

Synergistic Cloud Clearing and Cloud Property Retrieval Using Aqua Sounding and Imaging Infrared Measurements

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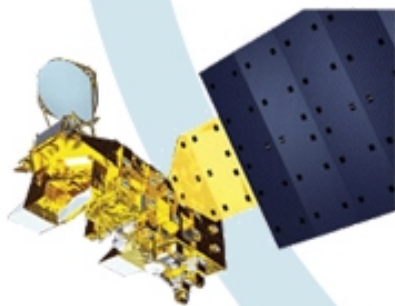
High spectral resolution (~0.5 cm⁻¹) infrared sounding and high spatial resolution (~1 km) infrared imaging measurements on board the NASA EOS Aqua satellite provide an unprecedented opportunity to characterize the full clear and cloudy sounding and cloud property retrieval capability that no single instrument has been able to achieve, up to now.

The Atmospheric Infrared Sounder (AIRS) has single field of view resolution at sub satellite point (i.e. nadir) of about 14 km. The clear sounding sampling probability is less than 10%. It requires the use of infrared measurements from multiple AIRS field of views and co-located microwave measurements to improve the yield of high performance clear sounding retrieval. Unfortunately, this procedure reduces the spatial resolution (from one single to 3 by 3 field of views, for example) and is also limited by the inhomogeneity (different types, phases, and heights) and contrast (difference of cloud fraction within each field of view) of the clouds within the processing footprint.

As part of International MODIS and AIRS Processing Package (IMAPP), AIRS sounding and cloud property retrieval will be demonstrated by the fusion of 1-km MODIS infrared radiances with the derived cloud mask and phase products. We will present the details of this synergistic procedure, performance of the cloud cleared radiances and the associated sounding and cloud property retrievals.

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