Geophysical Research Abstracts
Vol. 14, EGU2012-12557, 2012
EGU General Assembly 2012

GPS/RO-derived water vapour profiles of the atmosphere

P. Vergados (1) and S. Pagiatakis (2)

(1) NASA Jet Propulsion Laboratory, Pasadena, CA, USA, (2) York University, Earth and Space Science and Engineering, Toronto, Canada

The insensitivity of the Global Positioning System radio occultation (GPS/RO) remote sensing technique to clouds and aerosols makes GPS, and in the near future GNSS, one of the most promising instruments in retrieving the Earth's atmospheric thermodynamic parameters under all weather conditions. Therefore, combining GPS/RO high vertical resolution ($\sim$100 m in the middle troposphere) with independent atmospheric temperature measurements, water vapour retrievals under cloudy conditions can be realized. In this presentation, we will first demonstrate how water vapour profiles can be retrieved from the GPS/RO technique, discussing the systematic biases introduced by the effect of gravity and the widely used hydrostatic equation in the retrieval process. Then, we will show results of the GPS/RO-derived water vapour profiles under cloudy and clear sky conditions by using about 1,500 collocated GPS refractivity and temperature profiles from the Atmospheric Infrared Sounder (AIRS), introducing the complementary nature of radiowave (GPS) and infrared (AIRS) measurements.