Peer review report (Karoune and Plomp 2022, PCI Archaeology)

This well-written manuscript provides a convincing narrative of the importance of reproducible archaeological research and a brief how-to guide for beginners in the appendix. In the meantime, it also presents a balanced and fair view of the ethical concerns behind data sharing. In short, I highly recommend this paper to be published in a peer-reviewed venue in the future and hope it can persuade more archaeologists to value and practice open and reproducible research. Below are just a few minor comments to be addressed.

Minor Comments:

line 400: Mukurtu (https://mukurtu.org/about/) is a possible data management and sharing platform when working with indigenous communities. Their code is fully available on GitHub but setting up a server might involve some cost. One example using the Murkurtu platform is the Rowasu'u project (https://rowasuu.org/about).

line 472: Related to the scooping issue, it is very common for archaeologists to claim "data available on request" at the end of the manuscript to get away because of the mandatory data availability statement of journals. However, according to a recent study conducted by Gabelica et al. (2022), only the authors of 122 (6.8%) out of 1792 manuscripts actually responded to their request for data sharing and provided the corresponding data. I think this is a strong piece of evidence of why "data available on request" is not enough.

line 483: "more easy" should be "easier"

line 495: My personal recommendation here is a Coursera course called Reproducible Templates for Analysis and Dissemination (https://www.coursera.org/learn/reproducible-templates-analysis), covering the basics of Git and Rmarkdown. Everyone can enroll in the course for free, but the exercise, which is rather unnecessary, requires payment.

line 541: One more thing I would recommend here is R style guides like Google's R Style Guide (https://google.github.io/styleguide/Rguide.html) and ISAAK's R Style Guide (https://gitlab.com/ISAAKiel/StyleGuide). Style guide can be useful, particularly for beginners,

because one psychological barrier to reproducible research is that people are worrying if their codes are too ad-hoc, messy, and inconsistent to be shared with anyone. These style guides can help beginners foster good habits of programming. Some other archaeology-related resources include general archaeological sciences using R (https://benmarwick.github.io/How-To-Do-Archaeological-Science-Using-R/), archaeological network analysis (https://book.archnetworks.net/index.html), and Marwick's compiled list of archaeological papers including R codes (https://github.com/benmarwick/ctv-archaeology).

line 810: Maybe also consider adding the diamond open access in the glossary as this concept is mentioned in the article.

Line 960: Within the question "How do I clean up the data and code before sharing this publicly", I would suggest that the author can use one paragraph to first address the psychological barrier here that people are too ashamed to share their messy codes or afraid of potential criticism (https://www.computerworld.com/article/2833340/4-reasons-developers-are-scared-of-making-their-code-public.html). It is also important to emphasize that even researchers who have several years of programming experience will constantly seek help on Stack Overflow or similar platforms.

Line 1012: Language and package version should also be explicitly described. This is becoming increasingly important in R. The curse of the great ecology of R (many very specialized and ready-to-use packages) is that heavy package dependence of new packages makes them highly unstable. Maybe one tiny update of a dependent package will cause the dysfunction of the new package. Also, individual researchers who developed those small packages tend not to maintain them in the long term. For this reason, several researchers I knew started to use base R as much as possible or move to new languages like Julia. Perkel (2020) covered the irreproducibility of codes written years ago in a recent news piece.

line 1142: Another example of the diamond open access journal in archaeology would be *PaleoAnthropology* (https://paleoanthropology.org/ojs/index.php/paleo/index).

line 1225: Perhaps the authors can mention that there are specialized venues for publishing data like the *Journal of Open Archaeology Data* and *Scientific Data*. The former is designed for archaeologists, while the latter is a Nature portfolio journal that also accepts archaeological

datasets like p3k14c (Bird et al. 2022) and SignBase (Dutkiewicz et al. 2020). As a side note, although impact factor is known as a highly problematic metric for research evaluation if exercised without caution, particularly within the open science framework, for those who do care about impact factor because of their university policy, *Scientific Data* actually has a higher impact factor (6.444) than *Scientific Reports* (4.379) or any archaeology journals. This number to some extent shows that publishing data is a behavior appreciated by the research community and can have a direct benefit to the authors.

Figure 1 and Figure S2: these two figures are not particularly informative.

References:

Bird, D., Miranda, L., Vander Linden, M., Robinson, E., Bocinsky, R. K., Nicholson, C., ... & Freeman, J. (2022). p3k14c, a synthetic global database of archaeological radiocarbon dates. Scientific Data, 9(1), 1-19.

Dutkiewicz, E., Russo, G., Lee, S., & Bentz, C. (2020). SignBase, a collection of geometric signs on mobile objects in the Paleolithic. Scientific data, 7(1), 1-14.

Gabelica, M., Bojčić, R., & Puljak, L. (2022). Many researchers were not compliant with their published data sharing statement: mixed-methods study. *Journal of Clinical Epidemiology*.

Perkel, J. M. (2020). Challenge to scientists: does your ten-year-old code still run?. *Nature*, 584(7822), 656-659.