Geochronology Discuss., referee comment RC2
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Comment on gchron-2022-16

Irene Schimmelpfennig (Referee)

Referee comment on "Technical note: A software framework for calculating compositionally dependent in situ ^{14}C production rates" by Alexandria J. Koester and Nathaniel A. Lifton, Geochronology Discuss., https://doi.org/10.5194/gchron-2022-16-RC2, 2022

This manuscript reports theoretic production rates of in situ cosmogenic 14C in mineral and rock phases of various compositions, estimated from a specifically developed software framework.

Given the potential need for knowledge of 14C production rates in minerals and rocks other than quartz in future surface exposure dating studies, this manuscript is well suited for publication in Geochronology.

It is very well and clearly written. I suggest a few minor clarifications that should be addressed.

Lines 55-56: It could be good to clarify that the extraction procedures from mineral/rock phases other than quartz also still needs to be developed before these materials can be envisioned for geologic applications.

Lines 80-81: This sentence is unclear: does “well-constrained” refer to the exposure history? Natural variability of what? I don’t understand the point of the sentence.

Lines 81-82: The focus on quartz is also due to the fact that extraction procedures for other minerals or lithologies have not yet been developed or validated.

Line 149: Were elevation differences between individual samples at each site insignificant? Or were the concentrations corrected for them?

Lines 153-154: What is the calibrated value generated by the UWv3 calculator?

Lines 159-165: This should be simplified by saying that you calculate a correction factor P_Qcal/P_Qref , which gives 0.854 and which you multiply by the P_CDpred of all other tested mineral and rock phases. However, how reliable is this correction for other compositions, which are associated with other excitation functions than quartz?

Lines 237-238: Would it be possible to list the elemental 14C production rates, for direct comparison with those given in the Masarik (2002) abstract? This is also what is commonly done for the highly composition dependent 36Cl production.

Related to this, I suggest you should clarify whether or not the software also calculated production rates for compositions that differ from those considered here theoretically.

Caption of Table 1: Shouldn't this be "Oxide compositions… and accordingly calculated number densities"? (It should be clarified what the numbers are.)

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