

Solid Earth Discuss., referee comment RC2
<https://doi.org/10.5194/se-2021-127-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on se-2021-127

Ulrich Kueppers (Referee)

Referee comment on "Transient conduit permeability controlled by a shift between compactant shear and dilatant rupture at Unzen volcano (Japan)" by Yan Lavallée et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-127-RC2>, 2021

The manuscript presents results from field observations as well as textural and analytical investigations of parts of the final spine on the 1990-1995 dome of Unzen volcano, Japan. This study is well suited for SE and I recommend publication after minor corrections. I have one main consideration and several line-by-line comments.

Ulrich Kueppers, Ludwig-Maximilians-Universität (LMU) Munich, Germany

Main comment: The authors repeatedly invoke "repeated phases of increased magma ascent rate (line 44) or "pulsatory ascent" of magma (766) as underlying reason for the observed repeated brittle-ductile transitions. I would like to see more discussion whether this is considered a source or a path problem, i.e. whether magma ascent velocity varied in the first place or if geometrical conditions of the conduit system and/or the dynamic evolution of the magma may have led to the stick-slip-behaviour.

Line-by-line:

26: "in shallow volcanic conduits": not only here, right? and what means shallow? I would delete this vague indication of depth

32-34: please add some values.

46: "partially tore the spine core with slight displacement". unclear, please explain

67-69: no obvious order

352: delete "emplaced"?

396: "under microscopy". better say "under/with a microscope"?

397: please quantify the size of "large vesicles"

402: can bands "localise"?

414: "crystal plastic deformation" better change to "plastic crystal deformation"?

419: "few isolated millimetre-size vesicles". how is this possible in a 1 mm wide band (417)

444-445: "The fragments in the gouge are generally densely compacted and the porosity is uniformly distributed,". can you comment on whether the compaction took place before mechanical abrasion (rounding) and are a remnant of an earlier texture or if that happened during sintering?

527: "via crushing of the pore walls". odd wording, please consider rewording

567: "shallowing of the ascending spine". consider rewording. during magma ascent, the flow field may change such that a plug is formed but a spine is defined as the surficial (= above the dome surface) expression of magma/lava extruded that doesn't change texturally any longer under the acting stress at a given cooling rate.