TROPICAL RAINFALL MEASURING MISSION PRECIPITATION PROCESSING SYSTEM

File Specification
3G31

Version 7

December 5, 2012

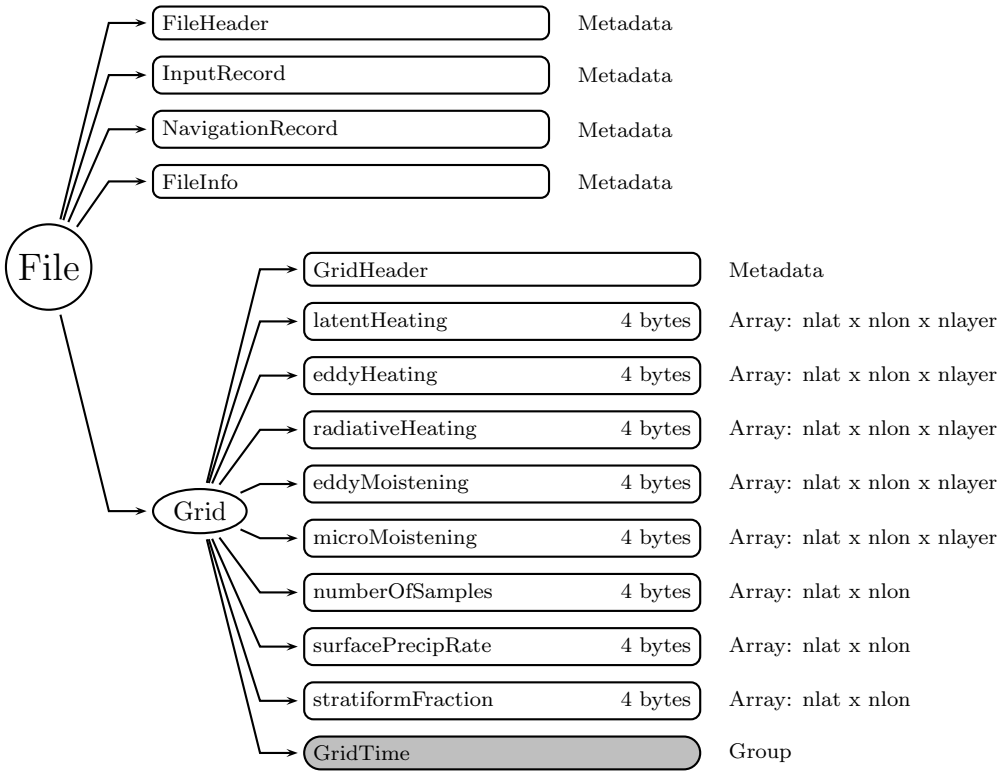

Figure 1: Data Format Structure for 3G31, Gridded Orbital Convective Stratiform Heating from Combined

0.1 3G31 - Gridded Orbital Convective Stratiform Heating from Combined

3G31, "Gridded Orbital Convective Stratiform Heating from Combined", produces 0.5^o x 0.5^o orbital apparent heating profiles from surface convective rainfall rate and surface stratiform rainfall rate. The PI is Dr. Wei-Kuo Tao. The granule size is one orbit. The following sections describe the structure and contents of the format.

Dimension definitions:

nlat	148	Number of 0.5^o grid intervals of latitude from 37^oN to 37^oS.
nlon	720	Number of 0.5^o grid intervals of longitude from 180^oW to 180^oE.
nlayer	19	Number of layers at 0.0-0.5 km, 0.5-1 km, 1-2 km, ..., 17-18 km above the ground level.

Figure 1 through Figure 2 show 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 TRMM Products for details.

InputRecord (Metadata):

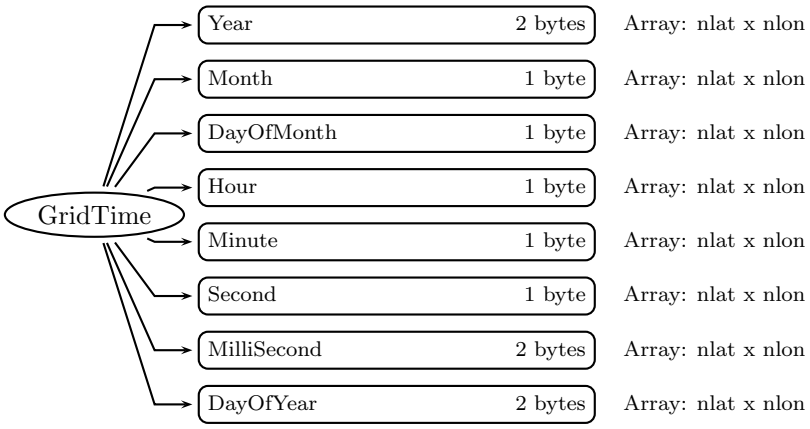

Figure 2: Data Format Structure for 3G31, GridTime

InputRecord contains a record of input files for this granule. This group appears in Level 1 and Level 2 data products. Level 3 time averaged products have the same information separated into 3 groups since they have many inputs. See Metadata for TRMM Products for details.

NavigationRecord (Metadata):
NavigationRecord contains navigation metadata for this granule. This group appears in Level 1 and Level 2 data products. See Metadata for TRMM 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 TRMM Products for details.

Grid (Grid)

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

latentHeating (4-byte float, array size: nlat x nlon x nlayer):
Latentheating. Values range from -50 to 100 K/hr. Special values are defined as:
-9999.9 Missing value

eddyHeating (4-byte float, array size: nlat x nlon x nlayer):
Eddy flux heating. Values range from -50 to 100 K/hr. Special values are defined as:
-9999.9 Missing value

radiativeHeating (4-byte float, array size: nlat x nlon x nlayer):
Radiative heating. Values range from -50 to 100 K/hr. Special values are defined as:
-9999.9 Missing value

eddyMoistening (4-byte float, array size: nlat x nlon x nlayer):
Apparent moistening due to eddy processes. Values range from -50 to 100 K/hr. Special

values are defined as:
-9999.9 Missing value

microMoistening (4-byte float, array size: nlat x nlon x nlayer):
Apparent moistening due to microphysical processes. Values range from -50 to 100 K/hr. Special values are defined as:
-9999.9 Missing value

numberOfSamples (4-byte integer, array size: nlat x nlon):
Number of samples in 0.5^o x 0.5^o boxes. Values range from 0 to 500000. Special values are defined as:
-9999 Missing value

surfacePrecipRate (4-byte float, array size: nlat x nlon):
Mean estimated surface precipitation rate from Level 2 Combined. Values range from 0 to 3000 mm/hr. Special values are defined as:
-9999.9 Missing value

stratiformFraction (4-byte float, array size: nlat x nlon):
Ratio of stratiform to total surface rain rate from Level 2 PR. Values range from 0 to 1. Special values are defined as:
-9999.9 Missing value

GridTime (Group)

Year (2-byte integer, array size: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
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: nlat x nlon):
Day of the year. Values range from 1 to 366 days. Special values are defined as:
-9999 Missing value

C Structure Header file:

```
#ifndef _TK_3G31_H_
#define _TK_3G31_H_

#ifndef _L3G31_GRIDTIME_
#define _L3G31_GRIDTIME_

typedef struct {
    short Year[720][148];
    signed char Month[720][148];
    signed char DayOfMonth[720][148];
    signed char Hour[720][148];
    signed char Minute[720][148];
    signed char Second[720][148];
    short MilliSecond[720][148];
    short DayOfYear[720][148];
} L3G31_GRIDTIME;

#endif

#ifndef _L3G31_GRID_
#define _L3G31_GRID_

typedef struct {
    float latentHeating[19][720][148];
    float eddyHeating[19][720][148];
    float radiativeHeating[19][720][148];
    float eddyMoistening[19][720][148];
    float microMoistening[19][720][148];
    int numberOfSamples[720][148];
    float surfacePrecipRate[720][148];
    float stratiformFraction[720][148];
    L3G31_GRIDTIME GridTime;
} L3G31_GRID;
```

```
#endif

#endif
```

Fortran Structure Header file:

```
STRUCTURE /L3G31_GRIDTIME/
    INTEGER*2 Year(148,720)
    BYTE Month(148,720)
    BYTE DayOfMonth(148,720)
    BYTE Hour(148,720)
    BYTE Minute(148,720)
    BYTE Second(148,720)
    INTEGER*2 MilliSecond(148,720)
    INTEGER*2 DayOfYear(148,720)
END STRUCTURE

STRUCTURE /L3G31_GRID/
    REAL*4 latentHeating(148,720,19)
    REAL*4 eddyHeating(148,720,19)
    REAL*4 radiativeHeating(148,720,19)
    REAL*4 eddyMoistening(148,720,19)
    REAL*4 microMoistening(148,720,19)
    INTEGER*4 numberOfSamples(148,720)
    REAL*4 surfacePrecipRate(148,720)
    REAL*4 stratiformFraction(148,720)
    RECORD /L3G31_GRIDTIME/ GridTime
END STRUCTURE
```