

AE decision on revised version of  
*Simulating sedimentary burial cycles: I. Investigating the  
role of apatite fission track annealing kinetics using  
synthetic data*

by McDannell and Issler

Noah McLean

Reviewers Ketcham and Gallagher indicate that this contribution has improved with the authors' extensive revisions. I agree. The resulting manuscript is more focused, clear and readable. I recommend accepting the revised manuscript, with the technical corrections outlined in the second round of referee reports.

One remaining point of contention concerns the scatter in synthetic grain ages created during forward modeling. This topic is discussed in Ketcham's original review but resulted in no revisions by the authors, as discussed on pages 21 and 22 of their response to reviewers. The issue is re-raised at the top of Ketcham's second report, and I agree with his conclusion that the paper would be stronger with more realistic forward-modeled data. However, I understand the authors' choice to simplify the forward-modeled dataset and accentuate the multi-kinetic nature of the synthetic data and its impact on the inverse-modeled thermal histories.

To increase the clarity of the final manuscript, the authors should quantify the modeled scatter in AFT data, which is described around line 220 in the revised manuscript. The forward modeled age dispersion is also the subject of a comment from Gallagher, with reference to the same line number. If the synthetic data were generated with QTQt, then this should be stated and an inline reference to the Gallagher 1995 appendix should be inserted.

The rest of the reviewers' comments require specific, minor technical corrections, which should be addressed by the authors in their final submission. This includes minor technical corrections/wordsmithing on lines 56, 57, 193, 220 (see above), 234, 255, 282, and optionally '382ish' from the Gallagher referee report. Likewise, Ketcham suggests minor technical corrections to lines 33, 34, 84, 98 (see also comment on line 78 from Gallagher), 100, 103, 111, 129, 226, 402, 488, 496, and 512, and optionally address Ketcham's broader comments for lines 424, 457 and 481.