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***

GPM Level 1 Products For GMI Radiometer

- ***Level 1 Base file – Instantaneous field of view (Counts)***
  - *Geolocated*
  - *Antenna temperature (Ta)*
  - *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 (Tb)*
  - *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 Tb->Tc)***
  - *Geolocated*
  - *Inter-calibrated Tb (known as Tc) {initially and hopefully during mission GMI Tb=Tc}*
  - *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*

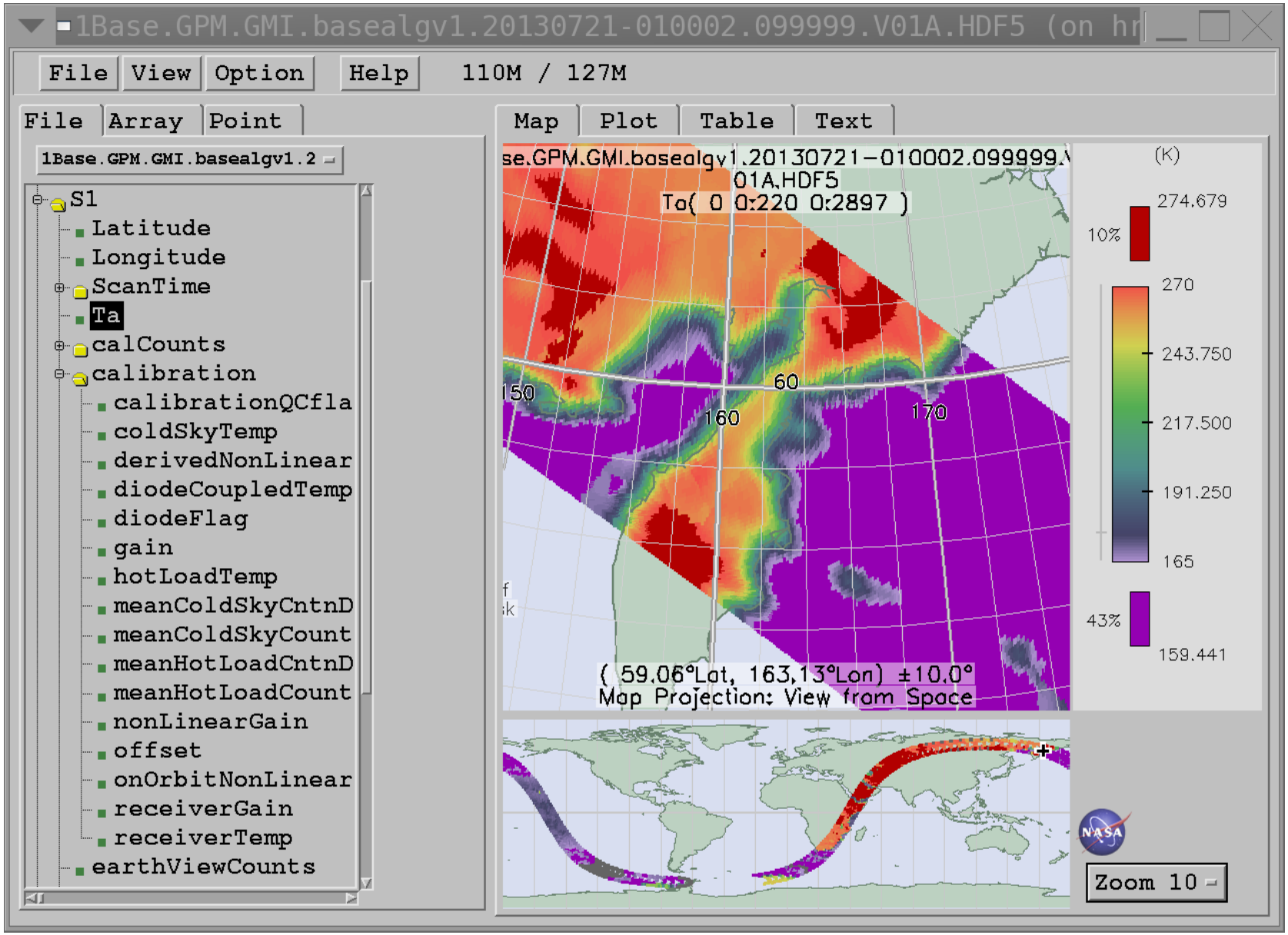
GMI L1 Physical Format

- ***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*

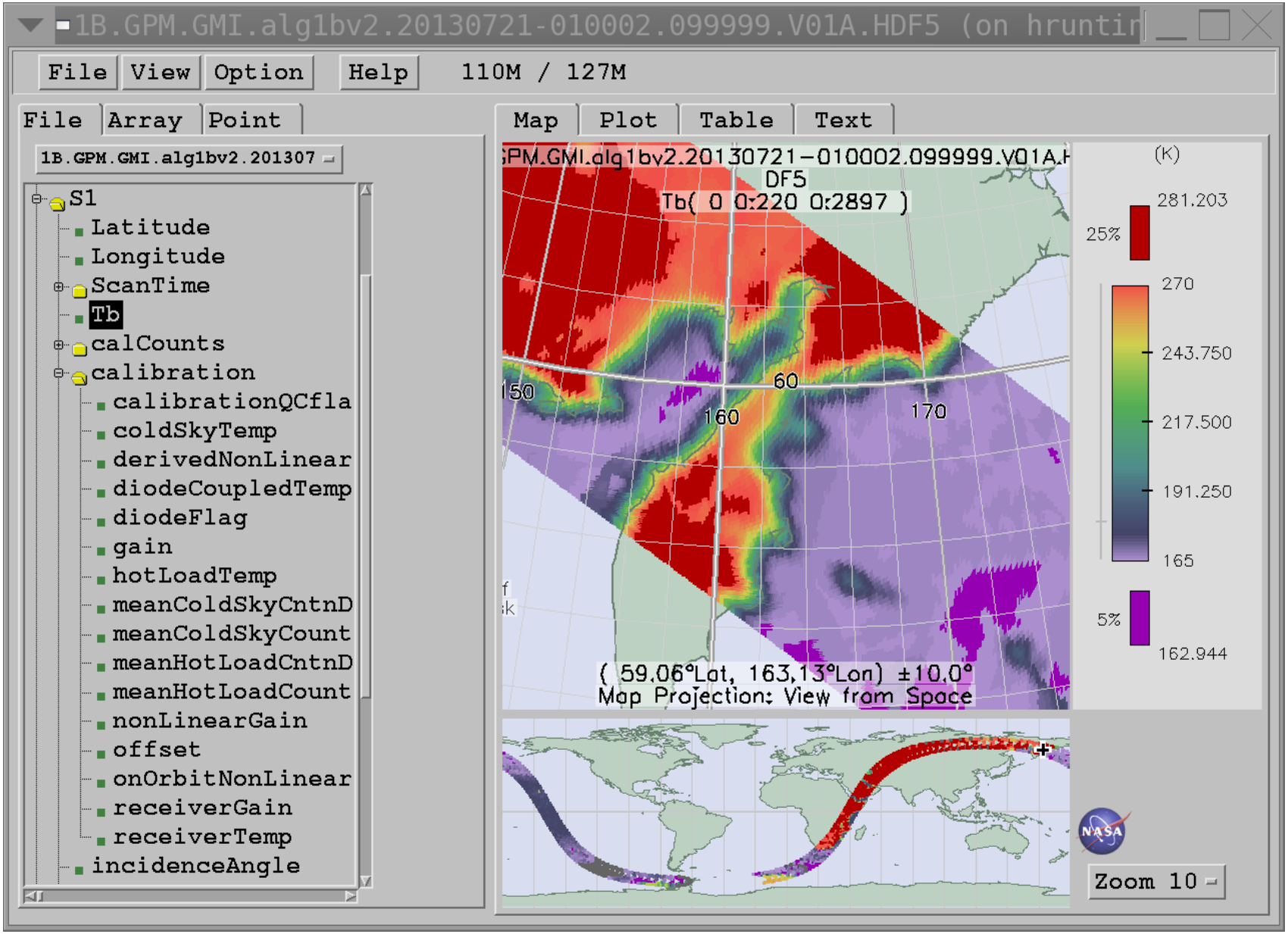
Overview of synthetic data production

- ***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***

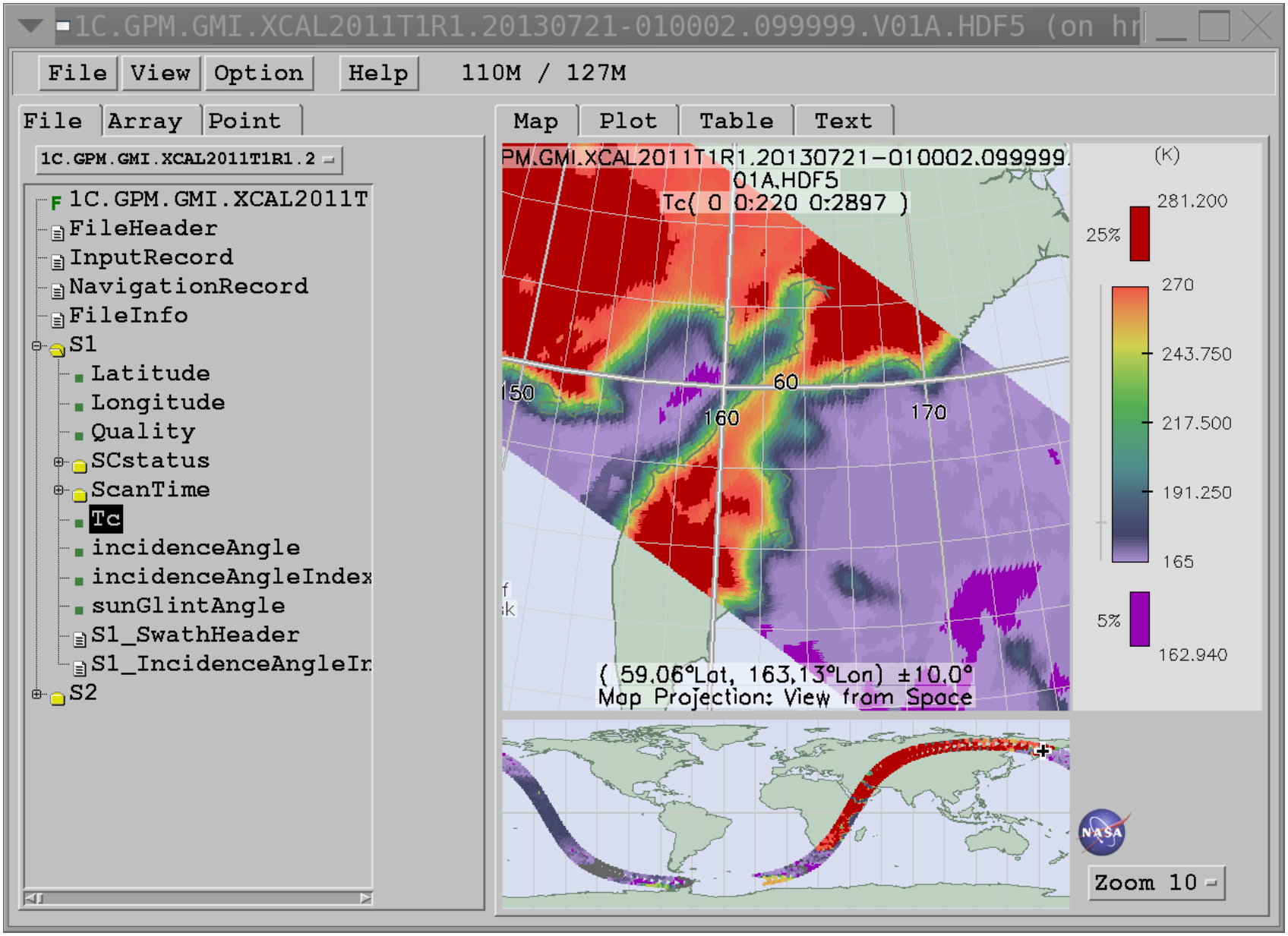
GMI Base File Content-Example



GMI 1B Contents-Example



GMI 1C Contents-Example



Future Synthetic Data Plans

- ***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 addition 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***

GPM File Specifications

- ***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

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 or Arthur.Y.Hou@nasa.gov