

Clim. Past Discuss., referee comment RC2
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Comment on cp-2022-32

Anonymous Referee #2

Referee comment on "A cosmogenic nuclide-derived chronology of pre-Last Glacial Cycle glaciations during MIS 8 and MIS 6 in northern Patagonia" by Tancred P. M. Leger et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-32-RC2>, 2022

The authors present a new glacial chronology in an eastern portion of the northern Patagonian Ice Sheet (PIS). While many glacial chronologies target moraines to determine the past extent and timing of ancient glaciers, this paper makes a case for combining knowledge gained from surface exposure dating on moraines with exposure ages from cobbles on outwash plains. The modern climate and surface of these outwash plains has allowed long-term preservation of outwash channels and likely original surfaces. The ages from the outwash plains provide additional details about past glaciations in this region that have not been well preserved in the moraines. Understanding glacier fluctuations of the PIS prior to the last glacial cycle is of great importance when trying to understand the cause of ice ages. By comparing the timing of PIS glaciation with insolation, northern hemisphere ice sheet fluctuations, CO₂ and sea surface temperatures, the authors point toward the importance of seasonality and winter duration in PIS glaciations. This paper is well written and thorough.

Minor Comments:

L70 - Could you specify the timing of the LGC for clarity?

L230 - This might not be relevant, but is it worth mentioning why the work took place at 3 different labs? Interlab calibration?

L627 - 'outwash terrace sampled features preserved braided...' please consider rewording this part for clarity

L880 - You may consider referencing specific parts of Fig. 8 within this text for clarity (e.g., (Fig. 8D; Darvill et al., 2016), (Fig. 8C; Denton et al., 2021))

L894 - Is it possible that some of the temperature proxies reflect changes in or a feedback/reaction to ice volume? Shouldn't MIS 5D be the coldest part of the last glacial cycle with high seasonality and very long, colder winters?

In general, how strongly can we pin the range of ages (or just the maximum age) from outwash plains to specific insolation signals, especially when we should expect a delay of several millennia between forcing and response?