



NPP Science Team Meeting

NPP Sounder PEATE Status

Steven Friedman
Jet Propulsion Laboratory

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This presentation covers work accomplished by the Sounder PEATE staff:

- Virgil Adumitroaie
- Robert Ando
- John Burke
- Van Dang
- Evan Fishbein
- John Gieselman
- Brian Kahn
- Sung-Yung Lee
- Ruth Monarrez
- Vicky Myers
- Quyen Nguyen
- Mathias Schreier
- Michael Starch
- Andres Tamayo
- Irina Tkatcheva

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Sounder PEATE Objectives

- **Support evaluation and analysis of CrIMSS SNPP**
 - *determine suitability for in NASA's climate research program*
 - *extending the climate data record started with AIRS/AMSU*
 - Support the Sounder Science Team in assessing climate quality from CrIMSS products
 - Utilize local technical/science staff to support Science Team
- **Support the SNPP Cal/Val and EDR Teams**
 - Provide findings to SNPP Change Board via channels
 - Participate in telecons and other communications with NOAA-led Calibration and EDR teams



Sounder PEATE Objectives

- **Primary products being evaluated are:**
 - Sensor Data Records (SDRs)
 - CrIS SDR
 - ATMS SDR
 - ATMS TDR
 - ATMS Remapped SDR
 - Environmental Data Records (EDRs)
 - CrIMSS Vertical Temperature Profile
 - CrIMSS Vertical Moisture Profile
 - CrIMSS Vertical Pressure Profile
 - (including surface)
 - ATMS & CrIMSS Intermediate Products

*CrIMSS = Cross Track Infrared Microwave Sounding Suite, includes EDR products derived from retrievals of data from the following instruments:

Cross-Track infrared Sounder (CrIS)
Advanced Technology Microwave Sounder (ATMS)



Sounder PEATE Support to Sounder Science Team

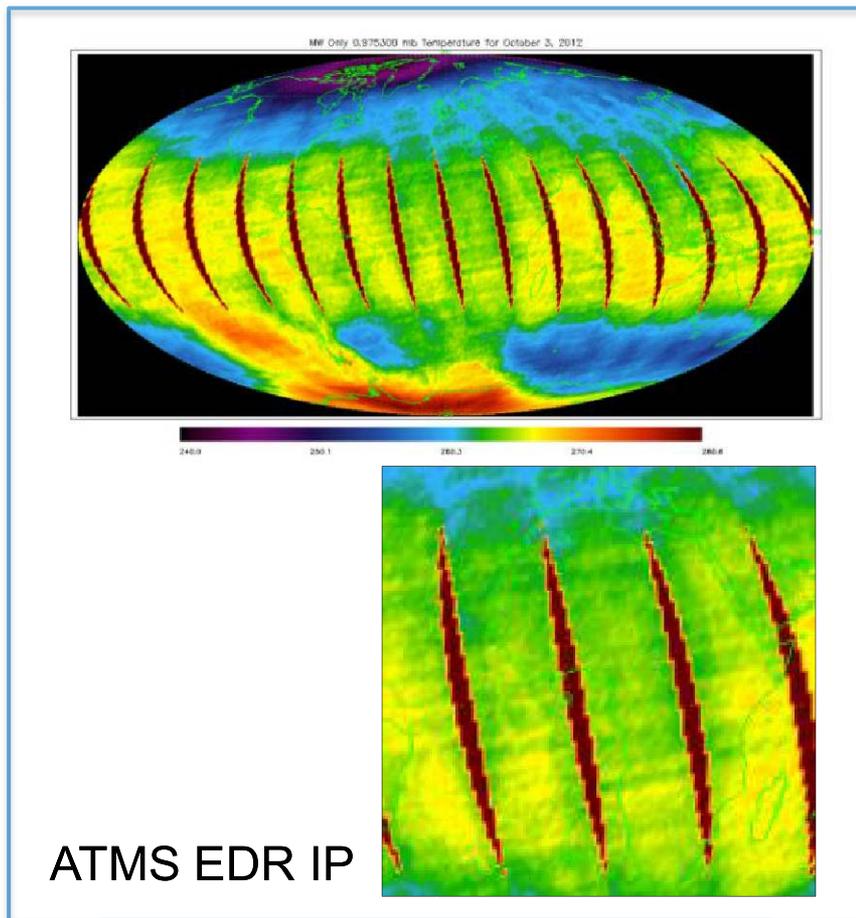
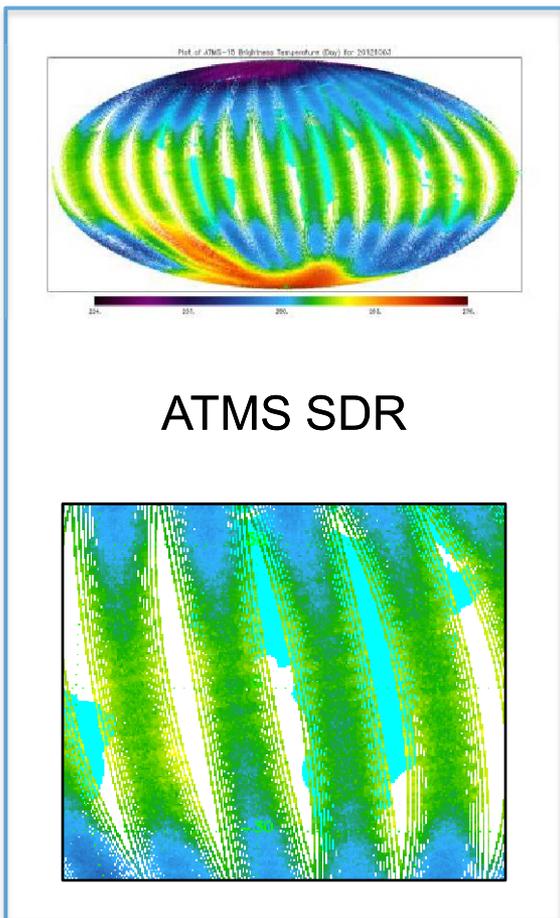
- **Data quality evaluation**
 - Conformance to ICDs
 - Continuity of operations – data stream interruptions
- **Support to NASA and NOAA Calibration Teams**
- **Retrieval Algorithm support**
 - Evaluation of retrieved quantities (EDRs) – accuracy and yield
 - Analysis of production algorithm, alternative algorithms
- **Production of products to help the Science Team determine whether SNPP products support climate studies**
 - Evaluation of SNPP products by themselves
 - ATMS and CrIS SDR
 - CrIMSS EDR (Standard and Intermediate Products)
 - Evaluation whether inter-platform products can be utilized to provide long-term continuous climate baseline:

Aqua → MetOp → SNPP



Data Product Evaluation: IDPS ATMS MW-Only 1mb Temperature (MW IP)

- ATMS-15 has 1/f noise (low frequency sensitivity fluctuation)
- The striping is transferred to EDR temperature

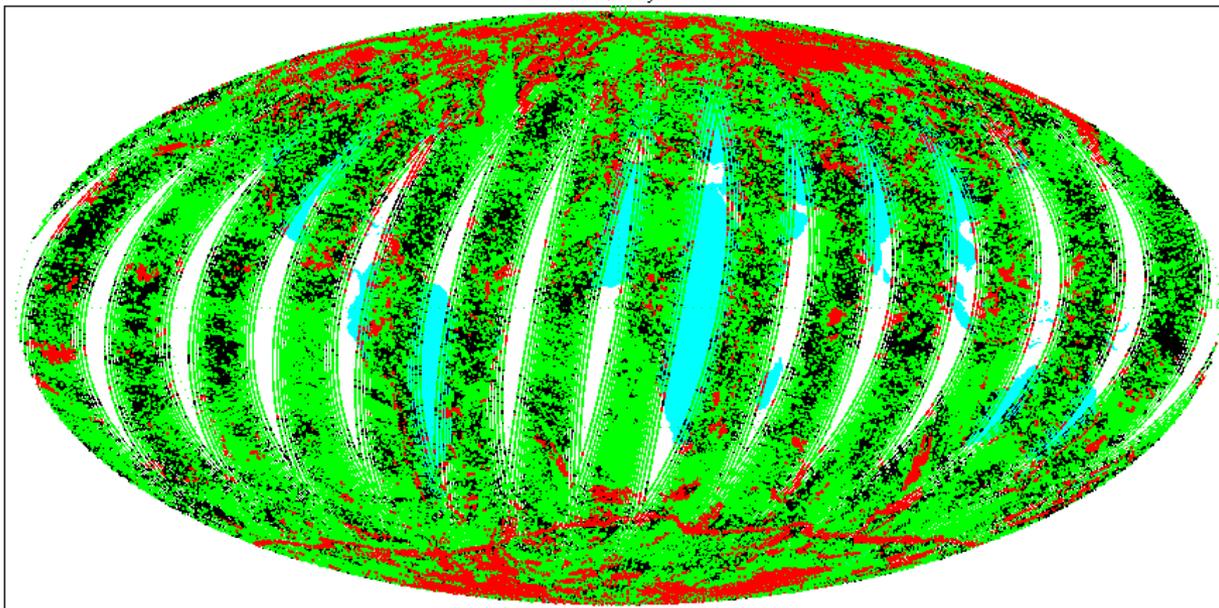




Data Product Evaluation: IDPS EDR Data Quality Indicators

- **Routine evaluation of EDRs are routinely performed**
 - Currently, data quality markings result in low yields
 - Some improvement w/MX 6.3, but retrieval quality remains poor
 - Very little High Quality Products (symbolized in **BLACK**)
 - Most FOVs are marked “LowMW” (**GREEN**) and “Poor” (**RED**)
 - Nighttime data are better than daytime

Plot of Retrieval Quality for 20121020

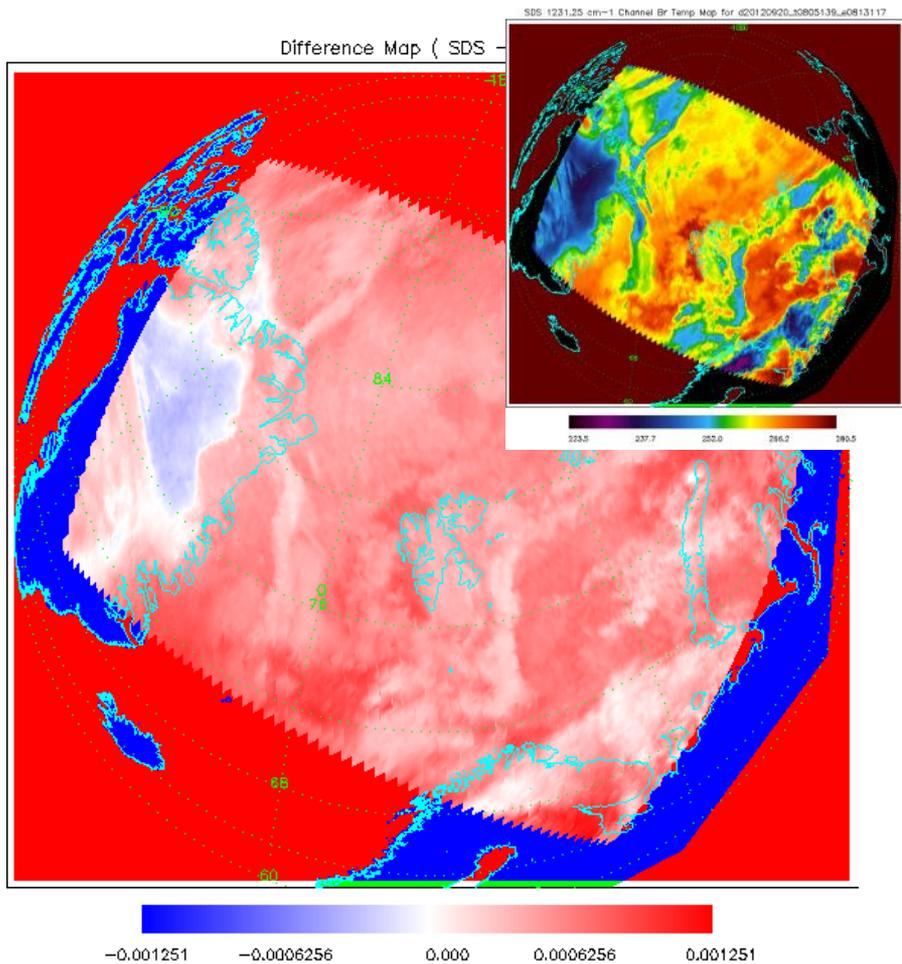


- Real improvement not expected until release of Mx7 (July 2013?)

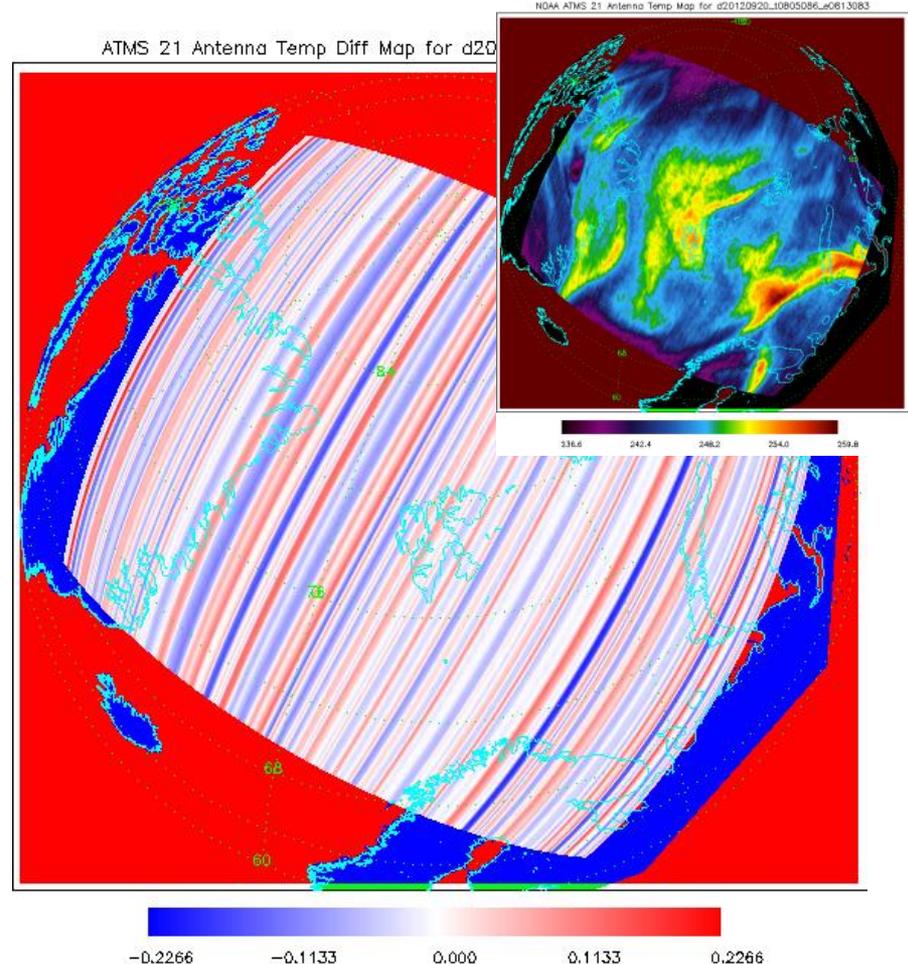


Comparing IPDS and Mini-IDPS Products

Differences are exhibited between IDPS and mini-IDPS products.



CrIS 1231.25 cm⁻¹ Channel



ATMS channel 21



Sounder PEATE Products (1 of 4)

- **Calibration Subsets (CrIS and IASI)* FOVs in four categories:**

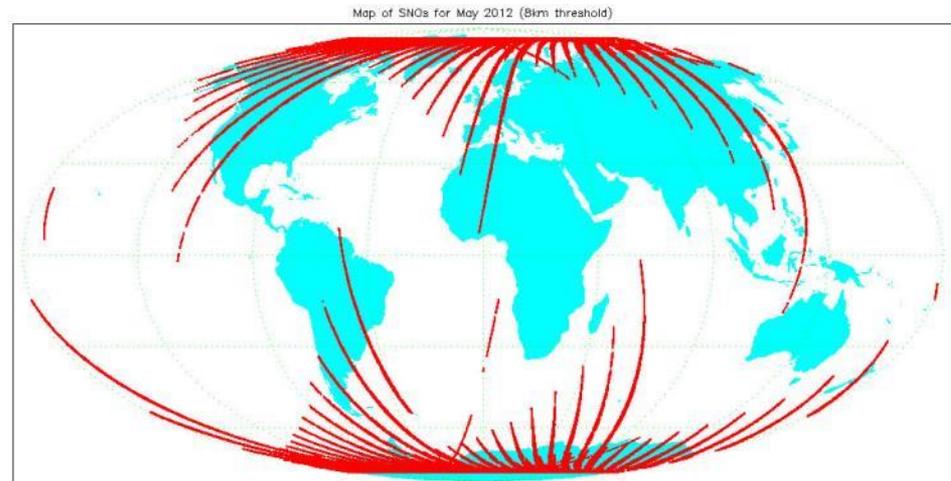
- Clear
- Random
- Deep-convective Cloud
- Fixed-site

*Sounder PEATE also has access to AIRS Calibration Subsets

- **Simultaneous Nadir Observations (SNO), SNPP-CrIS/ATMS with:**

- Aqua (AIRS/AMSU)
- MetOp A/B (IASI/AMSU/MHS)
- NOAA-18, NOAA-19 (AMSU)

(radiances matched to radiances)





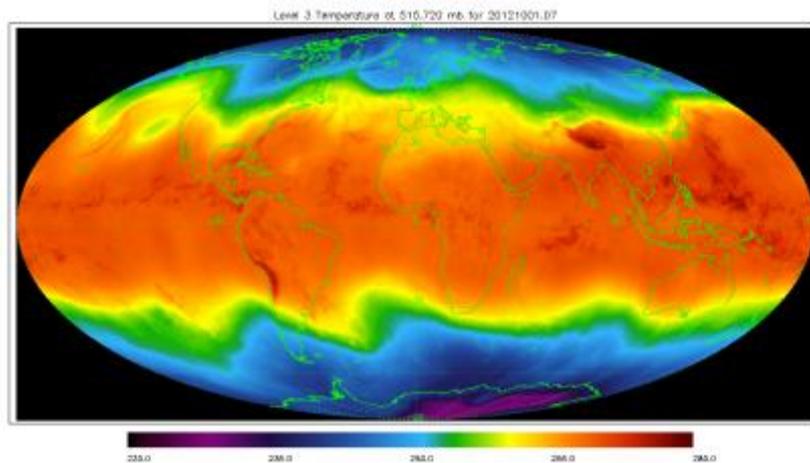
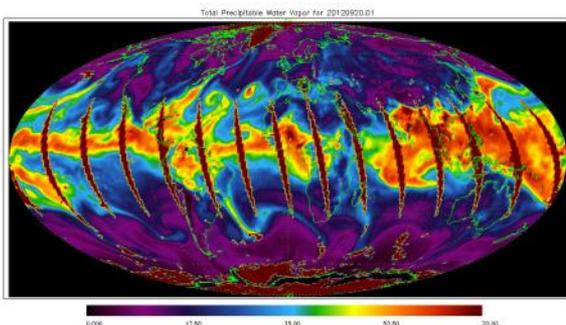
Sounder PEATE Products (2 of 4)

- **Match-up Products** (radiances matched to correlative data)
 - Analysis Matchup (Calculated radiances from forecast models)
 - Radiosonde Matchup (dedicated radiosondes)
 - GPS-RO Matchup – *planned for this year*
- **Calculated Radiances (SARTA, OSS)** (from forecasts)
 - Inputs: Numerical Weather Forecasts
 - Matched to RAOBS, GPS-RO, dedicated radiosondes, field campaigns
 - ATMS and CrIMSS retrieved EDRs and IPs
- **GPolygon Maps (granule coverage maps)**



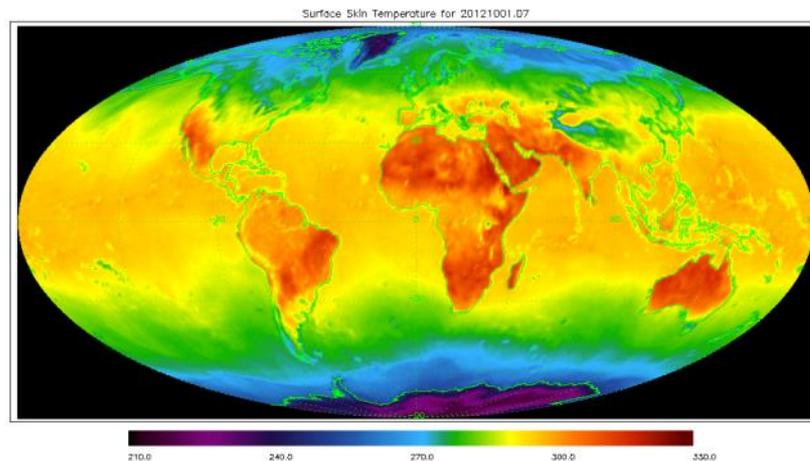
Sounder PEATE Products (3 of 4)

- **Level 3 Products (SNPP, MetOP, AIRS*)**
 - Daily, Multi-day, Monthly



MW-only Temperature (515 mb) - 7-day mean (CrIMSS EDR)

- Useful for characterizing global patterns of temperature, water vapor and key atmospheric constituents
- Support cross-comparisons between SNPP, MetOP and AQUA Level 3 products



Surface Skin Temperature - 7-day mean (CrIMSS EDR)

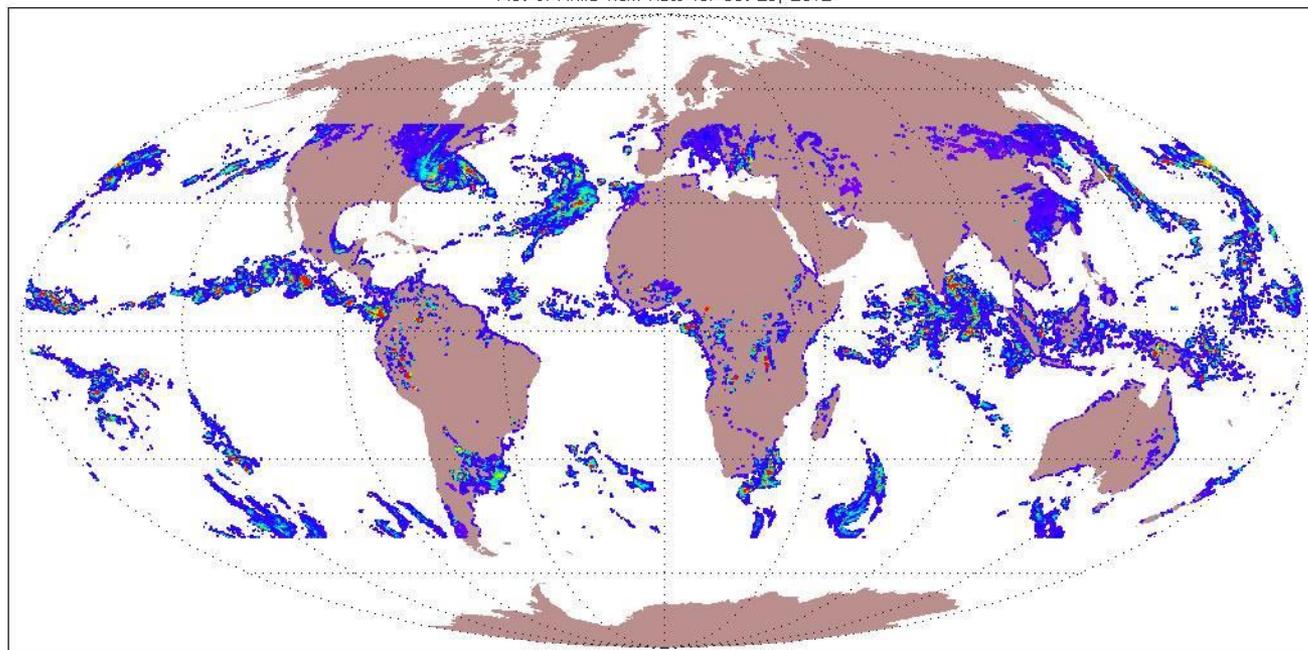
Source: Sung-Yung Lee, Sounder PEATE



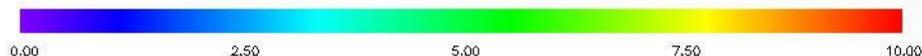
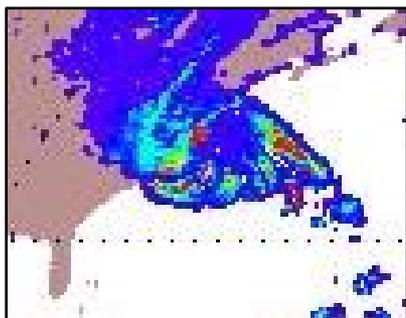
Sounder PEATE Products (4 of 4)

- **Microwave Rain Rate (SNPP ATMS) – Daily Product**
 - Current version is beta (early development)
 - Product development supporting research by William Blackwell and his team at MIT

Plot of ATMS Rain Rate for Oct 29, 2012



Rain Rate (mm/hr)
October 29, 2012
(Superstorm Sandy)



Source: William Blackwell, Sounder Science Team and Sounder PEATE Staff



Data Product Availability

- **PEATE data products are available locally**
 - A valid JPL user account is needed
 - Users must also have AIRS and/or PEATE server accounts
- **No public access at this time**
- **We are developing process for making PEATE data products available via the GES DISC**
 - SNO products will be first release
 - Calibration Subsets for SNPP to follow soon
 - Level 3 products will be available late this year



Plans for remainder FY13 and FY14

- **Data Production - continued production of PEATE products**
- **Continued analysis of SDR and EDR code and data products**
 - Identify issues/concerns with existing algorithms
 - Suggest corrections and updates to production algorithm
 - Exercising alternative retrieval approaches, compare results
- **Analysis of trends between various instrument products**
 - **SNPP in comparison to predecessor platforms**
 - Radiance continuity
 - EDR continuity
 - Consistency in following seasonal trends (Level 3)
- **Production of higher-level products per Science Team request**



- **Analysis of IDPS release MX 7.1**
 - **The first “real” EDR products are expected**
 - The PEATE will focus on supporting analysis of whether SNPP EDRs can be utilized to extend long-term climate baseline started with AIRS
- **EDR Reprocessing?**
 - *a consistent product baseline is necessary for climate studies*
 - EDR have not been produced with consistent baseline
 - In addition, alternative retrieval approaches may yield improved results when compared to IDPS-generated products
 - Past missions have already demonstrated that reprocessing is inevitable and result in improved life-of-mission products
- **The Sounder PEATE will continue to work with the SNPP Science team to develop reprocessing strategies**