

Comment on **essd-2021-269**

Mary Edwards (Referee)

Referee comment on "European pollen-based REVEALS land-cover reconstructions for the Holocene: methodology, mapping and potentials" by Esther Githumbi et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-269-RC2>, 2021

General comments

This paper concerns the use of Holocene pollen records to estimate taxon distributions and land-cover changes (LCC) through time for Europe, including the Mediterranean. It describes in detail the current state of the art use of the Landscape Reconstruction Algorithm (LRA) for the most intensely studied continental area--Europe. Of particular interest is the reduction of bias in pollen representation that allows a more accurate reconstruction of the interplay of open and forested land through time, a major proportion of which is likely related to anthropogenic land-use change.

The paper provides information on the general approach, data sources and sites, and choice of methods. It includes a detailed comparison of the numerous studies that have generated relative pollen productivity (RPP) values and a justification of the choices made in the production of the set of values used in this new iteration. The main sources of uncertainty are discussed and future improvements to methods and data are anticipated. Several useful tables provide a comprehensive list of regional studies, RPPs (including inconsistencies among studies) and data sources. Maps provide examples of the reconstructions through time.

Overall, this is an important contribution that brings together a large body of work and makes much information accessible in one place. It is carefully constructed, comprehensive and well explained.

Specific comments

p 27-28. Given the likelihood that the maps created by this approach will be used in various other applications (which are indeed mentioned in the discussion), some idea of progress towards a more "believable" depiction of LCC it might be useful: i) some comments on how far the process has come, compared with simple pollen-based maps or landcover maps generated by other means, and ii) perhaps a "health warning" that the data (RPPs and maps) are still approximations, for which there are suitable but also

unsuitable applications. Some mention of this is made in the discussion of the use of the LOVE package for local sites, such as might be of interest in archaeology. It is quite difficult to use this package (that is, to bring together the right site and the right data); given that, and the easy information the maps provide, it might be useful to emphasise that single grid cells on don't reflect "local" information.

P 29. It would be good if the first sentence acknowledges that while the LRA goes far beyond anything attempted before in the way of bias correction for pollen-based reconstructions, it is built on previous ideas, notably, the R-value approach of Davis, which was taken up by many other authors, including Prentice (who is mentioned) and actually, biomization, which because it uses a square-root function, does, in a non-specific way, reduce the impact of high pollen producers on large-scale reconstructions of vegetation cover.

Technical

The map figures have great value, and it might be worth reviewing how easily they can be read and interpreted.

- Fig 1: difficult to distinguish lake and bog colours

- Figs 2-6: ensure error circles are visible on dark cell colours. It takes high magnification to see them and even then they are indistinct. Many are large and therefore important to show.

Table B2 should read Romania (is correct in Tab C1)

The manuscript is well written and largely devoid of typos. I did spot a few (this list is unlikely to be comprehensive though).

L 147 should read The Prentice model OR Prentice's model

L163, no colon require after the verb "are"

L409 Start sentence with "Seventy-seven percent"

L410 no comma needed

L414 reword to "pollen from ruderals, for example, is often related..."

L513 naturally open (no hyphen)