Abstract Details

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Title: (IWG1) Airborne GPS downward-looking occultation experiment in 2(

Abstract:

AUTHORS: Takayuki Yoshihara1, Naoki Fujii1, Kazuaki Hoshinoo1, Ke Matsunaga1, Shinji Saitoh1, Toshitaka Tsuda2, Yuichi Aoyama2 and S Danno2 AFFILIATION: 1Electronic Navigation Research Institute, Toky Japan 2Research Institute for Sustainable Humanophere, Kyoto Unive Kyoto, Japan ABSTRACT: GPS occultation observation can provide atmospheric refractive index profile by continuously measuring Dopp in carrier phase from occultation GPS satellite. As a novel technique, mountain-based GPS occultation method (downward-looking; DL) is developed to estimate tropospheric water vapor profile below a receiv point with aid of temperature results from another observations. Rese Institute for Sustainable Humanosphere (RISH), Kyoto University and Meteorological Research Institute (MRI), Japan performed observatior campaigns at the top of Mt. Fuji (altitude: 3776 meters) in cooperatio NASA/JPL in the both summer of 2001, 2002. In this method, ionosp effect can be removed by dual-frequency observation in GPS signal, a required to continuously observe Doppler shift in carrier phase from G satellite with a negative elevation angle at the top of a high mountain Currently, it is expected to expand observational height range with a l receiving point than a mountain-based DL observation. Therefore, we perform airborne-based DL observation. Since a minimum of observat height range depended on signal tracking sensitivity of GPS receiver, further developed a purpose-built GPS receiver system for airborne-b experiments. To accomplish airborne-based DL observation, it is requ estimate precise aircraft velocity with an accuracy of several mm/s in processing along to a flight course in order to distinguish between atmospheric propagation effect and aircraft velocity from observed Dc shift data. For this subject, we use a GPS/INS system, which included laser gyros (for measuring angular velocities in three components) an accelerometers (for measuring accelerates in three components), and it on the experimental aircraft (Beachcraft B99 airliner) of the Electro Navigation Research Institute (ENRI). Using these equipments, we pe flight experiments of airborne-based DL observation in October 2003 February 2004. As a result, we recognized that our GPS receiver syste continuously tracked occultation signal with a minimum elevation ang degrees at a flight level of about 6 kilometers. In presentation, we wi initial results of airborne-based DL experiments, i.e. performance of a purpose-built DL receiver, data acquisition status, and so on.