Geophysical Research Abstracts
Vol. 17, EGU2015-6070, 2015
EGU General Assembly 2015

Validation of GPS derived integrated water vapor with microwave radiometer measurements in zenith and satellite tracking mode

Stefan Heise (1), Ming Shangguan (2), Zhiguo Deng (1), Galina Dick (1), Jens Wickert (1), and Florian Zus (1)

(1) GFZ German Research Centre for Geosciences, Dep. 1, Geodesy and Remote Sensing, Potsdam, Germany (stefan.heise@gfz-potsdam.de), (2) GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

Reliable and precise water vapour measurements are important for both, numerical weather prediction and climatological studies. In this context, zenith and slant total delay (ZTD, STD) data from Global Positioning System (GPS) ground observations provide a valuable source of integrated water vapour (IWV) information with high potential for assimilation to numerical weather models and nowcasting applications but also for climatological analysis of longer GPS IWV time series. Therefore it is important to validate the accuracy of GPS IWV with independent observations. For this purpose, in 2012 GFZ started to operate a water vapour radiometer (WVR) in vicinity of the Potsdam GPS station. It measures the absorption lines of atmospheric water vapour and oxygen at 14 frequency channels in the 22-58 GHz range and provides among others integrated water vapour measurements along the respective line of sight. Besides zenith IWV measurements the radiometer is operated in GPS satellite tracking mode enabling direct comparisons with the nearby GPS slant IWV observations (processed at GFZ). In this study we present validation results of GPS slant and zenith IWV data with the collocated radiometer observations. The validation covers all seasons including dry and wet humidity conditions. We address relations between the GPS-WVR differences and corresponding observation conditions that might have influence on the comparison results (elevation angles, ground pressure and temperature, atmospheric humidity).