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PROCEEDINGS

A Numerical Method of Granular Flow for Hazard Prediction Based on Depth-Integrated Model and High-Resolution Algorithm

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ABSTRACT

Landslide, debris flow and other large-scale natural disasters have a great threat to human life and property safety. The accuracy of prediction and calculation of large-scale disasters still needs great improvement, so as the study of prevention and interaction. In this paper, the depth-integrated shallow water flow model is adopted, and the numerical method of Kurganov developed in recent years is used to develop a high-resolution algorithm which can capture shock waves and satisfy the hydrodynamic conditions. In order to make it adapt to the granular flow, appropriate adjustment is made distinct from the original aerodynamic problem, and it can be used to calculate the basic dynamic characteristics, the interaction facing structures, the large geological disasters and many other difficult problems of shallow water flow.

It's worth mentioning that, we calculated the major landslide accident in Guangming New District, Shenzhen in 2015. The numerical results show that the landslide duration, the basic distribution of deposition and the average elevation are all in good agreement with the field observation results, which shows an excellent ability in predicting and processing large disasters. This model can also calculate the interaction between the granular flow and structures which may provide tremendous support in prevention engineering.

KEYWORDS

Numerical method; granular disaster; prediction

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