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# Downward-Looking GPS Occultation Mesurement from Top of Mt. Fuji

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Although the major applications of Global Positioning System (GPS) are positioning and navigation, GPS has been also used for atmospheric measurements.

Downward-Looking (DL) GPS occultation measurement is one of the technique to obtain atmospheric refractivity profiles within the atmospheric boundary layer and lower troposphere. Since the atmospheric refractivity in the lower troposphere largely depends on water vapor, DL GPS occultation can provide water vapor profiles with high vertical resolution and are useful for improving the accuracy of a regional weather prediction.

DL GPS occultation experiments from the top of Mt. Fuji were carried out in summer months since 2001. In 2003, we installed three different types of GPS receivers and antennas, and operated simultaneously for detecting occulting GPS signals.

(1)A TurboRogue SNR-8000 GPS receiver and a choke ring antenna

(2)A NovAtel OEM-4 GPS receiver and a high gain antenna

(3)A Furuno GPS receiver for airplane DL and a micro strip patch antenna System(2) and (3) can receive more than 30 occultation events per day although system(1) got about 10 events per day. Systems (2) and (3) can track GPS signals until low and negative elevation angles, and detected rising occultation events as well.

Applying geometrical analysis and Abel inversion, we analyzed refractivity profiles at an altitude range of 1.5-4km from rising occultation for the first time. We will obtain atmospheric refractivity profiles in a wide height range, which is expected to contribute to the improvement in accuracy of the regional weather forecast.

Keywords: GPS; radio occultation; refractivity profile;