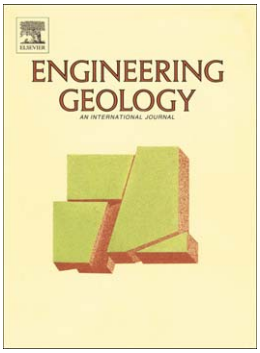

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High-position debris flow: A long-term active geohazard after the Wenchuan earthquake

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Abstract: After 12 May 2008 Wenchuan earthquake in Sichuan, a special type of long-term active compounded geohazard, namely high-position debris flow, frequently occurred in the seismic area. 136 high-position debris flow gullies were recognized from the 796 active debris flow gullies to investigate distinctive characteristics of such debris flows in terms of their geomorphological conditions, spatial distribution and causal factors. They usually initiate at high steep slopes and have high mobility and long runout. High-position debris flows have significantly larger magnitude and destructive force than those of common debris flows observed in the regions not affected by recent large earthquake. The high-position debris flows have been recognized as the most threatening geohazards among post-earthquake geological disasters in the Wenchuan earthquake region. Detailed investigation on 45 debris flows suggests three quantitative indices for recognizing the high-position debris flows: (i) the height difference between the material source and the debris flow exit or gully mouth should be larger than 350 m; (ii) the volume of source debris accumulation should be bigger than 1.0×10^6 m^3; and (iii) the gradient ratio of a debris flow channel should be steeper than 270‰. The spatial distribution of high-position debris flows was highly controlled by the seismogenic fault. Due to the abundant loose materials caused by earthquake, the rainfall threshold triggering high-position debris flows was found to have decreased at least 36.4%~63.7% when compared to the