

Comments to: “MagmaFOAM-1.0: a modular framework for the simulation of magmatic systems” by Brogi et al.

Manuscript submitted for publication on GMD

Description

This work describes a software library, which extends OpenFOAM, dedicated to the solution of problems typically encountered in modeling volcanic processes.

General comments

The library contains already existing subroutines (eg: SOLWCAD) and new interesting software. However, the existing software has been recoded within the same modular framework (OpenFOAM), allowing an easier use by model developer.

I have appreciated the efforts of the authors and I think that MagmaFOAM will be very useful for the volcanological community.

Minor comments

- Of course, eq.(3) is valid for $T > C$
- Line 256: The Reynolds number is more often based on the bubble diameter than bubble radius.
- Line 257: The definition of the Weber number seems incorrect. It should contain the surface tension in the denominator. Please check.
- The definition of $\Pi = \mu/\mu_g$ at line 258 seems incompatible with its value (10^{-6}) reported at line 259 and in the caption of Figure 6 (probably you mean “gas to liquid viscosity ratio” $\Pi = \mu_g/\mu$?).
- Line 257. According to the common nomenclature, you report the square of the Froude number. It should be $Fr = u_0/\sqrt{ga}$.
- Caption of Figure 7: please, can you define the symbols R_0 and S_0 ? Moreover, the dashed lines are practically superimposed to the solid lines and difficult to see. Probably you can highlight the dashed lines (eg with thicker lines) or simply indicate in the caption that the MagmaFoam and the Lyakhovsky et al. (1999) solutions practically coincide.
- Line 337. The relationship between maximum volume fraction in the volcanic products and fragmentation was observed by Sparks (1978). Probably it could be appropriate to cite also Sparks (1978) together with La Spina et al., (2017).

Typos

- Line 105: “con” \mapsto “can”
- Line 205: “wavelenght” \mapsto “wavelength”
- Line 389: “apporoaches” \mapsto “approaches”
- Line 410: “relativily” \mapsto “relatively”
- Line 411: “theretical” \mapsto “theoretical”

References

Sparks, R. S. J.: The dynamics of bubble formation and growth in magmas: A review and analysis, J. Volcanol. Geotherm. Res., 3, 1–37, [https://doi.org/10.1016/0377-0273\(78\)90002-1](https://doi.org/10.1016/0377-0273(78)90002-1), 1978.