

Clim. Past Discuss., referee comment RC2
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Comment on cp-2021-109

Anonymous Referee #2

Referee comment on "Holocene climate and oceanography of the coastal Western United States and California Current System" by Hannah M. Palmer et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-109-RC2>, 2022

Before I get to my review, I need to offer my sincerest apologies to the authors for taking so long to review this paper. A series of unfortunate errors on my part led to this paper falling through the cracks for a timely review. The underlying science of the manuscript didn't warrant such a slow response, and I owe the authors a significant apology for this error.

The manuscript prepared by Palmer et al. is a literature review that incorporates data from 50-100 published studies of marine & terrestrial paleoclimate records from across the US West Coast and western US. The paper is arranged according to early, middle, and late Holocene time intervals, with subdivisions for each time period devoted to regional synthesis, terrestrial climate (including fire reconstructions), marine conditions (mostly SST & upwelling intensity), paleoecology (largely pollen-based as well as some limited consideration of marine diatom & foram fauna), human-environment interactions (e.g., archaeology), and/or specific climate events (e.g., Little Ice Age, 8.2 ka event, European colonization, etc.). Of particular significance is the inclusion of a series of maps that correspond to these different Holocene time intervals and climate interpretations of the underlying reviewed studies.

While the subject matter is of great interest to the field of paleoclimatology generally, and the US West Coast specifically, I take exception to this work on the basis of 4 reasons:

- Many of the subsections listed above are superficial treatments of the subject matter, particularly the archaeology subsections. In several cases, these subsections are based entirely on only 1-2 studies. Some of the human-environment interaction sections are so short, I wondered why the authors even considered writing them (e.g., Sect. 3.1.6, 3.2.5). Why the focus on the Channel Islands? There are thousands of archaeological sites in the western US, and if you really used only the search term "archaeology" as the basis for inclusion in your review, then there should be a LOT more information contained in your review! My suggestion is to either drop the archaeology sections since they are pretty tangential to the main climate thrust of the manuscript, or else improve the thoroughness of the archaeological review sections.

- There is no consideration by the authors of the importance of age control regarding any of the records considered in this synthesis. I know this isn't the most fun subject to deal with, but you can't just ignore it. For example, several marine sediment records mentioned (e.g., Gardner et al., 1988; Barron and Bukry, 2007; Barron et al., 2017; McGann, 2015) either contain only 1 or 2 dates to pin down the entire Holocene, or are based on benthic forams that have huge reservoir corrections. I'd argue this fact may be a key reason to describe the lack of synchronicity in adjacent climate records that is mentioned in Line 856, or at least as important as the impacts of local vs regional "factors".

- In the Methods section, you also highlight that you will "prioritize records with high temporal resolution, continuous records..." [Line 204] = you should state objectively what this high-resolution data threshold is. Also, archaeological midden piles are not continuous records, which again brings into question why the authors opted to discuss these papers in the context of this review.

- This manuscript requires significant re-structuring. The research questions (hypotheses) are not introduced until Line 141, which is far too late in the introduction section. I read Sections 1.1 & 1.2 and got confused as to where this paper was going, as it rambled and lost focus until the hypotheses were introduced. Both of these sections can be culled by 50%. There is also no Discussion section that explicitly addresses the research questions using the results of the review, particularly Questions #2 and #3 (e.g., Lines 142-143).

Minor issues

- There are many grammatical & style issues to address throughout the manuscript, particularly in the introductory paragraphs. Because I recommended you cull 50% of this section, I'm not going to go through that section in detail. However, the authors do need to pay attention to these issues in the rest of the manuscript. For instance, small typos such as in Line 198 [...(Figs.s 2,3)...] or Line 335 [add a comma after "of northern California"] require very detailed attention to catch, which the authors clearly need to do.
- The very first sentence of the manuscript's abstract begins with a prepositional phrase, which is considered bad form in scientific writing, so please re-write. The occasional prepositional phrase is okay, but generally you should avoid using them.
- The authors are inconsistent in their use of capitalization of directions to describe the western United States and the Northeast Pacific Ocean. There are specific rules for how to apply directional adjectives, check out <https://editorsmanual.com/articles/capitalizing-directions/> for examples.
- For the initial identification of potential studies using key words, which database(s) were used? Many bibliographical databases have known shortcomings (such as exclusion of key research papers that are older than a decade or two), so it is worth reporting this detail and defending its selection.
- Line 340: What is total carbon? Do you mean total ORGANIC carbon, or carbonate-bound carbon? "Total carbon" is kind of a meaningless proxy, if that is indeed what you are reporting, so please clarify.
- Fig 4b = Y-axis label is wrong, as there are 2 different proxies plotted (opal + sedimentary $d^{15}N$). Also, what is the color coding supposed to mean on all of these similar figures (e.g., Figs 4, 5)?
- Appendix A = you have duplicated Columns 1 & 2, please clean it up.

In conclusion, I urge the authors to address these issues and re-submit the manuscript. I don't think any of these complaints are deadly to the manuscript, but some of them will require some time and careful effort to address. I hope the authors choose to pursue these modifications, as a Holocene-focused paleoclimatological synthesis of the US West Coast is of great interest to many scientists.