



# Synthetic Data and Data Formats for the GPM GMI Radiometer



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# *Topics To Present*

- *Types of GMI Level 1 products*
- *File names for GMI L1 products*
- *Contents for GMI L1 products*
- *Future plans for Synthetic data*
- *Summary*



- **Level 1 Base file – Instantaneous field of view (Counts)**
  - Geolocated
  - Antenna temperature ( $T_a$ )
  - Instrument and calibration counts
  - Detailed information about the GMI operations
  - Intended for people interested in applying their own calibration and, therefore, need details of the instrument environment
- **Level 1B – Instantaneous field of view (Brightness Temperatures)**
  - Geolocated
  - All calibration applied
  - Brightness temperature ( $T_b$ )
  - Detailed information about GMI operations
  - Intended for algorithm developers and people interested in the maintenance of the algorithms
- **Level 1C – Instantaneous field of view (Intercalibrated  $T_b \rightarrow T_c$ )**
  - Geolocated
  - Inter-calibrated  $T_b$  (known as  $T_c$ ) {initially and hopefully during mission GMI  $T_b = T_c$ }
  - User required data parameters included in product (fewer parameters than 1B)
  - Intended for general user community interested in consistent brightness temperature data.



## File Naming Convention for GPM GMI

- *Data type (level of processing)*
- *Platform name*
- *Sensor name*
- *Algorithm-name with version*
- *Start date – start time*
- *Orbit (6 digits)*
- *Data product version V(+3 characters)*
- *HDF5 (suffix)*
- *Example:*
  - *1B.GPM.GMI.L1BALGV1.20140601-235841.000101.V01A.HDF5*



- *HDF 5, 1.8 or later*
- *Written using internal gzip compression*
- *Written to be compatible and readable by netCDF4 libraries and tools*
- *Will be always be available online via anonymous ftp*
- *Two swaths in products*
  - *Low frequency including 89GHz*
  - *High Frequency: 166 and 183GHz*

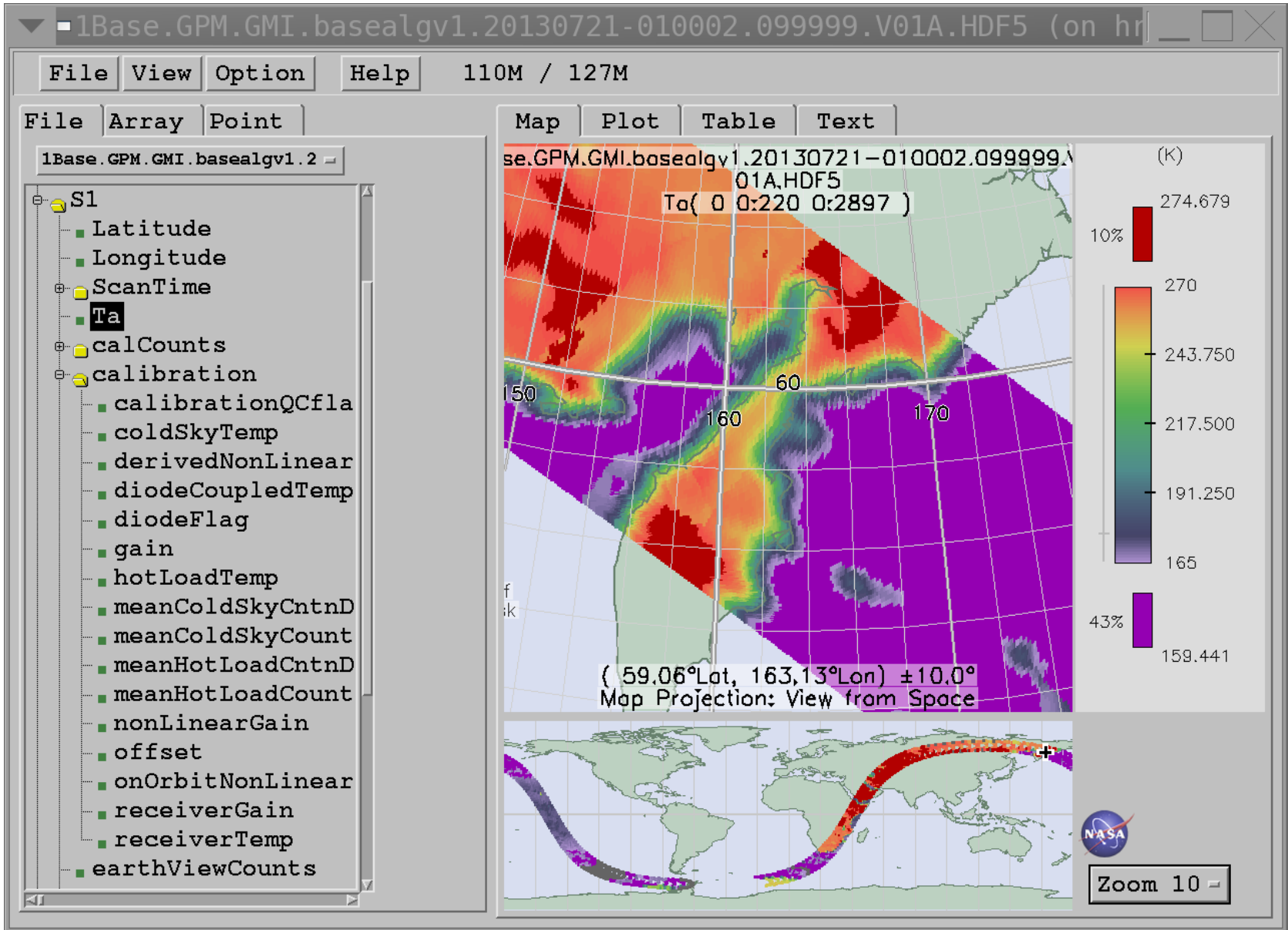


## Overview of synthetic data production

- *Uses TRMM TMI and AMSRE for low frequency*
- *Uses AMSU-B and SSMIS for high frequency (sounding channels)*
- *Applies a radiative transfer model to deal with the frequency and view differences*
- *Applies output to the GPM orbit*

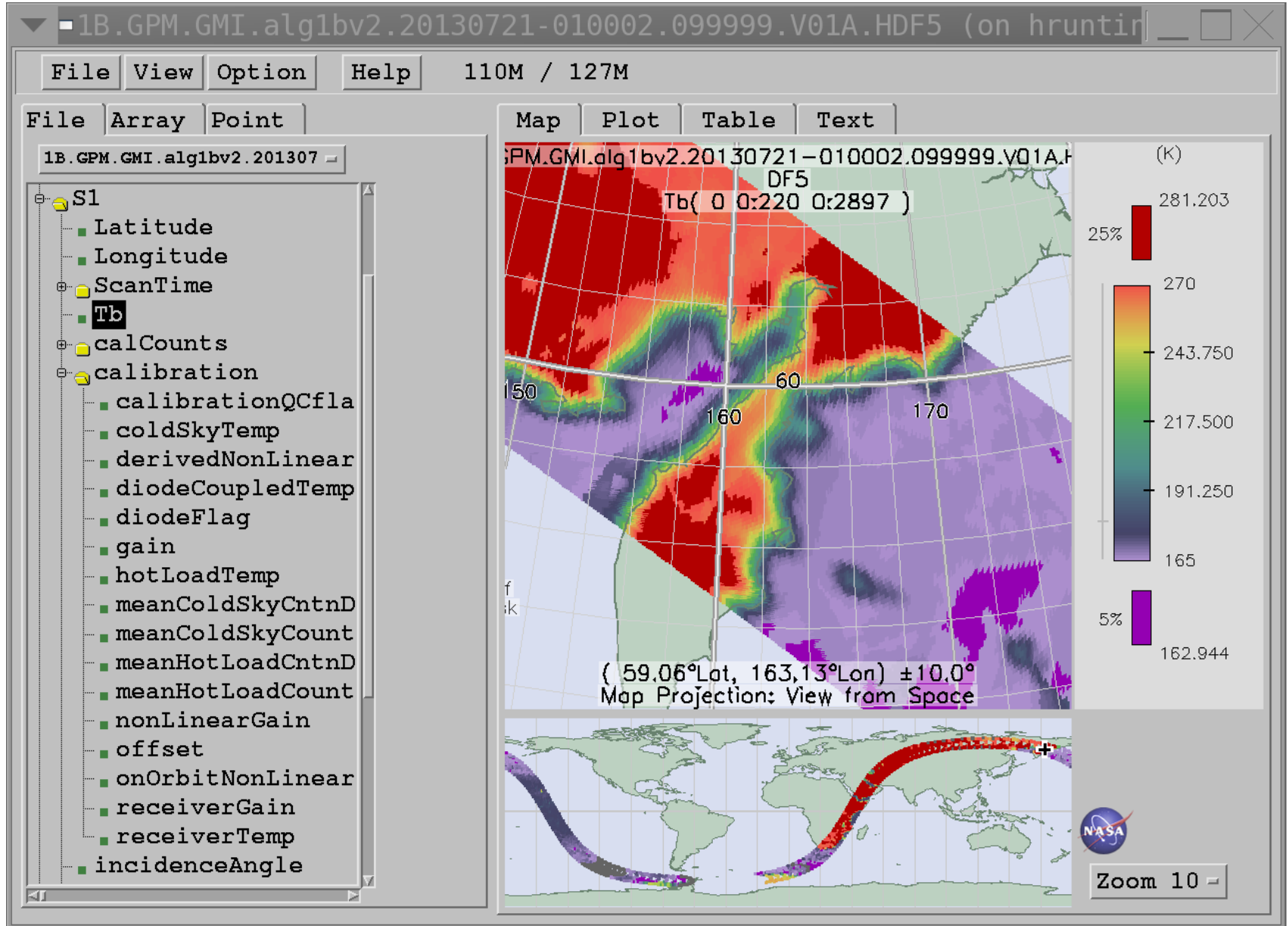


# GMI Base File Content-Example





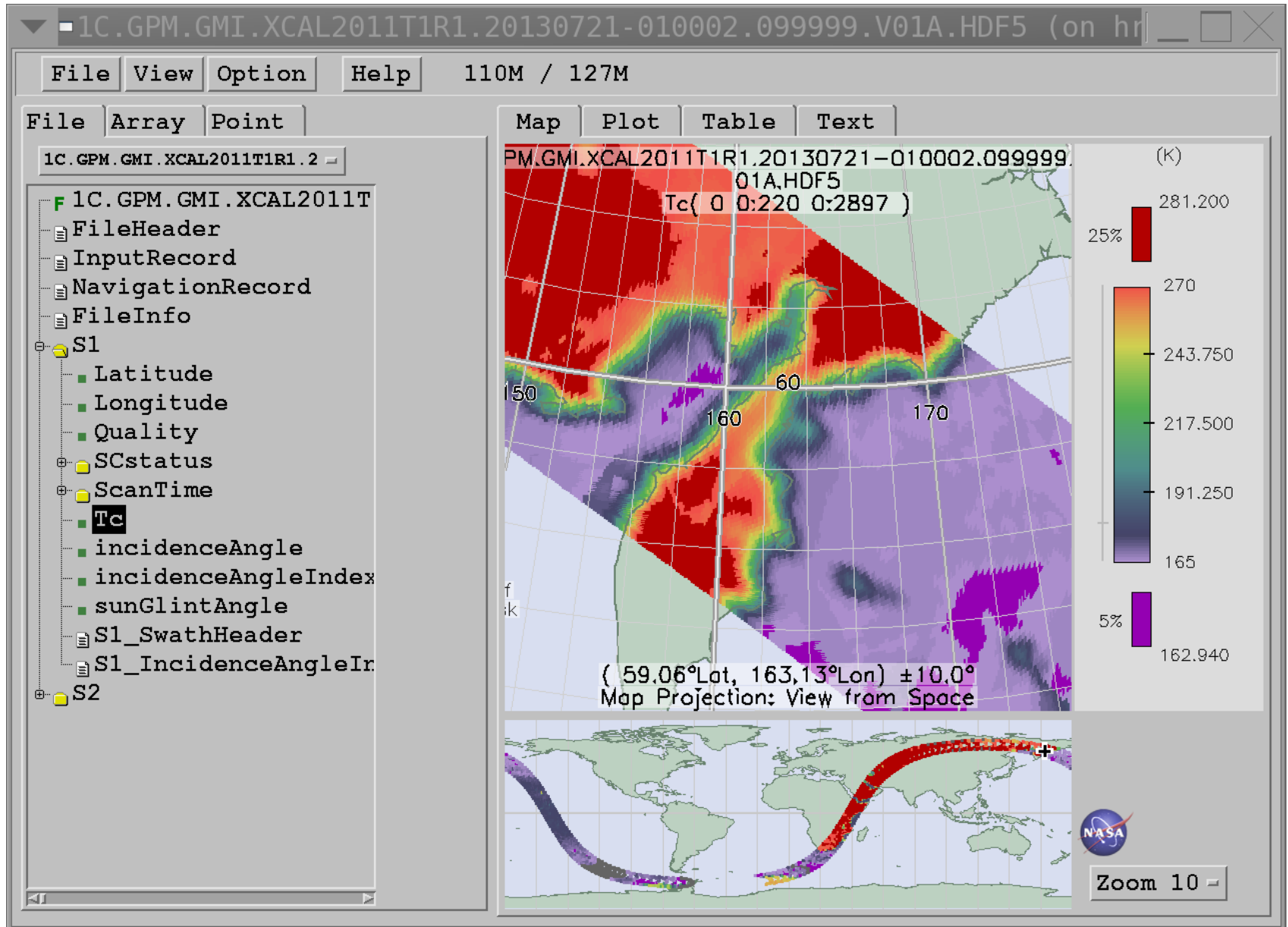
# GMI 1B Contents-Example







# GMI 1C Contents-Example





- *Keep up-to-date with the latest file specifications (currently L1 GMI products are fairly stable)*
- *Next version will include internal compression (should be transparent to users)*
- *Create additional synthetic data orbits*
- *Add simulated data created using models and data from ground validation*
- *Planned: 1 August 2012 synthetic GMI, simulated GMI data and simulated DPR data will be available online*
  - Server: *trmmopen.gsfc.nasa.gov*
  - Directory: *pub/simulatedData*
- *In early 2013 make Level 2 retrieval synthetic data available*



- <http://pps.gsfc.nasa.gov/GPMprelimdocs/GPMprelimdocs.html>
- Website has the preliminary documents including filenaming conventions, file and metadata specifications
- Currently only L1 and L2 swath products are at any level of stability. L2, however, is likely to change
- The Algorithm Theoretical Basis Document (ATBD) is also available
  - Via <http://pps.gsfc.nasa.gov>
  - Click on the ATBD link
  - Contains information about GMI L1B and all L2 products
  - Also has ATBD for the merged radiometer product (iMerge)
- Comments about any document may be sent to:
  - [Erich.F.Stocker@nasa.gov](mailto:Erich.F.Stocker@nasa.gov)



## Summary

- PPS creates and makes available synthetic GMI data via anonymous ftp server
- Synthetic data will be kept up-to-date based on the latest file specifications
- Synthetic data will be stored with internal compression (as will all GPM products).
- As the algorithm code for higher level processed retrievals is completed, tested, and delivered, the retrievals based on synthetic and/or simulated data will also be available
- Synthetic/simulated data available to users early (as are file specifications) to enable them to prepare and test software using GPM products
- Questions about synthetic data availability or requests can be directed to: [Erich.F.Stocker@nasa.gov](mailto:Erich.F.Stocker@nasa.gov) or [Arthur.Y.Hou@nasa.gov](mailto:Arthur.Y.Hou@nasa.gov)