Debris flow susceptibility assessment after the 2008 Wenchuan earthquake

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Due to a tremendous amount of loose material from landslides that occurred during the Wenchuan earthquake, the frequency and magnitude of debris flows have been immensely increased, causing many casualties and economic losses. This study attempts to assess the post-earthquake debris flow susceptibility based on catchment units in the Wenchuan county, one of the most severely damaged county by the earthquake. The post earthquake debris flow inventory was created by RS image interpretation and field survey. According to our knowledge to the field, several relevant factors were determined as indicators for post-earthquake debris flow occurrence, including the distance to fault surface rupture, peak ground acceleration (PGA), coseismic landslide density, rainfall data, internal relief, slope, drainage density, stream steepness index, existing mitigation works etc. These indicators were then used as inputs in a heuristic model that was developed by adapting the Spatial Multi Criteria Evaluation (SMCE) method. The relative importance of the indicators was evaluated according to their contributions to the debris flow events that have occurred after the earthquake. The ultimate goal of this study is to estimate the relative likelihood of debris flow occurrence in each catchment, and use this result together with elements at risk and vulnerability information to assess the changing risk of the most susceptible catchment.