

Interactive comment on “Permafrost distribution in steep slopes in Norway: measurements, statistical modelling and geomorphological implication” by Florence Magnin et al.

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Dear Editor and Associate Editor, Thank you very much for managing the reviewing of our paper. We choose to give one document as a reply for both reviewers. Before doing so, we want to provide some introductory remarks relevant for the review and our responses:

RC1 is very critical to the relevance of our study for a journal like ESURF. He/she states that certain geomorphological aspects neither are directly studied nor addressed in a satisfying way, especially in relation to explain the thermal relevance for slope instabilities. We understand this statement per se, however, we also state in our “Introduction”

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that the purpose of the manuscript is mainly to provide a base line for probable ground temperature in steep slopes on a national scale. We think, that such information is a key-step towards geomorphological analyses related to permafrost processes, rock wall stability in relation to thermal regime and other geomorphological relevant aspects. Hence, in our “Introduction” we state that “Knowing the current distribution of permafrost is a prerequisite to assess its past, present and future variability, as well as to provide key-knowledge and tools to land use-planners and geomorphologists”. We never claimed in our manuscript that our study will address explicitly the relationship of rock wall permafrost on rock wall stability, but we provide a possible distributional pattern of rock wall temperature across Norway, which might be relevant to address such questions. There are of course numerous examples in specialised journal like ESURF or The Cryosphere, providing such type of information (e.g. SfM modelling techniques to derive data relevant for geomorphological processes, etc.)

We are convinced that our study presents a new and unique data set collected over the entire land area of Norway, based on certainly exciting and challenging field work. The permafrost map produced from these data makes a base line for further studies and relevant geomorphological and geotechnical discussions. We think, the study and the data set is valuable for research perspectives within periglacial and paraglacial geomorphology, and ultimately landscape development. This was the basis of our decision, to choose a journal focussing on geomorphological processes as the first choice, as the possible “end-user” of such datasets would most likely be in the journals reader community. With this in mind, we simply could not address or follow some of reviewer 1 suggestions and comments, which is explained below

In order to address the general comments and clarify our paper’s objectives and content, we performed the following major changes:

- We revised the title trying to avoid confusion about the geomorphological content.
- We re-wrote the introduction to better elucidate why our study is relevant for geo-

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morphological applications and to better introduce rock slope permafrost modelling (following comments from RC2 and considering the possible confusions and lack of precision pointed out by RC1).

- We substantially re-wrote section 3.1, added a paragraph in section 3.2 and 3.5 and added more information in sections 3.3 and 3.4 to better explain our modelling approach and interpretation of the results.

- We also substantially re-wrote section 5.3 to make it more concise and to better explain the features we want to discuss.

- We deleted the paragraph on "Periglacial geomorphology" in section 4.

You will find in the supplement answers to general and detailed comments, as well as the revised manuscript with track changes. We address most of the detailed comments from RC1 in the pdf he/she provided that we attached in the supplements as well.

Please also note the supplement to this comment:

<https://www.earth-surf-dynam-discuss.net/esurf-2018-90/esurf-2018-90-AC2-supplement.zip>

Interactive comment on Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2018-90>, 2019.