

Geochronology Discuss., author comment AC2  
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## Reply on RC2

Melanie Bartz et al.

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Author comment on "Potential impacts of chemical weathering on feldspar luminescence dating properties" by Melanie Bartz et al., Geochronology Discuss.,  
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**We highly appreciate the time of referee#2 in reviewing our manuscript. The comments and suggestions of modification of the manuscript are very constructive and will improve our manuscript.**

"Please reflect on the terminology used: I found the term 'weathering' confusing where used as sample label. You are working on museum specimens that will probably not have been exposed to weathering in nature. So may be use 'treated', 'etched', or other terms that better describe the state of a sample. Please use similar terms throughout the manuscript (and also in figure captions).

A related issue: In the discussion, please highlight that your results were obtained on museum specimens. Mineral grains extracted from sediments may respond significantly different to etching due to very variable pre-depositional mechanical and chemical alteration.

Parts of the results and discussion section need more precise wording, losing superfluous words and jargon. A job for the senior author?"

**We agree that «weathering» is not a proper term for laboratory treatments and we decided on using «treated» throughout the manuscript. We will also make clear in the discussion that we deal with museum specimens rather than minerals extracted from natural environments to highlight potential differences from soils/sediments (i.e. mineral mixtures etc.). In general we will work on the wording throughout the manuscript.**

**Regarding the specific comments we will do the following changes:**

"Line 67: Wording - what is 'challenging' about putting an adequate optical filter in the detection pathway?"

**We mentioned the challenge of measuring a pure luminescence emission as the blue filter pack still transmits a small part of the UV wavelength region. Small changes in luminescence properties with chemical treatment in the UV emission might also have an effect in the blue luminescence emission usually used in luminescence dating applications. We will add information to the manuscript.**

"Line 73: `...well as changes' change to `...well as to changes'"

**We will work on the grammar/wording throughout the manuscript.**

"Line 104: `(unweathered)'? would `(untreated)' be more adequate? Please print units with all digits: 0 h, 4 h, 96 h, 240 h, and 720 h."

**We will use the terms «treated» or «untreated» in the revised manuscript.**

"Lines 109 & 110: wording - change: `hydrolysis conditions, which allow it to efficiently leach transition metals and trace elements from the surface of minerals without destructuring the silicate' to `hydrolysis conditions and efficiently leaches transition metals and trace elements from the mineral surface without destroying the silicate'"

**We will work on the grammar/wording throughout the manuscript.**

"Line 105 versus line 115 – please clarify: was shaking applied in both experiments over the full period?"

**Yes, shaking was applied in both experiments. We will make the experimental conditions clear in the methods section of the manuscript.**

"Line 120: wording – `weathering time point' change to `experiment duration' or similar"

**We agree that «weathering time point» might not be the most appropriate term and we will change it to «treatment duration».**

"Line 123: Unclear – `Sc was used as an internal standard'. Have values been normalised to Sc concentration?"

**The Sc standard was used for investigating the stability of the ICP-OES measurements. A normalisation approach was not applied as the Sc readings were constant, which means that the analysis was stable and that normalisation would not change the results. We will briefly explain that in the methods section.**

"Line 139: Change `were used' to `was used', Line 143: Change `were weighted' to `was weighted', Line 168: Change `were used' to `was used'"

**We will work on the grammar throughout the manuscript.**

"Line 149: Unclear: `background noise' – given your measurement setup I expect that the majority of background signal was due to black body radiation and not noise. Did you check the reproducibility of the setup?"

**We agree that the background signal was very minor compared to that of the black body radiation in the high temperature region (>350 °C). However, the signal-to-noise ratio was lower in the low temperature region, which corresponds to the main luminescence emissions for our samples and correction/subtraction of the background signal was necessary. We checked the reproducibility of the spectra between aliquots (n=3) and explored only minor differences in intensity. We will give additional information in the manuscript.**

"Line 160: Please print units with all digits., Line 204: Please print units with all digits."

**We will change that.**

"Line 171: 'feldspar sample compared to the pure' change to 'feldspar sample and given as percentage of the pure'"

**We will change that sentence accordingly.**

"Line 173: 'higher Ca content' needs a comparator - compared to?"

**Sample ALB1 was compared to sample ALB2 as both samples are albites. We will state that in the manuscript.**

"Line 198: 'The same' better 'Similar'"

**We will work on the wording throughout the manuscript.**

"Line 215: wording – While the shape of the TL emissions is unaltered even after .... the intensities of the TL emissions increased...."

Lines 219 - 223: wording – is it 'no significant change can be detected due to inter-aliquot variability?'"

**This is correct. Inter-aliquot variability is more evident rather than «real» changes in TL intensities after chemical treatment. We will present these results more clearly in the revised manuscript.**

"Chapter 4.2.2 – please reword. Shorten and focus using more precise terminology and descriptions. Some suggestions here:

Similar lines 230 - 233 – is the scatter significant? If not, refrain from speculating.

Line 235: 'up to saturation' - be more precise: The highest applied dose was 2250 Gy – the dose response (S&) is still growing...

Line 236: unclear – delete: 'Normalised to the initial D0 values,'

Line 241: change 'could be' to 'were'"

**Thank you for the suggestions of modification, we will work on the wording of the whole manuscript to be more precise and to avoid speculative wording.**

"Discussion lines 280-290. Is this a good analogue for chemical weathering in, for example, a soil?"

**It is comparable to weathering processes of specific minerals. Whether those processes can be good analogues in natural environments depends on the complex interplay between intrinsic (mineral properties) and extrinsic factors (environmental properties).**

"Line 315: unclear – 'when using the blue filter pack.' Is it 'the 410 nm emission.?'"

**Yes, it is the 410 nm emission, we will make it clear in the manuscript.**

" Figure 1:

I find the semi-logarithmic graph design not very clear. May I suggest plotting the data as percentage change on a linear scale? You can show all results in the same graph by normalizing the concentrations to the initial value. This should reveal potential trends more

easily. In addition to the different symbols, you may also want to use a colour scheme."

**We will modify figure 1. In the new version, we will plot the data as percentages and normalise the data to their initial values. However, plotting all data in one graph would likely overload the figure and make it difficult to follow due to the amount of data points and associated symbols/colours. Therefore, we would like to keep the number of figures.**

"Figure 5, Caption: Unclear – 'All curves'? is it 'All symbols'?"

**Yes, this should be «all symbols», we will revise the caption.**

We are happy to follow up a further discussion,

Melanie Bartz (on behalf of the co-authors)