

## Global Navigation Satellite System and Precise Point Positioning as Remote Sensing Tools for Monitoring Tropospheric Water Vapor

**Authors :** Panupong Makvichian

**Abstract :** Global Navigation Satellite System (GNSS) is nowadays a common technology that improves navigation functions in our life. Additionally, GNSS is also being employed on behalf of an accurate atmospheric sensor these times. Meteorology is a practical application of GNSS, which is unnoticeable in the background of people's life. GNSS Precise Point Positioning (PPP) is a positioning method that requires data from a single dual-frequency receiver and precise information about satellite positions and satellite clocks. In addition, careful attention to mitigate various error sources is required. All the above data are combined in a sophisticated mathematical algorithm. At this point, the research is going to demonstrate how GNSS and PPP method is capable to provide high-precision estimates, such as 3D positions or Zenith tropospheric delays (ZTDs). ZTDs combined with pressure and temperature information allows us to estimate the water vapor in the atmosphere as precipitable water vapor (PWV). If the process is replicated for a network of GNSS sensors, we can create thematic maps that allow extract water content information in any location within the network area. All of the above are possible thanks to the advances in GNSS data processing. Therefore, we are able to use GNSS data for climatic trend analysis and acquisition of the further knowledge about the atmospheric water content.

**Keywords :** GNSS, precise point positioning, Zenith tropospheric delays, precipitable water vapor

**Conference Title :** ICGNSSC 2018 : International Conference on Global Navigation Satellite Systems and Components

**Conference Location :** Sydney, Australia

**Conference Dates :** March 29-30, 2018