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Hydrology and Earth System Sciences Discussions

Interactive comment on "A regional model to predict the distribution patterns of alpine permafrost in the western part of the Qilianshan Mountains, on the northeastern edge of the Qinghai-Tibetan Plateau" *by* Y. Sheng et al.

Anonymous Referee #1

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In this manuscript, the authors present borehole temperature measurements, a model of permafrost distribution for a Chinese mountain range as well as model results for one specific basin. This is an important topic and corresponding measurements are rare. However, I recommend rejecting this manuscript because its conclusions are either trivial or not substantiated by the research presented. Using the three evaluation criteria of HESS, I rate this manuscript as follows: scientific significance: 4 (poor); scientific quality: 4 (poor); presentation quality: 3–4 (fair/poor).

I have reviewed this manuscript already in February 2009 for a specialized permafrost journal and also there recommended rejecting it. The manuscript as it is presented here is nearly identical, except for Figure 3 that has been added. Personally, I am disappointed, to have spent time on a review and then see the manuscript submitted to a differing journal nearly unchanged. In the following I will only provide very brief comments – mostly identical to the previous review.

Measurements: It is not clear, how the values presented in tables or Figure 3 were obtained and how representative they are. The "steadiest ground temperatures" of "four measurements [. . .] from early of June to the end of November" is not sufficiently accurate. It is unclear what single date or temporal granularity the presented measurements of soil moisture are based on – this is a strongly fluctuating parameter. These measurements do not support the conclusion "Therefore, it was thought that the topographic conditions were the main controlling factors for the distribution of permafrost in the study area", especially not when comparing boreholes in a narrow elevation range.

Model: A model with different components is presented, but not at all evaluated. The basis for the model is questionable, e.g. the regression presented in Fig. 4 is based on four points, only. Additionally, these points stem from an extremely narrow elevation range and the lapse rate of 3.8 °C/km is very low when compared to average atmospheric conditions, posing problems for the huge vertical extrapolation. Furthermore, the "Gauss curve model" is only published in Chinese and the validity of its use here cannot be traced by most reviewers or readers of HESS. Reading between the lines, the "Gauss curve model" seems to be designed to explain global distribution patterns and not local patterns in mountain basins.

Conclusions: Altitude control on ground temperatures in steep mountains is a trivial fact. Conclusions about latitude or shading are not supported by the model presented, since it has a questionable theoretical basis, a data basis that is insufficient and no evaluation. Similarly, the statistical characterization of the investigated basin using this model are of little value.

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The language is often confusing; especially the notation “extreme high-temperature permafrost” is misleading.

The relevance of the presented research within the scope of HESS is not evident in the manuscript but it could be argued for.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 5243, 2009.