

Response to reviewer #3

On behalf of my co-authors, I am very grateful for the positive and supportive feedback. Below I will address all comments carefully. Although we are not allowed to upload a new manuscript version at this stage, we considered all comments in our manuscript. Changes referring to the supplementing document are already available, because this website is rendered independently of Copernicus.

Main text

One concern that I have is that in the text (lines 322-324) it is stated that conversion from binx to XLUM is not always lossless. How bad is the loss? 1%? 15% What kind of data is lost? How do the authors envisage the support for the conversion of say binx files to XLUM format in R?

We agree. This comment was too thoughtlessly dropped demands elaboration. It refers only to the R package 'xlum' and not the XLUM format. It boils down to how many resources one should dedicate to subsequent developments *before* the format is finalised. We first wanted to discuss and mature the XLUM format before committing too many resources to the 'xlum' package development, which would require subsequent work-intensive changes.

Enabling a better conversion is a diligent but routine piece of work. We will iteratively improve the conversion features as soon as we have an initial version accepted (this manuscript, implementation Freiberg Instruments software). We will slightly modify the text, the clarify our approach.

Therefore, the loss cannot and should not be quantified in terms of percentage. It is our aim to make the conversion lossless; which the format allows.

Line 26: remove 'is' before 'often'

Done.

Line 33: insert space before '(Noy...'

Done.

Line 42: would suggest to add latest review paper on luminescence dating, Murray et al. Optically stimulated > luminescence dating using quartz. Nat Rev Methods Primers 1, 72 (2021). <https://doi.org/10.1038/s43586-021-00068-5>

Agreed.

Line 53: move 'Fig. 1' to end of sentence

Done

Line 56: subsequence → subsequent

Done.

Line 78: emphasis → emphasizes

Done (emphasises)

Line 180: Listing 1 (singular)

Done.

Line 340: Listing 4 (singular)

Done.

Figure 6: Suggest to remove ‘Marie Sklodowska-Curie; Max Karl Ernst Ludwig Planck’ from above the figure? It is not clear to me what it does there. Labels to Y-axes?

The names are the author names in the example dataset. But we agree that this will unnecessarily lead to confusion. We removed the names in the plot and added y-axis labels (“Component signal [a.u.]”).

Line 409: contain instead of contains?

Agreed. Perhaps it will be changed back later by the editor/copy editor because the non-plural form seems to dominate in modern English.

Supporting document

I have also downloaded and read this document. The whole document requires careful reading by the authors and a check of the English.

We apologise for the typos, we should have been more carefully reviewed this document.

My main comment is that Appendix 6 has only the Risø bin/binx to XLUM metadata argument matching. I would expect that also the other dataformats supplied by other manufacturers (see Table 1 in the main paper) are part of such an appendix. Is this not possible? I find it strange that only Risø binx files are discussed.

We consider the appendix a guidance, it is not part of the core format description. However, in order to address this comment, we have added similar matching instructions for the XSYG and the PSL (portable luminescence reader) format.

Page 3, section 3.1, last sentence: I think it is the other way around. Case 1 has three curves and case 2 has 1 curve?

Thank you for spotting this. We swap the order of the cases.

Section 3.1.1: the sentence ‘Please note that the XSD document... (which can be encoded)’ does not make sense. Rephrase.

Fixed.

Page 5: In the examples and the Fig. 1 (remove ‘the’) and start new sentence with ‘However’
3.1.3. meaningfully → meaningful; duaration → duration

Done.

Table 3: according the... according to?

Done.

Page 7: physical information is stored in the...

Done.

Table 4: any kind for heating (of heating?); how many kinds of heating are there? Please specify Isothermal,

We removed ‘any kind’.

Infrared (without capital as for the other info)

Done.

TM-OSL: ... optically stimulated luminescence (can be more specific)

Done.

Blue, green, violet,... : add stimulated after colour (e.g. BSL = blue-light stimulated luminescence)

Done.

Page 7, bottom: change to full sentence ‘Valid entries for sampleConditions are given in Table 5.’

Done.

Table 5: the information in this table does not describe the sample condition properly. These sample conditions come from the multiple-aliquot (TL) techniques: additive dose procedure; total bleach – additive dose procedure; regeneration procedure... e.g. naturally depleted luminescence to describe “Nat. (Bleach)” is, in my view, possibly incorrect. These aliquots were not necessarily bleached in natural sunlight; a solar simulate lamp was very often used to determine residual dose in MAAD-TL dating of finegrains. See e.g. Wintle A.G., Luminescence dating: laboratory procedures and protocols, Radiation Measurements, Volume 27, Issues 5–6, 1997, Pages 769-817 and references therein.

Thank you for this comment, we corrected it in the document.

Tables: make consistent throughout all tables whether information starts with capital or not.

Done.

Table 7: doi link overprints information

The PDF is auto-generated, the overprinting does not happen in the HTML, which is the main document, the PDF is only for convenience. Tweaking this minor issue would be rather complex or prompt a wrong examples (e.g., shorten but invalid DOI)

Table 8: archived

Done.

Section 3.6: check second sentence (These instead of There, to ease the sequential of data storage?)

Done.

Table 10: manufacturers; unique identifying the parent node?

Done.

Section 4: Rephrase third sentence (Either way...)

Done.

Section 4.1: Check first paragraph for English (stimulation, data processing...; Undertaken processing on the hardware level better?)

Done.

Section 5: Practical instead of Pratical

Thanks, done.

Section 6.1 add comma: block, others...

Done

p. 14: CURVENO instead of CRUVENO

Done.

Remarks: in the remarks column it is written ‘considered non-relevant’ or ‘usage unknown’. However, there must be some relevance or use to these arguments, otherwise it would not have been created. Please improve this and if necessary contact manufacturer.

Indeed, manufacturer data format usually includes additional bits necessary for other reasons but are irrelevant for the long-term storage of luminescence data. Still, they can be stored in the XLUM format, but the

arguments are non-compulsory. This may, of course, change in the future. Using those arguments would not render the XLUM file format incompatible. It only indicates that parsers do not need to process them.

On behalf of all co-authors,

Sebastian Kreutzer, Heidelberg, 2023-03-2