

## ***Interactive comment on “ESR-thermochronometry of the Hida range of the Japanese Alps: Validation and future potential” by Georgina E. King et al.***

**Anonymous Referee #2**

Received and published: 26 September 2019

Comments on King et al. submitted to Geochronology

This is the first paper reporting the thermochronology with both luminescence and ESR dating techniques. I strongly recommend this paper to be published after clarifying the points below.

(1) Last part of Chapter 3 and latter half of Fig.1: The authors once calculated the change with time of each signal intensity (Figs. 1b and c), then, using these results, they inverted to obtain the predicted cooling histories. Therefore, ideally, the red lines in latter half of Fig. 1 matches the white dashed lines, if I understand correctly. However, some of them are not. The authors should explain and discuss this point more clearly. It would partly because of the assumed initial condition, but there are cases that cannot be accepted, especially, slowest cooling rates for OSL centers. Probably,

C1

the discussion should be as such, in a case that the predicted cooling history obtained from OSL centers does not match that of ESR centers, the latter should be adopted. Then, this shall be applied to actual cases, i.e., Fig. 4.

(2) Discussions for Fig. 4: Probably, for samples KRG16-101 and 104, the results for all signals seems consistent, however, for the other two samples, they look inconsistent. The authors may use the criterion in (1), or may abandon the modelling. There should be cases that the results from different signals are not consistent with each other, then modelling of cooling history cannot be made from the statistical point of view. Probably Eq 10 would be for this. What are the L values for these?

Detailed points

Page 2 line 6: “later” should be “at higher doses”

Page 3 Eqs.1 and 2: “ $E_a - \mu(E_t)$ ” should be “ $E_a$ ”.

Page 5 eq. 5: The first term, “ $E_a$ ” should be “ $E_b$ ”, second term, “ $E_t - E_b$ ” should be “ $E_b$ ”.

Page 6 line 1: What is  $n_{mod}$ ?

Page 6 lines 1-8: What is  $m$ ? Probably number of traps.

Page 6 Eq. 9: Is this summation from 1 to  $m$ ? If so, it is not clear.

Page 7 line 17: Correct the inequality sign.

Page 8 line 7: “fitted” is by the least square method? How Ti-Li and Ti-H centers ratio was assumed?

Page 10 line 3: What is “signal intensity experiment”?

Page 10 line 3: Is “plateau” preheat plateau?

Section 5.1: One example of observed ESR spectrum should be shown together with a fitted spectrum.

C2

Page 10 line 17: Correct the values and/or sample number.

Page 10 line 19: KRG16-112 is not listed in the Table.

Page 10 lines 20-23: Section 4.3.1 probably says the authors adopted regenerative protocol, but the dose response in Figs. 3 are additive dose.

Page 13 line 1, Fig. 5: The signals seem to reduce too much. Please check the number in horizontal axis.

Page 13 line 26, "consistent": Please describe how consistent.

---

Interactive comment on Geochronology Discuss., <https://doi.org/10.5194/gchron-2019-6>, 2019.