

Karoune and Plomp present an insightful, functional, and significant discussion of reproducible research in archaeology within this manuscript. Their stated goal, to “introduce reproducible research in an understandable manner so that archaeologists can learn where and how to start improving the reproducibility of their research,” is certainly achieved with examples, workflows, clear definitions, and more. A caveat to my review: I do not consider myself an expert in the philosophy of reproducibility in archaeology, I see myself instead as a practitioner of my own niche understanding of how best to “do” reproducible research (e.g., <https://github.com/cylerc>). I share this because the strength of this manuscript is that archaeologists who are new, or experienced, practitioners in reproducibility will undoubtedly find helpful guidance within Karoune’s and Plomp’s manuscript – I certainly have, and I thank the authors for their exhaustive efforts in making these concepts accessible to us all within archaeology (and perhaps elsewhere!). Readers will take away an appreciation for why reproducibility matters and how to accomplish reproducible research.

The manuscript includes an introduction with key background (i.e., what is reproducibility, why is it important, etc.) and excellent figures/illustrations. In fact, the illustrations throughout this entire manuscript are impressive. The authors clearly understand the necessary intersection between text and visual aids for the greatest dissemination of concepts (reproducibility of ideas within a reproducibility manuscript). Karoune and Plomp then provide three examples of reproducible workflows, and discussions on barriers in reproducibility, training, resources, definitions, and an appendix of frequently asked questions and additional resources.

I have virtual no substantive constructive comments on the manuscript in its current form. As I previously mentioned, I gained new insights into the process (and capabilities) of reproducibility in archaeology while conducting this review. There are only a few minor thoughts that the authors may be interested in considering:

Line 180-189: I certainly agree that we need to move away from the sole ownership of research kept on our local computers that only benefit ourselves and a few other researchers. That seems to be a critical aspect of reproducibility, or really the *success* of reproducibility in archaeology. This also brought up an issue that I think about often which is the ability to share and practice reproducibility within non-academic (not a great term for this distinction) settings. I’m thinking particularly about State/Federal/Private agency and company archaeological records. For example, how do archaeologists practice reproducibility in their work when their research occurs within an agency that is consulting with Indigenous Nations, States, Federal agencies, or some combination of the above? Their research – regardless of the scale – still contributes to the archaeological body of knowledge, but there may be regulatory or proprietary reasons that data, concepts, results, even ideas, cannot be shared. There does not seem to be an easy way to currently manage this “grey” literature and reproducibility framework within archaeology except on a case-by-case basis. tDAR is a logical location where these types of data are currently curated, but I suspect a struggle is still the ability to have transparent reproducibility (e.g., tDAR might curate a record without easy access to the record itself). This is all just something to consider. It is an ongoing challenge.

Line 224-235: This is a key section, and I would recommend adding in a brief mention of the ability to use university repositories in addition to Zenodo, OSF, Figshare, and more. I recognize

that in some cases university repositories have limitations, and that these limitations may also be present in non-university repositories. For example, long-term preservation of digital data, curation of servers, etc., but I suspect that in some cases archaeologists beginning their reproducibility journey might find helpful resources and support within their university system. Arizona State University has a non-exhaustive list of some university open access repositories, here: <https://libguides.asu.edu/openaccessresources/repositories>

A final note relates to the concept of “full reproducibility” (Line ~212, Figure 4) in archaeology. Something that I have found disconcerting in our modern world of archaeology is exactly *how* research projects are created. I think this is as critical to research as how research projects occur in reproducible systems. This perhaps relates to “ideas”, “discussions”, “consultation”, “questions” under the research iceberg. I wish there were mechanisms in place to exhaustively document how research begins – or a sense of self-reporting responsibility to document how research began. Did a published paper spur a new idea? A tweet? A conference presentation? A conversation at a conference? An overheard conversation at a conference? You can see where I’m going with this...there are so many possible sources of inspiration for research in archaeology, and an equally large number of routes to accomplish that research (e.g., fully funded, and transparent research proposals vs. behind-the-scenes lab analyses through colleagues, etc.) but in very few instances are those processes made entirely clear in final products. I hope that as reproducibility in archaeology continues to evolve and take prominence that there will be a shift towards making the formation of research projects transparent and open as well. To me, this would create the ultimate cycle of reproducibility by identifying the underground roots of projects, not just the tree that grows once the roots are established (using a similar metaphor to the research iceberg). However, I’m also aware that once open, transparent, and reproducible archaeology begins to approach this aspect of the research process, there will likely be a needed evaluation of how archaeological ethics facilitate (or not) those specific research projects.

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