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Research on real-time monitoring method of water vapor ionosphere and platform construction based on CORS

Liu Xingwei (1), Pu Dexiang (1), Xu Chaoqian (2), and Gao Xiang (1)
(1) Chongqing Geomatics Center, Chongqing,China, (2) Wuhan University,Wuhan,China

The troposphere and ionosphere are two important components of the Earth's near-Earth space environment, and are the closest to the Earth's surface and most closely related to human life. Studying the spatial and temporal characteristics of water vapor changes helps to understand the water vapor cycle, which has important scientific and practical significance for studying climate environmental changes and improving weather forecasting levels. Studying the temporal and spatial variation of the total electron density (TEC) of the ionosphere can detect and study the irregular structure of the ionosphere, the influence of geomagnetic storm on the ionosphere, the response of the ionosphere to solar flares, the tomographic inversion of the three-dimensional structure of the ionosphere and the monitoring of earthquakes.GNSS technology can not only provide navigation and location services, but also use the delays of its signals as it passes through the ionosphere and troposphere to invert the changes in the spatiotemporal environment. With the large-scale construction and application of continuously operating reference stations (CORS), the real-time multi-dimensional water vapor and ionospheric distribution information can be obtained by using the dense CORS reference station network.
The method of Atmospheric precipitablewatervapor Based on PPP(Precise Point Positioning)and the three-dimensional ionospheric tomography method based on pixel base are studied. Combined with Chongqing CORS and IGS real-time service product (RTS), a regional water vapor ionospheric monitoring platform is constructed. The platform can provide high spatial and temporal resolution two-dimensional water vapor (including mm-level precision atmospheric precipitation products), two-dimensional and three-dimensional ionospheric products in real time. Now web is released online. The platform extends the service field of CORS in Chongqing, and is of great significance for monitoring short-term abrupt weather phenomena and studying fine morphological changes of the ionosphere.