XLUM: an open data format for exchange and long-term data preservation of luminescence data

General:

This manuscript is an original, timely and useful contribution to the field of luminescence dating. The paper is well-structured, clearly written and easy to follow even for people who are not familiar with computer scripts. Figures are informative and up to journal standard.

As the authors acknowledge, the success of XLUM will depend on adoption by the community but also on whether journal editors will make it compulsory to include all luminescence data during manuscript submission. The future will tell us. I think there will be broad support in the community and among the manufacturers of luminescence equipment for this initative.

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?

Minor editorial comments:

Line 26: remove 'is' before 'often'

Line 33: insert space before '(Noy…'

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

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

Line 56: subsequence → subsequent

Line 78: emphasis → emphasizes

Line 180: Listing 1 (singular)

Line 340: Listing 4 (singular)

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?

Line 409: contain instead of contains?

Supporting file: XLUM-file Format Documentation (version 1.0 [2022-09-21])

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

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.

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?

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

Page 5: In the examples and the Fig. 1 (remove ‘the’) and start new sentence with ‘However’

3.1.3. meaningfully → meaningful; duaration →duration

Table 3: according the… according to?

Page 7: physical information is stored in the…

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

Isothermal, Infrared (without capital as for the other info)

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

Blue, green, violet,…: add stimulated after colour (e.g. BSL = **b**lue-light **s**timulated **l**uminescence)

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

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 does 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.

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

Table 7: doi link overprints information

Table 8: archived

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

Table 10: manufacturers; unique identifying the parent node?

Section 4: Rephrase third sentence (Either way…)

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

Section 5: Practical instead of Pratical

Section 6.1 add comma: block, others…

p. 14: CURVENO instead of CRUVENO

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.