Climate of the Past Discussions

Clim. Past Discuss., referee comment RC1
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Comment on cp-2022-59

Anonymous Referee #1

Referee comment on "The climate and vegetation of Europe, North Africa and the Middle East during the Last Glacial Maximum (21,000 years BP) based on pollen data" by Basil Andrew Stansfield Davis et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2022-59-RC1, 2022

The paper uses pollen records of the LGM to reconstruct climate (winter, summer, and annual temperatures and precipitation), and vegetation (% of forest, main forest types, and main biomes) in Europe, the Mediterranean, and the Middle East. It uses well /decent dated pollen records, excluding those with poor chronological control and modern analog technique. The paper represents the most up-to-date vegetation and climate reconstruction during the LGM in these regions. Results generally contradict the old hypothesis of wide-scale expansion of a steppe grassland /tundra and a very cold and dry climate over much of Europe, however, they are in line with more recent palaeoecological and modeling results showing a more forested Europe during the LGM. Overall, the paper represents a significant update of climate and vegetation reconstruction at a large spatial scale during the LGM. I am happy to recommend this paper for publication after minor revision. One of the main places to improve the paper is the graphical representation of the findings. There is a detailed comparison of results from this study with other published records of vegetation, faunistic (zoological remains), and climate. I wonder if it is possible to show some of these values /comparisons on the figures. Otherwise, there are pages of text in the manuscript with no possibility of seeing this visually, which is a pity, as this would significantly improve the paper's impact.

More specific comments:

- 40 to 52, a nice overview; please add some references to support these statements. Here and in other places in the text, please see a very recent book describing the landforms of the European glacial landscapes: https://www.sciencedirect.com/book/9780323918992/european-glacial-landscapes#book-description
- 64-67 Please extend the relationship between climate CO2 and vegetation slightly.
- 89 perhaps also add the rates of plant expansion; generally, these are very high assuming the postglacial expansion from southern refugia, and generally, this does not

fit modeling results (for example, Nogués-Bravo et al. 2018; TREE, 33, 765-76; Feurdean et al., 2013, Plos One, 26, 8 71797, etc).

- 138, so there were 63 records, 27 with raw counts, and 35 digitized? Please re-write this sentence to make these numbers more transparent.

L172-180 may consider moving these levels of detail at the SI

- 248-251 is too long and a complicated sentence, please rephrase

l.261 What exactly is meant here by modern climate?

l.267-272, these lines should be supported by a ref

The names of taxa (Pinus, pine, birch, to name a few) appear wrongly written everywhere I guess it is due to the software conversion; please amend.

Results. I think one should avoid comparisons/ references to other studies in the Results and should be placed in the discussion

- 418 I am surprised to see the low percentages of Chenopodiaceae, Asteraceae, and Artemisia, over most of Europe
- 502 ff Chapter 4.0 also, please see the new book 2022 European glacial landscape: the last deglaciation shttps://www.sciencedirect.com/book/9780323918992/european-glacial-landscapes#book-description
- 626 ff see also Demay et al., 2021 Quaternary International 581-582, 258–289.

Conclusions: I found them overall too long, too many details. I think they should provide better summaries of the essential findings, for ex. L.889-891, l.903-904 sound like results, and the overall ending phrase is missing.

The number of graphs and figures made the number of illustrations very high and somehow redundant. Better keep the maps and send graphs to SI. This way, one can accommodate a comparative figure with published records described extensively in the discussion.