**Tropospheric CO Variability from AIRS and IASI Under Cloudy Conditions Using US Products**

**Introduction**

Satellite measurements using the thermal spectral range are affected by the presence of clouds, and therefore, it is necessary to remove the effects of clouds before retrieving any geophysical properties. AIRS and IASI are two spaceborne instruments that handle cloud contamination in their own ways. AIRS uses an ensemble mean to handle cloud contamination, which has a data rejection rate between 50-70% of the total measurements (Gado et al., 2003). The use of AIRS data over periods of approximately 13 days of nadir: the number of clear pixels is publicly available and not sufficient to provide information for land areas. IASI, on the other hand, uses a similar technique for cloud clearing as AIRS such that need to be first corrected to handle cloud contamination in the signals and this before retrieving many geophysical properties. AIRS and IASI DOFS for persistent cloudy areas are lower than those of clear areas, which would not have been sufficient to provide information for land areas. The IASI retrievals of CO are used to collocate with MODIS at footprints of 13.5 km are used to collocate with MODIS single-view pixels at footprints of 13.5 km.

**AIRS Cloud Clearing - reconstruct clear column radiances**

Clear cases are chosen where more than 95% of MODIS pixels within the AIRS footprint are defined as clear. CO distributions are reconstructed using clear-clouded radiances with the VMRs slightly higher for the pure clear cases.

**AIRS Tropospheric CO Variability between Clear and Cloud-cleared**

The studies are trended at latitudes from each monthly fit to show CO variability from clear and cloud-cleared cases. The left figure shows AIRS (red) and IASI (blue) CO retrievals over both the Northern and Southern Hemispheres (SH). The right figure shows the IASI and AIRS CO variability for the Northern and Southern Hemispheres, respectively.

**Conclusion**

AIRS DOFS for persistent cloudy cases are lower than for the clear cases. IASI DOFS for persistent cloudy cases are lower than for the clear cases. This is due to the change of surface reflectance variance.