# TROPICAL RAINFALL MEASURING MISSION PRECIPITATION PROCESSING SYSTEM

## File Specification
## 3A25

**Version 7**

November 21, 2014

## 0.1 3A25 - PR Rainfall

3A25, "PR Rainfall", computes monthly statistics of the PR measurements at both a low horizontal resolution (5 x 5 latitude/longitude) and a high horizontal resolution (0.5o x 0.5o latitude/longitude). The low resolution grids are in the Planetary Grid 1 structure and include 1) mean and standard deviation of the rain rate, reflectivity, path-integrated attenuation (PIA), storm height, Xi, bright band height and the NUBF (Non-Uniform Beam Filling) correction; 2) rain fractions; 3) histograms of the storm height, bright-band height, snow-ice layer, reflectivity, rain rate, path-attenuation and NUBF correction; 4) correlation coefficients. For the high resolution grids in the Planetary Grid 2 structure, mean rain rate along with standard deviation and rain fractions are computed. The following sections describe the structure and contents of the format.

Dimension definitions:

| | | |
|---|---|---|
| nlat | 16 | Number of $5^o$ grid intervals of latitude from $40^o$N to $40^o$S. |
| nlon | 72 | Number of $5^o$ grid intervals of longitude from $180^o$W to $180^o$E. |
| nlath | 148 | Number of $0.5^o$degree grid intervals of latitude from $37^o$N to $37^o$S. |
| nlonh | 720 | Number of $0.5^o$degree grid intervals of longitude from $180^o$W to $180^o$E. |
| nh1 | 6 | Number of fixed heights above the earth ellipsoid, at 2, 4, 6, 10, and 15 km plus one for path-average. |
| nh3 | 4 | Number of fixed heights above the earth ellipsoid, at 2, 4, and 6 km plus one for path-average. |
| nang | 5 | Number of fixed incidence angles, at 0, 5, 10 and 15 degree. |
| ncat2 | 30 | Second number of categories for histograms (30). Note that the number of thresholds is one greater than the number of categories. Thresholds are given below for several variables, others are TBD. Reflectivity (dBZ) (bhz): 0.01, 12., 14., 16., 18., 20., 22., 24., 26., 28., 30., 32., 34., 36., 38., 40., 42., 44., 46., 48., 50., 52., 54., 56., 58., 60., 62., 64., 66., 68., 70. Rainfall rate (mm/hr): 0.01 0.205, 0.273, 0.364, 0.486, 0.648, 0.864, 1.153, 1.537, 2.050, 2.734, 3.646, 4.862, 6.484, 8.646, 11.53, 15.37, 20.50, 27.34, 36.46, 48.62, 64.84, 86.46, 115.3, 153.7, 205.0, 273.4, 364.6, 486.2, 648.4, 864.6 Bright Band Height (km) (bhbb): 0.01, 0.25, 0.5, 0.75, 1., 1.25, 1.5, 1.75, 2., 2.25, 2.5, 2.75, 3., 3.25, 3.5, 3.75, 4., 4.25, 4.5, 4.75, 5., 5.25, 5.5, 5.75, 6., 6.25, 6.5, 6.75, 7., 7.5, 20. Storm Height (km) (bhstorm): 0.01, 0.5, 1., 1.5, 2., 2.5, 3., 3.5, 4., 4.5, 5., 5.5, 6., 6.5, 7., 7.5, 8., 8.5, 9., 9.5, 10., 10.5, 11., 11.5, 12., 12.5, 13., 14., 15., 16., 20. snowIceH, bbNadirWidthH: 0.0, 125.0, 250.0, 375.0, 500.0, 625.0, 750.0, 875.0, 1000.0, 1125.0, 1250.0, 1375.0, 1500.0, 1625.0, 1750.0, 1875.0, 2000.0, 2125.0, 2250.0, 2375.0, 2500.0, 2625.0, 2750.0, 2875.0, 3000.0, 3125.0, 3250.0, 3375.0, 3500.0, 3625.0, 3750.0 Snow Depth (km) (bhdepth): 0.01, 0.5, 0.75, 1., 1.25, 1.5, 1.75, 2., 2.25, 2.5, 2.75, 3., 3.25, 3.5, 3.75, 4., 4.25, 4.5, 4.75, 5., 5.25, 5.5, 5.75, 6., 6.25, 6.5, 6.75, 7., 7.25, 7.5, 20. Zpzm (km) (bhzpzm): 0., 1., 2., 3., 4., 5., 6., 7., 8., 9., 10., 11., 12., 13., 14., 15., 16., 17., 18., 19., 20., 22., 24., 26., 28., 30., 32., 34., 36., 38., 50. All PIA (dB) (bhpia): 0.01, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10., 100. NUBF or Non-Uniform Beam Filling Factor (unitless) (bhnubf): 1., 1.05, 1.1, 1.15, 1.2, 1.25, 1.3, 1.35, 1.4, 1.45, 1.5, 1.55, 1.6, 1.65, 1.7, 1.75, 1.8, 1.85, 1.9, 1.95, 2., 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0 Xi or Horizontal Non-Uniformity Parameter (unitless) (bhxi): 0., 0.2, 0.4, 0.6, 0.8, 1., 1.2, 1.4, 1.6, 1.8, 2., 2.2, 2.4, 2.6, 2.8, 3., 3.2, 3.4, 3.6, 3.8, 4., 4.2, 4.4, 4.6, 4.8, 5., 10., 20., 30., 50., 10000. Epsilon conditioned on use of SRT (unitless) (bhepsilon): 0., 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1., 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2., 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0 |

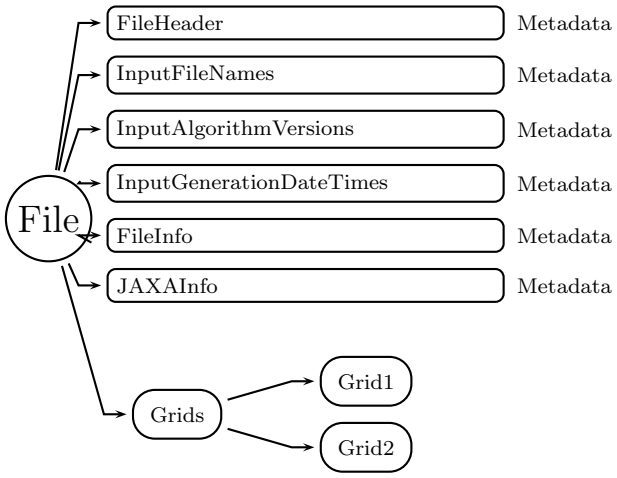


Figure 1: Data Format Structure for 3A25, PR Rainfall

Figure 1 through Figure 11 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.

**InputFileNames** (Metadata):
InputFileNames contains a list of input file names for this granule. See Metadata for TRMM Products for details.

**InputAlgorithmVersions** (Metadata):
InputAlgorithmVersions contains a list of input algorithm versions for this granule. See Metadata for TRMM Products for details.

**InputGenerationDateTimes** (Metadata):
InputGenerationDateTimes contains a list of input generation datetimes. 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.

**JAXAInfo** (Metadata):
JAXAInfo contains metadata requested by JAXA. Used by PR algorithms only. See Metadata for TRMM Products for details.

## **Grids** (Group)

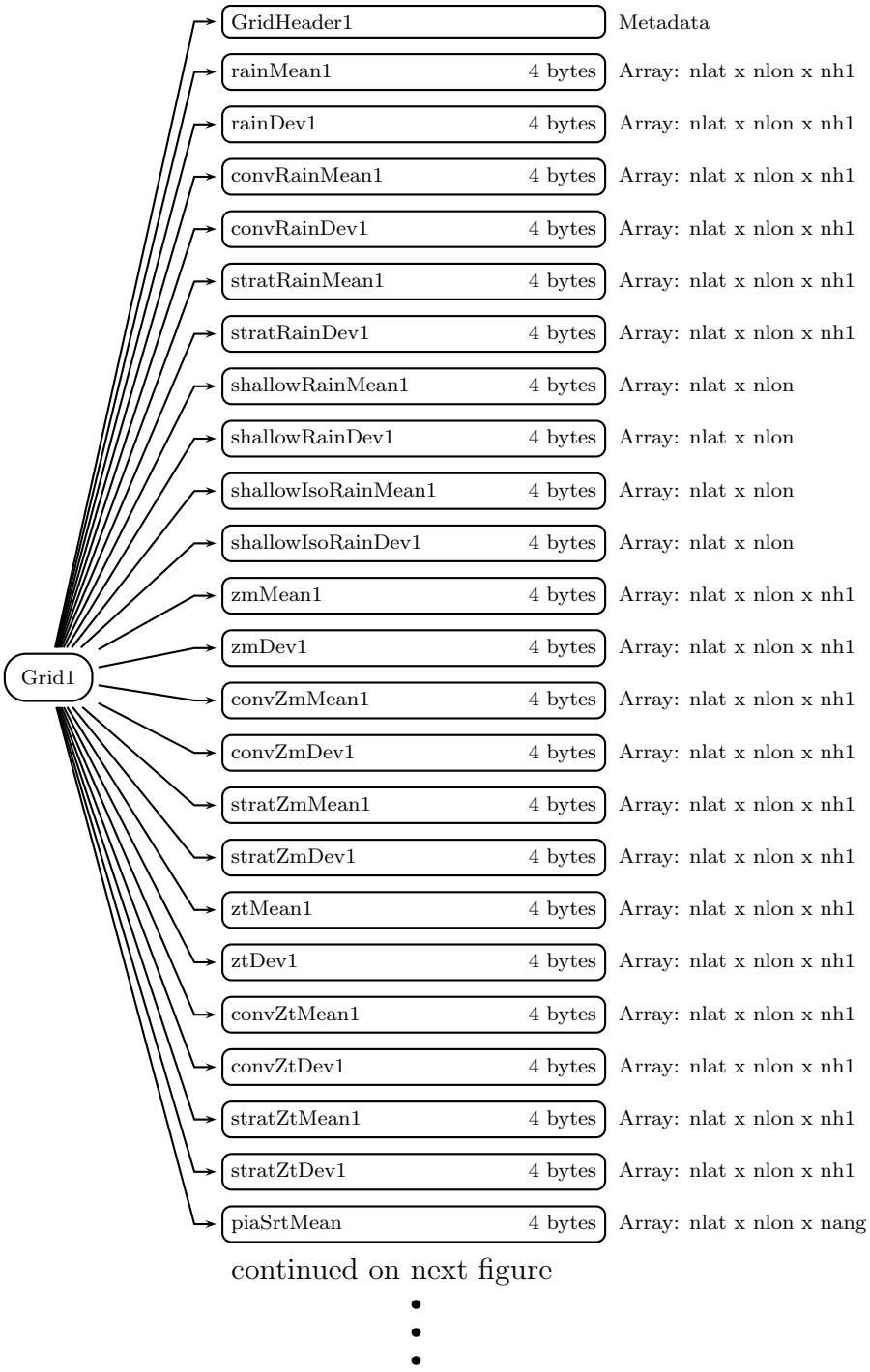


Figure 2: Data Format Structure for 3A25, Grid1, Grid1

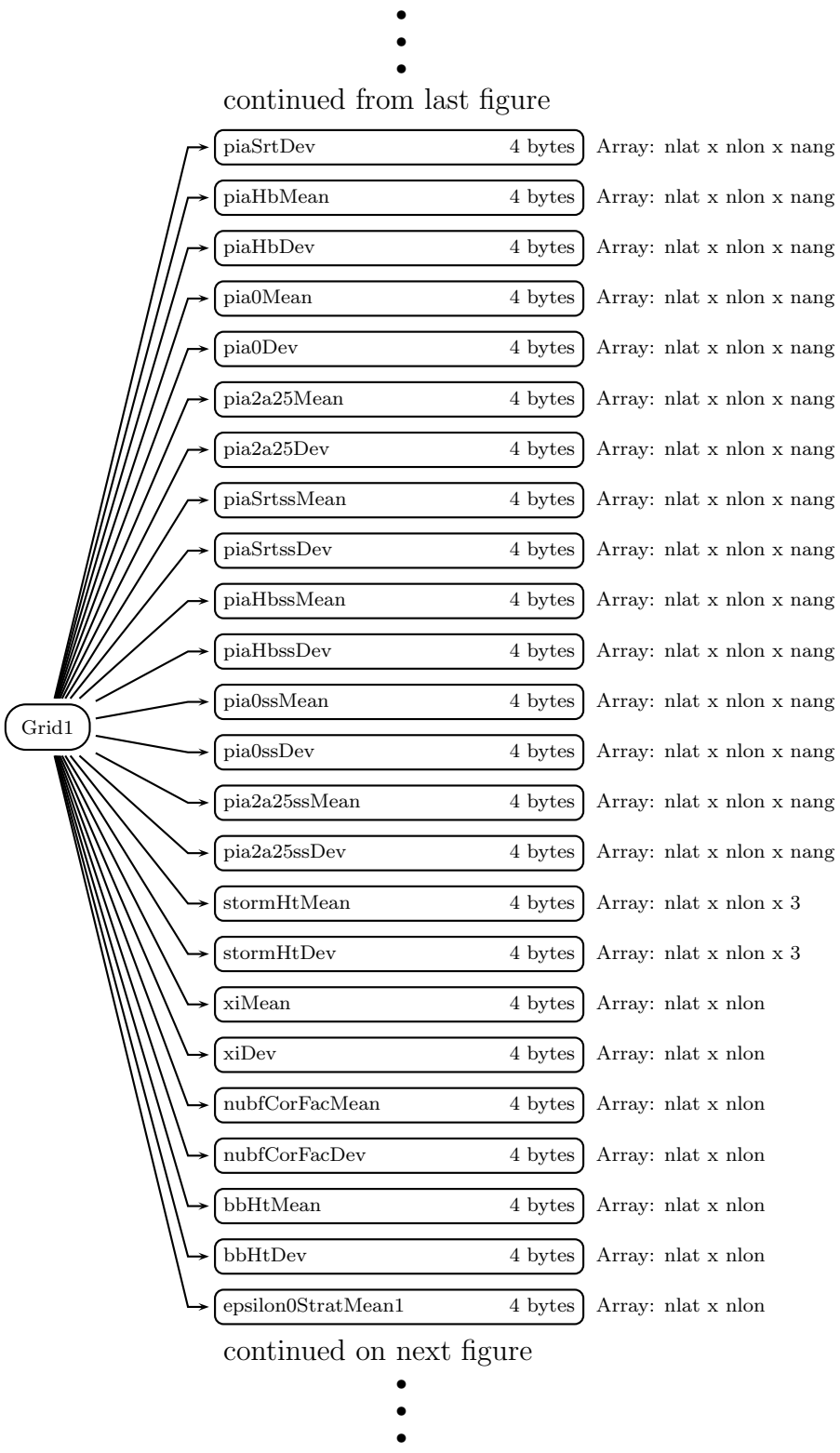


Figure 3: Data Format Structure for 3A25, Grid1, Grid1

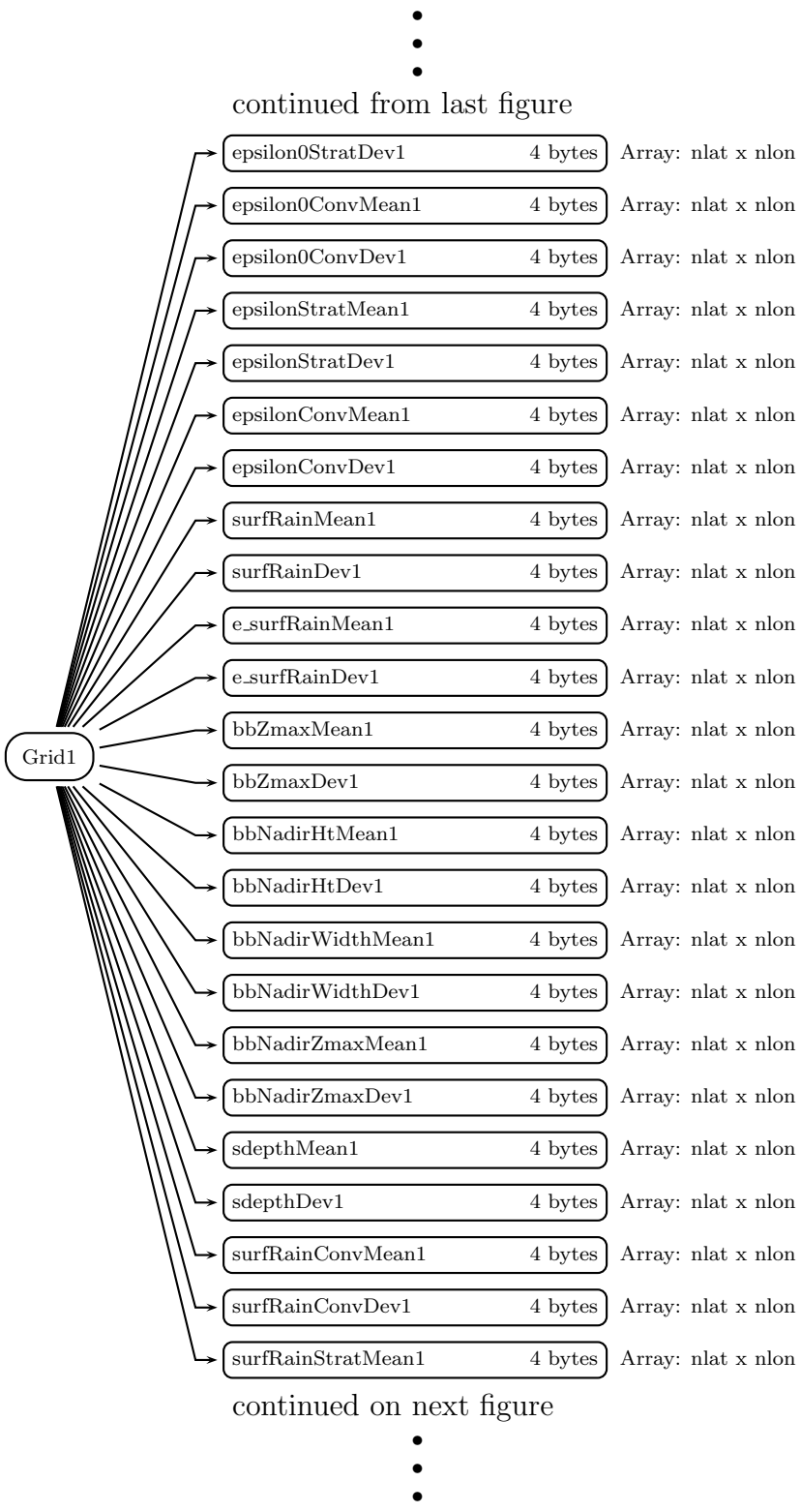


Figure 4: Data Format Structure for 3A25, Grid1, Grid1

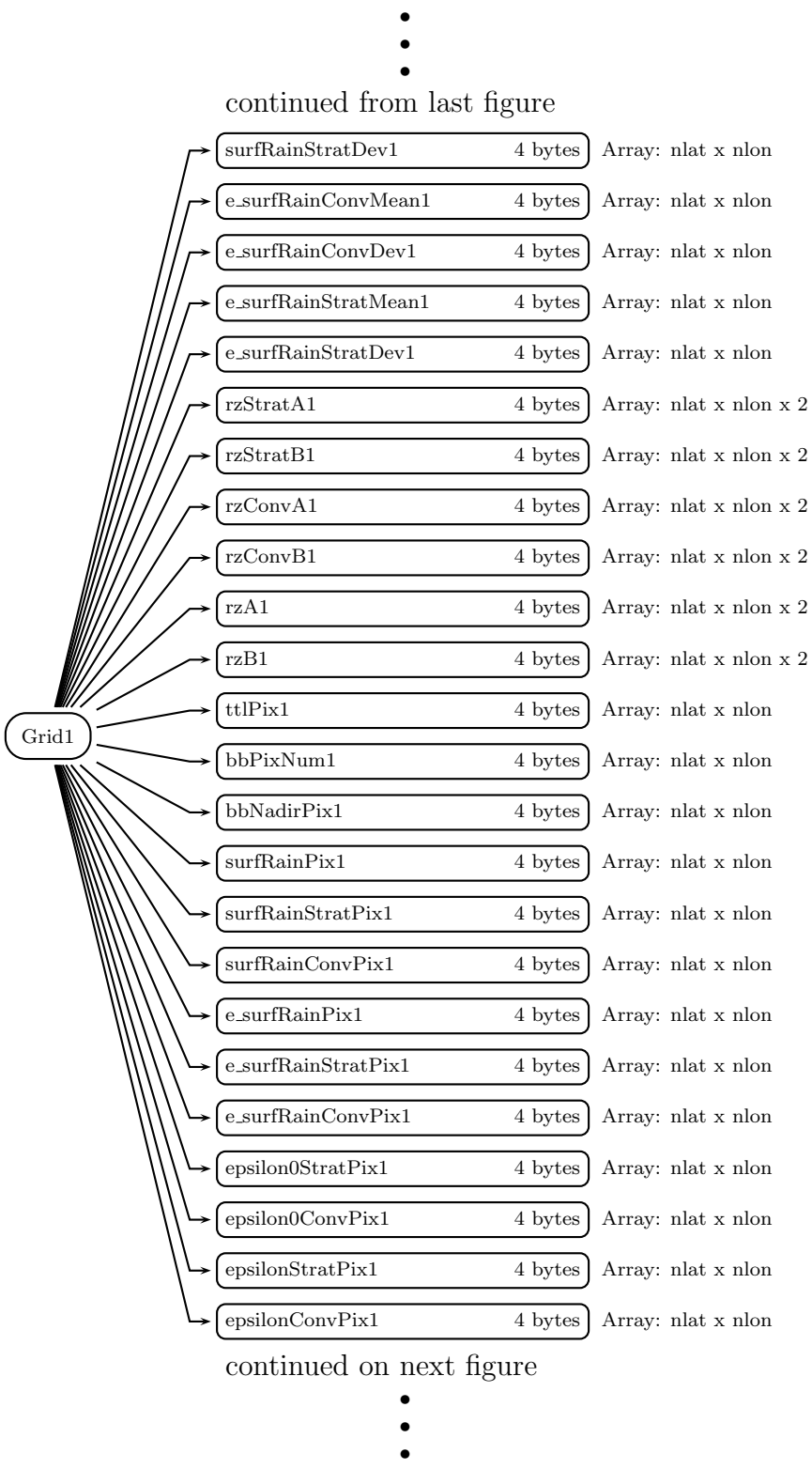


Figure 5: Data Format Structure for 3A25, Grid1, Grid1

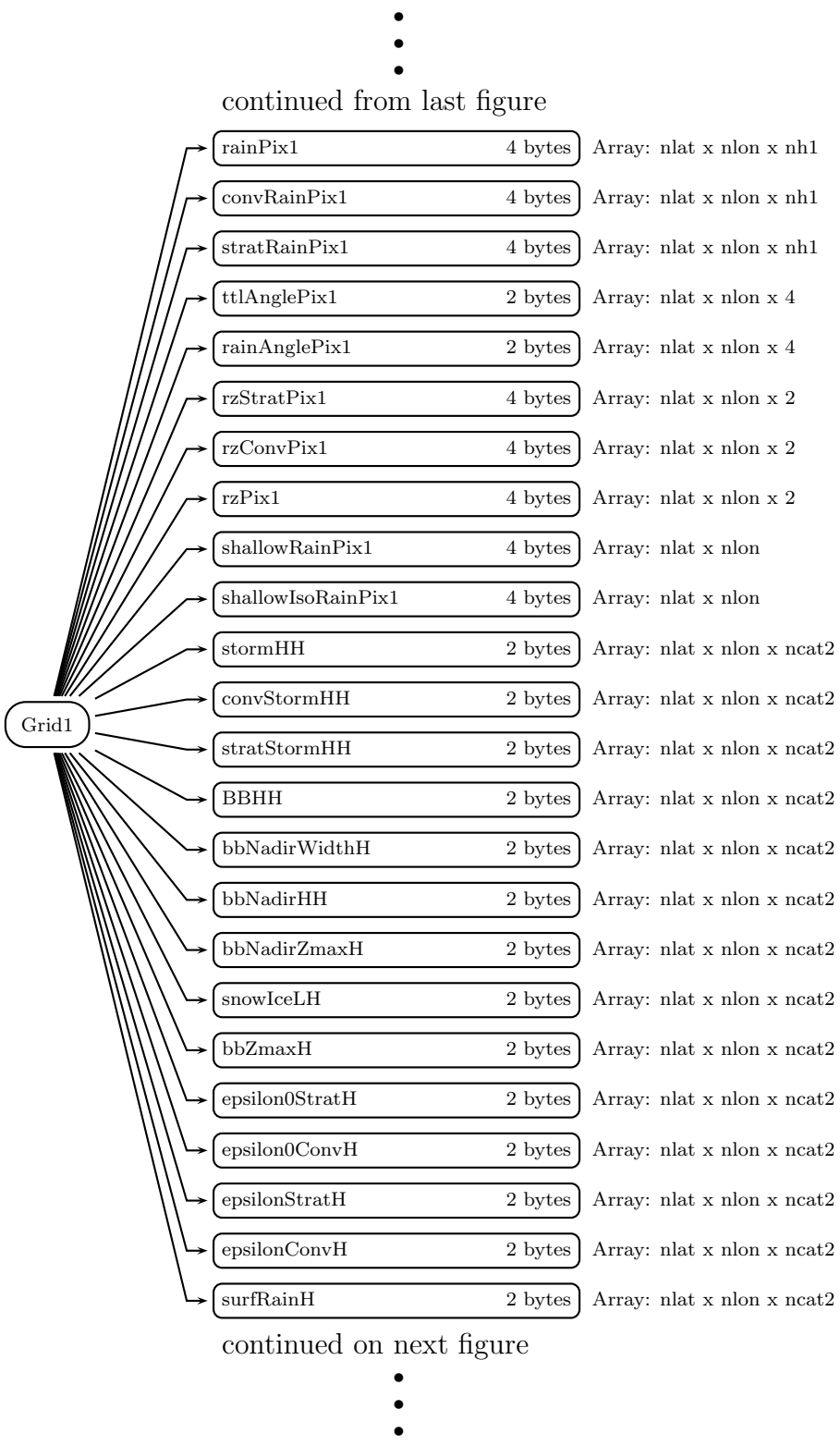


Figure 6: Data Format Structure for 3A25, Grid1, Grid1

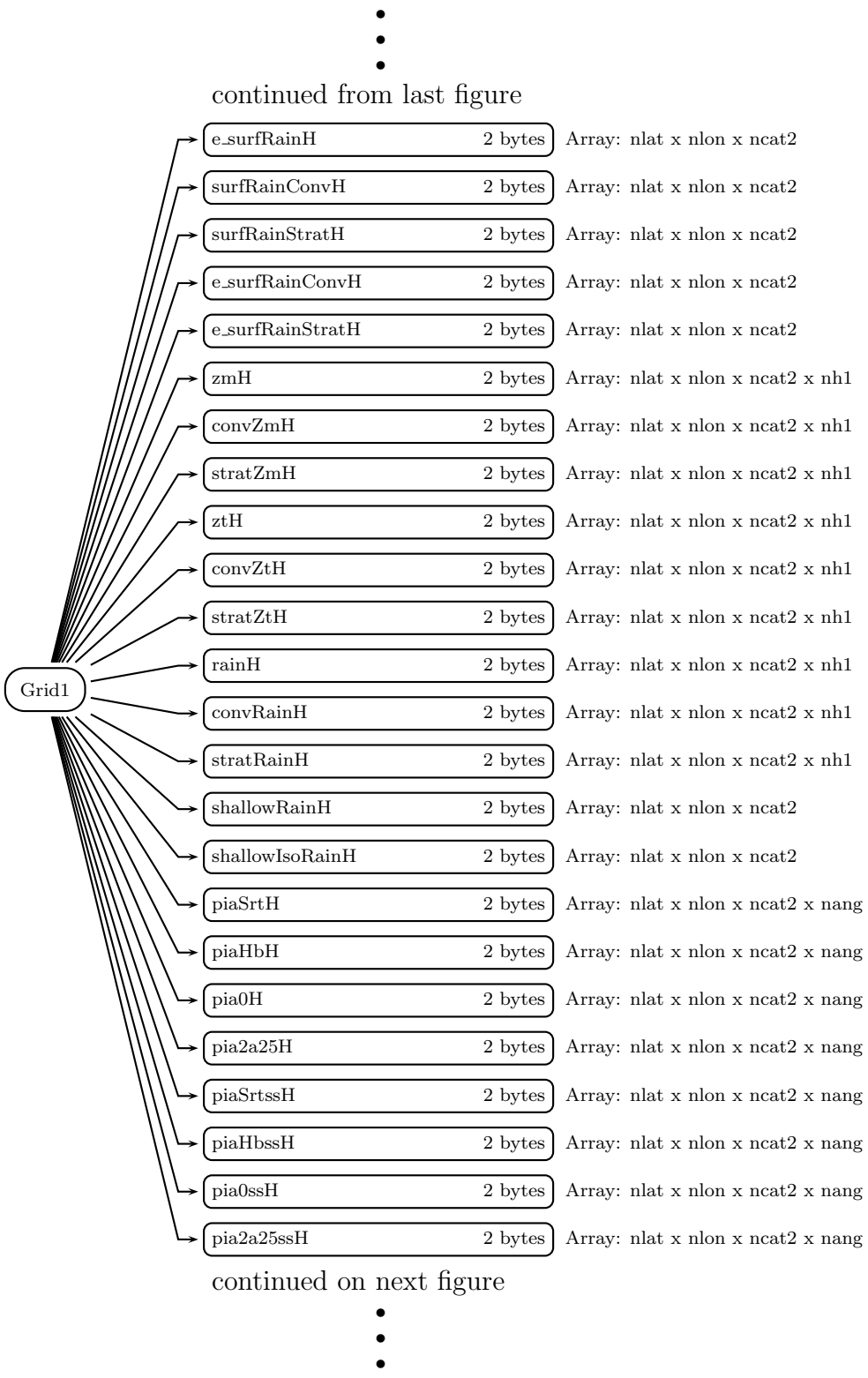


Figure 7: Data Format Structure for 3A25, Grid1, Grid1

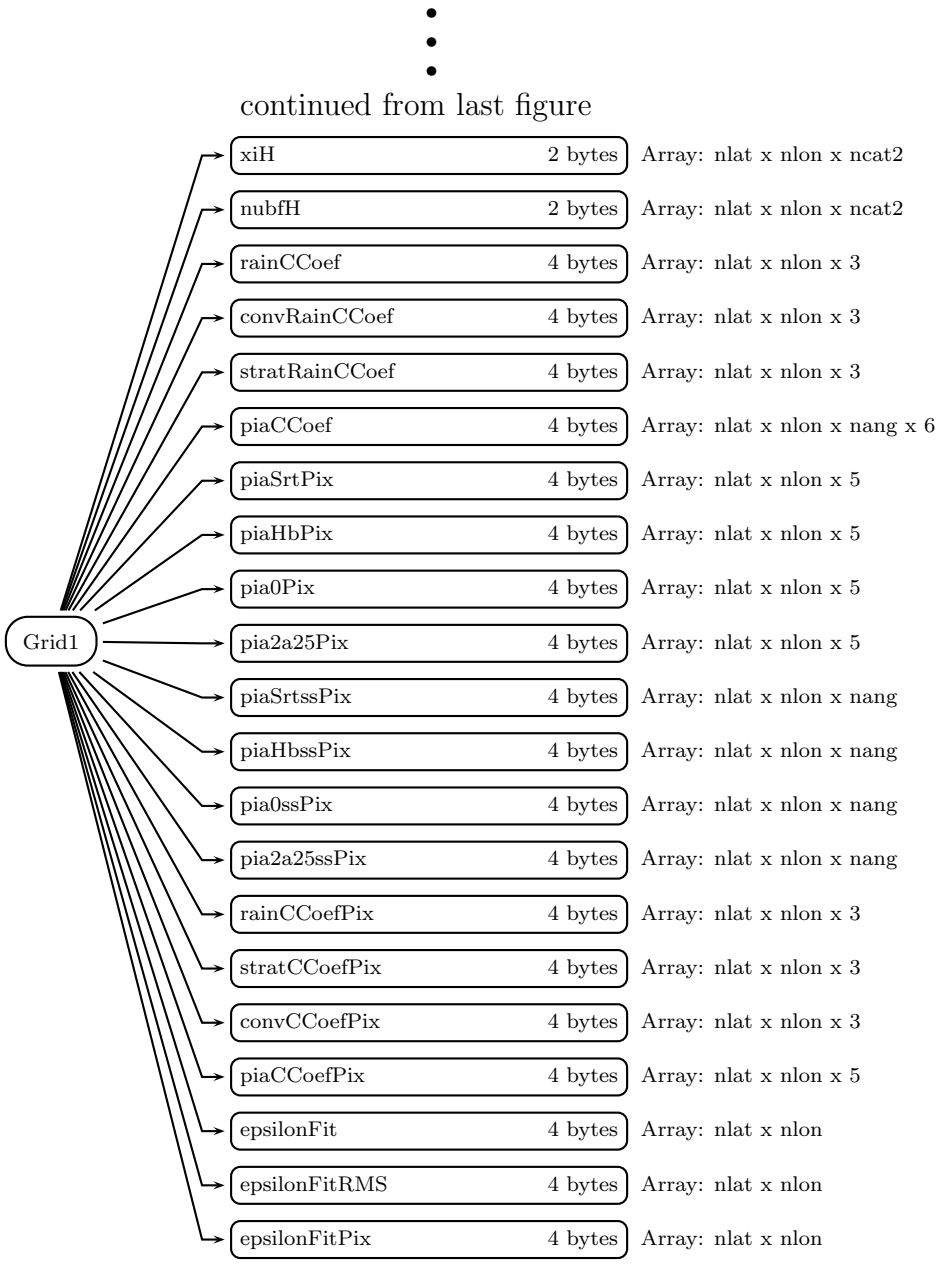


Figure 8: Data Format Structure for 3A25, Grid1

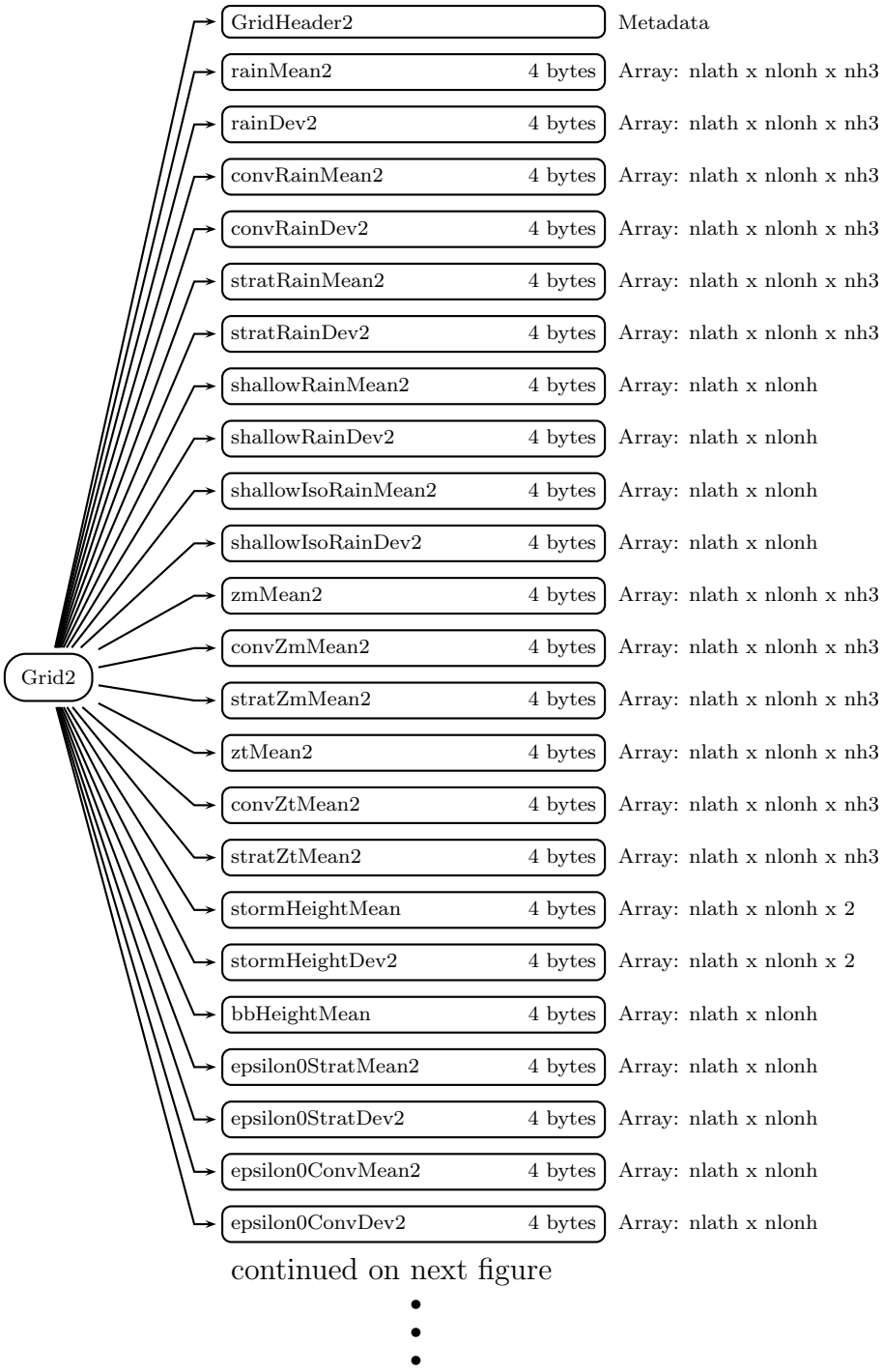


Figure 9: Data Format Structure for 3A25, Grid2, Grid2

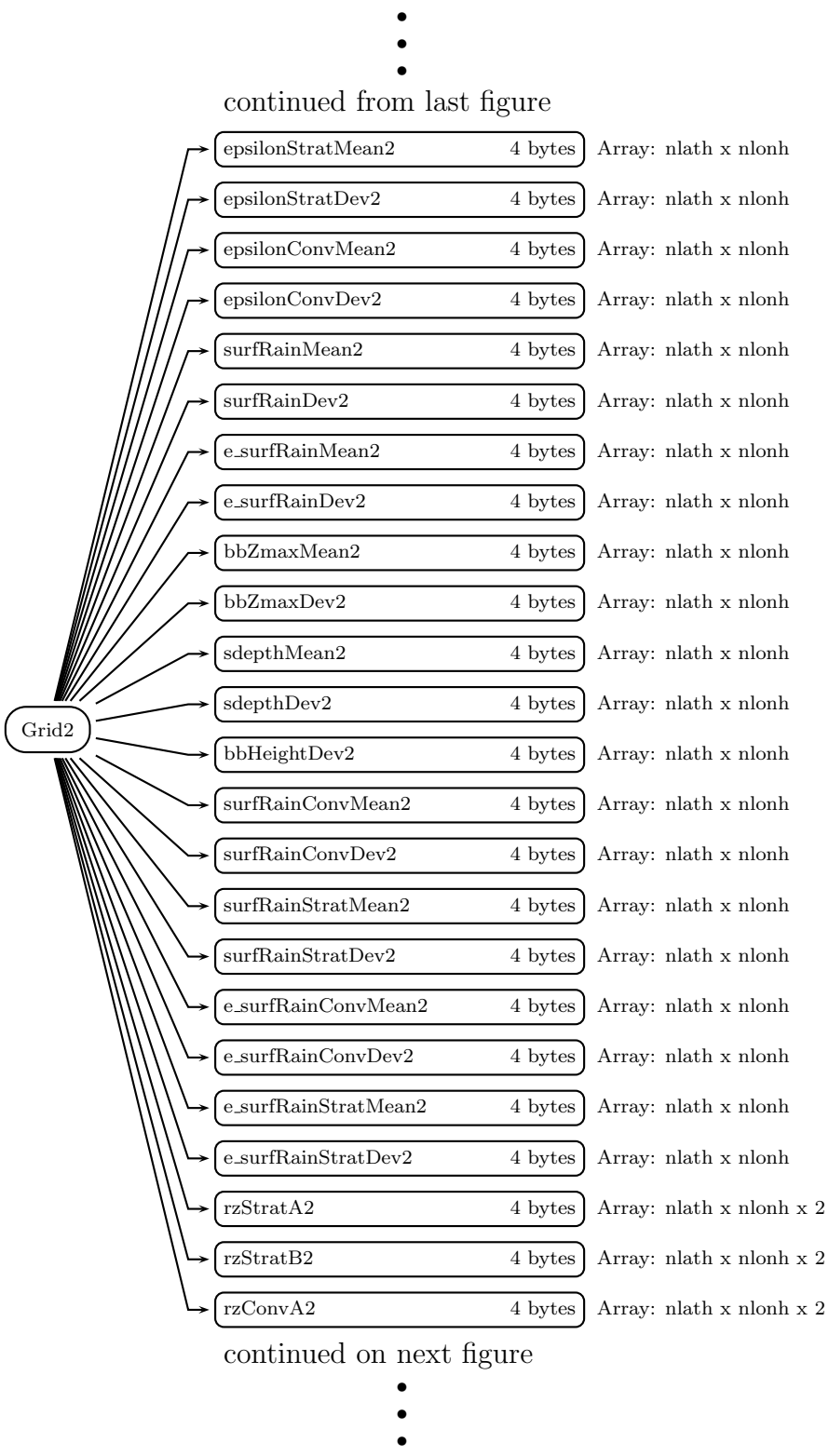


Figure 10: Data Format Structure for 3A25, Grid2, Grid2

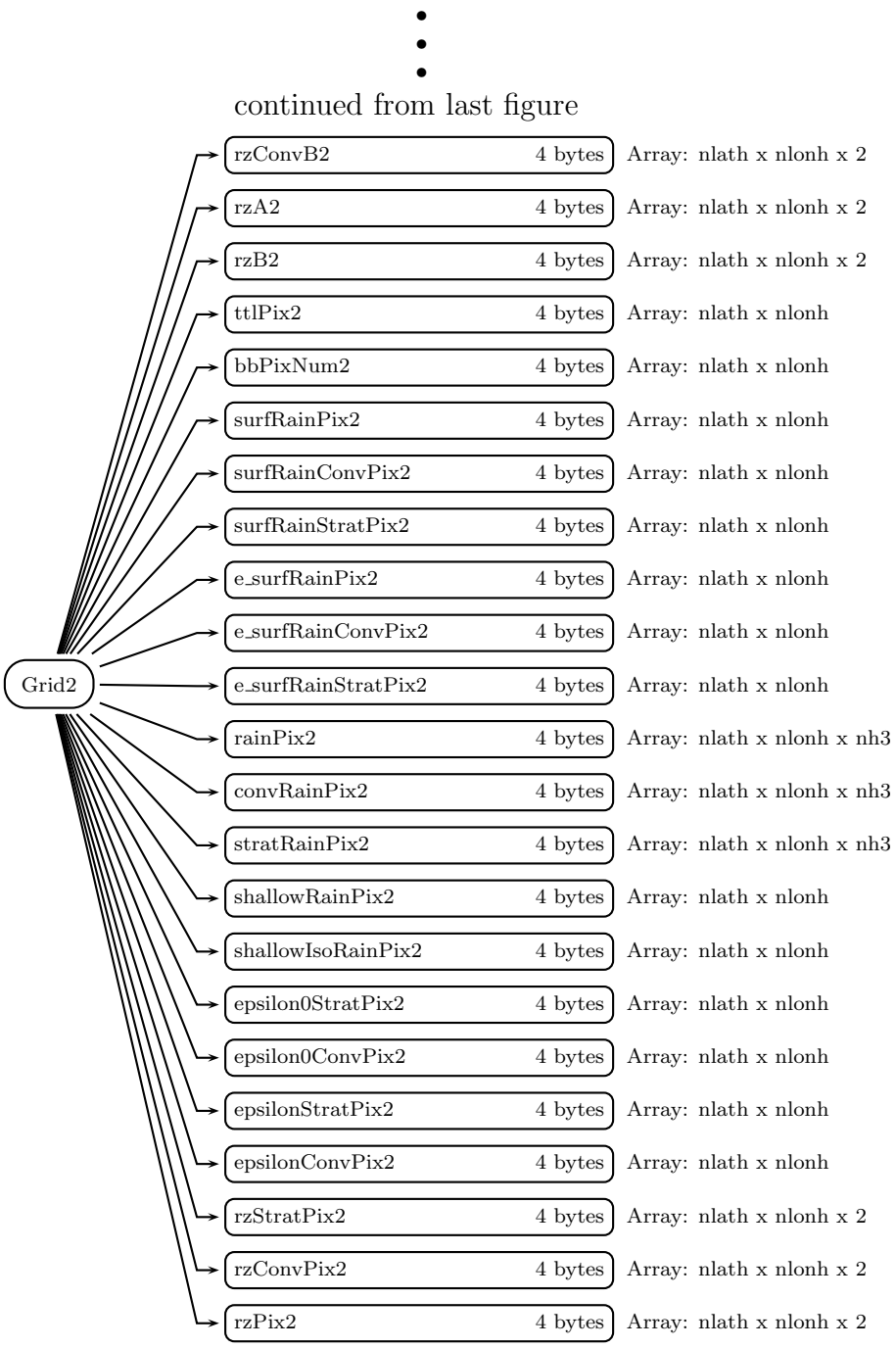


Figure 11: Data Format Structure for 3A25, Grid2

## **Grid1** (Grid)

**GridHeader1** (Metadata):
GridHeader contains metadata defining the grids in the grid structure. See Metadata for TRMM Products for details.

**rainMean1** (4-byte float, array size: nlat x nlon x nh1):
Rain Rate Mean 1 gives means of non-zero rain rates over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for the path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**rainDev1** (4-byte float, array size: nlat x nlon x nh1):
These are standard deviations of non-zero rain rates over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**convRainMean1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Rain Rate Mean 1 gives means of non-zero rain rates for convective rain over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**convRainDev1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Rain Rates Dev. 1 gives standard deviations of non-zero rain rates for convective rain over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**stratRainMean1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Rain Rate Mean 1 gives means of non-zero rain rates for stratiform rain over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**stratRainDev1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Rain Rates Dev. 1 gives standard deviations of non-zero rain rates for stratiform rain over 5 x 5 boxes for one month. The rain rates are determined in 2A-25 and evaluated for path-average and at the fixed heights of 2, 4, 6, 10 and 15 km. It ranges from 0.0 to 3000.0 mm/hr.

**shallowRainMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero shallow rain at a horizontal resolution of 5 x 5. It ranges from 0.0 to 3000.0 mm/hr.

**shallowRainDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero shallow rain at a horizontal resolution of $5^o$ x $5^o$. It ranges from 0.0 to 3000.0 mm/hr.

**shallowIsoRainMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero isolated shallow rain at a horizontal resolution of $5^o$ x $5^o$. It ranges from 0.0 to 3000.0 mm/hr.

**shallowIsoRainDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero shallow rain at a horizontal resolution of $5^o$ x $5^o$. It ranges from 0.0 to 3000.0 mm/hr.

**zmMean1** (4-byte float, array size: nlat x nlon x nh1):
The Zm Mean 1 gives means of measured radar reflectivity at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over $5^o$ x $5^o$ boxes for one month using data from 1C-21. It ranges from 0 to 100 dBZ.

**zmDev1** (4-byte float, array size: nlat x nlon x nh1):
The Zm Dev. 1 gives standard deviations of measured radar reflectivity at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over $5^o$ x $5^o$ boxes for one month using data from 1C-21. It ranges from 0 to 100 dBZ.

**convZmMean1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Zm Mean 1 gives the monthly means of measured radar reflectivity for convective rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged mean and means at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 1C-21. It ranges from 0 to 100 dBZ.

**convZmDev1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Zm Dev. 1 gives the monthly standard deviations of measured radar reflectivity for convective rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged standard deviation and those at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 1C-21. It ranges from 0 to 100 dBZ.

**stratZmMean1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Zm Mean 1 gives the monthly means of measured radar reflectivity for stratiform rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged mean and means at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 1C-21. It ranges from 0 to 100 dBZ.

**stratZmDev1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Zm Dev. 1 gives the monthly standard deviations of measured radar reflectivity for stratiform rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged standard deviation and those at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 1C-21. It ranges from 0 to 100 dBZ.

**ztMean1** (4-byte float, array size: nlat x nlon x nh1):
The Zt Mean 1 gives means of corrected radar reflectivity factors at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over $5^o$ x $5^o$ boxes for one month using data from 2A-25. It ranges from 0.1 to 80 dBZ.

**ztDev1** (4-byte float, array size: nlat x nlon x nh1):
The Zt Dev. 1 gives standard deviations of corrected radar reflectivity factors at the fixed

heights of 2, 4, 6, 10 and 15 km and for path-average over $5^o$ x $5^o$ boxes for one month using data from 2A-25. It ranges from 0.0 to 80 dBZ.

**convZtMean1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Zt Mean 1 gives the monthly means of corrected radar reflectivity for convective rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged mean and means at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 2A-25. It ranges from 0.1 to 80 dBZ.

**convZtDev1** (4-byte float, array size: nlat x nlon x nh1):
Conv. Zt Dev. 1 gives the monthly standard deviations of corrected radar reflectivity for convective rain at a horizontal resolution of 5 x 5. The path-averaged standard deviation and those at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 2A-25. It ranges from 0.0 to 80 dBZ.

**stratZtMean1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Zt Mean 1 gives the monthly means of measured radar reflectivity for stratiform rain at a horizontal resolution of 5 x 5. The path-averaged mean and means at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 2A-25. It ranges from 0.1 to 80 dBZ.

**stratZtDev1** (4-byte float, array size: nlat x nlon x nh1):
Strat. Zt Dev. 1 gives the monthly standard deviations of corrected radar reflectivity for stratiform rain at a horizontal resolution of $5^o$ x $5^o$. The path-averaged standard deviation and those at the fixed heights of 2, 4, 6, 10 and 15 km are calculated using data from 2A-25. It ranges from 0.0 to 80.0 dBZ.

**piaSrtMean** (4-byte float, array size: nlat x nlon x nang):
PIA srt Mean gives the monthly means of SRT (surface reference technique) path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of dB and a range from 0 dB to 100 dB.

**piaSrtDev** (4-byte float, array size: nlat x nlon x nang):
PIA srt Dev. gives the monthly standard deviation of SRT path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of dB and a range from 0 dB to 100 dB.

**piaHbMean** (4-byte float, array size: nlat x nlon x nang):
PIA hb Mean gives the monthly means of HB path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of dB and a range from 0 dB to 100 dB.

**piaHbDev** (4-byte float, array size: nlat x nlon x nang):
PIA hb Dev. gives the monthly standard deviation of HB path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of and a range from 0 dB to 100 dB.

**pia0Mean** (4-byte float, array size: nlat x nlon x nang):
PIA 0th Mean gives the monthly means of the 0th-order path-integrated attenuation

calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of and a range from 0 dB to 100 dB.

**pia0Dev** (4-byte float, array size: nlat x nlon x nang):
PIA 0th Dev. gives the monthly standard deviation of the 0th-order path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of dB and a range from 0 dB to 100 dB.

**pia2a25Mean** (4-byte float, array size: nlat x nlon x nang):
pia2a25Mean gives the monthly means of 2A25 path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of dB and a range from 0 dB to 100 dB.

**pia2a25Dev** (4-byte float, array size: nlat x nlon x nang):
pia2a25Dev. gives the monthly standard deviation of 2A25 path-integrated attenuation calculated at four fixed incidence angles. It has a horizontal resolution of 5 x 5. It has units of and a range from 0 dB to 100 dB.

**piaSrtssMean** (4-byte float, array size: nlat x nlon x nang):
Mean of PIA (path integrated attenuation, one-way) for SRT for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**piaSrtssDev** (4-byte float, array size: nlat x nlon x nang):
Standard deviation of PIA (path integrated attenuation, one-way) for SRT for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**piaHbssMean** (4-byte float, array size: nlat x nlon x nang):
Mean of PIA (path integrated attenuation, one-way) for HB method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**piaHbssDev** (4-byte float, array size: nlat x nlon x nang):
Standard deviation of PIA (path integrated attenuation, one-way) for HB method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**pia0ssMean** (4-byte float, array size: nlat x nlon x nang):
Mean of PIA (path integrated attenuation, one-way) for 0th-order method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**pia0ssDev** (4-byte float, array size: nlat x nlon x nang):
Standard deviation of PIA (path integrated attenuation, one-way) for 0th-order method for a sub- set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**pia2a25ssMean** (4-byte float, array size: nlat x nlon x nang):
Mean of final PIA (path integrated attenuation, one-way) from 2A25 for a sub-set of data

where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**pia2a25ssDev** (4-byte float, array size: nlat x nlon x nang):
Standard deviation of final PIA (path integrated attenuation, one-way) from 2A25 for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. Units are dB and it ranges from 0 to 100dB.

**stormHtMean** (4-byte float, array size: nlat x nlon x 3):
Storm Height Mean is the mean of the storm height for conditions of stratiform rain, convective rain and unconditional rain. It has units of meters and ranges from 0.0 to 20,000.

**stormHtDev** (4-byte float, array size: nlat x nlon x 3):
Storm Height Dev. is the standard deviation of the storm height for conditions of stratiform rain, convective rain and unconditional rain. It has units of meters and ranges from 0.0 to 20,000.

**xiMean** (4-byte float, array size: nlat x nlon):
Xi Mean gives the monthly means of the horizontal non-uniformity parameter of the rain field within a ray at a horizontal resolution of 5 x 5. It has no units and ranges from 0.0 to 99.0.

**xiDev** (4-byte float, array size: nlat x nlon):
Xi Dev. gives the monthly standard deviation of the horizontal non-uniformity parameter of the rain field within a ray at a horizontal resolution of 5 x 5. It has no units and ranges from 0.0 to 99.0.

**nubfCorFacMean** (4-byte float, array size: nlat x nlon):
The NUBF (Non-Uniform Beam Filling) Correction Factor Mean gives the monthly mean of NUBF correction for Z-factor and Rain Rate at a horizontal resolution of 5 x 5. It has no units and a range of 0 to 2.0.

**nubfCorFacDev** (4-byte float, array size: nlat x nlon):
The NUBF (Non-Uniform Beam Filling) Correction Factor Dev. gives the monthly standard deviation of the NUBF correction for Z-factor and Rain Rate at a horizontal resolution of 5 x 5. It has no units and ranges from 0 to 2.0.

**bbHtMean** (4-byte float, array size: nlat x nlon):
BB Height Mean gives the monthly means of the bright band height at a horizontal resolution of 5 x 5. It has units of meters and ranges from 0 to 20,000.

**bbHtDev** (4-byte float, array size: nlat x nlon):
BB Height Dev. gives the monthly deviation of the bright band height at a horizontal resolution of 5 x 5. It has units of meters and ranges from 0 to 20,000.

**epsilon0StratMean1** (4-byte float, array size: nlat x nlon):
Mean of epsilon conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0StratDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of epsilon0 conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0ConvMean1** (4-byte float, array size: nlat x nlon):
Mean of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0ConvDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonStratMean1** (4-byte float, array size: nlat x nlon):
Mean of epsilon conditioned stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonStratDev1** (4-byte float, array size: nlat x nlon):
Mean of epsilon conditioned stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonConvMean1** (4-byte float, array size: nlat x nlon):
Mean of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonConvDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0.0 to 5.0 (unitless).

**surfRainMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero near-surface rain rate at a horizontal resolution of 5 x 5. It ranges from 0.0 to 3000.0 mm/hr.

**surfRainDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero near-surface rain rate at a horizontal resolution of 5 x 5. It ranges from 0.0 to 3000.0 mm/hr.

**e_surfRainMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) in mm/hr. Over 5 x 5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) in mm/hr. Over 5 x 5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**bbZmaxMean1** (4-byte float, array size: nlat x nlon):
Mean of maximum reflectivity in bright band at a horizontal resolution of 5 x 5. It ranges from 0.0 to 100.0 dBZ.

**bbZmaxDev1** (4-byte float, array size: nlat x nlon):
Standard Deviation of maximum reflectivity in bright band at a horizontal resolution of 5 x 5. It ranges from 0.0 to 100.0 dBZ.

**bbNadirHtMean1** (4-byte float, array size: nlat x nlon):
Height of bright band from nadir ray in meters for 5 x 5 deg. boxes. It ranges from 0 to 20,000 meters.

**bbNadirHtDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of the bright band height from nadir ray in meters for 5 x 5 deg. boxes. It ranges from 0 to 20,000 meters.

**bbNadirWidthMean1** (4-byte float, array size: nlat x nlon):
Width of bright band from nadir ray in meters for 5 x 5 deg. boxes. It ranges from 0 to 10,000 meters.

**bbNadirWidthDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of the width of the bright band from nadir ray in meters for 5 x 5 deg. boxes. It ranges from 0 to 10,000 meters.

**bbNadirZmaxMean1** (4-byte float, array size: nlat x nlon):
Mean of maximum Z in bright band from the nadir ray in dBZ for 5 x 5 deg. boxes. It ranges from 0 to 70dBZ.

**bbNadirZmaxDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of maximum Z in bright band from the nadir ray in dBZ for 5 x 5 deg. boxes. It ranges from 0 to 70dBZ.

**sdepthMean1** (4-byte float, array size: nlat x nlon):
Mean of snow depth at a horizontal resolution of 5 x 5. It ranges from 0.0 to 20,000.0 m.

**sdepthDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of snow depth at a horizontal resolution of 5 x 5. It ranges from 0.0 to 20,000.0 m.

**surfRainConvMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero near-surface rain rate conditioned on convective rain in 5 x 5 deg. boxes. It ranges from 0.0 to 3000.0 mm/hr.

**surfRainConvDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero near-surface rain rate conditioned on convective rain in 5 x 5 deg. boxes. It ranges from 0.0 to 3000.0 mm/hr.

**surfRainStratMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero near-surface rain rate conditioned on stratiform rain in 5 x 5 deg. boxes. It ranges from 0.0 to 3000.0 mm/hr.

**surfRainStratDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero near-surface rain rate conditioned on convective rain in 5 x 5 deg. boxes. It ranges from 0.0 to 3000.0 mm/hr.

**e_surfRainConvMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on convective rain in mm/hr. Over 5 x 5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainConvDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on convective rain in mm/hr. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainStratMean1** (4-byte float, array size: nlat x nlon):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on stratiform rain in mm/hr. Over 5 x 5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainStratDev1** (4-byte float, array size: nlat x nlon):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on stratiform rain in mm/hr. Over 5 x 5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**rzStratA1** (4-byte float, array size: nlat x nlon x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on stratiform rain. Computed for near-surface and 2km heights. It ranges from 0 to 1.0.

**rzStratB1** (4-byte float, array size: nlat x nlon x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on stratiform rain. Computed for near-surface and 2km heights. Over 5 x 5 deg. boxes. It ranges from 0 to 1.0.

**rzConvA1** (4-byte float, array size: nlat x nlon x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on convective rain. Computed for near-surface and 2km heights. Over 5 x 5 deg. boxes. It ranges from 0 to 1.0.

**rzConvB1** (4-byte float, array size: nlat x nlon x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on convective rain. Computed for near-surface and 2km heights. Over 5 x 5 deg. boxes. It ranges from 0 to 1.0.

**rzA1** (4-byte float, array size: nlat x nlon x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs. Computed for near-surface and 2km heights. Over 5 x 5 deg. boxes. It ranges from 0 to 1.0.

**rzB1** (4-byte float, array size: nlat x nlon x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs. Computed for near-surface and 2km heights. Over 5 x 5 deg. boxes. It ranges from 0 to 1.0.

**ttlPix1** (4-byte integer, array size: nlat x nlon):
The Total Pixel Number 1 is the number of total pixels over 5 x 5 boxes for one month. The range is 0 to 2,000,000.

**bbPixNum1** (4-byte integer, array size: nlat x nlon):
The number of bright band counts over each 5 x 5 box for one month. The range is 0 to

2,000,000.

**bbNadirPix1** (4-byte integer, array size: nlat x nlon):
The number of bright band nadir pixel counts. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**surfRainPix1** (4-byte integer, array size: nlat x nlon):
Near-surface rain counts at a horizontal resolution of 5 x 5. It ranges from 0 to 2,000,000.

**surfRainStratPix1** (4-byte integer, array size: nlat x nlon):
Counts of non-zero near-surface rainfall conditioned on convective rain in 5 x 5 deg. boxes. Ranges from 0 to 32,767.

**surfRainConvPix1** (4-byte integer, array size: nlat x nlon):
Counts of non-zero near-surface rain fall conditioned on convective rain in 5 x 5 deg. boxes. Ranges from 0 to 32,767.

**e_surfRainPix1** (4-byte integer, array size: nlat x nlon):
The number of non-zero estimated surface rain pixel counts. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**e_surfRainStratPix1** (4-byte integer, array size: nlat x nlon):
The number of non-zero estimated surface rain pixel counts conditioned on stratiform. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**e_surfRainConvPix1** (4-byte integer, array size: nlat x nlon):
The number of non-zero estimated surface rain pixel counts conditioned on convective rain. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**epsilon0StratPix1** (4-byte integer, array size: nlat x nlon):
Counts of epsilon0 conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0 to 2,000,000.

**epsilon0ConvPix1** (4-byte integer, array size: nlat x nlon):
Counts of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0 to 2,000,000.

**epsilonStratPix1** (4-byte integer, array size: nlat x nlon):
Counts of epsilon conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0 to 2,000,000.

**epsilonConvPix1** (4-byte integer, array size: nlat x nlon):
Counts of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5deg. It ranges from 0 to 2,000,000.

**rainPix1** (4-byte integer, array size: nlat x nlon x nh1):
The Rain Pixel Number 1 is the number of non-zero rain rate pixels at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over 5 x 5 boxes for one month. The range is 0 to 2,000,000.

**convRainPix1** (4-byte integer, array size: nlat x nlon x nh1):
The Convective Rain Pixel Number 1 is the number of non-zero rain rate pixels for

convective rain at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over 5 x 5 boxes for one month. The range is 0 to 2,000,000.

**stratRainPix1** (4-byte integer, array size: nlat x nlon x nh1):
The Stratiform Rain Pixel Number 1 is the number of non-zero rain rate pixels for stratiform rain at the fixed heights of 2, 4, 6, 10 and 15 km and for path-average over 5 x 5 boxes for one month. The range is 0 to 2,000,000.

**ttlAnglePix1** (2-byte integer, array size: nlat x nlon x 4):
Total Angle Pixel Number 1 is the total number of pixels over each 5 x 5 latitude-longitude grid box for a month. This parameter is accumulated at four different angles (i.e., 0, 5, 10, and 15). The range is 0 to 30,000.

**rainAnglePix1** (2-byte integer, array size: nlat x nlon x 4):
Rain Angle Pixel Number 1 is the total number of non-zero rain rate pixels over each 5 x 5 latitude-longitude grid box for a month. This parameter is accumulated at four different angles (i.e., 0, 5, 10, and 15). The range is 0 to 30,000.

**rzStratPix1** (4-byte integer, array size: nlat x nlon x 2):
The number of R-Z coefficient pixel counts for stratiform rain for near-surface and 2km heights. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**rzConvPix1** (4-byte integer, array size: nlat x nlon x 2):
The number of R-Z coefficient pixel counts for convective rain for near-surface and 2km heights. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**rzPix1** (4-byte integer, array size: nlat x nlon x 2):
The number of R-Z coefficient pixel counts for near-surface and 2km heights. Over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**shallowRainPix1** (4-byte integer, array size: nlat x nlon):
Counts of non-zero shallow rain over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**shallowIsoRainPix1** (4-byte integer, array size: nlat x nlon):
Counts of non-zero isolated shallow rain over 5 x 5 deg. boxes. The range is 0 to 2,000,000.

**stormHH** (2-byte integer, array size: nlat x nlon x ncat2):
These are histograms of the 'effective' storm heights for 30 categories over a 5 x 5 box for one month. It ranges from 0 to 32,767.

**convStormHH** (2-byte integer, array size: nlat x nlon x ncat2):
These are histograms of the 'effective' storm heights for convective rain for 30 categories over a 5 x 5 box for one month. It ranges from 0 to 32,767.

**stratStormHH** (2-byte integer, array size: nlat x nlon x ncat2):
These are histograms of the 'effective' storm heights for stratiform rain for 30 categories over a 5 x 5 box for one month. It ranges from 0 to 32,767.

**BBHH** (2-byte integer, array size: nlat x nlon x ncat2):
These are histograms of the bright-band heights for 30 categories over a 5 x 5 box for one month, given that the bright band is detected. It ranges from 0 to 32,767.

**bbNadirWidthH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of bright band widths from nadir ray for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**bbNadirHH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of bright band heights from nadir ray for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**bbNadirZmaxH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of maximum Z in bright band from nadir ray for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**snowIceLH** (2-byte integer, array size: nlat x nlon x ncat2):
These are histograms of the depth of snow-ice layer for 30 categories over a 5 x 5 box for one month. The depth of snow-ice layer is defined as the difference between effective storm height and estimated height of 0$^o$C isotherm. It ranges from 0 to 32,767.

**bbZmaxH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of maximum Zt in bright band at a horizontal resolution of 5 x 5. It ranges from 0 to 32,000.

**epsilon0StratH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of epsilon0 conditioned stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**epsilon0ConvH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of epsilon0 conditioned convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**epsilonStratH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of epsilon conditioned stratiform rain and use of 2A21 SRT at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**epsilonConvH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of epsilon conditioned convective rain and use of 2A21 SRT at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**surfRainH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of near-surface rain rate at a horizontal resolution of 5 x 5. It ranges from 0 to 32,000.

**e_surfRainH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of non-zero estimated surface rain for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**surfRainConvH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of non-zero near-surface rainfall conditioned on convective rain in 5 x 5 deg. boxes. Binned into 20 categories. Ranges from 0 to 32,767.

**surfRainStratH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of non-zero near-surface rainfall conditioned on stratiform rain in 5 x 5 deg. boxes. Binned into 20 categories. Ranges from 0 to 32,767.

**e_surfRainConvH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of non-zero estimated surface rain conditioned on convective rain for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**e_surfRainStratH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram in counts of non-zero estimated surface rain conditioned on stratiform rain for 5 x 5 deg. boxes. There are 30 categories. It ranges from 0 to 32,767.

**zmH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Zm Histograms are histograms of measured reflectivities of rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a 5 x 5 box for one month. It ranges from 0 to 32,767.

**convZmH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Convective Zm Histograms are histograms of measured reflectivities of convective rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**stratZmH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Stratiform Zm Histograms are histograms of measured reflectivities of stratiform rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**ztH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Zt Histograms are histograms of corrected reflectivity factors for rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**convZtH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Convective Zt Histograms are histograms of corrected reflectivity factors for convective rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**stratZtH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
The Stratiform Zt Histograms are histograms of corrected reflectivity factors for stratiform rain pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**rainH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
These are histograms of non-zero rain rate pixels at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**convRainH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
These are histograms of non-zero rain rate pixels for convective rain at five heights (2, 4, 6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767

**stratRainH** (2-byte integer, array size: nlat x nlon x ncat2 x nh1):
These are histograms of non-zero rain rate pixels for stratiform rain at five heights (2, 4,

6, 10 and 15 km) and path-average for 20 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767

**shallowRainH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of non-zero shallow rain at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**shallowIsoRainH** (2-byte integer, array size: nlat x nlon x ncat2):
Histogram of non-zero isolated shallow rain at a horizontal resolution of 5 x 5 deg. It ranges from 0 to 32,000.

**piaSrtH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
PIA srt Hist. gives histograms of path-attenuation as determined by the surface reference technique (SRT) at 4 incidence angles ($0^o$, $5^o$, $10^o$ and $15^o$) for 30 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**piaHbH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
These are histograms of path-attenuation using an estimate derived from measured reflectivity (Zm) and a k-Z relationship at 4 incidence angles ($0^o$, $5^o$, $10^o$ and $15^o$) for 30 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**pia0H** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
PIA 0th Hist. is the histogram of the 0th order path-integrated attenuation with a horizontal resolution of $5^o$ x $5^o$. This histogram is calculated for 30 categories at 4 different incident angles ($0^o$, $5^o$, $10^o$ and $15^o$). It ranges from 0 to 32,767

**pia2a25H** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
These are histograms of path-attenuation as determined by 2A25 at 4 incidence angles ($0^o$, $5^o$, $10^o$ and $15^o$) for 30 categories over a $5^o$ x $5^o$ box for one month. It ranges from 0 to 32,767.

**piaSrtssH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
Histogram in counts of PIA from SRT subsetted by 2A25 method flag at 5 angles ($0^o$, $5^o$, $10^o$, $15^o$ and all 49 angle bins) for 30 categories over $5^o$ x $5^o$ deg. boxes. It ranges from 0 to 32,767.

**piaHbssH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
Histogram in counts of PIA from HB method subsetted by 2A25 method flag at 5 angles ($0^o$, $5^o$, $10^o$, $15^o$ and all 49 angle bins) for 30 categories over $5^o$ x $5^o$ deg. boxes. It ranges from 0 to 32,767.

**pia0ssH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
Histogram in counts of PIA from 0th-order method subsetted by 2A25 method flag at 5 angles ($0^o$, $5^o$, $10^o$, $15^o$ and all 49 angle bins) for 30 categories over $5^o$ x $5^o$ deg. boxes. It ranges from 0 to 32,767.

**pia2a25ssH** (2-byte integer, array size: nlat x nlon x ncat2 x nang):
Histogram in counts of final PIA from 2A25 subsetted by 2A25 method flag at 5 angles ($0^o$, $5^o$, $10^o$, $15^o$ and all 49 angle bins) for 30 categories over $5^o$ x $5^o$ deg. boxes. It ranges from 0 to 32,767.

**xiH** (2-byte integer, array size: nlat x nlon x ncat2):
The Xi Histograms is the histogram of non-uniformity parameter determined in 2A-25 for 30 categories over a 5 x 5 box for one month. It ranges from 0 to 32,767.

**nubfH** (2-byte integer, array size: nlat x nlon x ncat2):
NUBF (Non-Uniform Beam Filling) Hist. gives the histogram of the NUBF correction for Z-factor and rain rate of 30 different categories over 5o x 5o grid boxes. It ranges from 0 to 32,767.

**rainCCoef** (4-byte float, array size: nlat x nlon x 3):
These are correlation coefficients of non-zero rain rates between 3 heights (i.e., correlation coefficient of rain rates at 2 km vs 4 km, 2 km vs 6 km, and 4 km vs 6 km) for a 5 x 5 box for one month.. It ranges from -1.000 to 1.000.

**convRainCCoef** (4-byte float, array size: nlat x nlon x 3):
These are correlation coefficients of non-zero rain rates for convective rain between 3 heights (i.e., correlation coefficient of rain rates at 2 km vs 4 km, 2 km vs 6 km, and 4 km vs 6 km ) for a 5 x 5 box for one month. It ranges from -1.000 to 1.000.

**stratRainCCoef** (4-byte float, array size: nlat x nlon x 3):
These are correlation coefficients of non-zero rain rates for stratiform rain between 3 heights (i.e., correlation coefficient of rain rates at 2 km vs 4 km, 2 km vs 6 km, and 4 km vs 6 km) for a 5 x 5 box for one month. It ranges from -1.000 to 1.000.

**piaCCoef** (4-byte float, array size: nlat x nlon x nang x 6):
This is the correlation coefficient of three path-integrated attenuations (SRT, HB, and 0th order PIAs) at angles of 0, 5, 10 and 15 for a 5 x 5 box for one month. It ranges from -1.000 to 1.000.

**piaSrtPix** (4-byte float, array size: nlat x nlon x 5):
Counts of PIA using the SRT method. Over 5 x 5 deg. boxes, calculated at four incidence angles and for all angles. It ranges from 0 to 32,767.

**piaHbPix** (4-byte float, array size: nlat x nlon x 5):
Counts of PIA using the HB method. Over 5 x 5 deg. boxes, calculated at four incidence angles and for all angles. It ranges from 0 to 32,767.

**pia0Pix** (4-byte float, array size: nlat x nlon x 5):
Counts of PIA using the 0th order method. Over 5 x 5 deg. boxes, calculated at four incidence angles and for all angles. It ranges from 0 to 32,767.

**pia2a25Pix** (4-byte float, array size: nlat x nlon x 5):
Counts of PIA from 2A25. Over 5 x 5 deg. boxes, calculated at four incidence angles and for all angles. It ranges from 0 to 32,767.

**piaSrtssPix** (4-byte float, array size: nlat x nlon x nang):
Counts of PIA using SRT method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**piaHbssPix** (4-byte float, array size: nlat x nlon x nang):
Counts of PIA using HB method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**pia0ssPix** (4-byte float, array size: nlat x nlon x nang):
Counts of PIA using 0th-order method for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**pia2a25ssPix** (4-byte float, array size: nlat x nlon x nang):
Counts of final PIA from 2A25 for a sub-set of data where the 2A25 method flag has been set (see 2A25/3A25 algorithm users guide). Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**rainCCoefPix** (4-byte float, array size: nlat x nlon x 3):
Counts for correlation coefficients of rain at the 3 heights. Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**stratCCoefPix** (4-byte float, array size: nlat x nlon x 3):
Counts for correlation coefficients of rain conditioned on stratiform rain at the 3 heights. Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**convCCoefPix** (4-byte float, array size: nlat x nlon x 3):
Counts for correlation coefficients of rain conditioned on convective rain at the 3 heights. Over 5 x 5 deg. boxes. It ranges from 0 to 32,767.

**piaCCoefPix** (4-byte float, array size: nlat x nlon x 5):
Counts for correlation coefficients of PIA for the 5 angle categories (0, 5, 10, 15 degrees and all 49 angle bins). It ranges from 0 to 32,767.

**epsilonFit** (4-byte float, array size: nlat x nlon):
Estimate of epsilon from a linear fit of zeta from 2A25 and SRT PIA from 2A21. Values range from -10 to 10. Special values are defined as:
-9999.9 Missing value

**epsilonFitRMS** (4-byte float, array size: nlat x nlon):
RMS uncertainty from the fit of zeta and SRT PIA. Values range from -50 to 50. Special values are defined as:
-9999.9 Missing value

**epsilonFitPix** (4-byte integer, array size: nlat x nlon):
Number of measurements used in the fit of zeta and SRT PIA. Values range from 0 to 5000. Special values are defined as:
-9999 Missing value

## **Grid2** (Grid)

**GridHeader2** (Metadata):
GridHeader contains metadata defining the grids in the grid structure. See Metadata for TRMM Products for details.

**rainMean2** (4-byte float, array size: nlath x nlonh x nh3):
Rain Rate Mean 2 gives means of non-zero rain rates over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**rainDev2** (4-byte float, array size: nlath x nlonh x nh3):
Rain Rate Dev. 2 gives standard deviations of non-zero rain rates over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**convRainMean2** (4-byte float, array size: nlath x nlonh x nh3):
Conv. Rain Rate Mean 2 gives means of non-zero rain rates for convective rain over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**convRainDev2** (4-byte float, array size: nlath x nlonh x nh3):
Conv. Rain Rate Dev. 2 gives standard deviations of non-zero rain rates for convective rain over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**stratRainMean2** (4-byte float, array size: nlath x nlonh x nh3):
Strat. Rain Rate Mean 2 gives means of non-zero rain rates for stratiform rain over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**stratRainDev2** (4-byte float, array size: nlath x nlonh x nh3):
Strat/ Rain Rate Dev. 2 gives standard deviations of non-zero rain rates for stratiform rain over 0.5 x 0.5 boxes for one month. The rain rates are determined in 2A-25 and evaluated at the fixed heights of 2 km, 4 km, 6 km, and path average. It ranges from 0 to 3000.0 mm/hr.

**shallowRainMean2** (4-byte float, array size: nlath x nlonh):
Mean of shallow rain at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 3000 mm/hr.

**shallowRainDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of shallow rain at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 3000 mm/hr.

**shallowIsoRainMean2** (4-byte float, array size: nlath x nlonh):
Mean of shallow isolated rain at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 3000 mm/hr.

**shallowIsoRainDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of shallow isolated rain at a horizontal resolution of 0.5 x 0.5 deg. It

ranges from 0.0 to 3000 mm/hr.

**zmMean2** (4-byte float, array size: nlath x nlonh x nh3):
Zm Mean 2 gives the monthly means of the measured reflectivity at the fixed height levels of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from -20 to 80 dBZ.

**convZmMean2** (4-byte float, array size: nlath x nlonh x nh3):
Conv. Zm Mean 2 gives the monthly means of the measured reflectivity of convective rain at the fixed height levels of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from -20 to 80 dBZ.

**stratZmMean2** (4-byte float, array size: nlath x nlonh x nh3):
Strat. Zm Means gives the monthly means of the measured reflectivity of stratiform rain at the fixed heights of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from -20 to 80 dBZ.

**ztMean2** (4-byte float, array size: nlath x nlonh x nh3):
Zt Mean 2 gives the monthly means of the corrected reflectivity at the fixed heights of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from 0.1 to 80 dBZ.

**convZtMean2** (4-byte float, array size: nlath x nlonh x nh3):
Conv. Zm Mean 2 gives the monthly means of the corrected reflectivity of convective rain at the fixed height levels of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from 0.1 to 80 dBZ.

**stratZtMean2** (4-byte float, array size: nlath x nlonh x nh3):
Strat. Zm Means gives the monthly means of the corrected reflectivity of stratiform rain at the fixed heights of 2 km, 4 km, 6 km, and path average over $0.5^o$ x $0.5^o$ grid boxes. It ranges from 0.1 to 80 dBZ.

**stormHeightMean** (4-byte float, array size: nlath x nlonh x 2):
Storm Height Mean gives the monthly means of the storm height for stratiform and convective rain over $0.5^o$ x $0.5^o$ grid boxes. It has units of meters and ranges from 0 to 20,000.

**stormHeightDev2** (4-byte float, array size: nlath x nlonh x 2):
Standard deviation of storm height, conditioned for stratiform and convective rain at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 20,000.0 m.

**bbHeightMean** (4-byte float, array size: nlath x nlonh):
BB Height Mean gives the monthly means of bright-band height over grid boxes of $0.5^o$ x $0.5^o$. It has units of meters and ranges from 0 to 20,000.

**epsilon0StratMean2** (4-byte float, array size: nlath x nlonh):
Mean of epsilon0 conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0StratDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of epsilon0 conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0ConvMean2** (4-byte float, array size: nlath x nlonh):
Mean of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilon0ConvDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonStratMean2** (4-byte float, array size: nlath x nlonh):
Mean of epsilon conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0(unitless).

**epsilonStratDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of epsilon conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonConvMean2** (4-byte float, array size: nlath x nlonh):
Mean of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**epsilonConvDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of 0.5 x 0.5 deg. It ranges from 0.0 to 5.0 (unitless).

**surfRainMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero near-surface rain rate at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 3000.0 mm/hr.

**surfRainDev2** (4-byte float, array size: nlath x nlonh):
Standard Deviation of non-zero near-surface rain rate at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 3000.0 mm/hr.

**e_surfRainMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0mm/hr.

**e_surfRainDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**bbZmaxMean2** (4-byte float, array size: nlath x nlonh):
Mean of maximum reflectivity in bright band at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 100.0 dBZ.

**bbZmaxDev2** (4-byte float, array size: nlath x nlonh):
Mean of maximum reflectivity in bright band at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 100.0 dBZ.

**sdepthMean2** (4-byte float, array size: nlath x nlonh):
Mean of snow depth at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0.0 to 20,000.0 m.

**sdepthDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of snow depth at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 20,000.0 m.

**bbHeightDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of bright band height at a horizontal resolution of 0.5 x 0.5. It ranges from 0.0 to 20,000.0 m.

**surfRainConvMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero near-surface rain conditioned on convective rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**surfRainConvDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of non-zero near-surface rain conditioned on convective rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**surfRainStratMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero near-surface rain conditioned on stratiform rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**surfRainStratDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of non-zero near-surface rain conditioned on stratiform rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainConvMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on convective rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainConvDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on convective rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainStratMean2** (4-byte float, array size: nlath x nlonh):
Mean of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on stratiform rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**e_surfRainStratDev2** (4-byte float, array size: nlath x nlonh):
Standard deviation of non-zero estimated surface rain below clutter (See 2A25 algorithm user guide) conditioned on stratiform rain in mm/hr. Over 0.5 x 0.5 deg. boxes. It ranges from 0.0 to 400.0 mm/hr.

**rzStratA2** (4-byte float, array size: nlath x nlonh x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous

R,Z pairs conditioned on stratiform rain. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**rzStratB2** (4-byte float, array size: nlath x nlonh x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on stratiform rain. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**rzConvA2** (4-byte float, array size: nlath x nlonh x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on convective rain. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**rzConvB2** (4-byte float, array size: nlath x nlonh x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs conditioned on convective rain. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**rzA2** (4-byte float, array size: nlath x nlonh x 2):
The A parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**rzB2** (4-byte float, array size: nlath x nlonh x 2):
The B parameter in rainfall-reflectivity relation R = $AZ^B$ from fitting of instantaneous R,Z pairs. Computed for near-surface and 2km heights. Over 0.5 x 0.5 deg. boxes. It ranges from 0 to 1.0.

**ttlPix2** (4-byte integer, array size: nlath x nlonh):
The Total Pixel Number 2 is the number of total pixels over 0.5 x 0.5 boxes for one month. The range is 0 to 2,000,000.

**bbPixNum2** (4-byte integer, array size: nlath x nlonh):
The number of bright band counts over each 0.5 x 0.5 box for one month. The range is 0 to 2,000,000.

**surfRainPix2** (4-byte integer, array size: nlath x nlonh):
Near-surface rain counts at a horizontal resolution of 0.5 x 0.5. It ranges from 0 to 2,000,000,000.

**surfRainConvPix2** (4-byte integer, array size: nlath x nlonh):
Counts of non-zero near-surface rain conditioned convective rain at a horizontal resolution of 0.5 x 0.5deg. It ranges from 0 to 2,000,000.

**surfRainStratPix2** (4-byte integer, array size: nlath x nlonh):
Counts of non-zero near-surface rain conditioned statiform rain at a horizontal resolution of 0.5 x 0.5deg. It ranges from 0 to 2,000,000.

**e_surfRainPix2** (4-byte integer, array size: nlath x nlonh):
Counts of non-zero estimated surface rain at a horizontal resolution of 0.5 x 0.5deg. It ranges from 0 to 2,000,000.

**e_surfRainConvPix2** (4-byte integer, array size: nlath x nlonh):
Counts of non-zero estimated surface rain conditioned on convective rain at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**e_surfRainStratPix2** (4-byte integer, array size: nlath x nlonh):
Counts of non-zero estimated surface rain conditioned on statiform rain at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**rainPix2** (4-byte integer, array size: nlath x nlonh x nh3):
The Rain Pixel Number 2 is the monthly number of non-zero rain rate pixels for path-averaged rainfall and rainfall at the fixed heights of 2 km, 4 km, 6 km, and path average over 0.5 x 0.5 boxes. The range is 0 to 2,000,000.

**convRainPix2** (4-byte integer, array size: nlath x nlonh x nh3):
The Convective Rain Pixel Number 2 is the number of non-zero rain rate pixels for convective rain at the fixed heights of of 2 km, 4 km, 6 km, and path average over 0.5x 0.5 boxes for one month. The range is 0 to 2,000,000.

**stratRainPix2** (4-byte integer, array size: nlath x nlonh x nh3):
The Stratiform Rain Pixel Number 2 is the number of non-zero rain rate pixels for stratiform rain at the fixed heights of of 2 km, 4 km, 6 km, and path average over 0.5 x 0.5 boxes for one month. The range is 0 to 2,000,000.

**shallowRainPix2** (4-byte integer, array size: nlath x nlonh):
Counts of shallow rain rain at a horizontal resolution of 0.5 x 0.5deg. It ranges from 0 to 2,000,000.

**shallowIsoRainPix2** (4-byte integer, array size: nlath x nlonh):
Counts of shallow isolated rain rain at a horizontal resolution of 0.5 x 0.5deg. It ranges from 0 to 2,000,000.

**epsilon0StratPix2** (4-byte integer, array size: nlath x nlonh):
Counts of epsilon0 conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**epsilon0ConvPix2** (4-byte integer, array size: nlath x nlonh):
Counts of epsilon0 conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**epsilonStratPix2** (4-byte integer, array size: nlath x nlonh):
Counts of epsilon conditioned on stratiform rain and use of 2A21 SRT at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**epsilonConvPix2** (4-byte integer, array size: nlath x nlonh):
Counts of epsilon conditioned on convective rain and use of 2A21 SRT at a horizontal resolution of $0.5^o$ x $0.5^o$. It ranges from 0 to 2,000,000.

**rzStratPix2** (4-byte integer, array size: nlath x nlonh x 2):
The number of R-Z coefficent pixel counts conditioned on stratiform rain for near-surface and 2km heights. Over $0.5^o$ x $0.5^o$ boxes. It ranges from 0 to 2,000,000.

**rzConvPix2** (4-byte integer, array size: nlath x nlonh x 2):
The number of R-Z coefficent pixel counts conditioned on convective rain for near-surface and 2km heights. Over $0.5^o$ x $0.5^o$ boxes. It ranges from 0 to 2,000,000.

**rzPix2** (4-byte integer, array size: nlath x nlonh x 2):
The number of R-Z coefficent pixel counts for near-surface and 2km heights. Over $0.5^o$ x $0.5^o$ boxes. It ranges from 0 to 2,000,000.

## C Structure Header file:

```
#ifndef _TK_3A25_H_
#define _TK_3A25_H_

#ifndef _L3A25_GRID2_
#define _L3A25_GRID2_

typedef struct {
    float rainMean2[4][720][148];
    float rainDev2[4][720][148];
    float convRainMean2[4][720][148];
    float convRainDev2[4][720][148];
    float stratRainMean2[4][720][148];
    float stratRainDev2[4][720][148];
    float shallowRainMean2[720][148];
    float shallowRainDev2[720][148];
    float shallowIsoRainMean2[720][148];
    float shallowIsoRainDev2[720][148];
    float zmMean2[4][720][148];
    float convZmMean2[4][720][148];
    float stratZmMean2[4][720][148];
    float ztMean2[4][720][148];
    float convZtMean2[4][720][148];
    float stratZtMean2[4][720][148];
    float stormHeightMean[2][720][148];
    float stormHeightDev2[2][720][148];
    float bbHeightMean[720][148];
    float epsilon0StratMean2[720][148];
    float epsilon0StratDev2[720][148];
    float epsilon0ConvMean2[720][148];
    float epsilon0ConvDev2[720][148];
    float epsilonStratMean2[720][148];
    float epsilonStratDev2[720][148];
    float epsilonConvMean2[720][148];
    float epsilonConvDev2[720][148];
```

```
float surfRainMean2[720][148];
float surfRainDev2[720][148];
float e_surfRainMean2[720][148];
float e_surfRainDev2[720][148];
float bbZmaxMean2[720][148];
float bbZmaxDev2[720][148];
float sdepthMean2[720][148];
float sdepthDev2[720][148];
float bbHeightDev2[720][148];
float surfRainConvMean2[720][148];
float surfRainConvDev2[720][148];
float surfRainStratMean2[720][148];
float surfRainStratDev2[720][148];
float e_surfRainConvMean2[720][148];
float e_surfRainConvDev2[720][148];
float e_surfRainStratMean2[720][148];
float e_surfRainStratDev2[720][148];
float rzStratA2[2][720][148];
float rzStratB2[2][720][148];
float rzConvA2[2][720][148];
float rzConvB2[2][720][148];
float rzA2[2][720][148];
float rzB2[2][720][148];
int ttlPix2[720][148];
int bbPixNum2[720][148];
int surfRainPix2[720][148];
int surfRainConvPix2[720][148];
int surfRainStratPix2[720][148];
int e_surfRainPix2[720][148];
int e_surfRainConvPix2[720][148];
int e_surfRainStratPix2[720][148];
int rainPix2[4][720][148];
int convRainPix2[4][720][148];
int stratRainPix2[4][720][148];
int shallowRainPix2[720][148];
int shallowIsoRainPix2[720][148];
int epsilon0StratPix2[720][148];
int epsilon0ConvPix2[720][148];
int epsilonStratPix2[720][148];
int epsilonConvPix2[720][148];
int rzStratPix2[2][720][148];
int rzConvPix2[2][720][148];
int rzPix2[2][720][148];
```

```
} L3A25_GRID2;

#endif

#ifndef _L3A25_GRID1_
#define _L3A25_GRID1_

typedef struct {
    float rainMean1[6][72][16];
    float rainDev1[6][72][16];
    float convRainMean1[6][72][16];
    float convRainDev1[6][72][16];
    float stratRainMean1[6][72][16];
    float stratRainDev1[6][72][16];
    float shallowRainMean1[72][16];
    float shallowRainDev1[72][16];
    float shallowIsoRainMean1[72][16];
    float shallowIsoRainDev1[72][16];
    float zmMean1[6][72][16];
    float zmDev1[6][72][16];
    float convZmMean1[6][72][16];
    float convZmDev1[6][72][16];
    float stratZmMean1[6][72][16];
    float stratZmDev1[6][72][16];
    float ztMean1[6][72][16];
    float ztDev1[6][72][16];
    float convZtMean1[6][72][16];
    float convZtDev1[6][72][16];
    float stratZtMean1[6][72][16];
    float stratZtDev1[6][72][16];
    float piaSrtMean[5][72][16];
    float piaSrtDev[5][72][16];
    float piaHbMean[5][72][16];
    float piaHbDev[5][72][16];
    float pia0Mean[5][72][16];
    float pia0Dev[5][72][16];
    float pia2a25Mean[5][72][16];
    float pia2a25Dev[5][72][16];
    float piaSrtssMean[5][72][16];
    float piaSrtssDev[5][72][16];
    float piaHbssMean[5][72][16];
    float piaHbssDev[5][72][16];
    float pia0ssMean[5][72][16];
```

```
float pia0ssDev[5][72][16];
float pia2a25ssMean[5][72][16];
float pia2a25ssDev[5][72][16];
float stormHtMean[3][72][16];
float stormHtDev[3][72][16];
float xiMean[72][16];
float xiDev[72][16];
float nubfCorFacMean[72][16];
float nubfCorFacDev[72][16];
float bbHtMean[72][16];
float bbHtDev[72][16];
float epsilon0StratMean1[72][16];
float epsilon0StratDev1[72][16];
float epsilon0ConvMean1[72][16];
float epsilon0ConvDev1[72][16];
float epsilonStratMean1[72][16];
float epsilonStratDev1[72][16];
float epsilonConvMean1[72][16];
float epsilonConvDev1[72][16];
float surfRainMean1[72][16];
float surfRainDev1[72][16];
float e_surfRainMean1[72][16];
float e_surfRainDev1[72][16];
float bbZmaxMean1[72][16];
float bbZmaxDev1[72][16];
float bbNadirHtMean1[72][16];
float bbNadirHtDev1[72][16];
float bbNadirWidthMean1[72][16];
float bbNadirWidthDev1[72][16];
float bbNadirZmaxMean1[72][16];
float bbNadirZmaxDev1[72][16];
float sdepthMean1[72][16];
float sdepthDev1[72][16];
float surfRainConvMean1[72][16];
float surfRainConvDev1[72][16];
float surfRainStratMean1[72][16];
float surfRainStratDev1[72][16];
float e_surfRainConvMean1[72][16];
float e_surfRainConvDev1[72][16];
float e_surfRainStratMean1[72][16];
float e_surfRainStratDev1[72][16];
float rzStratA1[2][72][16];
float rzStratB1[2][72][16];
```

```
float rzConvA1[2][72][16];
float rzConvB1[2][72][16];
float rzA1[2][72][16];
float rzB1[2][72][16];
int ttlPix1[72][16];
int bbPixNum1[72][16];
int bbNadirPix1[72][16];
int surfRainPix1[72][16];
int surfRainStratPix1[72][16];
int surfRainConvPix1[72][16];
int e_surfRainPix1[72][16];
int e_surfRainStratPix1[72][16];
int e_surfRainConvPix1[72][16];
int epsilon0StratPix1[72][16];
int epsilon0ConvPix1[72][16];
int epsilonStratPix1[72][16];
int epsilonConvPix1[72][16];
int rainPix1[6][72][16];
int convRainPix1[6][72][16];
int stratRainPix1[6][72][16];
short ttlAnglePix1[4][72][16];
short rainAnglePix1[4][72][16];
int rzStratPix1[2][72][16];
int rzConvPix1[2][72][16];
int rzPix1[2][72][16];
int shallowRainPix1[72][16];
int shallowIsoRainPix1[72][16];
short stormHH[30][72][16];
short convStormHH[30][72][16];
short stratStormHH[30][72][16];
short BBHH[30][72][16];
short bbNadirWidthH[30][72][16];
short bbNadirHH[30][72][16];
short bbNadirZmaxH[30][72][16];
short snowIceLH[30][72][16];
short bbZmaxH[30][72][16];
short epsilon0StratH[30][72][16];
short epsilon0ConvH[30][72][16];
short epsilonStratH[30][72][16];
short epsilonConvH[30][72][16];
short surfRainH[30][72][16];
short e_surfRainH[30][72][16];
short surfRainConvH[30][72][16];
```

```
short surfRainStratH[30][72][16];
short e_surfRainConvH[30][72][16];
short e_surfRainStratH[30][72][16];
short zmH[6][30][72][16];
short convZmH[6][30][72][16];
short stratZmH[6][30][72][16];
short ztH[6][30][72][16];
short convZtH[6][30][72][16];
short stratZtH[6][30][72][16];
short rainH[6][30][72][16];
short convRainH[6][30][72][16];
short stratRainH[6][30][72][16];
short shallowRainH[30][72][16];
short shallowIsoRainH[30][72][16];
short piaSrtH[5][30][72][16];
short piaHbH[5][30][72][16];
short pia0H[5][30][72][16];
short pia2a25H[5][30][72][16];
short piaSrtssH[5][30][72][16];
short piaHbssH[5][30][72][16];
short pia0ssH[5][30][72][16];
short pia2a25ssH[5][30][72][16];
short xiH[30][72][16];
short nubfH[30][72][16];
float rainCCoef[3][72][16];
float convRainCCoef[3][72][16];
float stratRainCCoef[3][72][16];
float piaCCoef[6][5][72][16];
float piaSrtPix[5][72][16];
float piaHbPix[5][72][16];
float pia0Pix[5][72][16];
float pia2a25Pix[5][72][16];
float piaSrtssPix[5][72][16];
float piaHbssPix[5][72][16];
float pia0ssPix[5][72][16];
float pia2a25ssPix[5][72][16];
float rainCCoefPix[3][72][16];
float stratCCoefPix[3][72][16];
float convCCoefPix[3][72][16];
float piaCCoefPix[5][72][16];
float epsilonFit[72][16];
float epsilonFitRMS[72][16];
int epsilonFitPix[72][16];
```

```
} L3A25_GRID1;

#endif

#ifndef _L3A25_GRIDS_
#define _L3A25_GRIDS_

typedef struct {
    L3A25_GRID1 Grid1;
    L3A25_GRID2 Grid2;
} L3A25_GRIDS;

#endif

#endif
```

## Fortran Structure Header file:

```
STRUCTURE /L3A25_GRID2/
    REAL*4 rainMean2(148,720,4)
    REAL*4 rainDev2(148,720,4)
    REAL*4 convRainMean2(148,720,4)
    REAL*4 convRainDev2(148,720,4)
    REAL*4 stratRainMean2(148,720,4)
    REAL*4 stratRainDev2(148,720,4)
    REAL*4 shallowRainMean2(148,720)
    REAL*4 shallowRainDev2(148,720)
    REAL*4 shallowIsoRainMean2(148,720)
    REAL*4 shallowIsoRainDev2(148,720)
    REAL*4 zmMean2(148,720,4)
    REAL*4 convZmMean2(148,720,4)
    REAL*4 stratZmMean2(148,720,4)
    REAL*4 ztMean2(148,720,4)
    REAL*4 convZtMean2(148,720,4)
    REAL*4 stratZtMean2(148,720,4)
    REAL*4 stormHeightMean(148,720,2)
    REAL*4 stormHeightDev2(148,720,2)
    REAL*4 bbHeightMean(148,720)
    REAL*4 epsilon0StratMean2(148,720)
    REAL*4 epsilon0StratDev2(148,720)
    REAL*4 epsilon0ConvMean2(148,720)
    REAL*4 epsilon0ConvDev2(148,720)
    REAL*4 epsilonStratMean2(148,720)
```

```
REAL*4 epsilonStratDev2(148,720)
REAL*4 epsilonConvMean2(148,720)
REAL*4 epsilonConvDev2(148,720)
REAL*4 surfRainMean2(148,720)
REAL*4 surfRainDev2(148,720)
REAL*4 e_surfRainMean2(148,720)
REAL*4 e_surfRainDev2(148,720)
REAL*4 bbZmaxMean2(148,720)
REAL*4 bbZmaxDev2(148,720)
REAL*4 sdepthMean2(148,720)
REAL*4 sdepthDev2(148,720)
REAL*4 bbHeightDev2(148,720)
REAL*4 surfRainConvMean2(148,720)
REAL*4 surfRainConvDev2(148,720)
REAL*4 surfRainStratMean2(148,720)
REAL*4 surfRainStratDev2(148,720)
REAL*4 e_surfRainConvMean2(148,720)
REAL*4 e_surfRainConvDev2(148,720)
REAL*4 e_surfRainStratMean2(148,720)
REAL*4 e_surfRainStratDev2(148,720)
REAL*4 rzStratA2(148,720,2)
REAL*4 rzStratB2(148,720,2)
REAL*4 rzConvA2(148,720,2)
REAL*4 rzConvB2(148,720,2)
REAL*4 rzA2(148,720,2)
REAL*4 rzB2(148,720,2)
INTEGER*4 ttlPix2(148,720)
INTEGER*4 bbPixNum2(148,720)
INTEGER*4 surfRainPix2(148,720)
INTEGER*4 surfRainConvPix2(148,720)
INTEGER*4 surfRainStratPix2(148,720)
INTEGER*4 e_surfRainPix2(148,720)
INTEGER*4 e_surfRainConvPix2(148,720)
INTEGER*4 e_surfRainStratPix2(148,720)
INTEGER*4 rainPix2(148,720,4)
INTEGER*4 convRainPix2(148,720,4)
INTEGER*4 stratRainPix2(148,720,4)
INTEGER*4 shallowRainPix2(148,720)
INTEGER*4 shallowIsoRainPix2(148,720)
INTEGER*4 epsilon0StratPix2(148,720)
INTEGER*4 epsilon0ConvPix2(148,720)
INTEGER*4 epsilonStratPix2(148,720)
INTEGER*4 epsilonConvPix2(148,720)
```

```
    INTEGER*4 rzStratPix2(148,720,2)
    INTEGER*4 rzConvPix2(148,720,2)
    INTEGER*4 rzPix2(148,720,2)
END STRUCTURE

STRUCTURE /L3A25_GRID1/
    REAL*4 rainMean1(16,72,6)
    REAL*4 rainDev1(16,72,6)
    REAL*4 convRainMean1(16,72,6)
    REAL*4 convRainDev1(16,72,6)
    REAL*4 stratRainMean1(16,72,6)
    REAL*4 stratRainDev1(16,72,6)
    REAL*4 shallowRainMean1(16,72)
    REAL*4 shallowRainDev1(16,72)
    REAL*4 shallowIsoRainMean1(16,72)
    REAL*4 shallowIsoRainDev1(16,72)
    REAL*4 zmMean1(16,72,6)
    REAL*4 zmDev1(16,72,6)
    REAL*4 convZmMean1(16,72,6)
    REAL*4 convZmDev1(16,72,6)
    REAL*4 stratZmMean1(16,72,6)
    REAL*4 stratZmDev1(16,72,6)
    REAL*4 ztMean1(16,72,6)
    REAL*4 ztDev1(16,72,6)
    REAL*4 convZtMean1(16,72,6)
    REAL*4 convZtDev1(16,72,6)
    REAL*4 stratZtMean1(16,72,6)
    REAL*4 stratZtDev1(16,72,6)
    REAL*4 piaSrtMean(16,72,5)
    REAL*4 piaSrtDev(16,72,5)
    REAL*4 piaHbMean(16,72,5)
    REAL*4 piaHbDev(16,72,5)
    REAL*4 pia0Mean(16,72,5)
    REAL*4 pia0Dev(16,72,5)
    REAL*4 pia2a25Mean(16,72,5)
    REAL*4 pia2a25Dev(16,72,5)
    REAL*4 piaSrtssMean(16,72,5)
    REAL*4 piaSrtssDev(16,72,5)
    REAL*4 piaHbssMean(16,72,5)
    REAL*4 piaHbssDev(16,72,5)
    REAL*4 pia0ssMean(16,72,5)
    REAL*4 pia0ssDev(16,72,5)
    REAL*4 pia2a25ssMean(16,72,5)
```

```
REAL*4 pia2a25ssDev(16,72,5)
REAL*4 stormHtMean(16,72,3)
REAL*4 stormHtDev(16,72,3)
REAL*4 xiMean(16,72)
REAL*4 xiDev(16,72)
REAL*4 nubfCorFacMean(16,72)
REAL*4 nubfCorFacDev(16,72)
REAL*4 bbHtMean(16,72)
REAL*4 bbHtDev(16,72)
REAL*4 epsilon0StratMean1(16,72)
REAL*4 epsilon0StratDev1(16,72)
REAL*4 epsilon0ConvMean1(16,72)
REAL*4 epsilon0ConvDev1(16,72)
REAL*4 epsilonStratMean1(16,72)
REAL*4 epsilonStratDev1(16,72)
REAL*4 epsilonConvMean1(16,72)
REAL*4 epsilonConvDev1(16,72)
REAL*4 surfRainMean1(16,72)
REAL*4 surfRainDev1(16,72)
REAL*4 e_surfRainMean1(16,72)
REAL*4 e_surfRainDev1(16,72)
REAL*4 bbZmaxMean1(16,72)
REAL*4 bbZmaxDev1(16,72)
REAL*4 bbNadirHtMean1(16,72)
REAL*4 bbNadirHtDev1(16,72)
REAL*4 bbNadirWidthMean1(16,72)
REAL*4 bbNadirWidthDev1(16,72)
REAL*4 bbNadirZmaxMean1(16,72)
REAL*4 bbNadirZmaxDev1(16,72)
REAL*4 sdepthMean1(16,72)
REAL*4 sdepthDev1(16,72)
REAL*4 surfRainConvMean1(16,72)
REAL*4 surfRainConvDev1(16,72)
REAL*4 surfRainStratMean1(16,72)
REAL*4 surfRainStratDev1(16,72)
REAL*4 e_surfRainConvMean1(16,72)
REAL*4 e_surfRainConvDev1(16,72)
REAL*4 e_surfRainStratMean1(16,72)
REAL*4 e_surfRainStratDev1(16,72)
REAL*4 rzStratA1(16,72,2)
REAL*4 rzStratB1(16,72,2)
REAL*4 rzConvA1(16,72,2)
REAL*4 rzConvB1(16,72,2)
```

```
REAL*4 rzA1(16,72,2)
REAL*4 rzB1(16,72,2)
INTEGER*4 ttlPix1(16,72)
INTEGER*4 bbPixNum1(16,72)
INTEGER*4 bbNadirPix1(16,72)
INTEGER*4 surfRainPix1(16,72)
INTEGER*4 surfRainStratPix1(16,72)
INTEGER*4 surfRainConvPix1(16,72)
INTEGER*4 e_surfRainPix1(16,72)
INTEGER*4 e_surfRainStratPix1(16,72)
INTEGER*4 e_surfRainConvPix1(16,72)
INTEGER*4 epsilon0StratPix1(16,72)
INTEGER*4 epsilon0ConvPix1(16,72)
INTEGER*4 epsilonStratPix1(16,72)
INTEGER*4 epsilonConvPix1(16,72)
INTEGER*4 rainPix1(16,72,6)
INTEGER*4 convRainPix1(16,72,6)
INTEGER*4 stratRainPix1(16,72,6)
INTEGER*2 ttlAnglePix1(16,72,4)
INTEGER*2 rainAnglePix1(16,72,4)
INTEGER*4 rzStratPix1(16,72,2)
INTEGER*4 rzConvPix1(16,72,2)
INTEGER*4 rzPix1(16,72,2)
INTEGER*4 shallowRainPix1(16,72)
INTEGER*4 shallowIsoRainPix1(16,72)
INTEGER*2 stormHH(16,72,30)
INTEGER*2 convStormHH(16,72,30)
INTEGER*2 stratStormHH(16,72,30)
INTEGER*2 BBHH(16,72,30)
INTEGER*2 bbNadirWidthH(16,72,30)
INTEGER*2 bbNadirHH(16,72,30)
INTEGER*2 bbNadirZmaxH(16,72,30)
INTEGER*2 snowIceLH(16,72,30)
INTEGER*2 bbZmaxH(16,72,30)
INTEGER*2 epsilon0StratH(16,72,30)
INTEGER*2 epsilon0ConvH(16,72,30)
INTEGER*2 epsilonStratH(16,72,30)
INTEGER*2 epsilonConvH(16,72,30)
INTEGER*2 surfRainH(16,72,30)
INTEGER*2 e_surfRainH(16,72,30)
INTEGER*2 surfRainConvH(16,72,30)
INTEGER*2 surfRainStratH(16,72,30)
INTEGER*2 e_surfRainConvH(16,72,30)
```

```
    INTEGER*2 e_surfRainStratH(16,72,30)
    INTEGER*2 zmH(16,72,30,6)
    INTEGER*2 convZmH(16,72,30,6)
    INTEGER*2 stratZmH(16,72,30,6)
    INTEGER*2 ztH(16,72,30,6)
    INTEGER*2 convZtH(16,72,30,6)
    INTEGER*2 stratZtH(16,72,30,6)
    INTEGER*2 rainH(16,72,30,6)
    INTEGER*2 convRainH(16,72,30,6)
    INTEGER*2 stratRainH(16,72,30,6)
    INTEGER*2 shallowRainH(16,72,30)
    INTEGER*2 shallowIsoRainH(16,72,30)
    INTEGER*2 piaSrtH(16,72,30,5)
    INTEGER*2 piaHbH(16,72,30,5)
    INTEGER*2 pia0H(16,72,30,5)
    INTEGER*2 pia2a25H(16,72,30,5)
    INTEGER*2 piaSrtssH(16,72,30,5)
    INTEGER*2 piaHbssH(16,72,30,5)
    INTEGER*2 pia0ssH(16,72,30,5)
    INTEGER*2 pia2a25ssH(16,72,30,5)
    INTEGER*2 xiH(16,72,30)
    INTEGER*2 nubfH(16,72,30)
    REAL*4 rainCCoef(16,72,3)
    REAL*4 convRainCCoef(16,72,3)
    REAL*4 stratRainCCoef(16,72,3)
    REAL*4 piaCCoef(16,72,5,6)
    REAL*4 piaSrtPix(16,72,5)
    REAL*4 piaHbPix(16,72,5)
    REAL*4 pia0Pix(16,72,5)
    REAL*4 pia2a25Pix(16,72,5)
    REAL*4 piaSrtssPix(16,72,5)
    REAL*4 piaHbssPix(16,72,5)
    REAL*4 pia0ssPix(16,72,5)
    REAL*4 pia2a25ssPix(16,72,5)
    REAL*4 rainCCoefPix(16,72,3)
    REAL*4 stratCCoefPix(16,72,3)
    REAL*4 convCCoefPix(16,72,3)
    REAL*4 piaCCoefPix(16,72,5)
    REAL*4 epsilonFit(16,72)
    REAL*4 epsilonFitRMS(16,72)
    INTEGER*4 epsilonFitPix(16,72)
END STRUCTURE
```

```
STRUCTURE /L3A25_GRIDS/
    RECORD /L3A25_GRID1/ Grid1
    RECORD /L3A25_GRID2/ Grid2
END STRUCTURE
```