

## Effect of spatial resolution of rainfall on runoff modeling in urbanized basins: A case study of the Tsurumi river basin, Japan

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The use of accurate information in rainfall-runoff models regarding the spatial variations of rainfall is essential for monitoring river discharge, and may help to improve our understanding of water balances. Spatial variations in the amount of precipitation are monitored using limited rain gauge networks with the help of various interpolation techniques which have been used in rainfall-runoff modeling in many cases. Limited and interpolated rain gauge data can introduce large uncertainties into predictions made by hydrological models. In recent years, different type of spatial and temporal resolution of radar estimated rainfall data has been considered in the hydrological computation. Several studies agree that use of high-resolution rainfall data to the hydrological model may offer more realistic output, but there is not a clear guideline about the optimum scale of spatial and temporal resolution for the radar rainfall data. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) established an X-band polarimetric radar network (XRAIN), which uses an operational data processing system developed by the National Research Institute for Earth Science and Disaster Resilience (NIED). XRAIN is composed of X-band MP (multi-parameter) radars, and has spatial and temporal resolutions of 250-m and 1-min, respectively. This product is one of the best high-resolution radar rainfall systems in the world, considered as an input to the Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) model to simulate runoff. The model was set up for the Tsurumi river basin ( $\approx 117 \text{ km}^2$ ) and it is located close to the Yokohama city of Japan. In this study, we selected some extreme rainfall events to simulate runoff separately. Different spatial resolution of rainfall data were generated from XRAIN radar rainfall for each event and applied into the model. Simulated runoff of each event was analyzed and compared each other separately and few remarks are drawn on using different spatial resolution of rainfall to the hydrological model for small urbanized basin.

Keywords: Hydrology, Weather radar, Spatial distribution of rainfall, Hydrological model, Urbanized basin, Runoff