

Development of Hydro-debris2D into debris flow prediction

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Hydro-debris2D model has been developed and improved for predicting occurrence of debris flow throughout hydrological regime changes. The model contains three components: (1) Shallow-water based surface flow modules, in order to calculate mountain zone torrential flow regimes, (2) rapid subsurface/interflow in weathered rock, and (3) debris flow components. The model has been applied into Izu Oshima Island's debris flow event in 2013, to Hiroshima's debris flow disaster in 2014, and to Kyushu region heavy rainfall sediment disaster in 2017. As rainfall was input, we made a comprehensive comparison between observed rainfall station datasets from AMeDAS and High-resolution NHM calculation results for first two cases. In the case of Izu Oshima, heavy rainfall and extensive surface flow occurred in the western part of the island, together with extreme interflow which may have caused the start of debris flow in the mountain wall. In Hiroshima's case, observed rainfall reproduced occurrences of debris flow with better agreement of the disaster due to the slight changes in heavy-rainfall zone. In Kyushu zone, using only coarse rainfall data may not be sufficient to reproduce the actual sediment disaster pattern. Reanalyses of rainfall dataset is the essential to increase accuracy of their hindcast analyses. Prediction using ensemble rainfall data may be needed in order to increase the accuracy of the occurrence.

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