

Interactive comment on “The closure temperature(s) of zircon Raman dating” by Birk Härtel et al.

Beatrix Heller (Referee)

beatrix.heller@universite-paris-saclay.fr

Received and published: 4 February 2021

General remarks: The manuscript is written in a very scarce style omitting in some cases explications that would be necessary and details that would be interesting for the reader. This is especially true for the sample and measurement descriptions. The language is sometimes a bit imprecise, specific examples that need improvement are given in the provided supplement with specific remarks.

Taking into consideration that this manuscript is about a method which is not really established yet and only few examples exist on its application, the authors should write a bit more about the potential, possible applications and advantages of zircon Raman dating. Some citations would merit being included in the introduction. The idea of Ra-

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diation damage dating goes actually back to the 1950s (see Holland and Kulp (1950): “Geologic Age from Metamict Minerals”, *Science*, 111, p.312). Some important works of radiation damage might also be mentioned such as Holland and Gottfried (1955) and Murakami et al. (1991).

The authors seem to have a certain tendency to put trendlines into their data which, in some cases, seem to indicate rather what the authors want the reader so see than what the data actually shows. (For specific examples see the provided supplement)

The manuscript is about radiation damage and its annealing but the authors give not a single value of radiation damage density for their samples. In order to make the presented data comparable to other data, ideally U and Th concentrations should be measured for the analyzed spots and radiation damage densities should be calculated. If this is technically complicated the authors should at least estimate the damage densities from of their Raman spectra (e.g. by using the calibration by Palenik et al. 2003).

Calculation of the closure temperatures: in order to apply the obtained results to a lager set of samples it would be good it the authors could give additional values for the closure temperatures for very slow and very fast cooling (1°C/Ma and 100°C/Ma), 30°C/Ma seem less important though.

I did not check systematically but at least one citation (Palenik et al. 2003) is missing in the reference list. Please recheck

Several figures need some improvement and/or better explanations in the captions. For the concerned figure this is explained in detail in the provided supplement.

Please also note the supplement to this comment:

<https://gchron.copernicus.org/preprints/gchron-2020-39/gchron-2020-39-RC1-supplement.pdf>

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