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The tropospheric tomography model above the local GNSS network.

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One of the presently mainly investigated issue in GNSS application is influence of troposphere weather conditions. The unmodeled variability of these conditions limits the accuracy of static GNSS measurements to sub centimetre level, especially in height component, and in case of RTK reduces mount point service range to less than 30km. The parameter representing the influence of the weather conditions on the GNSS signal is Tropospheric Path Delay (TPD). The TPD is directly related to refraction caused in 90 % by temperature and pressure gradient (hydrostatic part) and in 10 % by water vapour distribution (wet part). Apart from it's negative role as an accuracy limiting factor, path delay could be used as an data source for meteorological applications. The research will allow usage of GNSS data as an additional meteorological instruments, in numerical weather prediction models. The paper presents the GNSS data processing strategy of TPD estimation, the choice of mapping functions, comparison of used a priori models and other parameters like tilting. Next, theoretical construction of tropospheric tomography model is demonstrated - the choice of model domain dissemination technique, time batches for path delays, and stabilization of ill-conditioned inverse solution. Then the different approaches of meteorological data reprocessing, accuracy assessment and data input are presented. The tests presented in this paper based on the case study: 48 hours GNSS campaign from Karkonosze Mountains, combined with respective meteorological on site measurements and radiosonde launches.

Keywords: GNSS local networks, GNSS data processing, GNSS meteorology,