

Interactive comment on “Magma mixing enhanced by bubble segregation” by S. Wiesmaier et al.

Anonymous Referee #2

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‘Magma mixing enhanced by bubble segregation’ – S. Wiesmaier et al.

This is a very interesting manuscript that should be published following minor revision. I am impressed by the scholarly approach and detailed arguments that succeed in extracting the maximum information from the experiments. I have only three significant comments. First, I found some of the discussion to be rather long and repetitive, particularly the parts on the dynamic evolution of the melt filaments. The text on this could be shortened in order to make it more interesting and punchy to read. Second, while I in no way deny the interest in studying mixing by this mechanism, I wonder how important it will be in nature. Bubble ascent through intermediate to silicic melt will be very slow – probably much slower than any bulk convective or advective motions. Are the mixing phenomena due to such motions not likely to overprint any generated by bubbles? Suppose that you put a layer of rhyolite in contact with a layer of basalt. It is hard for me to imagine that the thermally driven mingling at the interface will not occur

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faster, and potentially on a larger length scale, than any bubble-driven mixing. This is not to discredit the present study, but you may want to mention this issue. Third, it seemed to me that the nonlinearity of hybrid melt compositions on Fig. 5 was striking, but you barely mention it. Is this because it is discussed elsewhere? If not, I propose that you make more of this at the expense of the repetitive discussion on the filaments. I have only a few specific comments, as the manuscript generally reads very well. 1474 (5-10) – I don't follow this argument very well. 1474 (20-25) – This mechanism has, I think, been challenged in subsequent papers on the Bishop Tuff by Hildreth, Wilson and colleagues. 1474 (6) – Remind me what the Bond Number is. 1474 (22) – Spell out TEMA. 1476 (9) – By drop, do you mean bubble? 1477 (12) – Did you test for Na loss by varying the beam size on glass standards? This is important, since you present the Na data in Fig. 5. 1478 (21) – Where did you take the diffusivities from? 1481 (10) – Maybe show ALL the profiles described in the paper? 1495 (5-19) – I didn't follow the argument here very well, particularly pertaining to the Tenerife example. 1497 (0-29) – As I said, the Bishop example has been challenged. Moreover, the Lican example that you cite is completely unconvincing. The bubble content in these products (just like other mafic scoria) is due to decompression and vesiculation upon eruption. It has nothing to do with your process. Figures – the captions for 6 and 7 are inverted.

Interactive comment on Solid Earth Discuss., 7, 1469, 2015.

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