We would kindly thank Reviewer 1 for taking the time and consideration to review our manuscript, which helped to improve its clarity. Below we address each individual comment in Blue.

Dear authors,

The manuscript is very interesting and with the R script to reproduce de data very useful for the for researchers dedicated to the study of climate and landscape reconstruction in the quaternary small mammals. However, I consider that the manuscript could be published after clarifying some doubts and correcting some minor issues:

Abstract: Abbreviation of General Circulation Model is wrong written is GCMs

We fixed this spelling error

Keywords: In my opinion there are two unnecessary ones (paleoclimate and Mammalia) and they are not well ordered: rodent-based reconstructions, temperature patterns, Last Glacial Maximum, Late Glacial, Heinrich Stadial, Bølling-Allerød Interstadial, Younger Dryas.

We corrected the keywords as proposed by the reviewer

page 3, line 72: (Rodentia and /or Eulipotyphla)

We have modified as proposed

page 9, line 172-173: write in brackets the scientific name of the species after de common name, *Dicrostonyx torquatus* and *Apodemus agrarius*

We added the scientific names of these rodents

page 7-lines 141-142. Please better explain the use of the IUCN Red List for species distribution per 50 km, because those maps do not appear to be in the IUCN, 2021.

We clarified in the text that we used the geographic range polygons available from the IUCN Red List spatial data, and performed spatial intersections in R to determine whether each species range overlaps with a 50 km radius circle around each studied locality. This allowed us to generate locality-specific rodent faunal lists. We have revised the Methods section accordingly to make this process clearer:
"For each locality, we compiled a rodent faunal list (Table C2) by identifying all rodent species whose geographic range polygons, sourced from the IUCN Red List spatial data (IUCN, 2021), intersect with a 50 km radius buffer around the locality coordinates."
We hope this clarification resolves your concern.
We also added in supplementary material, the R script allowing to reproduce this part of data treatment.

page 10-line 176: Why you don't use direct the updated version of OxCal 4.4.4. (Bronk Ramsey, 2021) and the IntCal20 (Reimer et al. 2020). Probably some of the dating that you calibrated are wrong without the updating. Check it.

The main reason for not using the updated version of OxCal is purely a question of timing with the project; the first version of the database having been built before the release of IntCal20. We have not updated because, although the latest version is clearly better, the changes in the latest calibration mainly concern the Holocene and MIS3; the changes for the LGM and Late Glacial periods remain relatively minor.

We have recalibrated all dates with the updated versions of IntCal. No major changes have been observed with these latest versions. If we quantify the changes related to the used of the new curve, we have an average change in the minimum and maximum bounds of the intervals of just over 51 years, and only 9 levels undergo changes between 200 and 500 years (generally the aging ones).

We have modified the text accordingly with the new references. We modified the table C2 with the new dates.

page 13-238-241. In my opinion, the reason why altitude is omitted in the article needs a better explanation. Although the sites used are few, the altitudinal location is very important. At the same longitude and latitude, at different altitudes, you can have completely different associations of micromammals.

We agree with the reviewer that altitude is a very important factor for climate, ecosystems and small mammals. Initially, we explored altitude by adding this factor to the latitude and longitude parameters in GLMM. However, despite the size of the database, there are not enough high-elevation sites for each period, leading to erroneous models for some periods. We therefore choose to apply an average vertical lapse rate. This compromise is not perfect by any means, as we fail to take into account the likely long-term changes in the vertical lapse rate, and the possibility that it may differ from case to case mountains (i.e. Alps, Pyrenean etc..).

We modified the following line to clarify the point (line 249) : "Although the GLMM can include the effects of altitude, the number of high altitude fossil sites is too limited **per period to obtain sufficiently robust correlations to reproduce adiabatic effect, leading to erroneous models for geographical areas at middle and high altitudes. We therefore prefer to apply an average vertical lapse rate, to reflect this effect in geographical and temporal terms.** Elevation effects […]**".**

The list of sites with the different chronological periods presented is impressive and very complete. I only missed one site, published a couple of years ago, which has two levels from the end of the Late Ice Age. Here's the reference, perhaps it could be included:

Arjanto, D.Q., Fernández-García, M., López-García, J.M., Vergès, J.M., 2023. The end of Late Glacial in north-eastern Iberia: the small mammal assemblage from Cudó Cave (Mont-

Ral, Tarragona). Earth and Environmental Science Transactions of the Royal Society of Edinburgh 114 (1–2), 21–33.

We have not selected this site and its two levels because of the extent of the period covered by the two levels 107 and 105. According to the radiocarbon dates, level 107 covers part of the LGM, but also potentially HS3, and level 105 covers several Late Glacial events. As indicated in the article, we selected “stratigraphic units associated with radiocarbon dates limited to a single time interval”, in order to limit palimpsest bias and thus avoid blurring noise in the signal.