



## **A Study on Model Similitude of Seepage Failure of Debris Flow**

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This study was focused to build up the model similitude of debris flow to enhance the coordination of data that are from the field and from laboratory. Two models, Governing equation analyses and Dimensional analysis method, were constructed respectively to explore the insight mechanism of Seepage failure of debris flows between the prototype and its model. Based on the geometry similarity, kinematic similarity and dynamic similarity, the ratio for all the requisite relevant physic quantities between two systems were set up. Since the seepage failure is mainly due to seepage force, the ratio of seepage force to particle's submerged weight is the governing factor for dynamic similarity. In order to examine the feasibility of the model similitude derived in this study, a combination of the horizontal scale  $L = 150$  with vertical scale  $H = 100$  was chosen to evaluate the model with field site data. Models having been tested, the granular scale  $D = 109.4$ , the flow rate scale  $Q = 1144.9$  and the time scale  $t = 13.1$  can be obtained. These ratios are physically accepted. Each of governing equation analysis and dimensional analysis has its own theoretical basis. Any of them should be chosen physically to perform the transformation of corresponding physical quantities. The models proposed in this study not only provide the theoretical basis of model construction, but also bolster up the insufficiency of field data.