Background

The AIRS Science Team Version 6 retrieval algorithm is currently producing very high quality level-3 Climate Data Records (CDRs) from AIRS that will be critical for understanding climate processes. CDRs are gridded-level-3 products which include all cases passing AIRS Climate Quality Control (QC). AIRS is predicted to last through at least 2020. CrIS/ATMS is the only scheduled scorder follow-on to AIRS/AMSU. The mission objective is to develop a new CrIS/ATMS data product that will be able to provide a wide range of climate parameters for the polar orbiting mission. This new data product will fill in the large observational gap between AIRS/AMSU and the future satellite systems. The CrIS/ATMS mission was built to complement the AIRS mission.

The AIRS retrieval algorithm uses a radiative transfer model to calculate the expected radiances for a given atmospheric state. A neural network is then used to find the atmospheric state that best matches the observed radiances. The neural network is trained on a large database of simulated radiances that are generated using the radiative transfer model.

Sample Cloud Free Brightness Temperature Spectrum

Sample Cloud Free Brightness Temperature Spectrum

CrIS/ATMS Neural-Net Coefficients

As in AIRS Version-6, AIRS Version-6.22 uses Neural-Net methodology to generate the first guess for the retrieval. For each AIRS/AMSU or CrIS/ATMS Band, the Neural-Net coefficients are trained using a large database of simulated radiances that are generated using the radiative transfer model. The Neural-Net coefficients are then used to find the atmospheric state that best matches the observed radiances.

Summary

AIRS and CrIS total precipitable water and cloud products also match well with each other though AIRS has somewhat more total precipitable water than CrIS. AIRS Version-6.22 has a slightly better yield and larger errors than AIRS Version-6.

Single Day Global Comparisons

Results passing Climate QC are shown for the single day, December 4, 2013. EOS Aqua and NPP orbits overlap closely on this day. This is important for comparing purposes to minimize time-of-day sampling differences. This day also occurs after the major upgrade in ATMS calibration procedures.

Comparison of AIRS Version-6.22 with CrIS Version-6.22

AIRS and CrIS surface skin temperature and 700 mb temperature fields match very well, especially over ocean. Currently, CrIS skin temperature is somewhat lower than that of AIRS, which results in corresponding higher 700 mb temperature over land for CrIS.

Comparison of AIRS Version-6.22 with CrIS Version-6.22

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Comparison of AIRS Version-6.22 with CrIS Version-6.22

For questions or comments during AGU poster session call: Joel Susskind (240) 793-6398