

3D debris flow simulations by smoothed particle hydrodynamics (SPH) method

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Yamashiki et al. (2012) and Yamashiki et al. (2013) perform laboratory experiments that represent a debris flow. We use smoothed particle hydrodynamics (SPH), Lagrangian numerical hydrodynamics method, and reproduce the experiments by 2D simulations. We find that water does not erode rock

by using same size particles between water and rock, but that water can erode rock by using smaller size water particles than rock particle. We try to extend this 2D simulation to 3D one and will reproduce more realistic results.

Also, debris flows include not only rock and water but mud. We developed a 2D SPH code which includes the solid-liquid mutual interaction with fully SPH manner to deal with multiphase flow well. We compare the results of the code with the results of a land slide experiment and some simulations in Igarashi et al. (2012) and find that we can get the results similar to those of experiments. We also succeed to extend the code to 3D one and prepare to perform more realistic debris flow simulations.

Keywords: debris flow, simulation, smoothed particle hydrodynamics