NPP Science Team Meeting

NPP Sounder PEATE Status

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This presentation covers work accomplished by the Sounder PEATE staff:

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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)
• 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
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

- 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

Friedman: Sounder PEATE Overview – 2013-05-21

Source: S.Y. Lee, Sounder PEATE staff
• **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)

(map of SNOs for May 2013 (6km threshold))
• **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
  • Useful for characterizing global patterns of temperature, water vapor and key atmospheric constituents
  • Support cross-comparisons between SNPP, MetOP and AQUA Level 3 products

Source: Sung-Yung Lee, Sounder PEATE

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

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

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
Upcoming Activities

• 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