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Multi-layered Cloud Parameter Retrieval: Developments and Improvements Using Passive Satellite Observations

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INTRODUCTION

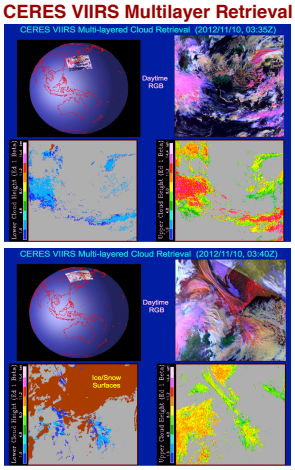
One challenge facing passive satellite cloud retrieval is the presence of multi-layered clouds. Here we present a number of the multispectral schemes for retrieving multilayered cloud properties from the polar-orbiter VIIRS and MODIS and from the geostationary SEVIRI and GOES data.

Multilayer Retrieval

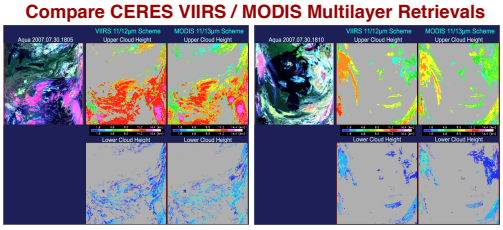
Our retrieval of upper-layer cloud top height employs the 11μm-12μm technique from VIIRS and the 11μm-13.3μm technique from MODIS, SEVIRI, and GOES series.

Our retrieval of lower-layer cloud parameters employs a two-layered iterative scheme that uses cloud information content derived based on the upper cloud parameters and VISST (cf. Patrick Minnis' talk on NASA Langley CERES Cloud Retrieval Algorithm).

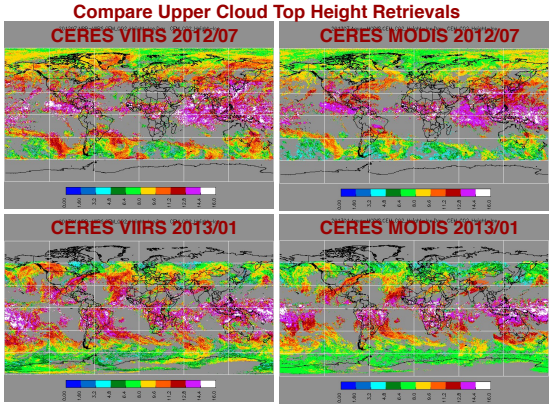
CERES VIIRS Multilayer Retrieval



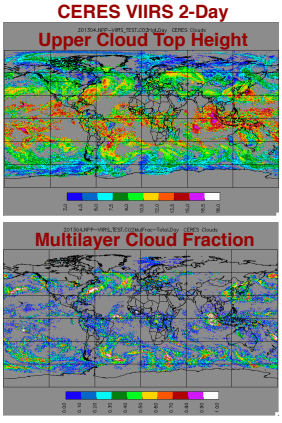
Compare CERES VIIRS / MODIS Multilayer Retrievals



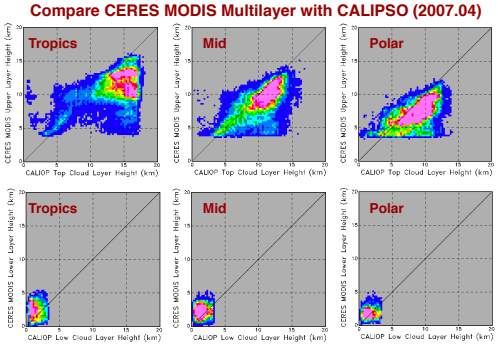
Compare Upper Cloud Top Height Retrievals

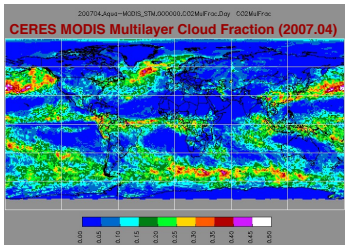


CERES VIIRS 2-Day

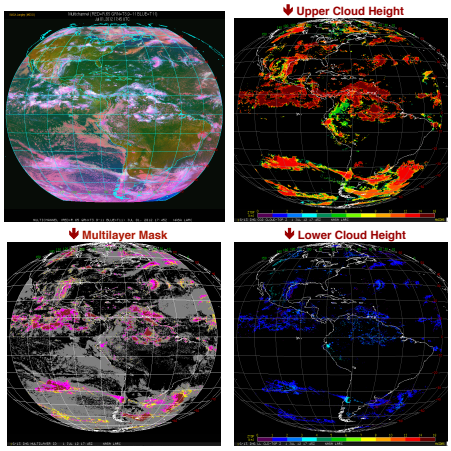


Compare CERES MODIS Multilayer with CALIPSO (2007.04)

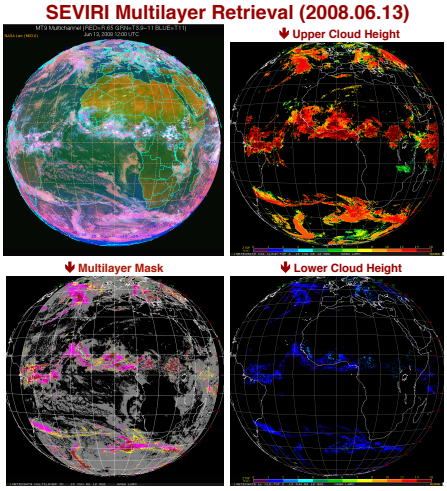




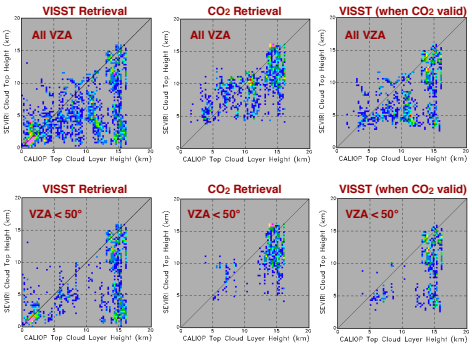
GOES-13 Multilayer Retrieval (2012.07.01)



SEVIRI Multilayer Retrieval (2008.06.13)



Compare SEVIRI Cloud Top Heights with CALIPSO (2008.06.13)



Summary

- Our upper-layer cloud top height retrievals performed well when applied to VIIRS, MODIS, SEVIRI and GOES satellite observations.
- Our multilayered cloud retrievals also performed well when applied to VIIRS, MODIS, SEVIRI and GOES data.
- Further refining and improving the multi-layered cloud parameters by employing additional satellite spectral channels are under study.