

Dear Prof. Jordan,

Please find attached the modified manuscript  $^{40}\text{Ar}/^{39}\text{Ar}$  constraints on the eruption history of the Christiana Volcano of the Christiana-Santorini-Kolumbo volcanic field, Greece by Vron et al (egosphere-2025-4857). Below you find point by point the suggestions by you and the two reviewers in blue and in black our response.

RC1 - Su-Chin Chang

The manuscript titled " $^{40}\text{Ar}/^{39}\text{Ar}$  constraints on the eruption history of the Christiana Volcano of the Christiana-Santorini-Kolumbo volcanic field, Greece" offers a new and robust age determination, contributing to the understanding of the tectonic evolution of the Aegean arc. The scientific motivation of this study is clear, and the results facilitate the resolution of the long-standing debate concerning the age of the Christiana-Santorini-Kolumbo volcanic field. The methodology and findings presented in the manuscript are well-articulated, with all figures being well-organized, thereby facilitating comprehension for the reader.

Nevertheless, the introduction and the geological background could be slightly revised, as the existing content lacks clarity for readers unfamiliar with the regional geology. Other than that, the overall quality of the manuscript is commendably high.

We modified the geological introduction, so the other volcanic fields are now better described (lines 65-84). We also added the reference suggestions of RC2.

RC2 - Tim Druitt

This is an important and scientifically robust contribution to our understanding of the history of Aegean volcanism. The paper is very well written and illustrated, and I have no significant criticisms. My only recommendation is that if possible the authors add photographs of the sample locations. For example, it would be hard to find the outcrop of Santorini sample C18-14A without a photo.

We modified the supplementary material by adding the field photographs we had (unfortunately not for every outcrop). We have also added photographs of the samples before these were processed for geochemical analysis.

The authors may like to look at Karstens, J et al. Revised Minoan eruption volume as benchmark for large volcanic eruptions. *Nature communications*, 14(1), p.2497. for the volume of the Minoan eruption, and Metcalfe, A. et al. Tectonic modulation of caldera volcanism on the South Aegean Volcanic Arc. *Earth and Planetary Science Letters*, 671, p.119633 for age revisions for Santorini volcanism. Overall I congratulate the authors on a very nice piece of work. Tim Druitt

We have added these two references to the paragraph describing the CSK-VF (lines 116 and 142).

**Associate editor comments:**

Thank you for your responses. Your responses to the reviewers are satisfactory. Especially considering that very minor changes were requested. Please proceed in revising and submitting a new version of your manuscript version. That being said, in addition of the revisions requested by the reviewers, and this point is important I am also requesting that you remove what you call "age" but instead is a dataset displaying significant scatter. For example, VU120-O2a ( $2.69 \pm 0.05$  with a MSWD of 5.8) and with the MSWD value of 5.8 indicating a very large scatter. Basically, your P value should always be  $\geq 0.05$  and with the appropriate MSWD corresponding cut off. Such a data scatter cannot be considered an age and should not be listed as such in your table nor your graph as it does not define a true plateau age. Please remove though as they don't respect the reporting norm outlined in Schaen et al. (2021) about

what constitute an age. That they provide the same number or not, it does not matter. Same for when the  $^{39}\text{Ar}$  % drop below 50 % (which is already very generous boundary). No age should be give for those sample and none true age were obtained. Now, you have very few of those cases, but still, they need to be properly addressed before I can move this manuscript forward. The good news is that it won't change anything at all to your story since most of your data are otherwise of excellent quality.

We have indicated that experiments VU120-O2, 05 and 09 (Samples CH18-07/15/08, respectively) are not statistically valid ages in Table 1 and have modified the supplementary excel file to include the p value. The above-mentioned samples have been removed from Figure 2 and the average values for the "age" of Christiana has been adjusted by removing these three samples from the average in L360, and the conclusion in L505 has been updated. We added some sentences to indicate why these samples were discarded from discussion in L243-316.

Also, at various places in the text,  $^{40}\text{Ar}/^{39}\text{Ar}$  is written without subscripts (e.g. L 343) and written  $^{39}\text{Ar}/^{40}\text{Ar}$  (L 441)– please fix.

Modified accordingly, also some other typos in this section.

This one is a minor point L 339: "we assume that the high temperature of a pyroclastic flow did completely reset the K-Ar system (of the obsidian clast)". Of course, this depend of the time temperature history of the clast in the tuff, but I'm curious if you have references where such a case as been observed? I remember doing modelling of Ar loss for individual sanidine crystals, but I have to admit that I never did that with glass. I would assume that the Ar loss in this case would be close to 100% considering the flat shape for the spectrum. Please add some info about that in the text if you can.

We agree with you that the Ar loss at that temperature would be probably 100%, but we are not aware of any publication that can confirm this.

We hope that our modifications are sufficient to get this study published in Geochronology.

With kind regards,

Pieter Vroon (on behalf of the authors)