How Would Cloud Types Affect the Differences in Multilayer Cloud Amounts Retrieved from the Satellite and ARM ARSCL Data

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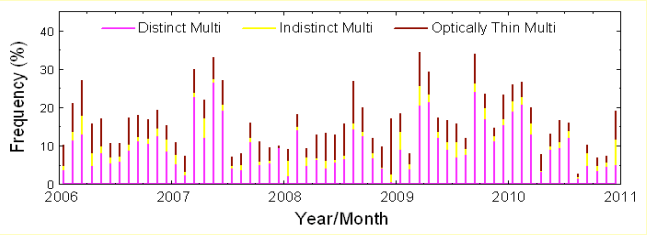
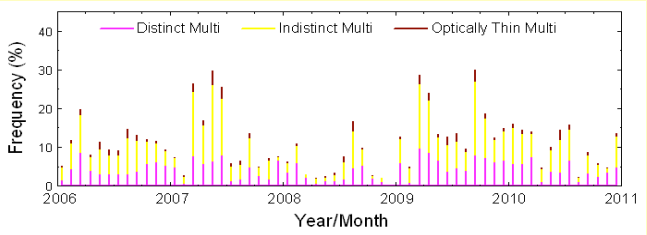
Introduction

We evaluated 5-year two different multilayered cloud retrieval products derived from: 1) space-borne U.S. Geostationary Operational Environmental Satellite (GOES) data using the Langley multilayered cloud retrieval algorithm and 2) ground-based U.S. DOE ARM Active Remotely Sensed Cloud Location (ARSCL) data using the lidar/radar measurements over the ARM SGP Site.

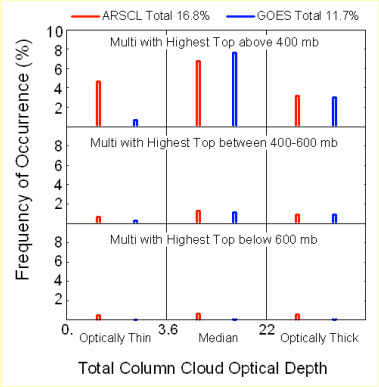
ARSCL Monthly Multilayer Cloud Amounts at ARM SGP Site



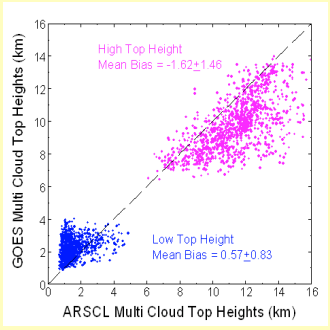
GOES Monthly Multilayer Cloud Amounts at ARM SGP Site



Multilayer Cloud Amounts for Different Highest Tops and Optical Depths



Differences between GOES and ARSCL Multilayer Cloud Top Height Retrievals



Summary

- Evaluations of GOES satellite (looking down) and ARM ARSCL (looking up) retrievals showed that good agreement exists between the two multilayer cloud products.
- Differences exist due to data mismatches, instrument sensitivities and different spatial resolutions of the sensors.
- Optically thin cirrus layers resided above optically thick lower clouds caused the main differences between the passive satellite and ground lidar/radar retrievals.

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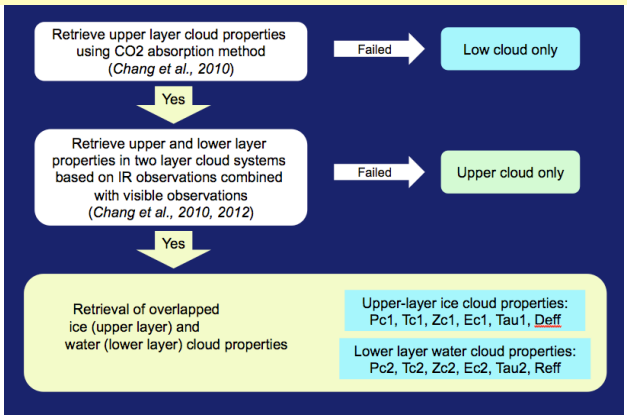
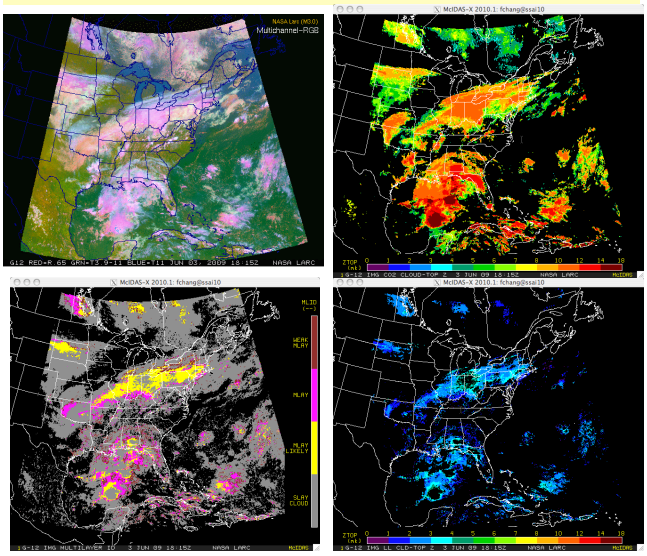
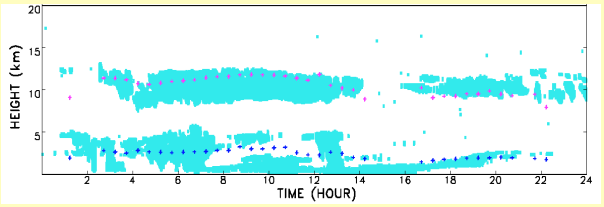
Methodology – GOES Satellite Algorithm



GOES Satellite Multilayer Cloud Retrieval Example



Comparisons of GOES Upper (pink) and Lower (blue) Cloud Top Heights with ARSCL Cloud Mask (cyan) – 2009/06/03



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