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Hist. Geo Space. Sci. Discuss., referee comment RC2
https://doi.org/10.5194/hgss-2021-17-RC2, 2022

Comment on hgss-2021-17

Andreas Schmittner (Referee)

Referee comment on "Pioneers of the ice age models: a brief history from Agassiz to Milankovitch" by M. Efe Ateş, Hist. Geo Space. Sci. Discuss., https://doi.org/10.5194/hgss-2021-17-RC2, 2022

This brief review of ice-age models is well written and I enjoyed reading it. I think it may provide a nice historical introduction for students and or non-climate-scientists to the topic. I especially liked the last two figures (7 & 8), which illustrate the applicability of Milankovitch's mathematical calculations with evidence from the geological record. However, I have two main comments/concerns that I think the author should consider in revising the work, in addition to several smaller and more technical comments.

My first main point is that a recent review of Milankovitch published last year by Andre Berger (https://doi.org/10.5194/cp-17-1727-2021) should be considered by the author. There is considerable overlap between the two works, and I would encourage the author to minimize the overlap, emphasize the differences, and to acknowledge the work by Berger.

My second main point is that the equations in the manuscript are not well motivated, and I didn't understand them. They should be better explained. E.g. in equations (2) – (5), what is the difference between Delta_Q and Delta_W? The different terms in the equations should be explained and motivated so that a typical reader can understand them.

Detailed technical comments:

Line 35: replace "have" with "has"

Line 107: replace "a glacier" with "glaciers"

Line 220: insert “to” after “lead”

Line 253: insert “at perihelion” after “winter”

Line 294: why is it compared here to the langley unit? Is this used elsewhere or was it a popular unit at that time?

Line 298: replace “year’s” with “half-year’s”

Line 299: I assume "colder" here means "has less insolation than". Perhaps clarify.

Line 336-338: This is interesting context, not mentioned by Berger’s review.

Line 380: What for values other than 90 and 270? It would make more sense if the different signs represent a range of longitudes of perihelion.

Line 395: insert “of lower equivalent geographical latitude” after “cases”

Line 399: Do we know if Milankovitch decided to plot this particular metric (equivalent latitude) for better comparison with work by others such as Penck and Bruckner?

Fig. 1: units should probably be changed from deg F to deg C

Fig. 6: I don't understand this figure. Why is T_S not equal to 1/2 T? In other words, why does point F not coincide with point P? What is the difference? Please explain.