

## ***Interactive comment on “Temperature variability and thermal offset in steep alpine rock and ice faces” by A. Hasler et al.***

**A. Hasler et al.**

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Answers to referee 2 (K. Isaksen)

(Comment of Referee signed with "")

General comment:

"However the paper can easily be made clearer in some places and parts of the text could be reduced. The “Discussion” is partly difficult to follow and last part of the “Introduction” is rather long (part of this could be moved to the “Discussion”). I will recommend that it should be published but with changes and suggestions as indicated above and below. In addition there are some comments that need further clarifications and considerations before the paper is acceptable for publication: "

We restructured the manuscript according to this general comment (see also Answers to referee 1, point 3 and 8)

Specific comments:

1) "P726, "Instrumentation": As it stands now the description of measurement setup needs some clarifications to allow their reproduction by fellow scientists. A few more lines from Beutel et al. (2009) and Hasler et al. (2008) would help."

The measurement infrastructure used for this study is the result of several years of development, testing and diverse enhancements within the project PermaSense. We think that the reproducibility of such a system may not be enhanced with a few additional lines. In the manuscript we avoided any details about this technology and referred to the published literature. We described the type of sensors and their positioning to allow an understanding of measurement setup. Hasler (2011) gives an overview for non-technicians (data users) of the system and the available data. Additionally technical information may be found on the website [www.permasense.ch](http://www.permasense.ch).

Ref: Hasler, A.: Thermal conditions and kinematics of steep bedrock permafrost. PhD Thesis. Zurich, Switzerland: University of Zurich. 2011. available at: [http://www.geo.uzh.ch/~ahasy/diss\\_hasler.pdf](http://www.geo.uzh.ch/~ahasy/diss_hasler.pdf)

2) "P723, L27: In a recent study in southern Norway (also performed on gentle mountain slopes), MGST varied by 1.5-3.0°C over distances of 30-100 meters (Isaksen et al. 2011). You may consider to also including this. Ref: Isaksen K, Ødegård RS, Etzelmüller B, Hilbich C, Hauck C, Farbrot H, Eiken T, Hygen HO, Hipp TF. 2011. Degrading mountain permafrost in southern Norway - spatial and temporal variability of mean ground temperatures 1999-2009. Accepted for publication in Permafrost Periglacial Processes."

Thanks for this brand-new reference. Included (in discussion like the respective paragraph).

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3) "P730, L19-27: This section needs some clarifications"

Rephrased.

4) "P731, L21: I can not see any data on MAAT in Figure 7!?"

Rephrased.

5) "P732, L7-8: The use of the abbreviations, MAT, MAGT etc is not totally clear. Please make this clearer and be consequent in the rest of the paper."

Implemented.

6) "P732, L14: Replace “warmer” with “higher” (e.g. temperatures are “higher/lower”, not “warmer/colder”)"

Changed.

7) "P732, L24: Replace “later one” with “latter” "

Changed.

8) "P732, L26: Replace “other publications” with e.g. “traditionally found in literature” "

Obsolete (paragraph moved and rephrased; see Answers to referee 1, point 7).

9) "P733, L3-8: Consider to include some of this in caption (Fig. 8)."

Implemented.

10) "P733, L12: Replace “warmest” with “highest” "

Changed.

11) "P733, L14: include “located” → “. . .positive TO are LOCATED relatively flat. . .” "

Changed.

12) "P734-737, Discussion: Consider splitting up the discussion with 2-3 subheadings

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to make it easier for the reader. As it stands now, parts of the text are a little hard to follow."

Implemented.

13) "P737, L24: Replace "colder" with "lower" "

Changed.

14) "P738, L6-25: Consider to move this text to "Discussion" "

Kept in place but rephrased (see Answers to referee 1, point 9).

15) "P743: Table 2 text: What is "563"? "

Corrected.

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Interactive comment on The Cryosphere Discuss., 5, 721, 2011.

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