



Applying WVR to verify the precipitable water vapor measured by ground-based GPS

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In order to determine the accuracy of the atmospheric precipitable water vapor derived from ground-based GPS data, projected measurements were made and compared against the reference data collected from corresponding weather stations and Water Vapor Radiometer (WVR) stations. As to ensure that comparable data were obtained, the distance between GPS stations and its corresponding weather stations were no more than 20 km apart. In total, 15 such pairings were employed. Periods of significant rainfall were preferred for this study. Thus, the GPS and the hourly rainfall records from the Central Weather Bureau (CWB) in Taiwan for the months of June and August 2006 were utilized. Moreover, the WVR observations measured at the Yangmingshan (northern Taiwan) and Beigang (western Taiwan) were collected to validate the precipitable water vapor estimates derived from ground-based GPS data. The Zenith Wet Delay (ZWD) of each station was calculated using Bernese 4.2 software. The data was processed relative to the TSKB station (Japan) to avoid the high correlation within the atmosphere and to eliminate systematic errors. The ZWD derived from GPS matched with the measurements of the WVR, with a slight offset by about 5 mm. Furthermore, it is observed that significant rainfall often results in a large decrease in the calculated ZWD. In the future, the upgrade of the data processing algorithm and the study of the relationships between ZWD and rainfall are our next efforts.