I agree with the authors' updates to this manuscript based on the reviewer comments, which I think helped clarify and strengthen the authors' arguments. This a really, really nice paper with important implications for EAIS volume during the LGM and subsequent thinning rates which will be useful targets for future glaciological modeling efforts. Thanks for a fun read!

I do have some very minor technical corrections – just a few places where clarity could be further improved and some typos. Most of my suggestions are for the abstract, as I think it could be tightened up a bit so that it's easy for a potential reader to hone in on the important findings here. I provided concrete wording suggestions but of course the authors' should feel free to use different wording that is more consistent with their voice! All this being said, I think this work is ready for publication.

Abstract

Line 10 – Make clear at the beginning that this study is in the Grove Mtns so you can more easily refer to it later in the abstract: "…14C dating [at a site/from a nunatak] in the Grove Mountains, located on the edge of the East Antarctic Plateau and 380 km inland…"

Line 11 – I think this second sentence here is an important concept to include in the intro (as you do), but is unnecessary in the abstract.

Line 16 – "location dividing thicker vs. thinner ice" - I think the wording on Line 56 is slightly clearer, so you could update this to read "…the magnitude of these thickness changes and the transition point from thicker-than-present to thinner-than-present LGM ice are poorly constrained"

Lines 17-27 –

"Geological reconstructions" to "bedrock erosion" – I suggest removing most of this background into and combining it with a description of the work presented in this paper.

"Here," to "gradual ice sheet thinning began ~16 ka" could be tightened up/reorganized a bit to provide a clearer description of your findings.

Together, these lines could look something like:

"Here, we reconstruct East Antarctic Ice Sheet (EAIS) thickness changes since the LGM at a nunatak in the Grove Mountains using *in situ* 14C, which circumvents the common issue of long-lived nuclide inheritance that leads to inaccurate records of LGM ice thickness. Samples between 1912 m a.s.l. and the modern ice margin (~1825 m a.s.l) yield 14C ages of X-X. Samples at and above 1912 m a.s.l. have saturated 14C concentrations, implying exposure of the nunatak summit through the LGM. We therefore place the LGM ice surface in the Grove Mountains ~70 m higher than at present. The unsaturated samples below 1912 m a.s.l. indicate that gradual thinning began ~16 ka, with some (25-45%) post-LGM thinning recorded ~16-11 ka and most (55-75%) recorded during the Holocene. Ice sheet models…"

Note that I removed reviewer 3's suggestion to define saturation in the abstract – I'm not actually certain I agree that "saturation" is overly colloquial and I think the definition could go into the introduction instead (which I think you already have).

Other technical corrections

Line 94 – explicitly (but briefly) state here why this is it a key site?

Line 92 - “how far inland ice was thicker” – you could instead use the term “hinge zone,” which you’ve defined already defined really nicely.

Lines 127-128 – maybe this is already stated above and I missed it, but could add the scatter in the 10Be and 26Al data as another line of evidence for inheritance.

Line 131 – rather than listing sample names in the text, could list them in Table 1.

Line 182 and Figure 2 caption – GR12 seems to be within uncertainty of (and actually, slightly younger than) GR01? I wonder if GR15 is really your only outlier? This is such a nice dataset!

Figure 2 – if not too much a hassle, could you add a 2nd Y axis showing elevation relative to modern ice surface (i.e., GR12 would be ~0)? Also, a general comment that came up for me when looking at this figure – could point out somewhere more explicitly in the abstract that you narrowed the LGM ice thickness to a very small window (~70-85 m above present), which is amazing! I know you do in the discussion on lines 211-213, so it’s also okay to just leave it there.

Line 206 – add “all of” before “our samples”

Line 209 – “at least not long or deeply enough” – a bit confusing still. How about: “not sufficiently thick as to override the summit for a significant duration, although saturation doesn’t preclude a short period (<x kyr) of cover or cover by thin (<10 m) ice”

Line 216 – “Up to 18 m of thinning” - separate into two sentences with 2nd being about glacial overshoot.

Line 239 – suggest rewording here and elsewhere from “covered shallowly” to “covered by thin ice” (see earlier suggestion)

Figure 3 caption – “contours show C14 conc”? Without the sample concentrations on here, I think you need to explain this slightly differently because I was left looking for 14C concentrations – “Burial-history contour plot for a sample at 1912 m a.s.l in the Grove Mountains. Modeled glacial histories start at 50 ka with one episode of burial under >10 m of ice (no 14C production during burial). 14C concentrations in the sample are saturated at the model start”

What is the “lesser end” of the saturation window – I think I asked that before but I still don’t understand (closer to the grey zone, I guess? Could this maybe just be “The sample only remains saturated if burial durations longer than X kyr happened before the LGM”?).

“Sample GR21 plots off the bottom-left” – same as confusion about first sentence, above.

Line 265 – remind reader here what the previous LGM reconstructions based on longer lived nuclides suggest? Is lost track of this, although it looks like you come back to it below?

Line 269 – “that” should be “than”

Figure 4 – 2nd to last sentence probably unnecessary since you state this nicely already in the first sentence of the caption.

Line 308 – revise slightly for clarity “Our record suggests that ice in the Grove Mountains began thinning ~16 ka, ~2 kyr later than the [more coastal?] Prince Charles Mountains, though the timing of initial thinning at our site is broadly consistent with….”

Line 312 – CRONUS-Earth calculator sentence- this could go in methods. Just there state that all previously published ages presented here are recalculated using…

Line 314 – “Note, however” sentence could be – “Part of this discrepancy could be due to small amounts of 10Be and 26Al inheritance in the Prince Charles Mountain samples. Further work to measure *in situ* 14C in the Prince Charles Mountain samples would enable an evaluation of the degree of lead and lag…” (the last sentence of this paragraph isn’t really necessary)