dataSetID = H5D_OPEN(fileID, dataSetLat )
  Latitude = H5D_READ(dataSetID)
  H5D_CLOSE, dataSetID

  dataSetLon = '/FS/Longitude'
  dataSetID = H5D_OPEN(fileID, dataSetLon )
  Longitude = H5D_READ(dataSetID)
  H5D_CLOSE, dataSetID

  dataSetName = '/FS/SLV/precipRateESurface'
  dataSetID = H5D_OPEN(fileID, dataSetName )
  precipRateESurface = H5D_READ(dataSetID)
  H5D_CLOSE, dataSetID

  H5F_CLOSE, fileID

;Confirmation
  print, ' '
  print, '+ Dataset +'
  for i=40,48 do begin
    print, 'Lat=',Latitude[i,5221],' Lon=',Longitude[i,5221],'
precipRateESurface=',precipRateESurface[i,5221]
  endfor

END

```

NetCDF file name.

Open NetCDF file.

Open data sets.
fileID: fileID obtained by H5F_OPEN
dataSetLat: Specify the name of data to be read.

Data set readout
dataSetID: dataSetID obtained by H5D_OPEN

Data Set Close

NetCDF file close

A portion of the data is output to confirm that it is read correctly.

5.1.2 Execution results

The following are the results of executing the program described in 5.1.1.

```
$ idl
IDL 8.8.1 (linux x86_64 m64).
(c) 2021, Harris Geospatial Solutions, Inc.
Licensed for use by: Japan Aerospace Exploration Agency (JAXA)
License: 702602

IDL> .run sample_L2_DPR_IDL.pro
% Compiled module: SAMPLE_L2_DPR_IDL.
IDL> sample_L2_DPR_IDL

+ Input file name +
../data/GPM/DPR/GPMCOR_DPR_2604010211_0345_068594_L2S_DD2_08A.nc
% Loaded DLM: HDF5.

+ Dataset +
Lat=      31.5478  Lon=      133.074  precipRateESurface=      7.51617
Lat=      31.5715  Lon=      133.127  precipRateESurface=      6.02810
Lat=      31.5952  Lon=      133.181  precipRateESurface=      2.18449
Lat=      31.6188  Lon=      133.234  precipRateESurface=      3.46073
Lat=      31.6429  Lon=      133.289  precipRateESurface=      5.81460
Lat=      31.6668  Lon=      133.343  precipRateESurface=      5.65536
Lat=      31.6908  Lon=      133.398  precipRateESurface=      0.930401
Lat=      31.7152  Lon=      133.454  precipRateESurface=      1.93838
Lat=      31.7397  Lon=      133.510  precipRateESurface=      3.58067
IDL>
```

5.2 L3 data reading

5.2.1 Source Programs

The following is an example of an L3DPR reading program, reading data named precipRateESurface from a file specified by fnL3.

```

PRO sample_L3_DPR_IDL

    fnL3 = '../data/GPM/DPR/GPMCOR_DPR_2603_M_L3S_D3M_08A.nc'

    print, ' '
    print, '+ Input file name +'
    print, fnL3

;Read Dataset Sample
    fileID = H5F_OPEN(fnL3)

    dataSetName = '/FS/G1/precipRateESurface/mean'
    dataSetID = H5D_OPEN(fileID, dataSetName)
    precipRateESurface = H5D_READ(dataSetID)

    H5D_CLOSE, dataSetID
    H5F_CLOSE, fileID

;Confirmation
    print, ' '
    print, '+ Dataset +'
    lat = (140.0/28.0) * 14 - 70.0 + (140.0/28.0/2)
    lon = (360.0/72.0) * 63 - 180.0 + (360.0/72.0/2)
    print, 'lat=', lat, ' lon=', lon
    print,
    '/FS/G1/precipRateESurface/mean[14,63,0,0,0]=', precipRateESurface[14,63,0,0,0]

END
    
```

NetCDF file name.

Open NetCDF file.

Open data sets.
fileID: fileID obtained by H5F_OPEN
dataSetName: Specify the name of the data to be read.

Data set readout
dataSetID: dataSetID obtained by H5D_OPEN

Data Set Close

NetCDF file close

A portion of the data is output to confirm that it is read correctly.

5.2.2 Execution results

The following are the results of executing the program described in 5.2.1.

```
IDL 8.8.1 (linux x86_64 m64).
(c) 2021, Harris Geospatial Solutions, Inc.

Licensed for use by: Japan Aerospace Exploration Agency (JAXA)
License: 702602
IDL> .run sample_L3_DPR_IDL.pro
% Compiled module: SAMPLE_L3_DPR_IDL.
IDL> sample_L3_DPR_IDL

+ Input file name +
../data/GPM/DPR/GPMCOR_DPR_2603_M_L3S_D3M_08A.nc
% Loaded DLM: HDF5.

+ Dataset +
lat=      2.50000      lon=      137.500
/FS/G1/precipRateESurface/mean[14,63,0,0,0]=      2.18966
```

6. Revision history

revision history			
version number	Date	Revised contents	remarks
1	Jan 26, 2016		
2	Sep 26, 2016	4. installation of libraries and tools: installation of HDF5 Delete description of	
3	Sep 13, 2017	1. Introduction: python description added to Table 1.1, flowchart revised accordingly. Table 1.2 Sample code operation check table was added. 4. installation of library tools: Table 4.2 Product bar version and PPS Toolkit (TKIO). In Table 4.3 Operating Environment, where it says tkio-3.70.7 Changed to tkio-x.xx.x 4.2.4Edit configuration file: Change "tkio-3.70.7" to "tkio-x.xx.x".	
4	Mar 15, 2018	3. Related documents and sample programs available: Table 3.1 sample program list added.	
5	Feb 5, 2019	1.-3. Correction due to addition of TRMM and renewal of GPM site 5.1, 5.2 Item name change	
6	Dec 6, 2021	1. modified to GSMAp product version 5 and GPM/TRMM product version 7. 3. revised availability of related documentation and sample programs	
7	Dec 24, 2021	Table 3.1 Sample data updated to V7 6 Corrected code description to match V7	
8	Feb 21, 2022	5.1, 5.2 lat/lon display added. Corrected errors. 5.5 Add GSMAp_NetCDF data display	
9	Jun 1, 2026	Table 3.1 Sample data updated to V8 Corrected code description to match V8 and NetCDF	

Data reading program guide (IDL version)