

Geochronology Discuss., referee comment RC2
<https://doi.org/10.5194/gchron-2021-11-RC2>, 2021
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Comment on gchron-2021-11

Anonymous Referee #2

Referee comment on "Technical Note: Noble gas extraction procedure and performance of the Cologne Helix MC Plus multi-collector noble gas mass spectrometer for cosmogenic neon isotope analysis" by Benedikt Ritter et al., Geochronology Discuss., <https://doi.org/10.5194/gchron-2021-11-RC2>, 2021

General comments

The manuscript describes the operation of a new noble gas mass spectrometer at the University of Cologne, as well as the laboratory procedures and confirmation that the performance of the equipment is on par with other laboratories. Some of the technical descriptions could benefit from more detailed explanation and clarification. The authors describe their method in great detail, I found the manuscript interesting and informative, and I recommend it be published with minor corrections.

The manuscript would benefit from better proof reading. There are a few themes throughout:

- use of semi colons rather than commas (e.g. lines 21, 33, 34) and hard to read sentences (e.g. line 239)
- missing gaps between number and unit (e.g. lines 133, 134, 192...)
- incorrect capitalisation (e.g. lines 17, 152, 154)
- Please consider accessibility with the plots. Some are hard to read because the text is too small. If you haven't already, check that some of the more colourful plots and schematics are colourblind friendly, and consider using symbols to differentiate, rather than for example "the green cluster".

Specific comments:

89 - 103: L1, Ax and H1 seem to be just thrown in here with no definition. Perhaps in line 85 you could define these?

195-207: Do you have any quantitative data to support the calibration of the bare cold trap. I'd be more interested in seeing plots of how the ad/desorption varies with temperature (and that 100% of the neon is released at 80K), and what the RGA sees when you de-gas the cold trap, rather than fig 1B. This is particularly of interest because you make comparisons with the disadvantages of a liquid nitrogen cold trap. It would be good to see the data or citations backing this up.

220- 222: Be very careful saying that automation helps 'prevent' oversight and negligence on the part of an operator! This view could bring in errors due to the expectation that automation is infallible. Do you have safeguards in place, will you know if a automatic valve failed to open during a run. Also, later when you talk about in-house software, is this available to scrutiny?

263 - The pressure being less than the gauge is capable of is good, but it does depend on where the pressure gauge is. If it right next to the turbo pump (it's hard to see from Fib 1B but this appears to be the case), you're not measuring the pressure in the furnace, you're measuring the pressure at the pump. If that's the case the blank is more important to report here than the pressure.

275 - define "hot" - what temperature are you running the hot getter at?

302: You calibrate with RedAir once per day to check mass discrimination, sensitivity and multiplier vs faraday gain. Is this enough? Do you observe changes (particularly multiplier vs faraday) over the course of the day as you run experiments? I'd expect at the start of a day the mass spec has had time to 'reset' overnight, so a calibration run every morning might be broadly consistent with the previous day, but over the course of the day there could be lots of sensitivity changes (especially with large signals). Also, you say "at least" once per day. Are there reasons why you might do more than one, or is there no set pattern?

322 - Figure 3. I cannot tell if this is just me seeing a pattern in the data, but does the dispersion increase with time? It would also be helpful, for accessibility, to have the symbols in the key, not just the colours.

Typos etc (not a complete list):

Line 13 - The opening line seems a bit clunky - use "dedicated to" rather than "dedicated for"? (first few sentences could do with reworking)

17 - mass spectrometer, not Mass-spectrometer

19 - automated would read better than automatized (section 2.3 is subtitled automation)
62 - 65 - This sentence is hard to read. Maybe "Common isobaric..... are at: $m/e = 20$ (interferences on $^{20}\text{Ne}^+$ are $^{40}\text{Ar}^{2+}$, H^{19}F^+ , H^{218}O^+), $m/e=21$ (interferences on $^{21}\text{Ne}^+$ are)etc"

85 - "five CFM modules" or "five CFMs", not "five CFMs modules"

110 - made of metal

198 ion pump not ion-pump

152 - 5×10 - use 'x' instead of * and 156.6 not 156,6

171 - gases not gasses

189 - the starcell is referred to here as an iongetter (should be ion getter?) pump but in 193 as an ion pump. Maybe just use ion pump here

280 - resulting rather than ensuing?