



Development of localized critical index for impact forecast of heavy rain

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Natural disasters have become more intensified and localized trends in worldwide occurring with social and economic damages. Heavy rain disasters have shown annual repeated in Korea, so far there are societal importance to develop the predictive index. Disaster risk index has been developed in the field of disaster prevention, although there are the limitation to adjust in meteorological predict.

We developed 'Heavy Rain Critical Index (HRCI)' to increase the efficiency of countermeasures against the repeated heavy rain disasters. HRCI was structured in sum of two major indices: meteorological elements and non-meteorological factors. We compiled 17 kinds of statistical data on damages caused by heavy rainfall during 2006 ~ 2015: six meteorological elements (1h, 3h, 6h rainfall, daily rainfall, duration of rainfall, and antecedent precipitation for previous 3 days), and eleven non-meteorological factors (mean bed slope, lowland ratio, mean elevation, mean river bed slope, area, population density, vulnerable social group ratio, agriculture field, ratio of impervious area, mean levee height, mean river width) in each regions. Correlation analysis was performed in standardized dataset between the amount of damage and each index for selecting major influential factors. We calculated regression equation in each damage type (Fd) with the derivation of weighted value (β), respectively. Each Fd from prior analysis merged with weighting factor (α : frequency of damage-occurrence) into the composite index for total damage, as HRCI ($R^2 = 0.59 \sim 0.74$, $MSE = 0.046 \sim 0.086$).

We can offer the diverse regional standards in damage types beyond rainfall forecasting. HRCI also represents the step forward to the regional weather forecasting model for predicting the amount of damage caused by heavy rain.