

Geochronology Discuss., author comment AC3  
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## Reply on CC1

Alastair C. Cunningham et al.

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Author comment on "Attenuation of beta radiation in granular matrices: implications for trapped-charge dating" by Alastair C. Cunningham et al., Geochronology Discuss.,  
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Babara – many thanks for the comments, I will address these as best I can here:

Figure 1 is not intended to be realistic. It is a schematic illustration designed to help the reader visualise the concepts and arguments of Section 2. In Section 2, the argument progresses from the highly simplified assumption of a homogenous matrix, towards the more realistic scenario of the granular matrix. So this argument actually progresses in the way you suggest it should- beginning by explaining the standard (Mejdahl) approach and then explaining what needs to change to accommodate the granular matrix. The figure placement is a bit early, however, so I will address that when I see the proofs.

With regard to the surface held activity, there are certainly unresolved questions on the nature of the chemical bonds, which could be resolved in future by sequential leaching experiments. Your assertion that distilled water would remove all surface-held nuclides is a pretty strong one; it would need to be backed up with evidence, and would need to explain why the residual activity concentrations are proportional to surface-to-volume ratio, in four different samples. From the work that I know of – particularly Olley's thesis, it is most likely that the U and Th nuclides are co-precipitated with iron and manganese oxides, and would not be affected by distilled water.

With regards to gamma spectrometry: Murray et al. (2018) gives full details of the measurement and analysis procedures, including calibration material and comparisons to reference samples. Typos: yes, it should be Pb-214 and Bi-214.