

Interactive comment on “Derivation and analysis of a high-resolution estimate of global permafrost zonation” by S. Gruber

Anonymous Referee #2

Received and published: 19 September 2011

Review comments on manuscript entitled “derivation and analysis of a high-resolution estimate of global permafrost zonation” by S. Gruber submitted to The Cryosphere for possible publication.

Using available global air temperature data of CRU30 and NCEP reanalysis, the author intends to model global permafrost distribution. As the author states many times throughout the manuscript, the approach has a lot of limitations. However, the final results are in good agreement with the IPA map. This is a good approach and opens doors for better future regional and global permafrost mapping. I recommend the manuscript to be published with some minor revisions as follows.

Major concerns: 1). The main parameter for mapping permafrost in this study is mean annual air temperature. In equation (1), the author also introduces two parameters:

C968

μ and σ . The author did not explicitly describe how these two parameters are estimated and what are their physical meanings. At least, the author needs to further to clarify. 2). In the old IPA map, in some areas, the boundaries between permafrost zones were drawn by MAAT, such as in North America and Qinghai-Xizang (Tibet) Plateau when data were much more sparse. Using new data as in this study, the author may just directly try use MAAT isotherms to overlap with the IPA map to see how well it was done in the old days. At the same time, the author should compare these MAAT isotherms with his new modeling results to check the improvements. This will make this study more valuable and attractive.

Minor points:

1) Throughout the manuscript, the author uses PE, PZI, PR, PA, I found it is very difficult to follow (after reading several times of this manuscript and I am still very confused about these terms). I strongly suggest that the author make it clear in one paragraph somewhere in the text so the potential readers will not go back and forth to check them.

2) P2, line 1, “... Earths’ ...” should be “... Earth’s ...”.

3) P2, line 15, “... data provides ...” should be “... data provide ...”.

4) P3, line 1, “... Earths’ ...” should be “... Earth’s...”.

5) P10, lines 4 through 13, confused by the text here and values listed in Table 1. For warm case, MAAT is -2.0oC, while for cold case, MAAT is -1.0oC, a typo?

6) P12, lines 12-19, the average CRU30 and NCEP30 may not be a good approach for MAAT. For this study, I would trust CRU30 better. Some comparison studies show that over alpine regions, NCEP reanalysis data have huge errors against ground based measurements (e.g., Ma et al., 2009).

7) P15, line 26, “...(CN,CN)...” typo?