

**Response to editor's comments:**

Dear Prof. Feathers,

Thank you very much for reviewing our revised manuscript. Your comments improved it further. In the following, our modifications are explained (**bold**) according to your comments (*italic*).

Best regards,

Melanie Bartz (on behalf of the co-authors)

*This is a good and interesting paper, well-written and the responses to the reviewers were generally good.*

**Thank you very much.**

*I have a few comments. If these are addressed, then I think the paper should be published:*

*1. In lines 34-35, the authors cite previously studies observing that chemical weathering affects luminescence properties, yet the thrust of this paper is to say that weathering has little effect. Can you explain these different conclusions?*

**The results can differ due to different sample and experimental conditions:**

- **Whilst previous luminescence studies (Berger et al., 2001; Wang and Miao, 2006; Valla et al., 2016) focused on natural samples, we used samples of specific feldspar types (i.e., similar weathering conditions throughout the bulk sample), whereas natural sediment samples are characterized by mixtures of different feldspars (i.e., feldspars with different strength to chemical weathering).**
- **Laboratory conditions differ from natural conditions (e.g., organic and inorganic ions, ionic strength, pH and redox fluctuations). Please, see discussion lines 323ff.**
- **Natural feldspar samples are likely prone of various erosional-depositional cycles and thus different weathering conditions.**

**In conclusion, it remains difficult to connect the cited studies with our observations. We added explanations to the conclusion.**

*2. Line 117 -- Can "complex" be used as a verb? Maybe reword.*

**Yes, it can be used as a verb in chemistry (like "chelate"). We prefer to keep "complex".**

*3. Lines 212-214 -- Your spectra results show nothing in the high temperature region of MIC, yet the glow curves clearly show a luminescence signal at high temperatures. Can this be explained?*

**This is an effect of data normalization as the data were normalized in two different ways: In figure 3, the data were normalized to the highest TL intensity coming from ca. 450 nm. In**

contrast, figure 4 shows a normalization to the curve itself (e.g. for 350 nm: normalization to the highest TL intensity in the 350 nm region). We added these information to the figure captions.

*4. I thought Reviewer 1's comments on XRD were good. I wonder if you could incorporate your reply into the supplementary material*

**We agree and added a figure to the supplementary material showing the XRD results of the albite samples comparing untreated and treated material. Additionally, we added information to the manuscript (lines 178-179).**