

Interactive comment on “Semi-automated calibration method for modelling of mountain permafrost evolution in Switzerland” by A. Marmy et al.

Anonymous Referee #2

Received and published: 1 February 2016

The manuscript by Marmy et al. is concisely written and dealing with an important question in permafrost modeling, trying to bridge the gap between site specific calibration and its practical adaptation to spatially distributed modeling on larger scales. In my opinion it is a valuable contribution to permafrost research using a new and time saving approach to calibrate complex models at a set of sites in the Swiss Alps and is as such suited to be published in this journal after some minor revisions.

General comments

The English should be improved and the manuscript should be shortened. The site descriptions are quite extensive and could in part be moved to a table instead. Also

C2930

the abstract should be shortened.

The distinction between 1D, 2D and 3D models is not consistent, as the cited 2D models partly refer to empirical statistical models whereas the 1D and 3D approaches refer to process based numerical models.

It is stated that wind speed has virtually no influence on the ground thermal regime. I would doubt this, so either a reference should be given or this simplification has to be addressed in the discussion.

The improved calibration using soil moisture data (Figure 9) is very interesting – it would be of great interest for the reader to see how the future projections for this specific site would change by applying the new calibration.

Technical corrections

P4788

L1: Permafrost also exists in other regions than the European Alps. Be more precise.

L5: ..which allow for. . .

L15: Is the calibration method "automated" or "semi-automated"?

L21: . . .by the end of. . .

L26: climate input data

P4789

L1-2: Sentence is unclear and should be rewritten.

L12: . . .has had notable effects on permafrost that are apparent..

P4791

L15: .. multiple sites. . .

C2931

L20: .. interpolating in between by the help of. . .

P4792

L14: ..massif site ..

L16: The expression "non-vegetated lithology" sounds unfamiliar to me.

P4797

L23: ...complete on-site meteorological. . .

P4798

L7: ..resolution for the. . .

L9: ...that some. . .

P4800

L13-15: See "General comments"

L17: For calibration, we used. . .

L19: ..errors are possible due to. . .

P4803

L6: ..them based on/using. . .

L27: ..for the ground thermal. . . .

P4804

L4-6: Give references to why these parameters are important in reality. It would also be interesting to read what kind of preliminary analysis is mentioned.

L13: ..tested as well as their range. . .

P4805

C2932

L15: "As expected": Why was this expected? Give a reference or a reasonable for this expectation.

L24: ..thick snow cover. . . .

L24-27: Sentence is unclear.

P4807

L9: How broad is the range of thermal conductivities needed?

L24: ..should be.. Or should it read "has to be"?

L24-26: This is somehow contradictory to the findings that evaporation is not important for the ground thermal regime at most sites, as it seems to be a tuning parameter for one site. Can you explain why?

P4808

L6: boreholes

L17: ..which is because..

P4811

L3: ...slightly positive. . .

L11: ...set of..

P4812

L4: ...artifact is due to. . .

L5: ...propagated when run..

L6: ... by 2080..

P4813

C2933

L9-15: Does the model have structural errors (L14) or is it realistic (L10)? Be more consistent.

P4814

L8: What is meant by "semi-infinite"?

L14: parameters

P4815

L28-29: What is meant by "provide again the P3-link"?

L29: .. as a validation. . .

P4816

L9: Give a proper definition of the wilting point.

L13: ..further improved. . . See also "General comments"

P4819

L24: . . .analyze the. . .

L27: . . .can be drawn. . .

P4820

L4: ..precisely whereas. . .

L25-26: Is this sentence complete?

P4821

L1: . . .decrease from. . .

Interactive comment on The Cryosphere Discuss., 9, 4787, 2015.

C2934