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Dear Cecile Gautheron,

thank you very much for your work. In the following we will outline every change made, based on the comments of your review and where appropriate provide suitable rebuttals. The line numbers we note in our attached responses refer to the revised version of our manuscript, now attached. Changes according to this review are marked in light blue. Changes based on the first review are marked in green.

Kind regards,

Benedikt Ritter

University of Cologne – Institute of Geology

Dear Ritter and co-authors,

Thank you for the corrected version which answers the different reviews. The text and figures are clearer and more informative; however, some small adjustment can be made. Additional details on Figures will increase the understanding on the procedure and results. Also, some small typo problems are still present in this version (see below).

Some explanations on Fig 3, 4 and 5 are still missing and link to the text is some time very poor, so please add more details on them:

-Fig 3 that is not described properly and links with Fig 1 are not made enough.

→We added additional information of Fig. 3 in the text and added additional figure reference in the manuscript. In general, Fig. 3 display just the user program interface. In

the text we wrote “For handling, a structured user program interface was designed (Fig. 3), which provides the user with information about all parameters, total duration, and additionally logs every extraction step.”

→We added several figure references for Fig. 1 in the manuscript where appropriate.

Please describe what is M1, M2, … M5.

→We extended figure caption 3 with the following information: “. M1-M5 indicate the different modules of the extraction line. Valve numbers (1-10,20-31, M, T, I) are coloured depending on the current state (open or close).”

Are the number next to the valve the valve number? If yes, please add this information to Fig 1, and indicate the meaning in the legend. The red or green valves are for close and open valves? Please describe the content of the figure to help the reader to understand how your lab is functioning

→ see Fig. 3 caption. For the general information about the extraction line, it is not necessary to add the valve numbers to Fig. 1. We think that it would overload the Fig. 1. The requested information is found in Fig. 3. The numbering of the valves is not required to understand how our lab is functioning, we do not refer to the numbers when we explain the functionality of the extraction line. Anybody can copy the line without knowing how we call the valves. We now state in the caption of Fig. 3 that open valves are depicted in green and closed ones are in red. Note: this Fig. 3 is a snapshot; the status of the valves changes during operation.

- Fig 4: please add a space between calibration and gas →corrected

I am not sure to understand the sentence of line 330-332 “the second measurement period…” How does the fact that you had a period where you developed the other noble gases change the neon data? Please add more justification and explanation with the different dataset. Please define when was the first and second measurement period? You did not explain, why some value present larger error bars than other. Please be more specific.

→ We now add “The larger errors of the $^{21}Ne/^{20}Ne$ -ratios of the second run may be due to the fact that prior to that run a longer development period of other noble gas species, and other sample materials, was conducted. During developmental work on a noble gas line, particularly when other gas species are analysed, the residual gas composition in the extraction line and in the mass-spectrometer may change. The latter may affect the response/stability of multipliers (^{21}Ne is the only isotope we measure on the multipliers; thus, it is the $^{21}Ne/^{20}Ne$ that shows the higher variability).” in the figure caption. The measurement periods are separated by the stippled vertical lines, this information is provided in the caption of Fig. 4 (`Stippled black lines delineate individual runs.`). The number of the measurement periods increases from left to right, with the increasing number of calibrations.

- Fig. 5: neon isotopic ratio. → We do not understand the intention of this comment. The description of the plot as "neon three-isotope plot" is also used by Vermeesch et al. 2015

Please explain better what the initial heating steps are? you mean the first 1 to 3 steps (green dots) and the steps 4 to 5 (grey rectangles) are the subsequent steps. Be more specific on how the distinction is done?

→We stated in the figure caption (Fig. 5): "The cloud of green symbols displays single-step CREU extractions (100 W-15 min), the green dots to the right of the cluster are the initial heating steps of stepwise extractions (at varying laser output), grey rectangles are the subsequent steps that invariably had low abundance; for details see Table 1." The initial (first) heating/power step (see Table 1) will extract the majority of the neon gas from CREU-1. Subsequent heating/power steps will extract the remainder of neon in the sample or CREU-1 and will plot due to the low abundance to the left close to the air value on the neon-three-isotope plot. We added to figure caption (Fig. 5): "…the green dots to the right of the cluster are the initial heating (first extraction of a sample) steps of stepwise extractions…"Line 357-358.

Small other typo problems:

Please unify the writing of the neon isotopic ratio in the text (21Ne/22Ne and not 21/22Ne), figures and table (use 21Ne/20Ne and not 21/20 etc) as the different notations are used. → corrected throughout the manuscript, figures and table

Line 280: please change 5*10-9 by 5x10-9→corrected

Same comment in line 339, 340, 341, 366, 369 →corrected

Line 241 put the 6 of 10^6 in index →error not found, however, we checked the entire manuscript for this problem

Ad GCN also in fig 3 and 4 → added

Table 1: please explain what is 21Ne* (the asterix is referring to what?) →modified to ^{21}Ne *cos, for the cosmogenic ^{21}Ne

In the acknowledgement, you can thank the reviewers → We added: "Furthermore, we want to thank Rainer Wieler and one anonymous reviewer for their constructive feedback on the submitted manuscript."

References: please add the DOI number to all references (when possible). Be careful with the writing of isotopes and molecule to put the associated symbol or number in index → added