

Interactive comment on “Permafrost Distribution Modeling in the Semi-Arid Chilean Andes” by Guillermo F. Azócar et al.

Anonymous Referee #2

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General comments:

The paper by Azócar et al. is well written and presents data that is very valuable given that permafrost distribution details in this portion of the world are very lacking. I think that this paper has what it takes to eventually be published in TC however, I currently would describe the paper as incomplete and thus requiring major revisions. As a result, my comments are relatively brief as I feel that I need to see more in order to evaluate the paper more effectively. I do not believe the authors should be discouraged by this but rather strive to include more detail and justification in the revised manuscript.

The two major inputs to the model are PISR and MAAT which I agree are really the most important factors for this type of empirical-statistical modelling. I however, have two problems including a portion of the methods and really the what the paper says it

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does which are listed below.

Production of MAAT data

The production of MAAT data is central to the model however, I feel the authors give little to no description on this in the methods and results. There could be an entire paper written on this MAAT model and you cannot use the proposed model without these data. I am not being critical of the methods used to create the MAAT model however, they must include more description and results including a map of MAAT distributions. In addition, there is also no mention of surface lapse rates in the area which I see as critical.

Rock glaciers as a PF indicator

I fundamentally struggle with the idea that rock glaciers can be used as an indicator of permafrost distribution. How is this paper not a rock glacier favourability index rather than a permafrost favourability index? You can make the argument that it is because the morphological characteristics of the rock glaciers are not considered but aside from this where does permafrost occur in the area where there is not rock glaciers? How does the model deal with this? Again I am not saying this is incorrect however, I feel this is a major issue that you need to address directly in a revised manuscript.

Other comments:

The use of the word altitude is completely incorrect in many portions of the paper. Altitude is above the ground and elevation refers to locations on the earth surface above sea level. Certain terms like ELA can remain because this is used in the literature (although technically incorrect) but all others must be changed.

Figure 1: use a hillshade rather than just the DEM. Additionally, use an inset map to show where in the world this is.

Figure 3 (possible in text) comment on where permafrost is present outside of rock glacier locations.

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Figure 3: include some mention of surface lapse rates in this figure.

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