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Poster

We present a method to detect the planetary boundary layer height (PBLH) using GNSS signal amplitude measured by a mountaintop-based RO (MRO) system. PBLH is an important troposphere parameter. PBLH corresponds to sharp changes in atmospheric properties such as water vapor content, temperature, and refractivity. The sharp refractivity changes cause RO signals to experience large carrier phase variations and deep amplitude fading. GNSS RO has been used in detecting the PBLH with receivers onboard low Earth orbit (LEO) satellites. The prevailing method using RO measurements to obtain PBLH is through detection of minimum refractive gradient. RO receiver generates carrier phase measurements which can be inverted to the RO signal bending angle and the refractivity profiles. A simpler method is to use the signal amplitude by detecting the altitude at which minimum amplitude occurs. In this project, data collected during a MRO experiment on the summit of Haleakala, Hawaii is used to derive the PBLH using both the refractivity gradient method and the signal amplitude method. The results indicate that the estimated PBLHs using the amplitude method are comparable with those derived from space-based RO measurements, space-borne lidar, and local radiosonde profiles.

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