

Interactive comment on “Fall-experiments on Merapi basaltic andesite and constraints on the generation of pyroclastic surges” by L. M. Schwarzkopf et al.

Anonymous Referee #1

Received and published: 3 August 2006

Pyroclastic surges, hot and gas-rich high-speed particle flows, are the most severity volcanic hazards, and their formation is poorly understood up to now. The fall-experiments with natural Merapi rock samples strive for explanation of this hazard process. We can get some clues from this experiment, despite some disparity with actual constrains.

1. The presentation of experimental set-up is not very clearness, we can get neither the panorama nor the details. There is a lack of an overview of the whole apparatus, and some details can describe on the side. The tube with pressure transducer is the same diameter (62mm) with the impact chamber, but in the Fig.1 the former looks like

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situated in the side of the chamber, and the relation between steel rod and pipe, rock sample and furnace, are both unclear.

2. There is a lack of comparison between laboratory and actual condition: The sample of basaltic andesite was taken from Merapi volcano, the paper did not mention where the sample was taken from? The sample is taken from which layer of the deposit, how far it is from the crater, and the author did not depict it. The sample is the deposit of pyroclastic flow, and some different from the material of pyroclastic flow before the generation of cliff-triggered surges.

3. The impact pressure waves

(1) It is very clear from the Fig.2, that the measured pressures are increased with increasing temperature, and are mostly generated by the sudden heating of air after the impact, I would like to suggest the author measure the temperature inside of the impact chamber, and to show the temperature curves with the pressure data in Fig.2 to prove their conclusion of the pressure was generated by the sudden heating of air.

(2) I would like to suggest the author make some spectrum or time-frequency analysis on the pressure waves, the results can give some hints with the mechanism of the pressure waves.

(3) As mentioned above, the measured pressure are mostly induced by the heating of air, but the major mechanism of fragmentation is the impact, did the author measure the pressure purely come from the impact? Is the impact pressure comparable with that at cliffs in the flow path of block-and-ash flows? I would like to point out the induced pressure at cliffs of block-and-ash flows is different with the dynamic pressures of pyroclastic density currents.

Interactive comment on eEarth Discuss., 1, 81, 2006.