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Solid Earth
Discussions

Interactive comment on "New developments in the analysis of volcanic pyroclastic density currents through numerical simulations of multiphase flows" *by* S. Lepore and C. Scarpati

S. Lepore and C. Scarpati

simone.lepore@unina.it

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Your comments allow us to better clarify some aspects of our manuscript. As for the first point, we agree about the necessity of writing the equations of conservation, which are now added in the paragraph 2. Thus, we decided to split the line 23 of page 177, and, after the full stop, we wrote the equations of conservation on a new line. So the line 23 now looks as it is reported in the supplement. Consequently, we renumbered the other equations. %%% Page 178, line 7: (1) has been substituted by (2); Page 178, line 8: Eq. (1) has been substituted by Eq. (1) and (2); Page 178, lines 18 and 19: (2) has been substituted by (3); Page 179, line 29, and page

180, line 1: (3) has been substituted by (4); Page 180, lines 6 and 7: (4) has been substituted by (5); Page 180, lines 15 and 16: (5) has been substituted by (6); Page 180, lines 20 and 22: (6) has been substituted by (7); Page 181, lines 2 and 3: (7) has been substituted by (8); %%% Regarding the second point, the initial and boundary conditions reported in Table 1, used in all our numerical simulations, pertain to the activity of collapsing eruptive columns and of associated pyroclastic density currents belonging to plinian eruptions, as attested by the value of mass discharge rate. Apart from that, the depositional system developed at the base of the pyroclastic density currents show low concentration values related to traction behaviour, which leads to the formation of stratified facies. We want to stress that similar depositional conditions are unrelated to the magnitude of the eruptions and can be developed during the emplacement of pyroclastic density currents associated with strombolian- to plinian-type eruptions, as some Campanian pyroclastic deposits can testify. Accordingly, we change the lines from 5 to 8 of page 177. The new text written in these lines is reported below. %%% ... 2002; Liu and Chow, 2002). Our simulations are performed using parameters to develop a plinian-type eruption with the collapse of the eruptive column and the propagation of a PDC. The rheological conditions in the depositional system at the base of the PDC produce a tractive regime (see below). Finally, merging together the studies of the concentration trends, sedimentation rates as a function of time, and geological observations, we discuss how these numerical simulations can be useful to explain the presence of stratified facies in strombolian to plinian deposits observed in the Phlegraean and Vesuvius areas (South Italy) as the Neapolitan ... %%% Moreover, we introduced at the beginning of the paragraph 4 a new sentence, which is: "The initial and boundary conditions reported in Table 1, used in all our numerical simulations, pertain to the activity of collapsing eruptive columns and of associated PDCs belonging to plinian eruptions, as attested by the value of mass discharge rate that is 2.3x107kg/s.". Finally, we slightly revised the line 4 of page 185 that is now "Apart from that, the described results of the simulations show a vertical stratification of the solid particles".

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Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/4/C13/2012/sed-4-C13-2012-supplement.pdf

Interactive comment on Solid Earth Discuss., 4, 173, 2012.

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