GSMaP RIKEN Nowcast (GSMaP_RNC)
Data Format Description

This document describes data format and information of Global Satellite Mapping of Precipitation (GSMaP) RIKEN Nowcast provided by RIKEN Data Assimilation Research Team (DA team) and distributed from JAXA.

The RIKEN DA Team performs cutting-edge research on weather forecasting by integrating computer simulations and observation data. Details of the technique are described in following paper.


Based on Otsuka et al. (2016)’s technique, they developed a precipitation nowcasting system that provides precipitation forecasts. Operation of the nowcast system involves hourly updates and accuracy verification, and results are used for research purposes.

NOTE:
Please note that the weather forecasts on this website can differ from weather forecasts provided by the Japan Meteorological Agency (JMA). Please give precedence to the latest warnings and advisories from the JMA.

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RIKEN acquired the weather forecasting license from the JMA for the area surrounding Japan defined by 0-60°N and 100-180°E, and provide the precipitation forecasts from 10 am to 5 pm on weekdays. Areas on the map shaded in gray indicate out-of-service locations.
Earth Observation Research Center (EORC), Japan Aerospace Exploration Agency (JAXA)

Product Overview

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter [unit]</th>
<th>Data format</th>
<th>Coverage</th>
<th>Grid size</th>
<th>Horizontal resolution</th>
<th>Temporal resolution</th>
<th>FTP directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hourly Rain Rate [mm/h] (masked)</td>
<td>4-byte float, plain binary, little-endian</td>
<td>Global (60°N-60°S)</td>
<td>3600 x 1200 x 13</td>
<td>0.1 degree grid box</td>
<td>Hourly</td>
<td>/riken_nowcast/masked/YYYY/MM/DD/</td>
</tr>
<tr>
<td>2</td>
<td>Hourly Rain Rate [mm/h] (raw)</td>
<td>/riken_nowcast/ra w/YYYY/MM/DD/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Summary of GSMaP_RNC Products

Note: YYYY: 4-digit year, MM: 2-digit month, DD: 2-digit day, and VV: 2-digit Algorithm version

There are 13 layers in one file, which consist of the initial value (preprocessed GSMaP_NRT) and 12-hour forecast data.

The “masked” data are produced operationally, and the “raw” data are produced after checks of the East Asia-Pacific area by the Riken/AICS according to the Japanese domestic law.

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1. Hourly Rainfall and Flag Files in Binary

1.1. Basic Information

Temporal resolution: 1 hour (hourly data)
Grid resolution: 0.1 degrees latitude/longitude grid (10km at the equator).
Latitude and longitude of the first grid [1, 1] is [59.95°N, 0.05°E].
Domain: Global (60°N-60°S)
Data latency: 6 hours after observation (masked)
about 7 hours after observation (raw)

1.2. FTP Directory Information

Hourly Rain Rate data;
masked: /riken_nowcast/masked/YYYY/MM/DD/
raw: /riken_nowcast/raw/YYYY/MM/DD/

where;
YYYY: 4-digit year;
MM: 2-digit month;
DD: 2-digit day; and

1.3. File Naming Rules

Data and flag files are named according to the following rules;

Hourly Rain Rate data (masked and raw): gsmap_rnc.YYYYMMDD.HHNN.dat

where;
Earth Observation Research Center (EORC), Japan Aerospace Exploration Agency (JAXA)

YYYY: 4-digit year;
MM: 2-digit month;
DD: 2-digit day;
HH: 2-digit hour; and
NN: 2-digit minute (currently fixed as 00).

1.4. Data Format
All binary files are produced in little-endian byte order platform, and archived with compressed using “gzip”. Grid of those files consists of 3600 rows x 1200 lines, which are longitude-latitude elements corresponding to a 0.1 x 0.1 degree grid that covers the global region from 60°N to 60°S. The center longitude and latitude of the first pixel [1, 1] (left top corner) are [0.05°E, 59.95°N] (Figure 1).

1.5. Stored Values of Hourly Rain Rate
“Hourly Rain Rate” data are stored in 4-byte float plain binary format. Unit is [mm/hr]. Negative value denotes missing in observation data or no retrieval was done in microwave retrieval algorithm. Detailed description for missing data is shown in Table 2.

Table 2 Stored Values of Hourly Rain Rate

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(positive)</td>
<td>Hourly rain rate [mm/hr].</td>
</tr>
<tr>
<td>−999</td>
<td>Masked due to no-check of the East Asia-Pacific area by the Riken/AICS</td>
</tr>
</tbody>
</table>

1.6. File Size
Approximately 10Mbyte (with gzip), and 221 Mbyte (uncompress) for each file.
2. Algorithm and references

2.1. Algorithm

The dataset of GSMaP RNC has been developed by RIKEN DA Team. Details of the forecasting system are described in following paper.


GSMaP_RNC algorithm uses the dataset of “Global Rainfall Map in Near Real Time”. Details of the latest GSMaP algorithm are described in following documents and references in Section 2.2.


2.2. References

Papers describing the GSMaP project and algorithm are as follows.

(About GSMaP project)


(About microwave imager algorithm)


(About microwave sounder algorithm)


(About microwave imager/sounder algorithm)


(About microwave-IR combined algorithm)


(About NRT system)


Additional related papers are listed on the JST/CREST GSMaP Project Website


3. Contact

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