

## ***Interactive comment on “Simulating the role of gravel on the dynamics of permafrost on the Qinghai-Tibetan Plateau” by S. Yi et al.***

**S. Gruber (Editor)**

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This paper has received three constructive reviews, one of which has looked in more detail at the parameterizations used, their provenance, and the methodology employed to support the validity and significance of conclusions. All reviewers agree on the importance of the research topic addressed and find the paper to be of good presentation quality. One reviewer raises serious concerns on the validity of the conclusions presented.

For key issues, this editorial comment serves to clarify the degree of revision required to warrant publication in The Cryosphere.

Three issues in the reviews pertain to the basic validity of the work presented: (1)

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Referee 2 questions points to potential flaws in the parameterizations proposed. In their interactive comment, the authors argue that some of these have been derived from a “prestigious model” and are in “official use” there, but agree that robust schemes should be developed. (2) Referee 2 points out that the ALT do not agree well between model and measurement and that in one case permafrost has disappeared. In their interactive comment, the authors point to favourable performance with respect to the depth of the permafrost base. (3) Referee 2 indicates that a claim for lower thermal conductivity in frozen than in thawed state is made but not adequately underpinned with evidence. The authors acknowledge this and indicate that the argument was rather intended to provide comparison with a scheme that simulated a two-fold increase.

In a revised version, the authors need to demonstrate, what shortcomings in existing parameterization or what behaviour of gravel soils can be described reliably based on observations. As the available measurements that can be used for testing models are few, the authors need to: (a) Be rigorous in the derivation of new parameterizations in order to make sure that their structure reflects existing knowledge as good as possible. In this context, well-argued derivation or empirical testing of parameterizations (here or in their original publications) provide valid support, prestige or official status of a method, however, does not. (b) Provide a careful evaluation of results with the measurements available and discuss the limitations of the conclusions to be draw. If only selected variable(s) (depth to base of permafrost) are used and others (active layer thickness or existence of permafrost) neglected, a sound argument is required to motivate why some variables are deemed more informative than others. In the discussion of model behaviour based on sensitivity studies and comparison with field data, the authors should attempt to reason why the behaviour could be plausible.

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Interactive comment on The Cryosphere Discuss., 7, 4703, 2013.

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