

Interactive comment on “Climate warming has led to the degradation of permafrost stability in the past half century over the Qinghai-Tibet Plateau” by Youhua Ran et al.

Anonymous Referee #3

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General comments: The authors of the manuscript “Climate warming has led to the degradation of permafrost stability in the past half century over the Qinghai-Tibet Plateau” present modelled permafrost conditions and evolution over the Qinghai-Tibet Plateau. The purpose of the work is to assess permafrost stability in the over the QTP and the presented results are interesting. The manuscript is in general well written, but I have some comments. Some of the assumptions in the paper are not very well discussed. In particular, I find that the authors do not discuss the use of MAAT and the chosen limit (-1 celcius) of permafrost. Do the presented results reflect the real thermal state of the QTP?

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Results and Discussion sections should be separated. Introduction: Though I find this manuscript highly interesting, the introduction would improve if the authors would motivate the study further in the introduction, e.g. include implications of the thermal stability degradation at QTP (Section 3.3.2).

Specific comments: 1. Page 1, Line 29: Replace "soil or rock that includes ice or organic material" by "ground".

2. Page 2, Line 5- 7: I do not understand this sentence.

3. Page 3, Line 2-3: Rewrite sentence, e.g. "Despite current warming, large permafrost areas may persist"

4. Page 4, Line 9: Avoid the word "Obviously". Why is the engineering perspective more useful?

5. Page 4, Line 18: Why is MAAT -1 celcius used as boundary between seasonally frozen ground and extremely unstable permafrost instead of MAAT -2 celcius? (Why is cave ice included?)

6. Page 5, Line 23: (Eq 4). First part of equation is not printed

7. Page 8, Line 12: MAAT -0.58 celcius in 2000 indicates seasonally frozen ground (According to Page 4, Line 18). I understand that permafrost is likely to persist in the ground though MAAT exceeded the chosen limit (-1 celcius), but this should be more clearly stated to avoid misunderstandings.

8. Page 9, Line 5 : Why are glaciers included in the permafrost area? Are these glaciers cold based?

9. Page 10, Line 3: Rewrite. The ground temperature is not independent of MAAT.

10. Page 10, Line 6: The snow cover is dependent on the climate zone (Not the sensitivity of the snow cover)

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11. Page 11, Line 19: Why is the geothermal heat flux missing?

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