Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2017-119-RC2, 2018

Geoscientific Model Development Discussions

Interactive comment on "Plume-SPH 1.0: A three-dimensional, dusty-gas volcanic plume model based on smoothed particle hydrodynamics" *by* Zhixuan Cao et al.

Anonymous Referee #2

Received and published: 14 March 2018

Reviewer' Comments for gmd-2017-119

After reading the paper, I think the proposed method is highly detailed and the type of discretization properly described. A few minor comments:

1. Please add the recent papers, which I consider, I related to your research:
   (a) Costa, A., Suzuki, Y., & Koyaguchi, T. (2018). Understanding the plume dynamics of explosive super-eruptions. Nature communications, 9(1), 654.
   (b) Terray, L., Gauthier, P. J., Salerno, G., Caltabiano, T., Spina, A. L., Sellitto,

P., & Briole, P. (2018). A New Degassing Model to Infer Magma Dynamics from Radioactive Disequilibria in Volcanic Plumes. Geosciences, 8(1), 27.

2. It would be nice to provide a theoretical bound for the computational effort of your method for a single simulation step and the numerical-grid resolution. You can make use of, for instance, the number of long-computations (e.g., matrix-vector products). Then, please provide a theoretical bound for such value when computations are performed across different processors.

3. It is not clear for me how the parallelization is performed, for instance, for a given time, do you split the domain across different processors? in such case, what constraints must be satisfied at each local domain in order to guaranty a consistent numerical solution of your equations?. Other possibility is to speed-up matrix computations, is this your case? or both?

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