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GPS data processing modelling for water cycle studies over West Africa

S. Nahmani (1), M.N. Bouin (1,2), O. Bock (1,3), E. Doerflinger (4) and F. Masson (5).

(1) Institut Géographique National, Marne-la-Vallée, France, (2) Now at Météo France, Brest, France, (3) SA / CNRS, Université Paris VI, Paris, France, (4) LDL / CNRS, Université Montpellier 2, France, (5) IPGS/EOST, Strasbourg, France (samuel.nahmani@ign.fr / Phone: +33 1 64 15 32 83)

Six permanent GPS stations have been deployed in West Africa within the AMMA project framework since 2005/2006 in order to obtain continuous precipitable water vapour (PWV) estimations. We aim to monitor the PWV evolution with a time resolution of 1 hour over the AMMA area. Some GPS sites were equipped with transmission facilities, which allows us to obtain NRT, 'rapid' and 'precise' PWV estimations. NRT and 'rapid' PWV time series are used as meteorological products while 'precise' PWV time series are used to study climate at different time scales (especially important for diurnal cycle studies). To ensure long term consistency and high accuracy of the GPS PWV, we account for the latest modelling capabilities implemented in GPS scientific softwares. As these recent improvements impact PWV estimations, we present here some results of the methodological and sensitivity tests we carried out. We develop some statistics tools to evaluate the precision/accuracy of our 'precise' analysis and validate our NRT or 'rapid' products.

First, we tested the impact of antenna and radome models on station position stability and tropospheric parameter determination. Second, we analysed the effects of the atmospheric modelling parametrization: a priori temperature and pressure values, mapping functions, gradient estimation, Markov chain parametrization. Finally, we tested the GPS network configuration (regional or global) impact and orbit accuracy effects on the final precision.