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Lasso-based Sensitivity Analyses of Terrain Factors of Debris Flows in Liangshan Prefecture, China

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The identification of debris flow gullies is very important to debris flow forecast and control. Terrain is one of the fundamental conditions to form debris flows, and then analyzing the sensitivities of terrain factors to debris flows is the key to identifying debris flow gullies. The research of this paper is based on 675 debris flows gullies and 498 non-debris flow gullies in Liangshan Prefecture, China. By processing the DEM in ArcGIS, 14 terrain factors, related possibly to debris flows, of the 1173 gullies were extracted. Lasso (Least Absolute Shrinkage and Selection Operator) was used to analyze the sensitivities of 14 terrain factors to the identification of debris flow gullies and non-debris flow gullies, and then 4 key terrain factors were selected. These 4 key terrain factors selected are average elevation, standard deviation of elevation, the watershed shape factor and Melton ratio. Use these 4 key terrain factors as the criteria in SVM to identify the test debris flow gullies in the study area and the result shows using criteria selected is almost same as using all terrain factors.