



EGUsphere, referee comment RC3
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Comment on egusphere-2022-828

Anonymous Referee #2

Referee comment on "Construction of the Ukrainian Carpathian wedge from low-temperature thermochronology and tectono-stratigraphic analysis" by Marion Roger et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-828-RC3>, 2022

This is a well written manuscript, easy to read and of potential interest to the readership of EGU sphere. Here is a list of moderate revisions that may be useful to improve the paper:

Line 35: references are required at the end of this sentence.

Line 43: as before, references are required at the end of this sentence.

Line 89: this statement should be supported by references to recent papers.

Line 102: Change "sedimentation" to "sedimentary"

Line 132: "Due to the absence of evidence for transient heating and in line with present-day well data, an average geothermal gradient of 25°C/km for the Carpathian wedge and its antecedent basin is used in this study.". This statement requires a more detailed discussion and should be supported by adequate references.

Line 184: Here you may also quote the book "Fission-track thermochronology and its application to geology (pp. 147-164). Springer, Cham"

Line 189: An appropriate citation is: Malusa and Fitzgerald 2020 -The geologic interpretation of the detrital thermochronology record within a stratigraphic framework,

with examples from the European Alps, Taiwan and the Himalayas. *Earth-Sci Rev.* 201, 103074

Line 210: Please specify to which author this zeta value is referred to.

Line 212: More recent papers concerning Dpar should be mentioned at the end of this sentence.

Line 359: *"The amount of additional heating after the end of sedimentation, as well as the time lag between the end of sedimentation and the onset of cooling, reflect the relative importance of tectonic thickening due to thrusting, and surface erosion (Husson and Moretti, 2002; Ter Voorde et al., 2004)."* This sentence suggests that exhumation is exclusively related to erosion, which is not the case during slab rollback (see for example Brun and Faccenna 2008 *EPSL*, Malusa et al 2015 *G3*).

Line 362: What are the independent constraints supporting this assumption?

Line 460: *"This pattern of low-temperature thermochronology ages, showing burial heating to maximum temperatures in the core of the wedge (Fig. 10) and decreasing toward both the internal and external limits, is consistent with models of steady-state orogenic wedges (Barr and Dahlen, 1990; Batt et al., 2001; Willett and Brandon, 2002). It is also comparable with exhumation patterns in other orogenic wedges, including the Olympic Mountains (Brandon et al., 1998; Batt et al., 2001); Taiwan (Beyssac et al., 2007) and the Apennines (Thomson et al., 2010; Erlanger et al., 2022)."* I recommend here a more open discussion about this point since there is no general consensus on the fact that Taiwan and the Apennines have reached a steady state.

Line 514: "Recycling of sediments is a major process in fold-and-thrust belts; quantifying the amount of eroded material and the timing erosion can help retrieve sediment fluxes over time. Our study provides a view on the sediment fluxes in the Ukrainian Carpathian wedge from the classic model of a formerly accreted nappe providing sediments to the next accreted nappe." Sediment recycling implies predictable thermochronologic age patterns (see Malusa and Fitzgerald 2020, their Fig. 13) that should be also illustrated and discussed in detail.

Figure 2: Symbols in the keys should be the same size as in the main figure they refer to.

Figure 3: I suggest using the same Dpar range for all the color bars in the radial plots.

