

## Estimation of precipitable water by way of analysis of all sites of nation-wide GEONET network

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In NIED for the study to improve the accuracy of heavy rainfall nowcasting in the Tokyo metropolitan area, we run the CReSS high-resolution atmospheric model assimilating the observation data of multi-parameter (MP) radar network. To accurate the model assimilating the accurate precipitable water observation data to the model, we run the automated system to calculate near-realtime hourly GPS precipitable water of about 150 GEONET network sites in the area every three-hour applying the RINEX file downloaded from GSI ftp server.

In addition, since 2011 fiscal year for the area of Osaka and Nagoya metropolitan areas and major local cities where flood disasters attacked before, we run the CReSS high-resolution atmospheric model when heavy rainfall attacks to clarify the atmospheric rainfall mechanism assimilating the observation data of the MLIT MP radar network. To accurate the atmospheric model assimilating the accurate precipitable water observation data it is required to calculate the accurate GPS precipitable water of the GEONET sites in and around the regions.

On the other hand, NIED established the automated system to estimate accurate site coordinates of all of nation-wide GEONET network sites applying the IGS ultra-rapid ephemeris and RINEX files automatically downloaded from GSI ftp server every day just after the observation for the development of the dynamic geodetic coordinates control system.

Thus in this study we have developed the system to calculate the accurate site coordinates of all of the GEONET network sites applying IGS rapid and final ephemerides and using the RINEX files obtained above, and to estimate the accurate vertical coordinate of all GEONET network sites automatically every day using the latest 30 days vertical coordinate solutions, and to calculate the GPS precipitable water of the sites in and around the region of the heavy rainfall anywhere domestic Japan immediately when flood disaster attacks, assimilating the GPS precipitable water to the CReSS model.

Keywords: GPS precipitable water, analysis of all GEONET sites, mechanism of heavy rainfall precipitation