

Estimating atmospheric refractivity by using Multi-GNSS Zenith Total Delays and Horizontal Delay Gradients

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Radio signals which are transmitted by the multi-GNSS constellation and received by a ground-based station allow the estimation of the zenith total delay (ZTD) and the so-called horizontal delay gradients. The ZTD is currently the basic observable used in atmospheric studies. Clearly, the ZTD is of limited value because it does not contain information about local atmospheric refractivity gradients. This information is potentially hidden in the horizontal delay gradients. Hence we developed forward and adjoint operators for variational data analysis. In this contribution we examine to what extent the horizontal delay gradients on top of the ZTD improve the estimated atmospheric refractivity in the vicinity of the considered station.