

## Observations of atmosphere with GPS occultation technique

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Various properties of the Earth's atmospheric and ionosphere can be derived by analyzing propagation characteristics of GPS radio waves. In particular, a profile of refractive index is retrieved from the bending of ray path for GPS signals, passing through the atmosphere at low and negative elevation angles, which is called the GPS occultation technique. This active limb-sounding measurement has been realized by using a GPS receiver aboard a low-earth orbiting (LEO) satellite. Recent LEO missions such as GPS/MET, Oersted, CHAMP, SAC-C have achieved significant progress in measuring water vapor and temperature profiles in the troposphere and stratosphere. The GPS occultation technique is also applicable to the planetary boundary layer by using GPS receivers on top of high mountains, on balloons and aboard aircrafts. The GPS remote sensing has become a powerful tool for scientific research, and provided valuable data-sets for assimilation into climate and numerical weather prediction models. We discuss new findings and applications of GPS occultation techniques in atmospheric research, as well as recent developments in retrieval techniques.