CrIMSS EDR
at Sounder PEATE

Sounder Science Team Meeting
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AER delivered Science S/W version 2.1.x (x>3) in Dec 2008
  * Sounder PEATE acquired version 2.1.3 (Oct 2008?), but with many missing files

Mini-IDPS at GSFC implemented Ops S/W version 1.5.0.37 in February 2009
  * CDFCB compliant SDR/EDR/IP files

IDPS CrIMSS EDR S/W Porting activities
  * U Wisc for IPOPP for DRO community
  * Souder PEATE at JPL
  * LaRC (Xu Liu and Susan Kizer)

Status of NGAS test data
  * Synthetic data is used by the science software
  * Proxy Data used by Ops software is not suitable for science evaluation
Roughly parallel to AIRS algorithm
  - MW only algorithm with global covariance
  - MW only algorithm with “stratified” covariance
  - IR+MW algorithm with cloud clearing

AER’s OSS instead of UMBC’s SARTA
  - No non-LTE correction shortwave channels
  - No separation of thermal and solar reflectance
    - These two make shortwave channels unusable during daytime
  - Variable CO2, HNO3, SO2 in latest science software, not in ops software yet
IDPS CrIMSS EDR Porting Activity

- IDPS S/W was developed for a specific H/W for performance
- Necessary to port to generic Unix environment
- Three groups were porting the IDPS CrIMSS EDR s/w independently
  - Sounder PEATE
  - U Wisc for IPOPP (Direct ReadOut community)
  - LaRC for IPO
- Each has a running version, MW only retrievals are close, but IR+MW retrievals are off
- Lately we started to work together
- Some of the porting difficulties are land fraction, surface elevations that have been performed in AIRS level 1a processing.
CrIMSS EDR and IP files

- Format described in CDFCB volumes 1 – 8
- 32 second granules (4 scan lines of CrIS) in HDF5
- The latest sample files (version 1.5.0.37) are CDFCB compliant, and are being released from mini-IDPS

**EDR**
- Vertical temperature profile
- Vertical water vapor profile
- Pressure profile

**IP (Intermediate Products)**
- Temperature and water vapor at OSS levels
- IR and MW spectral emissivity
- Ozone profiles
- Cloud Cleared Radiances

- Cloud liquid water retrieved, but not written
- No error estimates or averaging kernels are written
Status of IDPS software on Proxy Data

- Main purpose of proxy data is to measure the throughput
- **Cannot judge the quality of EDR algorithm**
- Only 8% of all MW retrievals pass Chi Square Test
- No (or only a few) IR+MW retrieval passes Chi Square Test
- A Few look-up-tables are inconsistent with proxy data
- Many of lessons learned from AIRS are not passed on
- Need better and more realistic simulation system
- Many attempts by AIRS science team to remove tuning were unsuccessful
- Use of shortwave window channels helps skin temperature
- Day/Night boundary is not solar zenith angle of 85 degree
MW Skin Temperature Map

- Ascending granules over southeast Asia
- JPL run (left) vs mini-IDPS sample data (right)
- Pattern match well
- High scan angle FORs are mostly rejected
- Large discontinuity along coastline
Synthetic vs Proxy Data

- **Science S/W is tested on synthetic data**
  - Four days, Oct 1 2000, Jan/April/July 1 2001
  - Sampled at three different angles on either side of nadir
  - No mixed land/water cases
  - Very good retrieval statistics

- **NGAS Proxy data generated from AIRS/AMSU/HSB**
  - Main purpose is to measure the throughput of the S/W
  - Spatial interpolation due to difference in scan pattern
  - OSS was used for AIRS to CrIS and MIT forward algorithm is used for AMSU/HSB to ATMS
  - Rotation of CrIS FOVs is simulated
  - Handling of difference in polarization is unknown
  - Do not use this proxy data outside AIRS swath (two extreme FORs)
Comparison of Proxy Data

- ATMS Channel 3
  - GSFC/LaRC Proxy (top figure)
  - NGAS Proxy (bottom figure)
- Both generated from Aqua
- GSFC/LaRC did not simulate higher orbit of NPP
- Couple of NGAS FORs from either end should be ignored
- Bias may be coming from different polarization
• **Documents**
  • Documents available to me are inadequate

• **Latest Science Software**
  • Version 2.1.3 delivered to us have many missing files.

• **Synthetic Data Need**
  • Unsampled synthetic data
    • Synthetic data for 2000 – 2001 distributed with science software is sampled at 3 different angles on either side of nadir without coastline.
  • NCEP forecasts that go with synthetic data
  • Truth files

• **Proxy Data Need**
  • Consistent synthetic data
  • Enough volume of data to generate tuning coefficients.
    • one or two orbits are available.
Spare Slides
Comparison of CrIS forward algorithms

- AER’s OSS vs UMBC SARTA (day time granule, both with Hamming Apod)
- OSS has known issues with reflected solar radiance and nonLTE
- SARTA has issues with end channels of each of the three bands
Comparison of ATMS forward algorithms

- MIT RTA from P. Rosenkranz
- OSS RTA for ATMS (extracted from science software)
- Atmospheric O2 channels match very well
- Small difference in H2O channels
- Surface channels have large differences, even with same emissivities

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