

Geochronology Discuss., referee comment RC2  
<https://doi.org/10.5194/gchron-2021-18-RC2>, 2021  
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## **Comment on gchron-2021-18**

Anonymous Referee #2

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Referee comment on "Late Holocene cryptotephra and a provisional 15□000-year Bayesian age model for Cascade Lake, Alaska" by Lauren J. Davies et al., Geochronology Discuss., <https://doi.org/10.5194/gchron-2021-18-RC2>, 2021

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This paper brings together three independent dating techniques to improve age model reliability for a lake record in Alaska. Davies et al. help to advance two areas; firstly, to expand the tephrostratigraphic record for North America and, secondly, provide a working example of how useful tephrochronology is in validating other independent dating techniques along with the use Bayesian statistics.

The paper itself is clearly written and provides an example for using multiple chronometers in a lake record setting. The introduction sets out the problems of obtaining accurate and precise ages using radiocarbon dating, particularly in high latitude lakes, and how these could be resolved with the use of combining other dating techniques such as palaeomagnetism and tephrochronology with the appropriate methods of Bayesian statistics. The methods conducted by the authors is definitive though additional detail could be added to some sections to allow clear reproduction of certain processes and provide additional information as to why a certain process were chosen. The step-by-step assessment of which radiocarbon dates were appropriate for the overall age model was useful to see. The tephra correlations made by the authors look robust and clear with appropriate additional comments made by RC1, which go into more depth for this part of the paper. There are a few additional comments made on the attached document around the presentation of data to justify primary deposition. The justification for including/excluding certain ages in the Bayesian age model were made clear and the age model results were repeatable. The discussion section brings together all the important points in a concise format. Additional information and references would provide further context for the reader to understand the points made. Though these are very minor. The figures are beautifully presented with clear and detailed captions explaining everything well. The supplementary files are very useful, particularly the publication of the OxCal coding for the final age model.

Overall, the authors of this paper have done a lot of work to produce valuable results and should be commended. This paper will provide a useful example for the scientific community to work from when conducting research with multiple chronometers as well as providing additional geochemical data for future tephra correlations in North America

records.

Please also note the supplement to this comment:

<https://gchron.copernicus.org/preprints/gchron-2021-18/gchron-2021-18-RC2-supplement.pdf>