

Interactive comment on “Eruptive shearing of tube pumice: pure and simple” by D. B. Dingwell et al.

Anonymous Referee #1

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This is a well-written manuscript, which discusses the processes leading to the formation of tube pumices. Tube pumices are considered quenched magma parcels recording its physical properties at the moment of fragmentation and are therefore important to identify the processes responsible for an explosive volcanic eruption. I have to say that, as currently presented, the arguments in support of simple shear are not extremely convincing and I think the authors should clarify the logic sequence leading to their conclusions.

I provide here some general comments. More detailed ones are given in an annotated pdf. The authors describe the tube pumices analysed as “highly representative of the eruptive products in these highly homogeneous deposits of Ramadas volcano” (Lines 105-106). The main conclusion of the paper is that the tube pumices are formed by simple shear, which, as indicated in Fig.1 is normally limited to a relatively minor portion of the conduit next to the wall. If I understand correctly the deposit of the eruption

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investigate is essentially composed of tube pumice. How do the author reconcile the simple shear argument with a deposit in which tube pumices are very abundant (Lines 86-87)? I think the authors should specify in the text the relative proportions of tube pumices and pumices with other textures in the deposit.

In Figure 8 it is not clear with respect to which direction the angle Θ is measured. This should be clarified either in the figure (may be with an inset) or the associated caption. This is quite important because Θ is the angle between the principal axis of the bubbles and the shear direction and it is measured in the plane containing both the shear direction and the velocity gradient (Rust et al., 2003). How did the authors identify the shear plane in the tube pumices? This should be explained in the text.

In Figure 9 why the authors do not use the same diagram provided in Fig.2 of Rust et al., 2003?

Lines 313-320. This part is the fundamental for the conclusions of the paper but I do not find it convincing. I refer in particular to this part: “From the mechanical scenarios that we have envisaged, the bubbles in a pure shear regime would implicitly stretch with the flow direction regardless of their initial size...”. I do not think this is correct, the initial bubble radius enters in the formulation of the capillary number and therefore bubbles of different radii will react differently to deformation, with the smallest ones potentially not deforming at all.

I suggest the author revised all the text from Lines 313 to 326 and produce a more convincing Figure 9.

Best Wishes

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/7/C1443/2015/sed-7-C1443-2015-supplement.pdf>

Interactive comment on Solid Earth Discuss., 7, 3053, 2015.

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