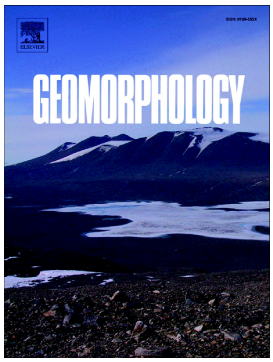

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A hybrid fuzzy weight of evidence method in landslide susceptibility analysis on the Wuyuan area, China

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Abstract

The present study proposed a hybrid fuzzy weight of evidence model for constructing a landslide susceptibility map in the Wuyuan area, China, where disastrous landslide events have occurred. The model combines the knowledge of experts obtained through a fuzzy logic approach and a hybrid weight of evidence method. The estimated knowledge-based fuzzy membership value of each environmental variable is combined with data-based conditional probabilities to derive fuzzy posterior probabilities and landslide susceptibility. The developed model was compared with a landslide susceptibility map produced using the data-driven weight of evidence method, based on 510 landslide and non-landslide sites. The sites were identified by analyzing airborne imagery, field investigation and previous studies. Landside susceptibility for these sites was analysed using 10 geo-environmental variables: slope, aspect, lithology, soil, rainfall, plan curvature, the normalized difference vegetation index, distance to roads, distance to rivers and distance to faults. The resultant hybrid fuzzy weight of evidence method showed high predictive power, with the area under the success and predictive curves being 0.770 and