



Hazard estimation of the possible pyroclastic flow disasters using numerical simulation related to the 2010 activity at Merapi Volcano, Indonesia

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Merapi Volcano, located on central Java Island in Indonesia began to erupt on Oct 26, 2010 and yielded pyroclastic flows on the south slope. They flew down along the Gendol River. The potential existed for further hazardous pyroclastic flows at that time. Actually, larger pyroclastic flows occurred again on Nov. 4. They flew down along the Gendol River and reached up to 13-18 km distance from the volcano. Both pyroclastic flows killed over 100 people.

In order to mitigate volcanic disasters, it is necessary to know the type and size of disaster that is feasible. Numerical simulation is thought to be useful for examination of such issues. Using simulation, we can anticipate extent of inundation area, morphological changes, and so on.

After the occurrence of pyroclastic flow on Oct 26, we built several scenarios for subsequent pyroclastic flow disasters and conducted 2-dimensional numerical simulations to estimate possible affected area by pyroclastic flows according to the scenarios.

In this paper, we introduce the outline of dynamic model used in numerical simulations first. Then we present basic concept employed to build scenarios for pyroclastic flows after the Oct 26 2010 and the way we build data sets that are necessary to conduct numerical simulation. Finally, we compare our scenarios of subsequent pyroclastic flow disasters and results of the simulation based on the scenarios with pyroclastic flows actually occurred after Oct 26. We examine validity of scenario-making and conducting numerical simulations for subsequent pyroclastic flow disaster and discuss remaining problems with making scenarios for numerical simulation and conducting numerical simulations.