We thank the anonymous reviewer for their time, expertise, and their insightful and helpful suggestions to make the manuscript more accessible, accurate, and impactful.

Anonymous Referee #2 Received and published: 26 August 2019
This manuscript details a comprehensive field investigation of a very remote rock glacier in the dry valleys of Antarctica. The authors carefully assess the geomorphology of the rock glacier, examine its internal form using geophysics, and evaluate the chemical and isotopic make up of its ice and those of the meltwater ponds atop the glacier. All of this evidence suggests that the rock glacier has been stable for ~40 ky, which is an impressive amount of time, given the controversy over the dynamics of a possible glacially-dammed lake at the mouth of the valley 5-10 ky ago. One thing that continues to challenge many of the researchers in the dry valleys is how such a lake could exist with so much ice in the area (locally) remaining intact. This set of evidence and conclusion is a terrific contribution to the dry valleys cryospheric literature and provides an excellent example of the wealth of secrets kept in these rock glaciers, especially in Antarctica.

We thank the reviewer so much for these kind comments.

Minor suggestions:
p. 2, line 21 – I suggest that 'subsurface structure' maybe be changed to 'internal structure', and that the authors add "(using GPR)" or something similar. The reason I mention this is that the GPR part of the Methods section sorta jumps out at the reader without much purpose. Hence, I propose putting some indication of the purpose back in the Introduction section.

Reply: Internal structure is a more accurate description and we will use that.

p. 8, line 17 – 'ground surface' is a little confusing here. Do you mean where the ice (at depth) is in contact with the ground or do you mean from the surface of the rock glacier, which one must stand on. I suggest being more accurate with this and all other instances of 'ground surface' in the paper.

Reply: We did mean the surface of the rock glacier that a person would stand on. We will change the terminology to "The presence of clean ice was verified via field excavations, with a sediment-clean ice interface commonly present at < 30 cm depth."

p. 10, lines 31-32 – the sentence "At this location, the rock glacier is cored by > 10 m of clean ice (Fig. 11b)," – should 'cored' be 'covered'? I didn't think that manual core collection got this deep. . . Oh wait, maybe you aren't meaning this to be the verb that has to do with collecting an ice sample. . . I'd suggest changing 'cored' to 'made up of' or something like that so that there's no confusion.

Reply: Because we use "core" as a verb (when we cored for ice samples) and a noun (ice-cored landform), we completely agree that this would be confusing. We will only use "core" and "cored" to refer to the ice core samples that we gathered in the field. In all other places we will change the description, such as "At this location, the rock glacier contains >10 m layer of clean buried ice."