稠密GNSS受信ネットワークを用いた電離層遅延長の微細時間空間変動に関する研究

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An observational study on the time and spatial micro variations of the localized ionospheric delays with a dense GNSS receivers

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The integrated amount of water vapor along the zenith angle, or PWV (Precipitable Water Vapor) can be estimated by GPS (GNSS) meteorology, which is a method to compute atmospheric parameters from troposphere-induced delays in signals of GPS (GNSS). We deployed a dual-frequency (DF) GNSS network around Uji campus of Kyoto University, Japan, with inter-station distances of few kilometers. By using this dense network, we built a basic system to observe PWV fluctuations occurring within a small horizontal scale (less than 10 km), which were then analyzed to identify possible precursors of local torrential rain. To utilize this network as a practical heavy rain early warning system for urban area, using inexpensive single-frequency (SF) receivers would be better for economic reasons. However, Using SF receivers occurs error in computing PWV because we cannot eliminate the ionospheric delays by using SF receivers. So we need to investigate and estimate ionospheric delays within this dense network system in many cases. In this study, we observed the time and spatial micro variations of the localized

ionospheric delays by using a dense GNSS receivers and QZSS(Quasi-Zenith Satellite System). Quasi-Zenith satellite orbit is asymmetrical figure-8 pattern and is almost directly overhead over Japan for a long time. So that satellite does not largely move in short period. For that reason, we can observe time and spatial variations of the localized ionospheric delays at a specific spot with our GNSS receivers network by QZSS.

In this investigate, we aim to research the impact of ionospheric delays on our dense GNSS receivers network for observing PWV and find the appropriate method to correct the effect of ionospheric delays on SF observations.