

GSMaP to RRI: Hourly Rainfall Workflow Guide

Using JAXA GSMaP v8 Satellite Data

Daiki KAKINUMA 2026.8

GSMaP_to_RRI_Colab.ipynb	: Python Program
GSMaP_to_RRI_User_Manual.md	: User manual in English
GSMaP_to_RRI_ユーザーマニュアル.md	: User manual in Japanese
User_Guide.pptx	: This slide
Registration of GEE.pdf	: How to register for Google Earth Engine

Overview



Basin-Independent

The program automatically clips to your target basin. It calculates grid dimensions and spatial boundaries from your uploaded **adem.txt** elevation file, with no hardcoded coordinates.



Satellite-Driven

Uses the **JAXA GSMaP Gauge v8** operational dataset. It automatically pulls gauge-adjusted **hourly** precipitation rates (mm/hour) at a native 0.1-degree spatial resolution.



Zero local setup

Runs entirely in the cloud via Google Colab. User do not need local GIS software, Python environments, database installations, or expensive Google Earth Engine service account keys.

Workflow

STEP 1

Configure

Input your Earth Engine Project ID. Define the simulation start and end date-times strictly in **UTC** (minutes set to 00).

※For instructions on how to create an ID, refer to a different document.

STEP 2

Upload

Upload **adem.txt** (mandatory ESRI ASCII elevation file) and **RRI_Input.txt** (optional configuration file).

STEP 3

Authenticate

Run the authentication cell, follow the popup window to log into your Google account, and grant Earth Engine permissions.

STEP 4

Run & Download

Execute the final cell, monitor the live progress bar (ETA, processing speed), and download the output ZIP archive.

Outputs

RRI MODEL INPUTS

- **rain.dat**

The formatted hourly rainfall input containing GSMaP rain grids matched to RRI requirements.

- **RRI_Input_GSMaP.txt**

Updated copy of your uploaded RRI settings file. Automatically updates line 3, 10, 14-15, and 16 (0.1 grid size).

QUALITY CONTROL

- **rain_hourly_statistics.csv**

Contains minimum, maximum, and mean rainfall stats for each processed hour to ensure data looks reasonable.

- **rain_metadata.json**

Logs selected Google Earth Engine collection, band, coordinates, hours, and data retrieval timestamps.

VALIDATION

- **validation.txt**

Automated file check output verifying structural integrity and passing/failing the output formatting.

- **RRI_rain_settings.txt**

Standalone configuration values for lines 10 and 14-16 of RRI_Input.txt for manual reference.

Three Important Rules Ensure Safety and Reproducibility in Analyses

01 | Dates and Times are Strictly in UTC

Google Colab does not convert time zones based on your PC or local country. Trainees must convert local time-series to UTC before inputting start and end hours.

(Please note that the rainfall data you created is in UTC when using it. For example, to ensure consistency with local data.)

02 | Data Gaps DO NOT Default to Zero

By default, processing terminates if any GSMaP pixel or hour is unavailable to prevent silent errors. Zero substitution must only be enabled with clear scientific justification.

03 | Each User Brings Their Own Project ID

The program is fully basin-independent and contains no shared publisher project IDs or service account credentials. User register and enter their own Cloud Project IDs.