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Study of tropospheric tomography for water vapor distribution with Neural Network

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Many meteorological disasters such as flood and landslides with torrential rain have been reported, and the mechanism of the precipitation system has been studied. Grasp of the situation of the precipitation with the portable radar is important, and a practical use study is investigated in Meteorological Research Institute or Osaka University. However, in the developing countries such as Indonesia and the Philippines, the observation with the radars have difficulty in realization under the present conditions at the point of cost and the maintenance. The water vapor tomography using a GPS and/or broadband satellite is thought to be effective as a situation of the precipitation monitoring system for the radars in the above-mentioned countries. When the development of a rain cloud bringing the damage of a heavy rain and the thunderstorm happens, there is an inflow of the water vapor from the neighborhood. It is thought that the measurement with the GPS elucidates the meteorological important flow and distribution of water vapor. Therefore, in this study, we develop water vapor tomography, the three-dimensional water vapor distribution, from GPS data and AMeDAS observation data using algorithm of residual minimization learning neural network (RMTNN). The numerical simulation demonstrate three-dimensional water vapor distribution can be estimated from GPS data. The details will be shown at our presentation.