Review of: "Lake Bonneville and the Wasatch Fault – new theories and new paradigms yield insights into present-day hazards in other regions of the world"

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The author presented a wide range of geologic features and data, and then proposed a valid process that can explain all the observations. There is good amount of explanation and analysis of the observations presented, making the story in this article compelling and convincing. I appreciate the author's sound logic in navigating through the plethora of observations to eventually conclude on the most improbable scenario after falsifying the alternatives.

However, I do a major concern, primarily regarding the IRPS theory, and some suggestions that I hope the author can address to improve the quality of the research and the article.

The IRPS theory, though creative, has critical, irreconcilable problems in terms of geophysics. Please note that this does not go against surge-type tsunami. This is about the underlying mechanism being proposed. Here are my arguments:

1. The crustal "bowing" is due to flexural deformation, not pure isostasy. It's better to differentiate the them. They both respond to surface loading or unloading. Flexural-isostatic adjustment does not have “pop”, which is in the earthquake timescale, because it depends on the flow rate (plastic deformation) of the upper mantle.
2. The pops are more like earthquakes and flexural-isostatic rebound is not a good candidate for the driving mechanism of earthquake. A better candidate is the tectonic extension of the Basin and Range Province, which is very active in tectonics. Additionally, the tectonic stress is at least an order of magnitude greater than flexural-isostatic stress (https://doi.org/10.1038/s41467-020-15841-5) and that already considers the stress due to Laurentide icesheet, an extreme case for isostatic stress. It requires much more quantitative evidence to suggest post-glacial rebound drives the earthquakes (or pops). And why is there no mega-tsunami from Hudson Bay due to post-glacial rebound?
3. Another reason that tectonic extension is better as the mechanism is the “tilted block faulting” model, for which Basin & Range Province is a typical example. In this model, a crustal block rotates, leading to one side down and the other up (hence basin and range). This model can perfectly explain the driving mechanism for the surge-type tsunami in the article.

I suggest the author should remove the IRPS theory and simply use multi-segment fault movement as the mechanism for surge-type tsunami instead. Doing so not only keeps the article contained and focused on explaining the observations, but also frees the article from having to go into the geophysical details and numbers (article is long enough). The idea of catastrophism in this article is already a great breakthrough that challenges previous hypotheses mainly based on

uniformitarianism. I personally think the article is already great research without the IRPS theory.

The author also claims the IRPS offers insights to other regions of the world. That may be a bit too ambitious because the IRPS theory is not validated and no other example of surge-type tsunami on a lake is provided. Again, the new paradigm is already a great breakthrough in geology in my opinion.

I also suggest the author to look into the effect of glaciers in the formation of the observations presented. While it may not be able to explain all the features, but it definitely is a force to be reckoned with in the surface processes. For example, can glacial damming or calving cause the surge-type tsunami and seiches?

Lastly, I wish the author can shorten the length of the paper. It would be nice to have a summary for how all the observations can support the author's new idea and debunk the old. The figures should also have better labeling. Take sediment core data for example. Instead of just putting “labels are in reference”, there should be some labeling to guide the readers what are deep-lake sediments or tufa and so on.

In summary, I found this article to be insightful and present a good research. The author's new paradigm is refreshing, creative, and capable of explaining many features and formations of Lake Bonneville for the past 50ky. There are some issues with the IRPS, but these issues do not debunk the proposed surge-type tsunami and seiches as the process to form the features observed.

I hope the author will find this review helpful.

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