Geophysical Research Abstracts
Vol. 15, EGU2013-6814, 2013
EGU General Assembly 2013

Analysis of long time series of precipitable water vapour from GPS, DORIS and NWP models

Olivier Bock (1) and Pascal Willis (2,3)

(1) IGN, LAREG, Univ Paris Diderot, Sorbonne Paris Cité, Paris, France (olivier.bock@ign.fr), (2) IGN, DT, Saint-Mandé, France, (3) IPGP, Univ Paris Diderot, Sorbonne Paris Cité, Paris, France

The analysis of GPS and DORIS measurements provides accurate estimates of zenith tropospheric delay (ZTD) and total column water vapour (TCWV). Such measurements are now available for more than 15 years from permanent ground-based stations which cover quite homogenously the globe and receive increasing interest for meteorology and climate research.

This work assesses the quality of operational and reprocessed GPS and DORIS datasets. Regarding GPS, two solutions produced by JPL as contributions to IGS (repro1, covering period 1995-2007, and trop_new, covering period 2001-2010) are compared. An independent reprocessed solution produced by IGN (sgn_repro1, covering period 2004-2010) is also used in the intercomparison. Differences due to different data processing procedures and errors in metadata and discontinuities due to changes in data processing procedures are evidenced in the operational solution. A reprocessed DORIS solution (IGN solution, period 1993-2008) is also compared to GPS and to the ECMWF reanalysis (ERA-Interim). The impact of changes in GPS or DORIS equipment on the quality of the ZTD estimates is investigated.

The reprocessed GPS and DORIS ZTD estimates are converted into TCWV and analysed globally and for different regions. The TCWV time series reveal significant variability at various timescales (inter-annual, seasonal, intra-seasonal and synoptic) and look very promising for validating independent observational datasets (e.g., radiosondes and satellite products) and models (reanalyses, climate models).