

THE IMPROVEMENT OF GPS/RO ATMOSPHERIC SOUNDING BY SYNERGISTIC USE OF HYPERSPECTRAL INFRARED RADIANCE MEASUREMENTS

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ABSTRACT: Atmospheric soundings from satellite measurements are critical to numerical weather prediction (NWP) and various scientific research applications. The global positioning system (GPS) radio occultation (RO) technique provides high-accuracy and fine-vertical-resolution atmospheric profiles, which have been proven to have positive feedback in weather and climate simulations. However, the spatial resolution between GPS RO soundings is currently over 200 km, which is not suitable for mesoscale applications. On the other hand, atmospheric soundings from hyperspectral infrared instruments, such as the Atmospheric Infrared Sounder (AIRS), can provide substantial accuracy and acceptable spatial resolution to preserve the gradient in mesoscale systems. In this study, we improve the spatial resolution of GPS RO soundings from the COSMIC/FORMOSAT-3 mission by synergistic use of AIRS soundings. Preliminary results demonstrate the advantage of the synergistic algorithm over either instrument alone; sounding results from synergistic use of both measurements maintain the fine vertical resolution while improving its spatial accuracy for mesoscale NWP applications.