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Global validity and behaviour of tropospheric gradients estimated by GPS

Laurent Morel (1), Eric Pottiaux (), Frederic Durand (), Jean michel Follin (), Stephane Durand (), and Joel Van Baelen ()

(1) Laboratoire Géomatique et Foncier, Cnam, Le Mans, France, (2) Royal Observatory of Belgium, Belgium, (3) Laboratoire de météorologie physique, University of Clermont Ferrand, France

Estimation of tropospheric gradients in GNSS data processing is a well-known technique to improve positioning. Today, they are routinely estimated by several global and regional GNSS analysis centres but they are still not yet used for operational meteorology. We discuss the physical meaning of tropospheric gradients estimated from GPS observations recorded by several permanent stations located all around the world. We estimated Zenith Total Delay (ZTD) and tropospheric gradients using GIPSY-OASIS software. The stations have been selected due to their proximity of the relief and we observe that gradient directions are stable over the time and pointed toward the relief for most of the stations selected. Correlation coefficient are processed between gradients (yearly mean values (Ge, Gn) as vector component) and direction of the steep slopes (obtained by analyzing Digital Elevation Model at 20 km, 40 km and 60 km around the station). These results give us a first step for a physical meaning to gradients when stations are closed to high mountains.