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Poster
Abstract
The electromagnetic signal transmitted by the global navigation and positioning systems (GNSS) suffers a delay which is mainly caused by the water vapor in the atmosphere. Estimating the delay affecting the signal propagation, it is possible to estimate the water vapor column on the troposphere above each station. Observing the water vapor distribution on the troposphere remains a challenge for the weather forecast. Radiosondes provide precise water vapor profiles of the troposphere, but lack geographical and temporal coverage, while satellite meteorological maps have good spatial resolution but even poorer temporal resolution. GPS has proved its capacity to measure the integrated water vapor in all weather conditions with high temporal sampling frequency. Satellites travel under different elevation angles, but taking a convenient mapping function, the zenith direction is commonly considered. All components of the troposphere contribute to such zenith delay, but it is convenient to study its hydrostatic and wet terms separately. The in- duced dipole moment of the atmosphere is associated with the Zenith Hydrostatic Delay (ZHD). Zenith Wet Delay (ZWD, non-hydro- static) is mainly due to the permanent dipole moment of water vapor, which is highly variable in space and time: the ZWD is fully attributed with the content of water vapor along the signal path. The main objective of this research is to investigate the dry and wet part of the neutral atmosphere (tropospheric delay) and estimate and analysis of precipitable water vapor over Ethiopia GPS stations. During this research, we are used GPS Analysis programing software in Massachusetts Institute of technology (GAMIT), GLOBK, and TRACK form a comprehensive suite of programs for analyzing GPS measurements primarily to study total delay and analysis precipitable water vapor. GLOBK is a Kalman filter whose primary purpose is to combine various geodetic solutions such as GPS, and other experiments. From this preliminary study result we got time series of temporal and spacial variation of GPS derived zenith hydrostatic and Wet Zenith delay in millimeter levels in all GPS stations . The result indicates the direct correlations of surface temperature on precipitable water vapor over tested stations.
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