Geochronology Discuss., community comment CC5
https://doi.org/10.5194/gchron-2021-22-CC5, 2021

Reply on CC4

Ian Duddy

Community comment on "Simulating sedimentary burial cycles – Part 2: Elemental-based multikinetic apatite fission-track interpretation and modelling techniques illustrated using examples from northern Yukon" by Dale R. Issler et al., Geochronology Discuss., https://doi.org/10.5194/gchron-2021-22-CC5, 2021

We are saddened that Issler et al in their response (CC4) has focused a personal attack on us and our methods rather than responding in appropriate detail to the technical issues surrounding the very poor EMPA data at the heart of our comments. At many points in CC4 the authors take issue with what we do, and how we do it. We respectfully point out that what we do is not at issue here; it is whether the claims made in their paper are justified by the data they present. They are not.

Issler et al question our motives, but we understood that the purpose of this forum was to provide a public space in which comments could be made without anonymity. Few academics seem willing to take the opportunity to air their views in public. Our initial comment was not written in defense of our methods, but to point out the negative attitude with respect to apatite compositional influence in the review of Ketcham.

Despite being first and foremost a commercial entity, Geotrack has strived to maintain a major research effort and has published >>100 peer reviewed papers. If, as Issler et al suggest we operate outside the academic sphere, it is not our doing, although this attitude is not unique.

That the EMPA data is too poor in quality to justify any conclusions regarding the utility, or otherwise, of rmr_0as a superior kinetic measure to either chlorine alone, or Dpar, is incontrovertible on the basis of our comment (CC3), yet this is denied by the authors in their response to our comment. Such poor quality data (e.g. totals as low as 81%) would not be accepted in a discussion of igneous rock petrogenesis, for example, and it should not be accepted here.

In this paper, Issler, McDannell, O'Sullivan and Lane, are attempting to replace what they see as inferior indicators of apatite annealing kinetics (in their view, apatite chlorine alone and/or Dpar) with one based on a range of elements - rmr_0. The attempt is based on only two samples for which the central EMPA dataset is inadequate as detailed in our comment (CC3). We are not *delving into minutiae"* when we point out that accurate structural formulae, the basis of rmr_0, cannot be determined from analyses with poor totals. The entire story presented in the paper derives from these analyses. Issler et al are obfuscating when they say that there could be many reasons for poor totals, including abundant elements not measured! Regardless, these analyses cannot be used to justify

the claims regarding the relationship between rmr0 and AFT annealing. We hope that the authors will address this point directly. We are not exaggerating the problem.

Finally, we are confident that the LTT community would welcome input from those familiar with EMPA analysis and the reliability of structural formulae determined from apatite analyses with low totals such as these.

Ian Duddy and Paul Green, Oct 20 2021.