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Service Change Notice 22-112 Updated
National Weather Service Headquarters Silver Spring MD
230 PM EST Mon Jan 30 2023

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From: Ajay Mehta
 Director, NWS Office of Observations

Subject: Updated: Activation of GOES-R Geostationary Lightning Mapper
 Gridded Data Products on the Satellite Broadcast Network on or
 after March 6, 2023

Updated to make three changes to SCN 22-112 issued on November 22, 2022:
Added guidance for handling the GLMFDSTAT files; clarified the extent of
geographic coverage and tiling scheme; and revised the estimated file
counts and data volumes.

On or after March 6, 2023, gridded data products from the GOES-East and
GOES-West Geostationary Lightning Mapper (GLM) instruments will become
available on the NWS Satellite Broadcast Network (SBN), channels GRE & GRW
respectively (Ports 1209, 1210 / PIDs 107, 108).

For each 2x2km cell in the GOES-East or GOES-West fixed-grid coordinate
system, these data products estimate the following three parameters every
minute:

| Field Name | Units / Semantics |
|----------------------------|-------------------------------------|
| Flash Extent Density (FED) | Flashes per minute |
| Minimum Flash Area (MFA) | Square kilometer (km ²) |
| Total Optical Energy (TOE) | nanoJoules (nJ = 1e-9 Joules) |

GLM detects lightning over an area slightly smaller than the Full Disk
observed by the Advanced Baseline Imager (ABI). In particular GLM
detections extend only to 55 degrees North latitude, thus omitting
northern Canada and nearly all of Alaska.

The gridded GLM products are tiled into rectangles numbered 000-061 and
labeled "PAA" through "PCJ", as depicted below:

| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 000 | 001 | 002 | 003 | | PAA | PAB | PAC | PAD | | | |
| 004 | 005 | 006 | 007 | 008 | 009 | PAE | PAF | PAG | PAH | PAI | PAJ |
| 010 | 011 | 012 | 013 | 014 | 015 | PAK | PAL | PAM | PAN | PAO | PAP |
| 016 | 017 | 018 | 019 | 020 | 021 | PAQ | PAR | PAS | PAT | PAU | PAV |
| 022 | 023 | 024 | 025 | 026 | 027 | PAW | PAX | PAY | PAZ | PBA | PBB |
| 028 | 029 | 030 | 031 | 032 | 033 | PBC | PBD | PBE | PBF | PBG | PBH |
| 034 | 035 | 036 | 037 | 038 | 039 | PBI | PBJ | PBK | PBL | PBM | PBN |
| 040 | 041 | 042 | 043 | 044 | 045 | PBO | PBP | PBQ | PBR | PBS | PBT |
| 046 | 047 | 048 | 049 | 050 | 051 | PBU | PBV | PBW | PBX | PBY | PBZ |
| 052 | 053 | 054 | 055 | 056 | 057 | PCA | PCB | PCC | PCD | PCE | PCF |
| 058 | 059 | 060 | 061 | | | PCG | PCH | PCI | PCJ | | |

Both GOES-East and GOES-West gridded GLM products use this tiling scheme. Tile numbers (000-061), defined by the GOES-R Ground System, appear within the files; the corresponding tile labels (PAA-PCJ) appear in WMO headers. (See details below.)

These lightning products follow a "punctured" tiling scheme: in each minute, only tiles with at least one lightning flash detected (i.e. tiles with content) are produced. Thus in each minute, many fewer than 62 tiles are produced.

(In each minute, a separate "GLMFDSTAT" file is also produced for each satellite, listing which gridded GLM tiles were produced in that minute. This file is not needed to handle the 1-minute tiles; but may be used to aggregate lightning activity, e.g., every 5 or 30 minutes. GLMFDSTAT files are labeled "PZZ" in WMO headers to distinguish them from the gridded GLM data tiles.)

Each tile's rows and columns are defined in geostationary sensor coordinates (i.e., view angles); each file includes the projection details needed to transform these sensor coordinates into longitude and latitude positions on the earth.

Further details on these gridded GLM products are available from the University of Maryland (<https://lightning.umd.edu/glm/>) and the NOAA Virtual Lab (<https://vlab.noaa.gov/web/towr-s/glm> - including explanatory graphics and links to sample files).

The gridded GLM products (data tiles and GLMFDSTAT files) have the following WMO headers, SBN channels, cadence, file counts, and data volumes:

| Satellite | WMO header | SBN Channel | Cadence | Files/day* | GB/day* |
|-----------|-------------|-------------|---------|------------|---------|
| ----- | ----- | ----- | ----- | ----- | ----- |
| GOES-East | TIRS00 KNES | GRE | 1 min. | 25,640 | 2.09 |
| GOES-West | TIRT00 KNES | GRW | 1 min. | 12,040 | 0.91 |

(* These numbers are approximate and will vary with weather conditions, due to data compression and the "punctured" tiling scheme detailed above.)

The WMO headers listed above are followed by labels "PAA" through "PCJ" (for data tiles) or "PZZ" (for GLMFDSTAT files). Thus the full WMO headers for gridded GLM have the following patterns:

TIRS00 KNES DDhhmm Pxx (GOES-East)

TIRT00 KNES DDhhmm Pxx (GOES-West)

(where Pxx: PAA - PCJ for tiles; PZZ for GLMFDSTAT files)

To ingest and display the gridded GLM data products, SBN receiving sites will need to configure their systems to receive and handle the gridded GLM data and the GLMFDSTAT files, and to distinguish them from each other and from ABI Full Disk imagery (which uses similar WMO headers).

Critical weather or other factors may affect the timing of this change on the SBN.

For questions pertaining to these changes, please contact:

NOAA/NWS Office of Observations
Silver Spring, MD
Email: nws-obs-satellites@noaa.gov

or

AWIPS Network Control Facility (NCF) Help Desk
NOAA/NWS Office of Central Processing
Silver Spring, MD
Phone: 888-808-8624

For questions regarding the content or distribution of the products listed here please contact:

Stephen Superczynski
GOES-R User Services Coordinator
Greenbelt, Maryland
Email: stephen.superczynski@noaa.gov

National Service Change Notices are online at:

<https://www.weather.gov/notification/>

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