McDannell and Issler.. Simulating sedimentary cycles

The authors have made substantial changes to the original manuscript and it is now more accessible/readable.

They have reduced the length and I think it is now clearer in terms of addressing the role of multi-kinetic (or multi-compositional) data (ages, lengths) in resolving thermal history information. I could make comments on the presentation - those would be primarily stylistic (e.g. there are many Beatles sentences... long and winding) but that is more a personal choice. I admit to not being a big fan of the Beatles in general.

Some minor, but not necessarily insignificant, comments

L78...not sure you need the word exaggerated here. There is no need to be too apologetic for using near perfect synthetic data..just state it. The paragraph starting on line 98 is a little repetitive on that point.

L56..not clear what is linear here....if eqn 1 has eCl.

L 57 - make it clear in the equation that this is eCl (if it is) rather than the Cl in the original Ketcham et al. 1999) Cl* value.

L193 regardless of feasibility...you mean geological feasibility...rather than data fitting feasibility...clarify that..you could say that a candidate thermal histories that predicts the data adequately (at least in relation to the current thermal history) can be accepted, regardless of its geological feasibility...as you say a few lines below, but it should be here.

L220 - if you generated the synthetic data with QTQt, then the scatter in the ages is from randomly resampling a binomial distribution for Ns, given Ns+Ni...explained in the appendix of Gallagher 1995. As stated ..Varying Ns/Ni.... is not very specific...the resampling process adds a bit of natural noise (i.e. more or less Poissonian).

Also the length data are generated by drawing the desired number of lengths randomly from the predicted distribution.

(and also note that neither the central ages nor the single grain ages are used for the data fit, as implied in the reply to referees - it is the same binomial distribution approach to give a conditional probabilility for Ns and Ni, given a predicted Ns/Ni.. or rho_s/rho_i).

L 234...the sampling is in a Bayesian framework, but Bayesian sampling is probably not appropriate....you tune the parameters for sampling (strictly we are using proposal functions...that have a standard deviation as a parameter to tune, for example).

L255 - EX is the mean of the posterior distribution, or the weighting being the posterior probability...now that is Bayesian.

L255 examine..better as illustrate ?

L282 - the ability of QTQt to recover....while you are using QTQt, I think the issue is more general...just say... the ability to recover ?

L 382ish- section 5.2)- any interest in a comment on taking the sub-groups and modelling each one individually to assess what parts of the thermal history are constrained by which subsets of data ?

L430 for information- there is now a published comment and reply on the Green and Duddy discussion.

L 512 - Conclusions....these are pretty clear but perhaps overly positive in the sense that you may be leaving yourselves open to be criticized of promoting over interpretation - as with real data things will not be so nice - but I expect that will be addressed inthe secobd paper.