

# PLANETARY BOUNDARY LAYER PROFILING FROM COSMIC-2, SENTINEL-6, AND SPIRE GNSS RADIO OCCULTATION

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C. O. Ao, **P. Vergados**, and K.-N. Wang

Jet Propulsion Laboratory, California Institute of Technology

An important application of GNSS-RO that has emerged in the past decade is its ability to profile the moist thermodynamical structure of the Earth's planetary boundary layer (PBL) at high vertical resolution. Studies performed using COSMIC and similar missions have revealed its unique capabilities and limitations. Global PBL heights exhibit spatial, diurnal, seasonal, and interseasonal variabilities that can be used to extend in-situ observations and assess climate models.

A new generation of data, including COSMIC-2 and Sentinel-6 that have improved receiver tracking and higher SNRs, are now available for PBL investigations. We will present results that show how these measurements have improved the PBL profiling performance over the previous missions and how this varies with SNRs. At the same time, we have investigated the quality of PBL profiling from Spire GNSS-RO data available from the NASA Commercial Data Acquisition Program (CSDAP) and compared these results with COSMIC-2 and Sentinel-6. Together, the combined COSMIC-2, Sentinel-6, and Spire data provide significantly better observation coverage than COSMIC, with better PBL penetration. This allows us to study the PBL height and vertical structure with improved spatial and temporal resolution.