GPM/GMI
Level-2/3 Product Format

Version 2.0

May 9th, 2017

Japan Aerospace Exploration Agency

Revision history

revision	date	section	content, reason
Version 1.0	Sept. 2nd 2014	ALL	New
Version 2.0	May. 9th 2017	Chapter 1	Reflect the format change of 2AGPROFGMI due to GPM Version 5 update.

Reference

(1) PRECIPITATION PROCESSING SYSTEM GLOBAL PRECIPITATION MEASUREMENT “File Specification for GPM Products”

(2) PRECIPITATION PROCESSING SYSTEM GLOBAL PRECIPITATION MEASUREMENT “Metadata for GPM Products”

Contents

1. 2AGPROFGMI – Radiometer Profiling

1.1. Data Format Structure

1.1.1. Dimension definition

Dimension definitions:

- nsan
  - var Number of scans in the granule.
- npixel
  - 221 Number of pixels in each scan.
- nspecies
  - 5 Number hydrometer species.
    Species are defined in speciesDescrition in the DataHeader group.
- sddim
  - 21 Number of characters in each species description.
- ntemps
  - 12 Number of profile temperature indeces.
    Indeces are defined in temperatureDescriptions in the DataHeader group.
- nlyrs
  - 28 Number of profiling layers.
    The top height of each layer is defined in hgtTopLayer in the DataHeader group.
- nprf
  - 80 Number of unique profiles for each species and 2 meter Temperature index.

1.1.2. Data Format Structure for 2AGPROFGMI – Radiometer Profiling

2AGPROFGMI, ”Radiometer Profiling”, generates surface rainfall and vertical hydrometeor profiles on a pixel by pixel basis from radiometer brightness temperature data using the Goddard Profiling algorithm GPROF2014. Because the vertical information comes from a radiometer, it is not written out in independent vertical layers like the TRMM Precipitation Radar. Instead, the output is referenced to one of 80 typical structures for each hydrometeor or heating profile. These vertical structures are referenced to as profiles in the output structure. Vertical hydrometeor profiles can be reconstructed to 28 layers by knowing the profile number (i.e. shape) of the profile and a scale factor that is written for each pixel.

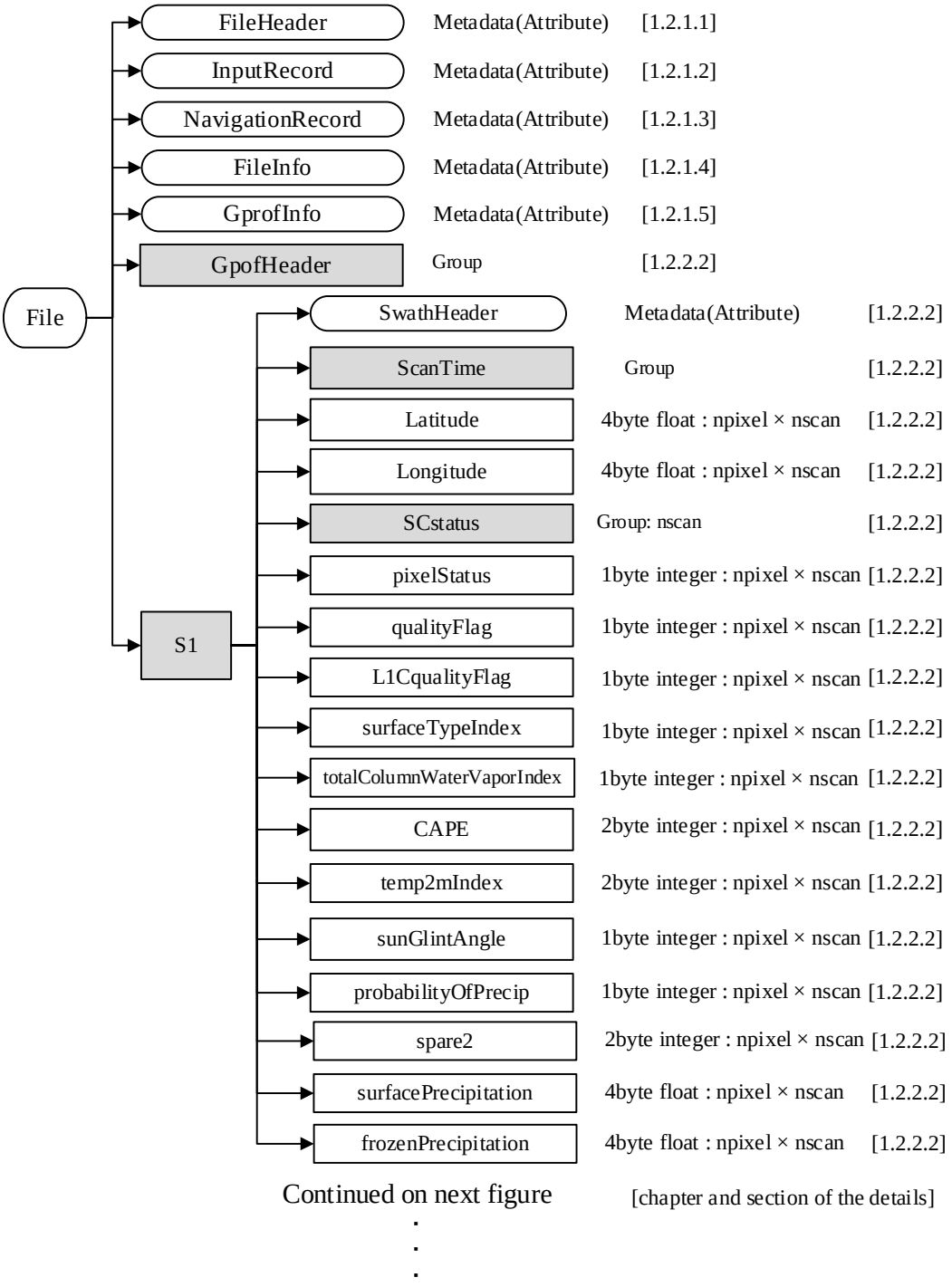

Figure 1.1-1 Data Format Structure for 2AGPROFGMI – Radiometer Profiling

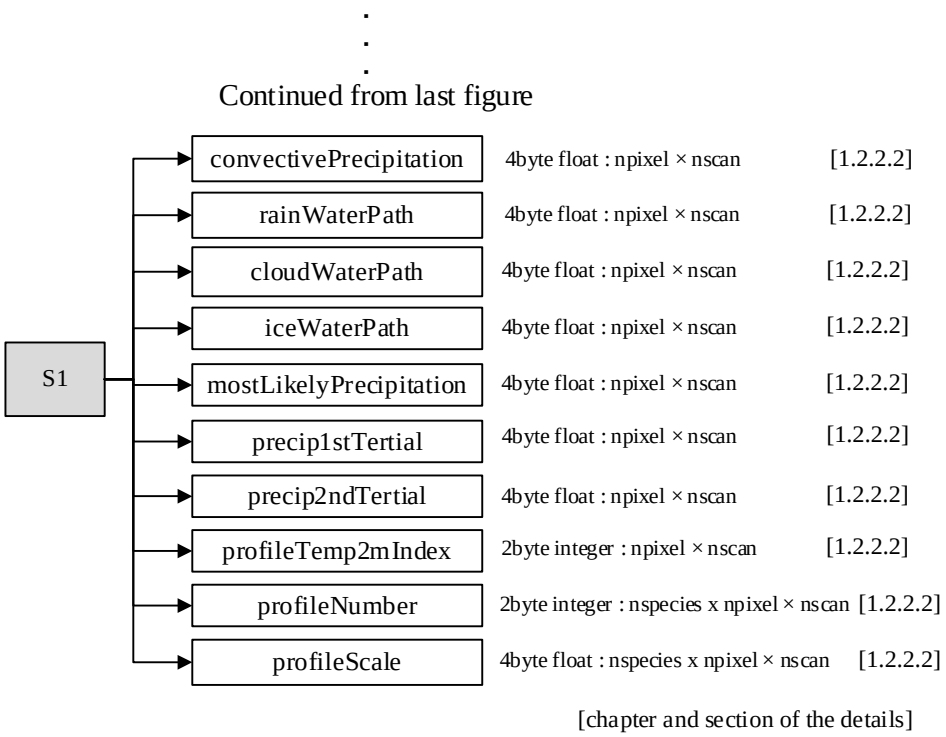

Figure 1.1-2 Data Format Structure for 2AGPROFGMI – Radiometer Profiling

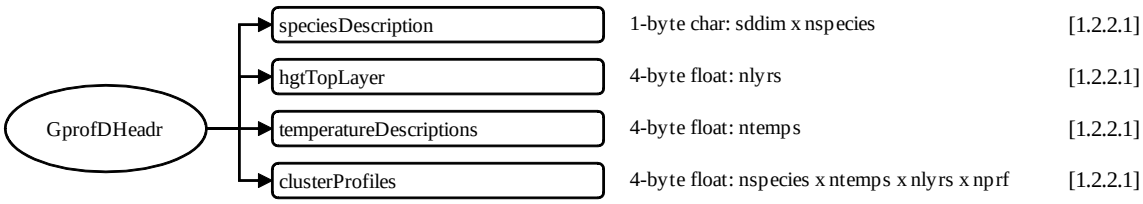

Figure 1.1-3 Data Format Structure for 2AGPROFGMI – GprofDHeader

1.1.3. Data Format Structure for each Group

1.1.3.1 Data Format Structure for S1 Group

S1 Group's structure is shown in this section.

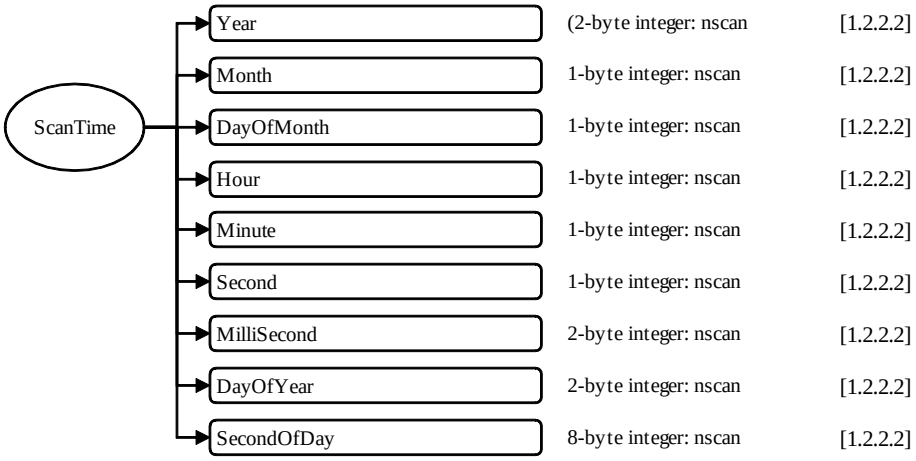

Figure 1.1-4 Data Format Structure for 2AGPROFGMI, ScanTime

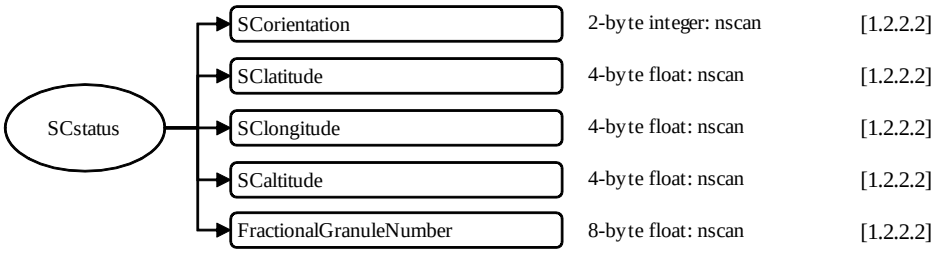

Figure 1.1-5 Data Format Structure for 2AGPROFGMI, SCstatus

1.2. Contents of objects in each Group

1.2.1. Metadata

1.2.1.1 FileHeader

FileHeader contains metadata of general interest. Table 1.2-1 shows each metadata elements in FileHeader.

Table 1.2-1 FileHeader Group

Metadata Element	Estimated Size (bytes)	Description
DOI	256	Digital Object Identifier *Value is blank currently.
DOIauthority	256	Digital Object Identifier Authority.
DOIshortName	256	Digital Object Identifier Short Name. *Value is blank currently.
AlgorithmID	50	The algorithm that generated this product, e.g., 2A12.
AlgorithmVersion	50	The version of the algorithm that generated this product.
FileName	50	The file name of this granule.
SatelliteName	10	Values are: TRMM GPM MULTI F10 ... F18 AQUA GCOMW1 CORIOLIS MT1 NOAA15 ... NOAA19 METOPANPP. More values will be added as they are known.
InstrumentName	10	Values are: PR TMI VIRS PRTMI KU KA DPR GMI DPRGMI MERGED SSMI SSMIS AMSRE AMSR2 WIND-SAT MADRAS AMSUA AMSUB SAPHIR MHS ATMS. More values will be added as they are known.
GenerationDateTime	50	The date and time this granule was generated. The format is YYYY-MM-DDTHH:MM:SS.sssZ, where YYYY is 4-digit year, MM is month number, DD is day of month, T is ”T”, HH is hour, MM is minute, SS is second, sss is millisecond, and Z is ”Z”. All fields are zero-filled. The missing value is constructed by replacing all digits with 9, i.e., 9999-99-99T99:99:99.999Z
StartGranuleDateTime	50	The start time defining this granule. The format is the same as GenerationDateTime. DETAILS: An orbital granule starts when the satellite is at the position defined by GranuleStart. Thus the start time is not the first scan time. Some algorithms have overlap scans in the file before the start time as defined is swathHeader. A monthly granule starts on the first ms of the month, for example March 1998 would be 1998-03-01T00:00:00.000Z
StopGranuleDateTime	50	The stop time defining this granule. The format is the same as GenerationDateTime. DETAILS: An orbital granule stops when the satellite is at the position defined by GranuleStart. Thus the stop time is not the last scan time. Some algorithms have overlap scans in the file after the stop time as defined in SwathHeader. A monthly granule stops on the last ms of the month, for example March 1998 would be 1998-03-31T23:59:59.999Z
GranuleNumber	50	The number of this granule, which starts as in GranuleStart. If the GranuleStart is identical to the orbit start, then the GranuleNumber will be the same as the orbit number. The GranuleNumber will have 6 digits, including leading zeroes, for example 001234.
NumberOfSwaths	50	The number of swaths in this granule.
NumberOfGrids	50	The number of grid structures in this granule.
GranuleStart	50	The starting place in the orbit of this granule. Currently defined values are ”SOUTHERNMOST LATITUDE” and ”NORTHBOUND EQUATOR CROSSING”.
TimeInterval	50	The time interval covered by this granule. Values are ”ORBIT”, ”HALF ORBIT”, ”HALF HOUR”, ”HOUR”, ”3 HOUR”, ”DAY”, ”MONTH”, ”CONTACT”.

Metadata Element	Estimated Size (bytes)	Description
ProcessingSystem	50	The name of the processing system, e.g., ”PPS”, ”JAXA”.
ProductVersion	50	The data version assigned by the processing system.
EmptyGranule	50	Whether a granule is empty. Values are ”EMPTY” or ”NOT EMPTY”.
MissingData	50	The number of missing scans.

1.2.1.2 InputRecord

InputRecord contains a record of input files for this granule. Table 1.2-2 shows each metadata elements in InputRecord.

Table 1.2-2 InputRecord Group

Metadata Element	Estimated Size (bytes)	Description
InputFileName	1000	A list of input file names for this granule.
InputAlgorithmVersion	1000	A list of algorithm versions of the input files for this granule.
InputGenerationDatteTimes	1000	A list of generation date times of the input files for this granule. The format is the same as GenerationDateTime.

1.2.1.3 NavigationRecord

NavigationRecord contains navigation metadata for this granule. Table 1.2-3 shows each metadata elements in NavigationRecord.

Table 1.2-3 NavigationRecord Group

Metadata Element	Estimated Size (bytes)	Description
LongitudeOnEquator	50	The longitude where the satellite crosses the equator going from south to north.
UTCDateTimeOnEquator	50	The UTC time when the satellite crosses the equator going from south to north. The format is the same as GenerationDate Time.
MeansolarBetaAngle	50	The average solar beta angle in this granule.
EphemerisFileName	50	Name of the ephemeris file input for processing.
AttitudeFileName	50	Name of the attitude file input for processing.
GeoControlFileName	50	Name of the GeoTK Control Parameters File input for processing.
EphemerisSource	50	Values are ”0 CONSTANT INPUT TEST VALUE”, ”1 GROUND ESTIMATED STATE (GES)”, ”2 GPS FILTERED SOLUTION (GEONS)”, ”3 GPS POINT SOLUTION (PVT)”, ”4 ON BOARD PROPAGATED (OBP)”, ”5 OEM GROUND EPHEMERIS FILE”, ”6 GEONS WITH FALLBACK AS FLAGGED”, ”7 PVT WITH FALLBACK AS FLAGGED”, ”8 OBP WITH FALLBACK AS FLAGGED”, ”9 GES WITH FALLBACK AS FLAGGED”
AttitudeSource	50	Values are ”0 CONSTANT INPUTS FOR TESTING”, ”1 ON BOARD CALCULATED PITCH ROLL YAW”
GeoToolkitVersion	50	Version of the GeoToolkit
SensorAlignmentFirstRotationAngle	50	Alignment angle, first rotation, in degrees. Rotation adjustment from sensor coordinates to the Attitude Control System Flight Coordinates.
SensorAlignmentSecondRotationAngle	50	Alignment angle, second rotation, in degrees.
SensorAlignmentThirdRotationAngle	50	Alignment angle, third rotation, in degrees.

Metadata Element	Estimated Size (bytes)	Description
SensorAlignmentFirstRotationAxis	50	Euler rotation sequence, first rotation axis. Values are ”1”, ”2”, ”3” (representing X, Y, Z).
SensorAlignmentSecondRotationAxis	50	Euler rotation sequence, second rotation axis. Values are ”1”, ”2”, ”3” (representing X, Y, Z).
SensorAlignmentThirdRotationAxis	50	Euler rotation sequence, third rotation axis. Values are ”1”, ”2”, ”3” (representing X, Y, Z).

1.2.1.4 FileInfo

FileInfo contains metadata used by the PPS I/O Toolkit. Table 1.2-4 shows each metadata elements in FileInfo.

Table 1.2-4 FileInfo Group

Metadata Element	Estimated Size (bytes)	Description
DataFormatVersion	50	The version of the data format used to write this file. This version is separate for each AlgorithmID. The order is: ”a” ”b” ... ”z” ”aa” ”ab” ... ”az” ”ba” ”bb” ...
TKCodeBuildVersion	50	Usually TK CodeBuildVersion is ”1”. If the I/O routines built by TKIO change even though the DataFormatVersion is unchanged, then TK CodeBuildVersion increments to ”2”, ”3”, ... If subsequently DataFormatVersion changes, TKCodeBuildVersion becomes ”1” again.
MetadataVersion	50	The version of metadata used to write this file. This version is separate for each AlgorithmID. The order is: ”a” ”b” ... ”z” ”aa” ”ab” ... ”az” ”ba” ”bb” ...
FormatPackage	50	The underlying format of this granule. Values are ”HDF4”, ”HDF5”, ”NETCDF”, ”TKBINARY”
BlueprintFilename	50	The filename of the primary blueprint file that defined the format used to write this file.
BlueprintVersion	10	The BlueprintVersion of the format definition
TKIOVersion	50	The version of TKIO used to create I/O routines to write this file. TKIOVersion does not define the format used to write this file.
MetadataStyle	50	The style in which the metadata was written, e.g., ”PVL”. ”PVL” means < parameter >=< value >;
EndianType	50	The endian type of the system that wrote this file. Values are ”BIG ENDIAN” and ”LITTLE ENDIAN”.

1.2.1.5 GprofInfo

GprofInfo contains metadata required by Gprof. This group appears in Gprof products. Table 1.2-5 shows each metadata element in this group.

Table 1.2-5 GprofInfo Group

Metadata Element	Estimated Size (bytes)	Description
Satellite	12	Name of satellite.
Sensor	12	Name of sensor.
PreProcessorVersion	12	Version of preprocessor.
PostProcessorVersion	12	Version of postprocessor.
ProfileDatabaseFilename	128	Filename of profile database.
riginalRadiometerFilename	128	Original filename of the radiometer.
ProfileStructureFlag	1	Flag as to whether cluster was computed. If cluster was computed, StructureFlag = 1. If cluster was not computed, StructureFlag = 0 and clusterNumber and clusterScale are set to missing.

1.2.2. Data Group

Elements of data group are explained in detail in this section.

1.2.2.1 GprofDHeader (Group)

(1) speciesDescription (1-byte char, array size: sddim x nspecies)

Description of each species. Special values are defined as:

255 Missing value

(2) hgtTopLayer (4-byte float, array size: nlyrs)

Height of the top of each of 28 atmospheric layers in the clusterProfiles. The tops are every 0.5 km up to 10 km, then every km after that up to 18.0 km. Values are: 0.5, 1.0, ... 9.5, 10.0, 11.0, ... 18.0. Values range from 0 to 18.0 km. Special values are defined as:

-9999.9 Missing value

(3) temperatureDescriptions (4-byte float, array size: ntemps)

Temperature of 2 meter temperature indeces of clusterProfiles. Values are in C. Special values are defined as:

-9999.9 Missing value

(4) clusterProfiles (4-byte float, array size: nspecies x ntemps x nlyrs x nprf)

Standard GPM profile structures. Dimensions are hydrometeor/heating species (5); 2 meter temperature index (12); vertical layers (28); and profile number (80). To recover values in a profile see the description below in the variable profileScale. Special values are defined as:

-9999.9 Missing value

1.2.2.2 S1 (Swath)

(1) SwathHeader (Metadata)

SwathHeader contains metadata for swaths.

Table 1.2-6 SwathHeader Group

Metadata Element	Estimated Size (bytes)	Description
NumberScansInSet	50	The scans read by TKreadScan are a ”set”. For single swath data, one scan is read so NumberScansInSet=1. For multiple swath data, one TKreadScan may read more than one scan. For example, for SSM/I data one TKreadScan reads one low frequency scan and two high frequency scans. Therefore NumberScansInSet=1 for the low frequency swath and NumberScansInSet=2 for the high frequency swath.
MaximumNumberScansTotal	50	The maximum allowed number of total scans in this swath. Total scans = overlap scans before granule + scans in granule + overlap scans after granule.
NumberScansBeforeGranule	50	The number of overlap scans before the first scan of the granule in this swath.
NumberScansGrAnule	50	The number of scans in the granule in this swath.
NumberScansAfterGranule	50	The number of overlap scans after the last scan of the granule in this swath.
NumberPixels	50	The number of IFOV in each scan in this swath.
ScanType	50	The type of scan in this swath. Values are: ”CROSSTRACK” and ”CONICAL”

(2) ScanTime (Group in S1)

A UTC time associated with the scan.

Year (2-byte integer, array size: nscan)

4-digit year, e.g., 1998. Values range from 1950 to 2100 years. Special values are defined as:

-9999 Missing value

Month (1-byte integer, array size: nscan)

Month of the year. Values range from 1 to 12 months. Special values are defined as:

-99 Missing value

DayOfMonth (1-byte integer, array size: nscan)

Day of the month. Values range from 1 to 31 days. Special values are defined as:

-99 Missing value

Hour (1-byte integer, array size: nscan)

UTC hour of the day. Values range from 0 to 23 hours. Special values are defined as:

-99 Missing value

Minute (1-byte integer, array size: nscan)

Minute of the hour. Values range from 0 to 59 minutes. Special values are defined as:

-99 Missing value

Second (1-byte integer, array size: nscan)

Second of the minute. Values range from 0 to 60 s. Special values are defined as:

-99 Missing value

MilliSecond (2-byte integer, array size: nscan)

Thousandths of the second. Values range from 0 to 999 ms. Special values are defined as:

-9999 Missing value

DayOfYear (2-byte integer, array size: nscan)

Day of the year. Values range from 1 to 366 days. Special values are defined as:

-9999 Missing value

SecondOfDay (8-byte float, array size: nscan)

A time associated with the scanTime sec is expressed as the UTC seconds of the day. Values range from 0 to 86400 s. Special values are defined as:

-9999.9 Missing value

Table 1.2-7 ScanTime Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	Year	-9999	1950	2100	[year]	2-byte integer	2 x nscan	2	nscan	1	1
2	Month	-99	1	12	[month]	1-byte integer	1 x nscan	1	nscan	1	1
3	DayOFMonth	-99	1	31	[day]	1-byte integer	1 x nscan	1	nscan	1	1
4	Hour	-99	0	23	[hour]	1-byte integer	1 x nscan	1	nscan	1	1
5	Minute	-99	0	59	[minute]	1-byte integer	1 x nscan	1	nscan	1	1
6	Second	-99	0	60	[s]	1-byte integer	1 x nscan	1	nscan	1	1
7	MilliSecond	-9999	0	999	[ms]	2-byte integer	2 x nscan	2	nscan	1	1
8	DayOfYear	-9999	1	366	[day]	2-byte integer	2 x nscan	2	nscan	1	1
9	SecoundOfDay	-9999.9	0	86400	[s]	8-byte float	8 x nscan	8	nscan	1	1

(3) Latitude(4-byte float, array size: npix1 x nscan)

The earth latitude of the center of the IFOV at the altitude of the earth ellipsoid. Latitude is positive north, negative south. Values range from -90 to 90 degrees. Special values are defined as:

-9999.9 Missing value

Table 1.2-8 Latitude Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	Latitude	-9999.9	-90	90	[degree]	4-byte float	4 x 221 x nscan	4	npix1	nscan	1

(4) Longitude (4-byte float, array size: npix1 x nscan)

The earth longitude of the center of the IFOV at the altitude of the earth ellipsoid. Longitude is positive east, negative west. A point on the 180th meridian has the value -180 degrees. Values range from -180 to 180 degrees. Special values are defined as:

-9999.9 Missing value

Table 1.2-9 Longitude Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	Longitude	-9999.9	-180	180	[degree]	4-byte float	4 x 221 x nscan	4	npix1	nscan	1

(5) SCstatus (Group)

SCorientation (2-byte integer, array size: nscan)

The angle of the spacecraft vector (v) from the satellite forward direction of motion, measured

clockwise facing down. The relationship of v to the sensor geometry is defined in the introduction to this algorithm. Values range from 0 to 360 degrees. Special values are defined as:

-9999 Missing value

SClatitude (4-byte float, array size: nscan)

Values range from -90 to 90 degrees. Special values are defined as:

-9999.9 Missing value

SClongitude (4-byte float, array size: nscan)

Values range from -180 to 180 degrees. Special values are defined as:

-9999.9 Missing value

SCaltitude (4-byte float, array size: nscan)

Values range from 0 to 1000 km. Special values are defined as:

-9999.9 Missing value

FractionalGranuleNumber (8-byte float, array size: nscan)

The floating point granule number. The granule begins at the Southern-most point of the spacecraft's trajectory. For example, FractionalGranuleNumber = 10.5 means the spacecraft is halfway through granule 10 and starting the descending half of the granule. Values range from 0 to 100000. Special values are defined as:

-9999.9 Missing value

Table 1.2-10 SCstatus Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	SCorientation	-9999	0	360	[degree]	2-byte integer	2 x nscan	2	nscan	1	1
2	SClatitude	-9999.9	-90	90	[degree]	4-byte float	4 x nscan	4	nscan	1	1
3	SClongitude	-9999.9	-180	180	[degree]	4-byte float	4 x nscan	4	nscan	1	1
4	SCaltitude	-9999.9	0	100	[km]	4-byte float	4 x nscan	4	nscan	1	1
5	FractionalGranuleNumber	-9999.9	0	100000	-	8-byte float	8 x nscan	8	nscan	1	1

(6) pixelStatus (1-byte integer, array size: npixel x nscan)

If there is no retrieval at a given pixel, pixelStatus explains the reason (Range 0 - 99).

0 Valid pixel
1 Invalid latitude/longitude
2 Channel Tbs out of range
3 Surface code / histogram mismatch
4 Missing TCWV, T2m, or sfccode from preprocessor
5 No Bayesian Solution
-99 Missing value

Table 1.2-11 pixelStatus Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	pixelStatus	-99	0	99	-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(7) qualityFlag (1-byte integer, array size: npixel x nscan)

qualityFlag indicates a generalized quality of the retrieved pixel (Range 0 - 4).

Valid values include:

0 Pixel is "good" and has the highest confidence of the best retrieval.

1 "Use with caution." Pixels can be set to 1 for the following reasons:
- Sunglint is present, RFI, geolocate, warm load or other L1C 'positive value' quality warning flags.
- All sea-ice covered surfaces.
- All snow covered surfaces.
- Sensor channels are missing, but not critical ones.

2 "Use pixel with extreme care over snow covered surface."
This is a special value for snow covered surfaces only.
The pixel is set to 2 if the probability of precipitation is of poor quality or indeterminate. Use these pixels for climatological averaging of precipitation, but not for individual storm scale daily cases.

3 "Use with extreme caution." Pixels are set to 3 if they have channels missing critical to the retrieval, but the choice has been made to continue the retrieval for the pixel.

-99 Missing value

Table 1.2-12 qualityFlag Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	qualityFlag	-99	0	4	-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(8) L1CqualityFlag (1-byte integer, array size: npixel x nscan)

This is the pixel quality from the input L1C data file. Range is -128 to 127.

GENERAL SPECIFICATIONS:

0 = Good data in all channels in the swath

gt 0 = Cautionary warning flags

1-99 = Generic flags (all sensors)
100-127 = Sensor specific flags

lt 0 = Major errors resulting in missing data

-(1-98) = Generic flags (all sensors)
-99 = Missing value (no quality information available)
-(100-127) = Sensor specific flags

DETAILED SPECIFICATIONS:

1 = Possible sunGlint, 0 le sunGlintAngle lt 20

2 = Possible radio frequency interference

3 = Degraded geolocation data

4 = Data corrected for warm load instrusion

-1 = Data is missing from file or unreadable, missing scan

-2 = Invalid Tb or unphysical brightness temperature Tb lt 50 or Tb gt 350

-3 = Error in geolocation

-4 = Data is missing in 1 channel

-5 = Data is missing in multiple channels

-6 = Lat/Lon values are out of range

-7 = Non-normal status modes

-10 = Distance to its corresponding LF pixel exceeds 7Km threshold. Used in L1C-R product only.

-99 = Missing value (no quality information available)

Table 1.2-13 L1CqualityFlag Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	L1CqualityFlag	-99	-128	127	-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(9) surfaceTypeIndex (1-byte integer, array size: npixel x nscan)

Indicates the type of surface (Range 0 - 99).

Codes include

1 : Ocean

2 : Sea-Ice

3-7 : Decreasing vegetation

8-11 : Decreasing snow cover

12 : Standing Water

13 : Land/ocean or water Coast

14 : Sea-ice edge

-99 Missing value

Table 1.2-14 surfaceTypeIndex Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	surfaceTypeIndex	-99	0	99	-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(10) totalColumnWaterVaporIndex (1-byte integer, array size: npixel x nscan)

The integer total precipitable water used to select the correct database profiles. Total-ColumnWaterVaporIndex is the nearest integer value to the model Total Precipitable Water. In the climate Gprof product the ECMWF model is used. In the standard Gprof product the GANAL model is used. In the NRT Gprof product the JMAfcst model is used. Values range from 0 to 78 mm. Special values are defined as:

-99 Missing value

Table 1.2-15 totalColumnWaterVaporIndex Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	totalColumnWaterVaporIndex	-99	0	78	[mm]	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(11) CAPE (2-byte integer, array size: npixel x nscan)

Model derived CAPE index. Values range from 1 to 5. Special values are defined as:

-99 Missing value

Table 1.2-16 CAPE Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	CAPE	-99	1	5	-	2-byte integer	2 x npixel x nscan	2	npixel	nscan	1

(12) temp2mIndex (2-byte integer, array size: npixel x nscan)

The 2 meter temperature Index used to select profiles in the database. Values are in K. Special values are defined as:

-9999 Missing value

Table 1.2-17 temp2mIndex Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	temp2mIndex	-9999	-	-	-	2-byte integer	2 x npixel x nscan	2	npixel	nscan	1

(13) sunGlintAngle (1-byte integer, array size: npixel x nscan)

Conceptually, the angle between the sun and the instrument view direction as reflected off the Earth's surface. sunGlintAngle is the angular separation between the reflected satellite view vector and the sun vector. When sunGlintAngle is zero, the instrument views the center of the specular (mirror-like) sun reflection. If this angle is less than ten degrees, the pixel is affected by sunglint and qualityFlag for the pixel is lowered. Values range from 0 to 127 degrees. Special values are defined as:

-88 Sun below horizon

-99 Missing value

Table 1.2-18 sunGlintAngle Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	sunGlintAngle	-99	0	127	[degree]-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(14) probabilityOfPrecip (1-byte integer, array size: npixel x nscan)

A diagnostic variable, in percent, defining the fraction of raining vs. non-raining Database profiles that make up the final solution. Values range from 0 to 100 percent. Special values are defined as:

-99 Missing value

Table 1.2-19 probabilityOfPrecip Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	probabilityOfPrecip	-99	0	100	-	1-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(15) spare2 (2-byte integer, array size: npixel x nscan)

Spare variable.

Table 1.2-20 spare2 Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	spare2	-	-	-	-	2-byte integer	1 x npixel x nscan	1	npixel	nscan	1

(16) surfacePrecipitation (4-byte float, array size: npixel x nscan)

The instantaneous precipitation rate at the surface. Check pixelStatus for a valid retrieval. Values are in mm/hr. Special values are defined as:.

-9999.9 Missing value

Table 1.2-21 surfacePrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	surfacePrecipitation	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(17) frozenPrecipitation (4-byte float, array size: npixel x nscan)

The instantaneous frozen precipitation rate at the surface. Check pixelStatus for a valid retrieval. Defined from Combined Profiles addition of snow and grauple in the lowest profile level with a rate of fall factor. Values are in mm/hr. Special values are defined as:

-9999.9 Missing value

Table 1.2-22 frozenPrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	frozenPrecipitation	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(18) convectivePrecipitation (4-byte float, array size: npixel x nscan)

The instantaneous convective precipitation rate at the surface. Check pixelStatus for a valid retrieval. Defined using Combined/DPR precipitation type. Values are in mm/hr. Special values are defined as:

-9999.9 Missing value

Table 1.2-23 convectivePrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	convectivePrecipitation	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(19) rainWaterPath (4-byte float, array size: npixel x nscan)

Total integrated rain water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 1.2-24 rainWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	rainWaterPath	-9999.9	0	3000	kg/m^2	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(20) cloudWaterPath (4-byte float, array size: npixel x nscan)

Total integrated cloud liquid water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 1.2-25 cloudWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	cloudWaterPath	-9999.9	0	3000	kg/m^2	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(21) iceWaterPath (4-byte float, array size: npixel x nscan)

Total integrated ice water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 1.2-26 iceWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	iceWaterPath	-9999.9	0	3000	kg/m^2	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(22) mostLikelyPrecipitation (4-byte float, array size: npixel x nscan)

The surface precipitation value with the closest Tb match within the Bayesian retrieval. Values are in mm/hr. Special values are defined as:

-9999.9 Missing value

Table 1.2-27 mostLikelyPrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	mostLikelyPrecipitation	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(23) precip1stTertial (4-byte float, array size: npixel x nscan)

The surface precipitation value at the 1st tertiary of the precipitation distribution. Values are in mm/hr. Special values are defined as:

-9999.9 Missing value

Table 1.2-28 precip1stTertial Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	precip1stTertial	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(24) precip2ndTertial (4-byte float, array size: npixel x nscan)

The surface precipitation value at the 2nd tertiary of the precipitation distribution. Values are in mm/hr.

Special values are defined as:

-9999.9 Missing value

Table 1.2-29 precip2ndTertial Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	precip2ndTertial	-9999.9	-	-	mm/hr	4-byte float	4 x npixel x nscan	4	npixel	nscan	1

(25) profileTemp2mIndex (2-byte integer, array size: npixel x nscan)

Temperature 2 meter height Index in the clusterProfiles array. See profileScale description below.

Values range from 1 to 21. Special values are defined as:

-9999 Missing value

Table 1.2-30 profileTemp2mIndex Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	profileTemp2mIndex	-9999	1	21	-	2-byte integer	2 x npixel x nscan	2	npixel	nscan	1

(26) profileNumber (2-byte integer, array size: nspecies x npixel x nscan)

Profile Number in the clusterProfiles array for each species. See profileScale description below.

Values range from 1 to 80. Special values are defined as:

-9999 Missing value

Table 1.2-31 profileNumber Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	profileNumber	-9999	1	80	-	2-byte integer	2 x nspecies x npixel x nscan	2	nspecies	npixel	nscan

(27) profileScale (4-byte float, array size: nspecies x npixel x nscan)

profileScale is used to scale the values of the clusterProfiles array.

In order to recover a value of a single pixel, select your species, level, and profile2mTempIndex, then use profileNumber and profileScale to obtain the value:

Where:

S = species (1-5)

Species defined in speciesDescription

T = profile2mTempIndex (1-12)

Temperatures defined in temperatureDescriptions

L = profile level (1-28) Top of each level specified in hgtTopLayer

P = profileNumber (1-80) for species S

In a Fortran program,

P = profileNumber(S)

Pixel Value = profileScale(S) * clusterProfiles(S,T,L,P)

In a C program,

P = profileNumber[S-1]

Pixel Value = profileScale[S] * clusterProfiles[P-1][L-1][T-1][S-1]

Table 1.2-32 profileScale Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	profileScale	-9999	1	80	-	4-byte float	4 x nspecies x npixel x nscan	4	nspecies	npixel	nscan

2. 3GPROF – GPROF Profiling

2.1. Data Format Structure

2.1.1. Dimension definition

Dimesition definition:

- nat
  - 720 Number of 0.25 grid intervals latitude from 90N to 90S.
- nlon
  - 1140 Number of 0.25 grid intervals longitude from 180W to 180E.
- nlayer
  - 28 Number of profiling layers.
    The top of each layer is 0.5, 1.0, 1.5, ..., 9.5, 10.0, 11.0, ..., 18.0 km. The layer tops are heights above the earth's surface.

2.1.2. Data Format Structure for 3GPROF – GPROF Profiling

3GPROF, "GPROF Profiling", produces global 0.25^{o} x 0.25^{o} gridded means using Level 2 GPROF data. Vertical hydrometeor profiles and surface rainfall means are computed. Various pixel counts are also reported. The PI is Joyce Chou. The product can be monthly or daily. The following sections describe the structure and contents of the format.

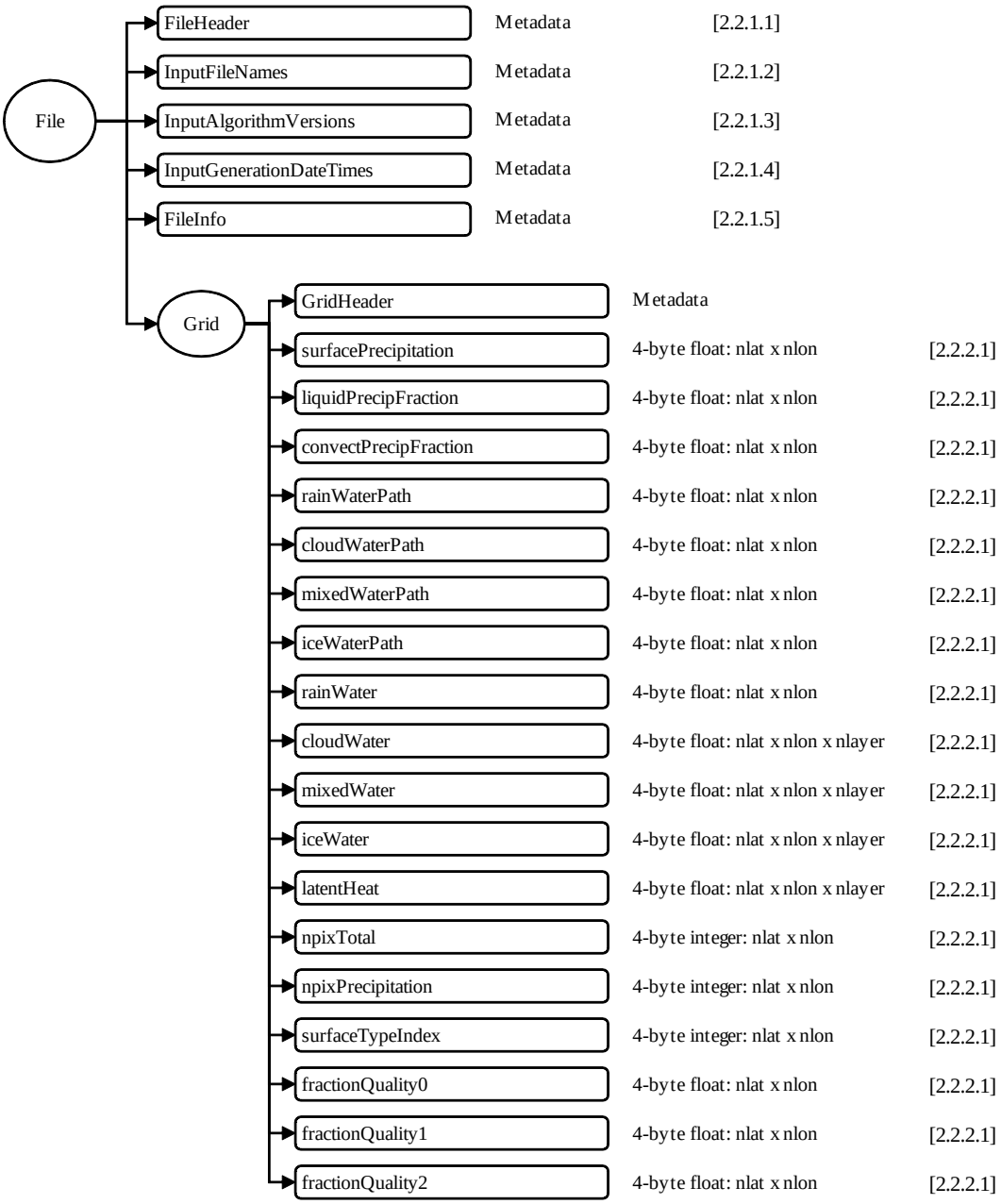

Figure 2.1-1 Data Format Structure for 3GPROF – GPROF Profiling

2.2. Contents of objects in each Group

2.2.1. Metadata

2.2.1.1 FileHeader

FileHeader contains metadata of general interest. Table 2.2-1 shows each metadata elements in FileHeader.

Table 2.2-1 FileHeader Group

Metadata Element	Estimated Size (bytes)	Description
DOI	256	Digital Object Identifier
AlgorithmID	50	The algorithm that generated this product, e.g., 2A12.
AlgorithmVersion	50	The version of the algorithm that generated this product.
FileName	50	The file name of this granule.
SatelliteName	10	Values are: TRMM GPM MULTI F10 ... F18 AQUA GCOMW1 CORIOLIS MT1 NOAA15 ... NOAA19 METOPANPP. More values will be added as they are known.
InstrumentName	10	Values are: PR TMI VIRS PRTMI KU KA DPR GMI DPRGMI MERGED SSMI SSMIS AMSRE AMSR2 WIND-SAT MADRAS AMSUA AMSUB SAPHIR MHS ATMS. More values will be added as they are known.
GenerationDateTime	50	The date and time this granule was generated. The format is YYYY-MM-DDTHH:MM:SS.sssZ, where YYYY is 4-digit year, MM is month number, DD is day of month, T is ”T”, HH is hour, MM is minute, SS is second, sss is millisecond, and Z is ”Z”. All fields are zero-filled. The missing value is constructed by replacing all digits with 9, i.e., 9999-99-99T99:99:99.999Z
StartGranuleDateTime	50	The start time defining this granule. The format is the same as GenerationDateTime. DETAILS: An orbital granule starts when the satellite is at the position defined by GranuleStart. Thus the start time is not the first scan time. Some algorithms have overlap scans in the file before the start time as defined in swathHeader. A monthly granule starts on the first ms of the month, for example March 1998 would be 1998-03-01T00:00:00.000Z
StopGranuleDateTime	50	The stop time defining this granule. The format is the same as GenerationDateTime. DETAILS: An orbital granule stops when the satellite is at the position defined by GranuleStart. Thus the stop time is not the last scan time. Some algorithms have overlap scans in the file after the stop time as defined in SwathHeader. A monthly granule stops on the last ms of the month, for example March 1998 would be 1998-03-31T23:59:59.999Z
GranuleNumber	50	The number of this granule, which starts as in GranuleStart. If the GranuleStart is identical to the orbit start, then the GranuleNumber will be the same as the orbit number. The GranuleNumber will have 6 digits, including leading zeroes, for example 001234.
NumberOfSwaths	50	The number of swaths in this granule.
NumberOfGrids	50	The number of grid structures in this granule.
GranuleStart	50	The starting place in the orbit of this granule. Currently defined values are ”SOUTHERNMOST LATITUDE” and ”NORTHBOUND EQUATOR CROSSING”.
TimeInterval	50	The time interval covered by this granule. Values are ”ORBIT”, ”HALF ORBIT”, ”HALF HOUR”, ”HOUR”, ”3 HOUR”, ”DAY”, ”MONTH”, ”CONTACT”.
ProcessingSystem	50	The name of the processing system, e.g., ”PPS”, ”JAXA”.
ProductVersion	50	The data version assigned by the processing system.
EmptyGranule	50	Whether a granule is empty. Values are ”EMPTY” or ”NOT EMPTY”.
MissingData	50	The number of missing scans.

2.2.1.2 InputFileNames

InputFileNames contains a list of input file names for this granule. Since some algorithms may have 2000 input files, this group is a ”Long Metadata Group”, which has no elements.

2.2.1.3 InputAlgorithmVersion

InputAlgorithmVersions contains a list of input algorithm versions for this granule. Since some algorithms may have 2000 input files, this group is a ”Long Metadata Group”, which has no elements. This group appears in Level 3 time averaged products.

2.2.1.4 InputGenerationDataTimes

InputGenerationDateTimes contains a list of input generation datetimes for this granule. Since some algorithms may have 2000 input files, this group is a ”Long Metadata Group”, which has no elements. This group appears in Level 3 time averaged products.

2.2.1.5 FileInfo

FileInfo contains metadata used by the PPS I/O Toolkit. Table 2.2-2 shows each metadata elements in FileInfo.

Table 2.2-2 FileInfo Group

Metadata Element	Estimated Size (bytes)	Description
DataFormatVersion	50	The version of the data format used to write this file. This version is separate for each AlgorithmID. The order is: ”a” ”b” ... ”z” ”aa” ”ab” ... ”az” ”ba” ”bb” ...
TKCodeBuildVersion	50	Usually TK CodeBuildVersion is ”1”. If the I/O routines built by TKIO change even though the DataFormatVersion is unchanged, then TK CodeBuildVersion increments to ”2”, ”3”, ... If subsequently DataFormatVersion changes, TKCodeBuildVersion becomes ”1” again.
MetadataVersion	50	The version of metadata used to write this file. This version is separate for each AlgorithmID. The order is: ”a” ”b” ... ”z” ”aa” ”ab” ... ”az” ”ba” ”bb” ...
FormatPackage	50	The underlying format of this granule. Values are ”HDF4”, ”HDF5”, ”NETCDF”, ”TKBINARY”
BlueprintFilename	50	The filename of the primary blueprint file that defined the format used to write this file.
BlueprintVersion	10	The BlueprintVersion of the format definition
TKIOVersion	50	The version of TKIO used to create I/O routines to write this file. TKIOVersion does not define the format used to write this file.
MetadataStyle	50	The style in which the metadata was written, e.g., ”PVL”. ”PVL” means < parameter >=< value >;
EndianType	50	The endian type of the system that wrote this file. Values are ”BIG ENDIAN” and ”LITTLE ENDIAN”.

2.2.2. Data Group

Elements of data group are explained in detail in this section.

2.2.2.1 Grid (Grid)

(1) GridHeader (Metadata)

GridHeader contains metadata defining the grids in the grid structure.

Table 2.2-3 GridHeader Elements

Metadata Element	Estimated Size (bytes)	Description
BinMethod	50	Method used to obtain the value in each grid box. The only defined value is ”ARITHMEAN”.
Registration	50	Representative location within the grid box. The only defined value is ”CENTER”.
LatitudeResolution	50	North-south size of a bin (degrees latitude).
LongitudeResolution	50	East-west size of a bin (degrees longitude).
NorthBoundingCoordinate	50	Northern-most latitude (degrees) covered by the grid.
SouthBoundingCoordinate	50	Southern-most latitude (degrees) covered by the grid.
EastBoundingCoordinate	50	Eastern-most longitude (degrees) covered by the grid.
WestBoundingCoordinate	50	Western-most longitude (degrees) covered by the grid.
Origin	50	Origin of the grid indices, e.g., ”SOUTHWEST”.

(2) surfacePrecipitation (4-byte float, array size: nlat x nlon)

The monthly mean of the instantaneous precipitation rate at the surface for each grid. Values range from 0 to 3000 mm/hr. Special values are defined as:

-9999.9 Missing value

Table 2.2-4 surfacePrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	surfacePrecipitation	-9999.9	0	3000	[mm/hr]	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(3) liquidPrecipFraction (4-byte float, array size: nlat x nlon)

The fraction of the total surface precipitation over the accumulation period that is liquid (i.e. rain). Over the tropics this will typically be one, while over higher latitudes where frozen precipitation is more prevalent it will vary from zero to one. Values range from 0 to 1. Special values are defined as:

-9999.9 Missing value

Table 2.2-5 liquidPrecipFraction Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	liquidPrecipFraction	-9999.9	0	1	-	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(4) convectPrecipFraction (4-byte float, array size: nlat x nlon)

The fraction of the total surface precipitation over the accumulation period from pixels identified as convective. Values range from 0 to 1. Special values are defined as:

-9999.9 Missing value

Table 2.2-6 convectPrecipFraction Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	convectPrecipFraction	-9999.9	0	1	-	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(5) rainWaterPath (4-byte float, array size: nlat x nlon)

The monthly mean of the total integrated rain water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 2.2-7 rainWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	rainWaterPath	-9999.9	0	3000	[kg/m^2]	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(6) cloudWaterPath (4-byte float, array size: nlat x nlon)

The monthly mean of the total integrated cloud water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 2.2-8 cloudWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	cloudWaterPath	-9999.9	0	3000	[kg/m^2]	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(7) mixedWaterPath (4-byte float, array size: nlat x nlon)

The monthly mean of the total integrated mixed phase water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 2.2-9 mixedWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	mixedWaterPath	-9999.9	0	3000	[kg/m^2]	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(8) iceWaterPath (4-byte float, array size: nlat x nlon)

The monthly mean of the total integrated ice water in the vertical atmospheric column. Values range from 0 to 3000 kg/m^2. Special values are defined as:

-9999.9 Missing value

Table 2.2-10 iceWaterPath Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	iceWaterPath	-9999.9	0	3000	[kg/m^2]	4-byte float	4 x 720 x 1140	4	nlat	nlon	

(9) rainWater (4-byte float, array size: nlat x nlon x nlayer)

The monthly mean of the rain water content for each grid at each vertical layer. Values range from 0 to 10 g/m^3. Special values are defined as:

-9999.9 Missing value

Table 2.2-11 rainWater Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	rainWater	-9999.9	0	10	[g/m^3]	4-byte float	4 x 720 x 1140 x 28	4	nlat	nlon	nlayer

(10) cloudWater (4-byte float, array size: nlat x nlon x nlayer)

The monthly mean of the cloud liquid water content for each grid at each vertical layer. Values range from 0 to 10 g/m^3. Special values are defined as:

-9999.9 Missing value

Table 2.2-12 cloudWater Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	cloudWater	-9999.9	0	10	[g/m^3]	4-byte float	4 x 720 x 1140 x 28	4	nlat	nlon	nlayer

(11) mixedWater (4-byte float, array size: nlat x nlon x nlayer)

The monthly mean of the mixed precipitation liquid water content for each grid at each vertical layer. Values range from 0 to 10 g/m^3. Special values are defined as:

-9999.9 Missing value

Table 2.2-13 mixedWater Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	mixedWater	-9999.9	0	10	[g/m^3]	4-byte float	4 x 720 x 1140 x 28	4	nlat	nlon	nlayer

(12) iceWater (4-byte float, array size: nlat x nlon x nlayer)

The monthly mean of the precipitation ice liquid water content for each grid at each vertical layer. Values range from 0 to 10 g/m^3. Special values are defined as:

-9999.9 Missing value

Table 2.2-14 iceWater Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	iceWater	-9999.9	0	10	[g/m^3]	4-byte float	4 x 720 x 1140 x 28	4	nlat	nlon	nlayer

(13) latentHeat (4-byte float, array size: nlat x nlon x nlayer)

The monthly mean of the latent heating release for each grid at each vertical layer. Values range from

-256 to 256 C/hr. Special values are defined as:

-9999.9 Missing value

Table 2.2-15 latentHeat Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	latentHeat	-9999.9	-256	256	[C/hr]	4-byte float	4 x 720 x 1140 x 28	4	nlat	nlon	nlayer

(14) npixTotal (4-byte integer, array size: nlat x nlon)

The monthly number of pixels with pixelStatus equal to zero for each grid. The major effect of the pixelStatus requirement is to remove sea ice. npixTotal is used to compute the monthly means described above. Values range from 0 to 10000. Special values are defined as:

-9999 Missing value

Table 2.2-16 npixTotal Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	npixTotal	-9999	0	10000		4-byte integer	4 x 720 x 1140	4	nlat	nlon	1

(15) npixPrecipitation (4-byte integer, array size: nlat x nlon)

The monthly number of pixels with surfacePrecipitation greater than 0 for each grid. For ocean, a pixel is also required to have probabilityOfPrecip greater than 50 percent. Values range from 0 to 10000. Special values are defined as:

-9999 Missing value

Table 2.2-17 npixPrecipitation Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	npixPrecipitation	-9999	0	10000		4-byte integer	4 x 720 x 1140	4	nlat	nlon	1

(16) surfaceTypeIndex (4-byte integer, array size: nlat x nlon)

Indicates the type of surface (Range 0-99)

Codes include:

1 Ocean
2 Sea-Ice
(3-12 are ‘land classification’)
3 Maximum Vegetation
4 High Vegetation
5 Moderate Vegetation
6 Low Vegetation
7 Minimal Vegetation
8 Maximum Snow
9 Moderate Snow
10 Low Snow
11 Minimal Snow
12 Standing Water and Rivers
13 Water/Land Coast Boundary
14 Water/Ice Boundary
15 Land/Ice Boundary

-99 Missing value

Table 2.2-18 surfaceTypeIndex Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	surfaceTypeIndex	-99	0	99	-	4-byte integer	4 x 720 x 1140	4	nlat	nlon	1

(17) fractionQuality0 (4-byte float, array size: nlat x nlon)

The fraction of the retrieved pixels in a given grid box identified as good retrievals. For regions where there are no retrieval issues this will be 1.0. Areas with surface screening or contamination issues with questionable retrievals during the accumulation period will have values less than one and should thus be used with caution for any quantitative analysis. Values range from 0 to 1 percent. Special values are defined as:

-9999.9 Missing value

Table 2.2-19 fractionQuality0 Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	fractionQuality0	-9999.9	0	1	[%]	4-byte float	4 x 720 x 1140	4	nlat	nlon	1

(18) fractionQuality1 (4-byte float, array size: nlat x nlon)

The fraction of total pixels with qualityFlag equal to 1 (medium quality) for each grid. Values range from 0 to 1 percent. Special values are defined as:

-9999.9 Missing value

Table 2.2-20 fractionQuality1 Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	fractionQuality1	-9999.9	0	1	[%]	4-byte float	4 x 720 x 1140	4	nlat	nlon	1

(19) fractionQuality2 (4-byte float, array size: nlat x nlon)

The fraction of total pixels with qualityFlag equal to 2 (low quality) for each grid. Values range from 0 to 1 percent. Special values are defined as:

-9999.9 Missing value

Table 2.2-21 fractionQuality2 Elements

No.	Element	Missing	Min	Max	unit	type	Data size (byte)	type	array		
1	fractionQuality2	-9999.9	0	1	[%]	4-byte float	4 x 720 x 1140	4	nlat	nlon	1

Index

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