Geophysical Research Abstracts
Vol. 18, EGU2016-11242, 2016
EGU General Assembly 2016

Development and assessment of road weather information in Seoul

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Road-based transport is essential for populations operating in large urban environments. Driving conditions are impacted by the intensity of rainfall. However, rainfall is not directly measured on roads. In this study, we evaluated road weather prediction accuracy using representative rainfall days in Seoul, South Korea, during 2013.Data were collected by 190 weather stations, of which 33 were located within 20 meters of a road and were used as model validation sites, while the remaining 157 were used as model fitting sites. Inverse distance weighting (IDW) and ordinary kriging (OK) based on variograms were considered for interpolation. We used the bias, root mean squared error (RMSE), mean absolute error (MAE), and correlation coefficient (CC) as the prediction performance criteria. The prediction performance of OK was higher than that of IDW. As expected, prediction performance increased when the number of rainfall observations increased. We also simulated road conditions using the accumulated historical rainfall data. Generating road information for the entire urban road network is very expensive; therefore, 177,599 road positions were reproduced from 22,184 road link units. Finally, safe driving speeds were calculated from simulated rainfall, stopping distance, and visibility distance.We hope that the results of this study will provide a basis for the safety information given to road users.