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Replay to Anonymous Reviewer 2

Thank you for your corrections, comments, and suggestions to our manuscript. They will help to improve the revised version of the paper. Our response to specific comments provided are detailed below.

Since all the apatite fission-track data reported in the text are based on borehole samples, the reader might expect that the authors would at least refer to and discuss their results in the context of some known issues regarding the application of low temperature thermochronometry to the deep borehole samples. It includes i.a., defects for fission-track dating reported by Wauschkuhn et al. (2015 and references therein).

Thank you for pointing out some potential issues related to the application of low temperature thermochronometry to borehole samples as those reported by Wauschkuhn et al. (2015). However, their study was done based on several samples from a single deep borehole. In our case, we had single samples from several boreholes and two samples from only two boreholes (Gołdap-IG1, Tłuszcz-IG1). In these two boreholes, a decrease in age with depth is visible, as well as shortening of the measured confined tracks. Consequently, in our case, the number of samples per borehole was insufficient to support methodological considerations similar to those in Wauschkuhn et al. (2015). An appropriate explanation will be included in the revised version of the manuscript.

Throughout the text, any information on how the length of the confined tracks have been presented (c-axis corrected or not) could hardly be found. This information must be declared in the text since the effect of bias in length distribution might be a significant component (see Ketcham et al., 2007).

For modelling, we used confined tracks non-corrected to the C-axis, taking geological constraints into account and Dpar values. Normalizing fossil track lengths to a personalized zero-length, either that of induced (Ketcham et al., 2009, 2015) or fossil (Kohn et al., 2002, 2005; Gunnell et al., 2003) tracks is a questionable procedure (e.g., Green and Duddy, 2012) for eliminating discrepancies between measured and predicted lengths as each dataset to which an annealing model has been fitted has an intrinsic zero-length that was used for its parameterization. This information we will be supplemented to the thermal modelling chapter.

It is confusing to use the capital letters through the text, tables, and figures for the epochs/series names (e.g., Table 1: Triassic lower; Jurassic Middle). This needs to be clarified and homogenized throughout the manuscript following the ICS recommendations.

We followed the ICS rules in the text, i.e., writing formal chronostrtigraphic subdivisions with a capital letter and informal with a small letter. However, we made some mistakes in the tables. Thank you for pointing this out. The tables will be corrected.

In table 2, many reported Zr grains contain inclusions. Does it possibly have any influence on the reported ZHe ages?

All inclusion in Table 2 were distinguish between: (i) solid and (ii) fluid inclusions. However, chemical characteristics of inclusions were not identified. Results in Table 2 show that the inclusions did not

affect the (U-Th)/He data for zircons in most cases. But in a few cases, where we were not sure about the impact of inclusions, we have just excluded uncertain zircons from calculating of average zircon (U-Th)/He ages (see Tab. 2).

Szewczyk & Gientka (2009) reported some heat flow density perturbations for the NE Poland reaching up to 2000 m depth, so in the range of many of the analysed borehole samples. In this context, please better explain which present-day temperatures (e.g., line 491) do you present in your text and use for thermal modelling.

In the analysed boreholes, where thermal modelling was carried out (Tab. 4), the contemporary temperature is much lower than the sensitivity range of the thermochronological method used. Thus, temperature fluctuations of ± 10 °C in the boreholes from the study area that are mentioned in the paper by Szewczyk & Gientka (2009) do not affect the obtained results. For example, in the Gołdap IG1 well, two samples were analysed with a temperature of 35 °C (B13) and 45 °C (B14). The fission track system in apatites is sensitive above a temperature of 60 °C and the helium system in zircons above 130 °C. An appropriate note will be added to the revised text.

All the remaining minor comments to figures and tables as well as technical corrections will be implemented in the revised version of the manuscript.