

The AIRS/CrIS/IASI (and CHIRP) Radiative Transfer Algorithms

AIRS Science Team Meeting

C. L. Hepplewhite^{1,2}, Sergio DeSouza-Machado^{1,2}, L. Larrabee Strow^{1,2}

September 25, 2019

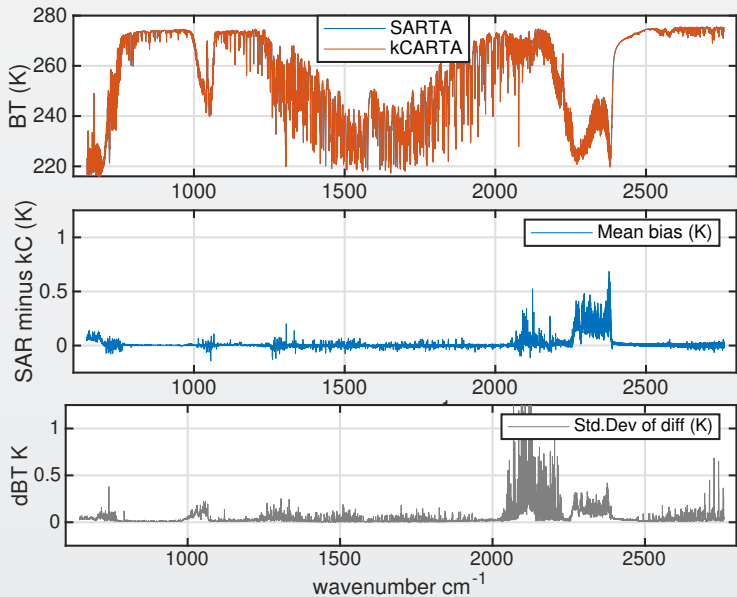
¹UMBC Physics Dept.

²UMBC JCET

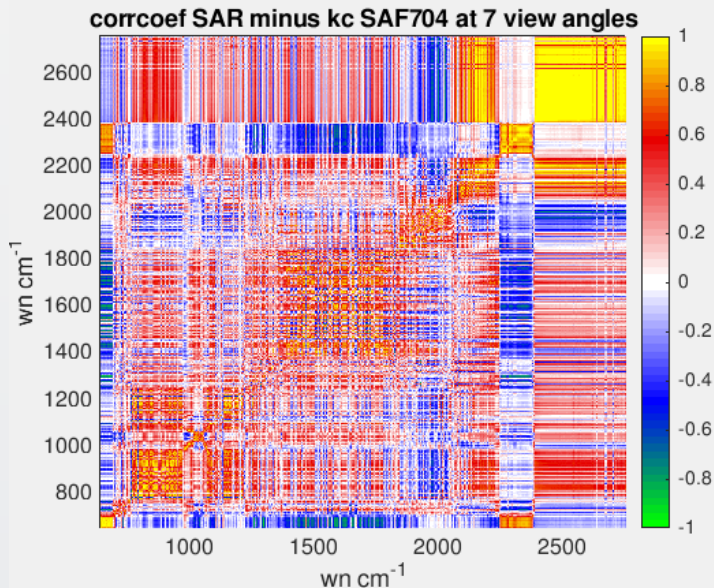
- kCARTA calculations of layer-to-space optical depths for all parameters for the 49 and 703 SAF regression profiles for AIRS_L1C, CrIS FSR and IASI are complete.
- AIRS_L1C and IASI SARTA update was released May and June this year.
- Updated version of AIRS using L1C channel set with SRFs referenced to 10-Sep-2010 drift corrected.
- Spectroscopy based on HITRAN 2016 & LBLRTM12.8 CO₂,CH₄ line mixing.
- The kCARTA is used to generate TOA radiances to compare directly with SARTA for validation.
- CrIS FSR SARTA update for 2019 currently in work.

- The 2019 SARTAs include the fixed gases, and variable O₃, H₂O, CO₂, CH₄, HNO₃, N₂O, SO₂, NH₃, the nonLTE and improved reflected surface thermal.
- The new SARTA includes hooks to HDO algorithm, the computation is turned off.
- HDO regression is in progress, regression residuals up to 10% rms. Different method required for MW than for SW bands. Method based on depletion relative to standard abundance.
- To start on SARTA for CHIRP in due course.

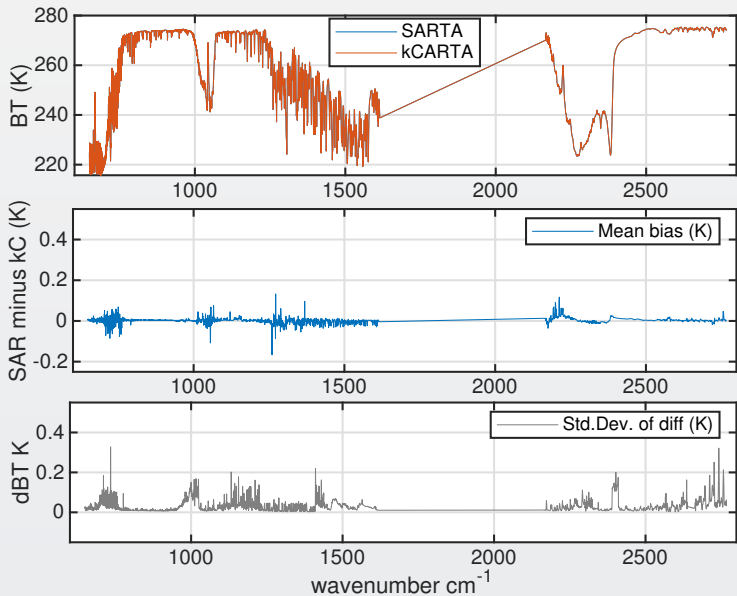
Results - IASI



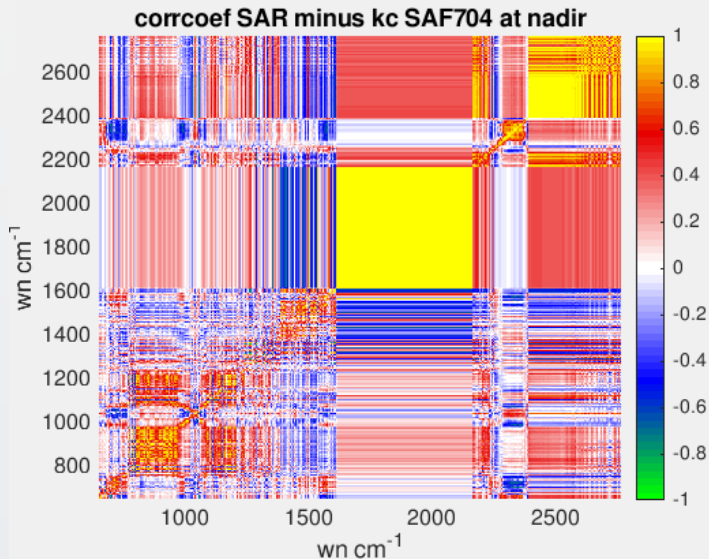
IASI - error correlation



Results - AIRS_L1C



AIRS - error correlation



Results - AIRS_L1C Mean & Std. Dev vs angle

