Review of

A meta-analysis of Final Palaeolithic/earliest Mesolithic cultural taxonomy and evolution in Europe.

The manuscript " *A meta-analysis of Final Palaeolithic/earliest Mesolithic cultural taxonomy and evolution in Europe"* by Mr Riede and co-authors, which has been submitted to PCI Archaeology (available through the link: https://doi.org/10.5281/zenodo.8195587) uses a meta-analysis approach to evaluate the efficacy and replicability of contemporary cultural classifications of prehistoric cultural taxonomies focusing on the Final Palaeolithic and the earliest Mesolithic in Europe (c. 15,000 to 11,000 BP). To achieve this aim, the authors used a high-level computational approach on a large spatiotemporal scale, combining a set of statistical tests designed to accumulate research results on novel integrated dataset including key sites, lithic toolkit composition, blade and bladelet production technology as well as lithic armatures.

Overall, the manuscript is well written. Data collection is adequately and openly presented in sufficient detail with additional information structured into chapters provided in the supplementary information. The literature cited is very informative and relevant to the topic of the current manuscript. All figures are appropriate and the statistical tests are displayed with accuracy. The argumentation is well stated as it is clearly indicated in the abstract.

The main point of this study is that the results of meta-analysis provide better estimates of the relation in the population than single studies, especially when integrating operational chain analysis to resolve cultural taxonomic questions. While I overall agree with their findings and these data is potentially be of great interest for a broad readership, the presented manuscript would benefit from some clear information/discussion that I have resumed in two main points:

Selected studies and dataset

This study emphasizes to us the coherence of the various NACs groupings and the existence of a cultural diversification tracked over time. However, considering the large spatiotemporal scale, the inclusion of a limited set of studies biases estimates about the effect sizes in the population, since the results do not identify all possible studies on the phenomenon.

Data inconsistencies

The selection of reliable key sites identified as those that hold rich information on lithic typo-technology well published by regional experts in prestigious journals, might influence meta-analysis results and lead to misleading inferences about the issue of

taxonomic designations. Furthermore, considering the fact that typical specimens are usually selected for drawing because they are representative of taxonomic entities, the inclusion of complete specimens rather than fragments might biases the estimates about the effect sizes in the population.

Minor remarks:

Line 24: do you mean domain or module? Please correct accordingly in the text.

Line 55: unretouched components are excluded from the meta-analysis, though Belloisian and Laboraian unretouched knives, *identified as an important production goal,* were included in the dataset. The exclusion of unretouched components, which might biases the meta-analysis results, needs to be explained.

Line 286: the authors stressed that the Epigravettian macro-unit stands apart with a distinct laminar technological organization and suggested that this might be a bias of limited data from the long-lived Epigravettian. This very important point in this study seem to be mentioned as a side note here and needs to be more clarified in discussion.

Line 573: The discussion would have benefit from the integration of other aspects of material culture such as bone/ivory technology, genetic data, cave art, burials ... This would have strengthen the argumentation.