GLOBAL PRECIPITATION MEASUREMENT PRECIPITATION PROCESSING SYSTEM

File Specification
3IMERGHH

Preliminary Version

January 3, 2017

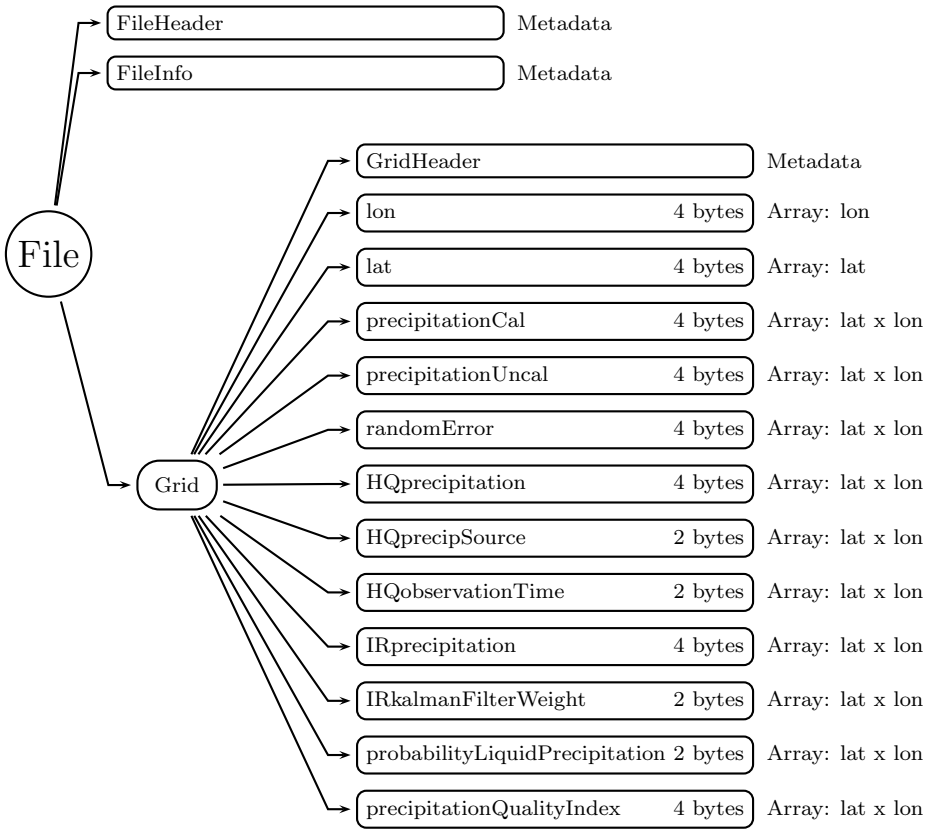

Figure 1: Data Format Structure for 3IMERGHH, IMERG 30-minute

0.1 3IMERGHH - IMERG 30-minute

3IMERGHH, "IMERG 30-minute", provides precipitation estimates at 0.1 degrees by the Integrated Multi-satellitE Retrievals for GPM (IMERG). IMERG is intended to intercalibrate, merge, and interpolate satellite microwave precipitation estimates, together with microwave-calibrated infrared (IR) satellite estimates, and precipitation gauge analyses. The PI is Dr. George Huffman. The granule size is 30 minutes. The following sections describe the structure and contents of the format.

Dimension definitions:

lat	1800	Number of 0.1^o grid intervals of latitude from 90° N to 90° S.
lon	3600	Number of 0.1^o grid intervals of longitude from 180° W to 180° E.

Figure 1 shows the structure of this product. The text below describes the contents of objects in the structure, the C Structure Header File and the Fortran Structure Header File.

FileHeader (Metadata):
FileHeader contains general metadata. This group appears in all data products. See Metadata for GPM Products for details.

FileInfo (Metadata):
FileInfo contains metadata used by the PPS I/O Toolkit (TKIO). This group appears in all data products. See Metadata for GPM Products for details.

Grid (Grid)

GridHeader (Metadata):
GridHeader contains metadata defining the grids in the grid structure. See Metadata for GPM Products for details.

lon (4-byte float, array size: lon):
Longitude of the center of the grid box. Values range from -180 to 180 degrees_east. Special values are defined as:
-9999.9 Missing value

lat (4-byte float, array size: lat):
Latitude of the center of the grid box. Values range from -90 to 90 degrees_north. Special values are defined as:
-9999.9 Missing value

precipitationCal (4-byte float, array size: lat x lon):
Precipitation estimate using gauge calibration over land. Values range from 0 to 1000 mm/hr. Special values are defined as:
-9999.9 Missing value

precipitationUncal (4-byte float, array size: lat x lon):
Precipitation estimate with no gauge calibration. Values range from 0 to 1000 mm/hr. Special values are defined as:
-9999.9 Missing value

randomError (4-byte float, array size: lat x lon):
Random error estimate of precipitation. Values range from 0 to 1000 mm/hr. Special values are defined as:
-9999.9 Missing value

HQprecipitation (4-byte float, array size: lat x lon):
Instananeous microwave-only precipitation estimate covering the current 30-minute period. Values range from 0 to 1000 mm/hr. Special values are defined as:
-9999.9 Missing value

HQprecipSource (2-byte integer, array size: lat x lon):

```
HQprecipSource values are as follows:
      0 = no observation
      1 = TMI
      2 = TCI
```

```
3 = AMSR
4 = SSMI
5 = SSMIS
6 = AMSU
7 = MHS
8 = Megha-Tropiques
9 = GMI
10 = GCI
11 = ATMS
12 = AIRS
13 = TOVS
14 = CrlS
15 = future microwave scanner
16 = future microwave scanner
17 = future microwave scanner
18 = future microwave scanner
19 = future microwave scanner
20 = future microwave sounder
21 = future microwave sounder
22 = future microwave sounder
23 = future microwave sounder
24 = future microwave sounder
```

Satellite ID of the instantaneous microwave-only precipitation estimate covering the current 30-minute period. Values range from 0 to 24.

HQobservationTime (2-byte integer, array size: lat x lon):
Observation time (from the beginnning of the current half hour) of the instantaneous microwave-only precipitation estimate covering the current 30-minute period. Values range from 0 to 29 minutes. Special values are defined as:
-9999 Missing value

IRprecipitation (4-byte float, array size: lat x lon):
Microwave-calibrated IR precipitation estimate covering the current 30-minute period. Values range from 0 to 1000 mm/hr. Special values are defined as:
-9999.9 Missing value

IRkalmanFilterWeight (2-byte integer, array size: lat x lon):
IR weighting in the final precipitation estimate. The values range from 0 to 100, where 0 is no IR weighting and 100 is entirely based on IR. A value of 0 is provided as well in areas of no precipitation.

probabilityLiquidPrecipitation (2-byte integer, array size: lat x lon):
Probability of liquid precipitation. 0=definitely frozen. 100=definitely liquid. 50=equal probability frozen or liquid. This field is globally complete and provided irrespective of the presence of precipitation. Values range from 0 to 100 percent.

precipitationQualityIndex (4-byte float, array size: lat x lon):
Estimated quality of precipitationCal where 0 is worse and 100 is better. Values range from 0 to 100. Special values are defined as:
-9999.9 Missing value

C Structure Header file:

```
#ifndef _TK_3IMERGHH_H_
#define _TK_3IMERGHH_H_

#ifndef _L3IMERGHH_GRID_
#define _L3IMERGHH_GRID_

typedef struct {
    float lon[3600];
    float lat[1800];
    float precipitationCal[3600][1800];
    float precipitationUncal[3600][1800];
    float randomError[3600][1800];
    float HQprecipitation[3600][1800];
    short HQprecipSource[3600][1800];
    short HQobservationTime[3600][1800];
    float IRprecipitation[3600][1800];
    short IRkalmanFilterWeight[3600][1800];
    short probabilityLiquidPrecipitation[3600][1800];
    float precipitationQualityIndex[3600][1800];
} L3IMERGHH_GRID;

#endif

#endif
```

Fortran Structure Header file:

```
STRUCTURE /L3IMERGHH_GRID/
    REAL*4 lon(3600)
    REAL*4 lat(1800)
    REAL*4 precipitationCal(1800,3600)
    REAL*4 precipitationUncal(1800,3600)
    REAL*4 randomError(1800,3600)
    REAL*4 HQprecipitation(1800,3600)
    INTEGER*2 HQprecipSource(1800,3600)
    INTEGER*2 HQobservationTime(1800,3600)
```

```
    REAL*4 IRprecipitation(1800,3600)
    INTEGER*2 IRkalmanFilterWeight(1800,3600)
    INTEGER*2 probabilityLiquidPrecipitation(1800,3600)
    REAL*4 precipitationQualityIndex(1800,3600)
END STRUCTURE
```