Solid Earth Discuss., 4, C141–C142, 2012
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Solid Earth
Discussions

Interactive comment on "The strength and permeability of tuffisite-bearing andesite in volcanic conduits" *by* S. Kolzenburg et al.

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Received and published: 19 April 2012

The manuscript presents new data on the role of clastic veins often found in shallow coherent lava bodies in terms of bulk mechanical behaviour and of transient permeability for magma degassing. The paper is based on a solid methodology and data are of good quality over a significant spectrum of approaches. The issue of the role of fracturing on mechanical properties is certainly one of the most important for domes and stratovolcanoes, as it controls gravitational stability.

Samples from clastic veins of Colima volcano have been analysed for porosity, permeability, ultrasonic wave velocity and compressive strength, which provide a very solid methodological approach. However the interpretation of data, in my opinion, do present some areas of ambiguity for the following reasons:

The term tuffisite is highly ambiguous; it is used in kimberlite diatremes and maar literature to define almost whatever pyroclastic deposit filling the pipes; Tuffen et al 2003 used it for veins formed internally to a rhyolite, capable to be healed with time; it is used as a synonym to intrusive pyroclastic- or just clastic-filling cracks formed at fragmentation level or at magma-water interaction level etc etc...this ambiguity then is reflected on the interpretation of your data, beacuse it is not clear at all from the paper what is the author's intepretation of the juvenile-free, crystal-fragments that form the veins. Did they form at the time of the andesite domes (so why no glass)? Did they form as clastic dykes during some later phreatic event? Did they for at the time of the 2005 eruption (so why no glass)? Note that the entire discussion on the transient role of these veins in terms of permeability and strength, due to possible processes of veins healing is appropriate only for the first case. I strongly suggest the authors to first dismiss the term tuffisite, then define exactly what type of clastic/pyroclastic veins have been sampled. Only after that it will be possible to give an appropriate interpretation to the role of those veins in terms of mechanics and permeability. For example, do the authors think that the presence of those veins played any role in the dynamics of the 2005 eruption (or pre-eruption)? The paper discusses longly about the time needed for veins to recover (reduce porosity and increase mechanical strength). However while a series of potential processes for recovery are discussed it is not clear which one is that relevant for the Colima samples. I would actually like to see more discussion about the role of these veins on the bulk mechanical strength of the shallow volcanic system in terms of potential for slope failure.

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Interactive comment on Solid Earth Discuss., 4, 459, 2012.