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Estimating Zenith Total Delay Fields by using Ground-Based GPS network

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Tropospheric refraction is one of the major error sources in GNSS positioning. The delay of radio signals caused by the troposphere ranges from 2m at the zenith to 20m at lower elevation angles. Climatological models can help to correct these delays, but they are limited in accuracy and spatial resolution resulting in up to a few decimetres error in positioning solutions. Moreover, SAR images are affected by the same atmospheric disturbances, even if empirical methods are used to mitigate those artefacts. The present availability of dense ground-based GPS networks delivering ZTD estimates in Real and in Near-Real-Time allow to generate ZTD fields which can be continuously updated as soon as fresh ZTD estimates are delivered. Such ZTD fields can be very useful to improve SAR image geolocation and rapid positioning applications since they can provide the atmospheric delay in the geographical region of interest and/or at the user moving location. We will present a method for estimating ZTD fields interpolating, trough Ordinary Kriging, ZTD estimates given at the receiver sites and we will apply it on a proper test region selected in Europe.