The Spatial Estimation of Maximum Daily Fresh Snow Accumulation Based on an Artificial Neural Network

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We propose an artificial neural network model that estimates the maximum daily fresh snow accumulation (MDFSA) at ungauged locations. Daily minimum temperature, daily average temperature, and daily precipitation of meteorological data are used as the model input. The data sets collected for 30 years (1987yr∼2016yr) in Korean Peninsula was used for the training and cross-validation of the model. The MDSFA that was spatially interpolated using the ordinary Kriging (OK) was used as the control variable for comparison. The correlation coefficients between the estimated and observed MDFSA based on our ANN model and OK were 0.88 and 0.30, respectively. In order to investigate the performance of the ANN model for estimating the daily maximum snow depth of the ungauged area, the input data of the ANN model was spatially interpolated using Ordinary Kriging. In this case, the correlation coefficient of 0.49 was obtained. The performance of the ANN model in mountainous areas above 200m above sea level was found to be somewhat lower than that in the rest of the study area. This result of this study implies that the ANN model can be used effectively for the accurate and immediate estimation of the maximum snow depth over the whole country.