Numerical investigation and application of 3D multi-phase non-Newtonian rheology model for debris flow

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Abstract

A 3D multiphase debris flow model – DebrisInterMixingFoam was studied. An improvement to include the VOF field updating in the iteration of updating the flow field variables was proposed. The improved model was first validated by a debris flow deposition on slope plane case. Then the model was applied to two benchmark debris flow cases and a real debris flow event. In all cases, the model results were favorably compared with the experimental data or field investigation data. As there were only two key parameters to be calibrated in DebrisInterMixingFoam, it was easy to be used to model debris flow. The numerical results showed that this model can achieve good accuracy for debris flow simulation after calibrations of these two key parameters.

Full Text

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