Estimation of spatial distribution of precipitation by using of dual polarization weather radar data

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Abstract

Access to accurate spatial precipitation in many hydrological studies is necessary. Existence of many mountains with diverse topography in South Korea causes different spatial distribution of precipitation. Rain gauge stations show accurate precipitation information in points, but due to the limited use of rain gauge stations and the difficulty of accessing them, there is not enough accurate information in the whole area. Weather radars can provide an integrated precipitation information spatially. Despite this, weather radar data have some errors that can not provide accurate data, especially in heavy rainfall. In this study, some location-based variable like aspect, elevation, plan curvature, profile curvature, slope and distance from the sea which has most effect on rainfall was considered. Then Automatic Weather Station data was used for spatial training of variables in each event. According to this, K-fold cross-validation method was combined with Adaptive Neuro-Fuzzy Inference System. Based on this, 80% of Automatic Weather Station data was used for training and validation of model and 20% was used for testing and evaluation of model. Finally, spatial distribution of precipitation for 1×1 km resolution in Gwangdeoksan radar station was estimates. The results showed a significant decrease in RMSE and an increase in correlation with the observed amount of precipitation.

Keywords : Spatial Distribution of Precipitation, Weather Radar Data, ANFIS, South Korea

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