THE IMPROVEMENT OF ATMOSPHERIC BOUNDARY LAYER PROFILING FOR HYPERSPECTRAL INFRARED SOUNDING RETRIEVALS

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ABSTRACT: The spaceborne hyperspectral infrared measurement, such as the Atmospheric Infrared Sounder (AIRS) onboard NASA's *Aqua* satellite, has been proved that provides a great accuracy in the atmospheric thermodynamic profiling. The AIRS sounding suggests the estimation of atmospheric thermodynamic state at the accuracy of 1K per 1-km layer and 10% per 2-km layer in temperature and moisture profiles, respectively. However, the major uncertainties are raised in the atmospheric boundary layer due to the overlapping of weighting functions at several channels. In this study, we improve the traditional sounding retrieval algorithm by combining the temporal- and spatial-collocated hourly surface observation into the soundings algorithm. The preliminary result shows the sounding performance is improved when surface observation incorporates with the satellite observation. The difference reduces not only at the lowest surface level but also in the atmospheric boundary layer, when compare the retrieved profiles to radiosonde over Dongsha Islands. This will greatly help to condition atmospheric boundary thermodynamic state, where the major energy flux exchanges between the atmosphere and the surface from satellite observation.