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Variability of GPS-derived zenith tropospheric delay and some result of its assimilation into numeric atmosphere model

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Abstract

The total zenith tropospheric delay (ZTD) is an important parameter of the atmo- sphere and directly or indirectly reflects the weather processes and variations. This paper presents a hardware and software complex for continuous measurements and prediction of atmospheric thermodynamics and radiowaves refraction index. The main part is a network of ground-based spatially separated GPS-GLONASS receivers, which allows the remote sensing zenith tropo- spheric delay. GPS-Derived Zenith Tropospheric Delay shows the day to day variation and mesoscale spatial and temporal variability. Comparison with the numerical weather reanalysis fields and solar photometer measurements showed agreement with the relative deviation of less than 10%. Hardware-software complex includes the numerical model of the atmosphere on a computational cluster. A variational assimilation system was used to examine the comparative impact of including satellite derived total zenith tropospheric delay from GPS and GLONASS ground observations. Preliminary results show that the initial field of radiowaves refraction index was improved by assimilating the satellite derived ZTD.