

Characteristics of 2-D convective structure in Yom-Nan river basin, Thailand: an analysis using radar data on heavy rainfall events

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Abstract: Study of flood needs to use fine-resolution spatio-temporal data to elucidate the precipitating clouds causing the events. Understanding precipitating clouds is to characterize both stratiform and convective clouds composed of severe rainfall events that will be advanced basic knowledge for flood situation in the developing countries including Thailand. In Thailand, people living in susceptible flood prone areas have frequently encountered the severe flood events for both mountainous regions as flash flood and river plain regions. Those floods are usually caused by heavy rainfall in amount, frequency and intensity during wet season from May to mid-October of each year. Using rainfall observed at rain gauge is very useful to analyze physical information from the events. However, it is not sufficient for investigation spatial characteristics of those precipitating cloud due to insignificant on their spatial distribution of the gauge. However, radar reflectivity observed by ground-based radar can fulfill the disadvantage of using gage data because the spatial resolution of radar data is high to elucidate the spatial characteristics of the rain events. In this study, we focused on analysis of convective structure on heavy rainfall events in 2017-2018 over the observation range of Phitsanulok radar located in the middle of Thailand. The Yom-Nan river basin is the main focusing area in our analysis. Geometric characteristics using radar reflectivity (area, perimeter, orientation and dimension of ellipse) of those convective structures are obtained and stored in database for analysis purpose. Finally, descriptive statistics of the extracted storm characteristics have been analyzed and statistical distributions are fitted to the observed frequency distributions.

Keywords: radar reflectivity, middle of Thailand, heavy rainfall events, convective structure