Review of “Depths in a day - A new era of rapid-response Raman-based barometry

using fluid inclusions” by Devitre et al, 2023

Internal USGS review by Dawnika Blatter 9/29/23.

This paper presents a case study for rapid analyses and model calculations of pressures/depths of fluid inclusion entrapment in Kilauea olivine crystals from the recent September 2023 eruption as a petrologic eruption response method to inform observatories of the depths from which magma is ascending. The calculated pressures clearly indicate that the crystals grew at pressures consistent with the shallow Halema’uma’u reservoir, which could be critical data for interpreting monitoring signals. Furthermore, the authors demonstrate that these analyses and calculations can be done within days of receiving samples and thus on timescales that would be useful during eruption response.

I am not an expert in Raman analyses of fluid inclusions or modeling their entrapment pressures and can’t comment much on that part of the methodology except to say that it is explained well and is convincing. The manuscript is well written and organized, the figures and supplementary data are complete and compelling, and the references are appropriate.

I have included a few other suggestions to improve clarity of the text (see the attached marked up pdf file) and figures and tables in the supplement.

We have addressed these comments in the text and files. Note that the manuscript has been heavily revised since this version.

1. Trade names are used in several places and require a footnote with the following disclaimer: "The use of trade names does not signify indorsement by the U.S. Geological Survey."

We have fixed this in the new version and the footnotes were added.

1. Figures and Supplemental figures: Scale bars or some type of scale is needed for the figures.

While we appreciate it is customary to add scale bars to images, in this case the supplement images were not meant to document the FI but rather they are the exact slidedeck that we use as support during the simulation for navigation only. It is meant to show that such a slidedeck is sufficient to navigate and analyse the samples.

1. Supplementary Tables: Check significant digits on the reported values. Also remove columns that do not contain data.

We have revised this. However, for consistency within the datasheets, we’ve kept common columns even when it is empty in one subset. For example, it may be that the column “melt film?” a textural observation is empty in the “deleted\_badFI” sheet, which is a subset of the “Raman\_allreps” sheet where the column is not empty. We keep such columns across the dataset.

1. Check on whether you need to do a data release in one of the USGS accepted data repositories or consider doing it through Sciencebase. This can hold up Bureau Approval at the last step (it happened to me). There also might be some requirements about the software being available in the USGS software repository (not personal github sites). Better to check now than to have delays later… One person to ask would be Jordan Lubbers since he recently dealt with this issue.

The data will be archived on Zenodo upon approval. DiadFit is now published and available on PyPi, open access.