Meteorological Applications of Ground-based GNSS Observations

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ABSTRACT: Over the last two decades, Global Navigation Satellite Systems (GNSS) have emerged as a precise and cost-effective tool for studying the composition of the Earth's atmosphere. As the GNSS signal travels from the transmitting satellite to the ground-based receiver, it is refracted by the atmosphere and this refraction introduces a propagation delay in the signal. The average vertical component of the propagation delays encountered by the signals from all the satellites in view of a given ground-based GNSS receiver is known as the Zenith Total Delay (ZTD). Using surface meteorological parameters, the ZTD can be converted to integrated water vapor (IWV), which represents the amount of water vapor in a vertical atmospheric column above the ground-based receiver. In addition, the GNSS-derived ZTD has been found helpful in the improvement of weather forecasts through assimilation in the numerical weather prediction (NWP) models. Furthermore, the availability of GNSS observations with a global coverage and a time span of about two decades make it possible to use the long-term time series of GNSS-derived ZTD and IWV for climate monitoring applications. This presentation will provide a background on the meteorological applications of ground-based GNSS and discuss their impact in the light of some previous research results.

Coffee & cookies will be served
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