Finite element simulation for seismic ground response in mountainous areas at the time of 2015 Nepal Gorkha Earthquake

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In this study, the 3D dynamic elasto-plastic finite element method is used to simulate the overall distributions of earthquake-induced slope failures in the targeted area in intermountain regions in Nepal, which can be regarded as a pilot case survey for future detailed investigations. The analytical method adopted in here is almost the same as the previous relevant studies by the authors (e.g., Wakai et al. (2015)). The area is located near the Dhunche Town along the Trishuli River, in the transition zones between the higher and lesser Himalayas.
In the analysis, nonlinear material properties of the ground as well as 3D topography, geological conditions and input motion are taken into account appropriately. Those factors strongly influences the dynamic amplification effects relevant to slope failures. The numerical results obtained from this analysis include the distributions of the maximum horizontal acceleration response and residual displacement at the ground surface, and the maximum shear stress mobilized in the surficial layers. After the comparisons of the results between the calculated one and observed facts in local areas, it can be concluded that the proposed numerical method has a sufficient ability to predict the phenomena and can be possibly utilized for predicting overall dis-tribution of earthquake-induced landslide which would be helpful for developing landslide susceptibility maps in mountainous areas in Nepal.

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