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A Study on The Snowfall Threshold Using Cluster Analysis According to Snowfall Damage in Gwangju and Jeonnam Province

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Weather warning system should be considered for regional differential because weather disaster of the hazard event occured diversely according to local characteristics like the infrastructure, capability, nature etc. In this study, we suggested the differentiated threshold value of heavy snowfall impact for 23 areas of Gwangju and Jeonnam province from analysed past disaster data. However, the disaster data didn't fully represent for each region due to irregular and scarce data. For this reason, cluster analysis method applied to meteorological characteristics was carried out in this study. It was utilized K-means clustering that groups observations that are 'close' to each other and Nbclust which is an R package for determining the relevant number of clusters. The clustering result shows that 3 groups in each 23 areas. In this research, The threshold value was set as Level 1 to 3 for 12hours snowfall instead of KMA's snowfall warning system which is operated as 2 steps(advisory 5cm, warning 20cm for 24 hours). Low threshold as 'Be Aware' was selected as the average snow accumulation. Medium and high threshold as 'Be Prepared and Take Action' was concerned with snowfall frequency and disaster vulnerability a fifty-fifty basis. Following the frequency analysis procedure, the Gumbel distribution was selected as the most likely to be the distribution type. We determined top 5, 1% of the probability density function at the medium and high threshold. It is a major indicator of potential risk statistically. Also, the threshold considering the disaster vulnerability was set based on the probablilty of disaster or damage occurrence within the total snowfall cases. As a result, the three level threshold for heavy snowfall of each cluster is approximately >3∼4, >9∼11, >13∼16(cm/12hr). It is advisable to use the threshold modified in consultation with the person in charge of disaster prevention at the field.