Cirrus and Ice Supersaturation
AIRS-CALIPSO synergy

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Previous analysis with TOVS Path-B and SAGE: cirrus clouds and ice supersaturation in the upper troposphere (Lamquin et al. EGU 2007)

AIRS
L2, V4, temperature and water vapor vertical profiles (Sassktd et al. 2003)

A-Train satellites
RHic calculation in 50 to 100 hPa – thick pressure layers

RHic distributions with different vertical extent within p layer: more extent of clouds in p layer leads to distribution closer to in situ distributions

Relative humidity (ice) distributions: humidity by AIRS and clear/cloudy distinction by CALIPSO (clear: dashed)

Why are peaks of distributions biased compared to in situ and ground lidar distributions?

Conclusions:
- Vertical extent of clouds influences RHic distribution: mean RHic varies by about 15%
- Calculation of IFS occurrence: take RHic with maximum occurrence
- Horizontal homogeneity assumed
- Influence of horizontal extent to be tested

CALIPSO
data from NASA Langley Research Center Atmospheric Science Data Center

Colocation: August 2006 – July 2007
Night, 760° - 60° latitude coverage

For the calculation of RHice q and qst are averages of q and qsat in the AIRS layer

Peak of RHic distribution lower in regions with thin clouds

Ratio of geometrical cloud thickness to p layer thickness for high clouds in the p layer of humidity

Insights from in situ and ground lidar measurements for RHic

Mean RHic as function of clouds vertical extent in p layer
-Theoretical data: 1st, 70°-60° S-H2: 300-300 hPa
-Trapped data 1st: 130-230 hPa