

## The study of the physical characteristics of thunderstorm clouds that cause hailstorms during the summer season using weather radar data in northern Thailand with geographic information systems

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### **ABSTRACT**

The purpose of this study was to examine physical characteristics of severe thunderstorm clouds that caused hailstorms in Chiang Khong District, Chiang Rai Province, in the northern Thailand. On April 23, 2020, an evening hailstorm lasted for about 2 hours made approximately of 500 damaged houses. However, the data have not been analyzed spatially with geographic information systems, possibly due to the complexity of managing radar data with high spatial and temporal resolution. Therefore, this study aims to propose a process for data processing by using an open-source radar library in the Python. The radar data were generated from the C-band system of the Meteorological Department of Thailand. Physical characteristics such as the location of occurrence, the size of the thunderstorm cloud, the strength of the radar signal in the thunderstorm cloud, and the speed of movement were determined interm of a GIS framework. The QGIS was used to convert the data of raster into vector of the cloud. The sensitivity test at levels of 20, 25, 30, and 35 dBZ were used for comparative test in physical characteristics of the cloud. This analysis could be conducted alongside topographic data or DEM. This research fulfilled the processing and the using radar data with GIS systems, enabling geographers and meteorologists for developing an accurately analysis process on physical characteristics of severe rain clouds.

**Keywords:** Ground-based Weather Radar, Hailstorms, Physical Characteristics Analysis of Severe Thunderstorm Clouds, Thailand