

The Cryosphere Discuss., referee comment RC1
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Comment on tc-2022-207

Jacopo Boaga (Referee)

Referee comment on "Identifying mountain permafrost degradation by repeating historical electrical resistivity tomography (ERT) measurements" by Johannes Buckel et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2022-207-RC1>, 2022

The paper concerns the use of time-repeated ERT surveys to assess the evolution of permafrost degradation in several Alps sites (from Switzerland and Austria). The paper is well written, clear and represents a relevant case study for the long time monitoring of periglacial landforms as rock glaciers. The work deserves publication in TC, after the minor comments suggested here below.

Ln 55-60 This paragraph seems to introduce ERT use in permafrost studies, but most of the references here cited are not relative to ERT application case studies. It sounds strange.

Ln 66-70 I'm not sure statistical approach can solve the problems of contact resistance, maybe this sentence should be re-phrased.

Ln 85 Here or in line 440, for specific galvanic contact in debris problem consider also <https://doi.org/10.1002/nsg.12192>

Ln 179-186 No clear the relative standard deviation 0.3%. Is this the stack error? Which error was used during the inversion process? Authors for sure appreciated how pre-processing is essential in ERT inversion. The filtering of the dataset should be then better described, if it is done with some pre-processing code or in the RES2DINV suite. 'Visually identifiable' is a weak approach for repeatable measurements.

Ln 252-260 The very important point highlighted by Uhlemann and Kuras should be inserted here, since breaking the point assumption is the first doubt arising from this (very interesting) textile approach.

Ln 278 Input voltage ? Do you mean current injection ?

Ln 285-290 This is my main criticism to the work: authors do not present a quantitative comparison of the most relevant aspect of these new electrodes: contact resistance. I expect that, as first testing of these very interesting approach, authors measure and compare contact resistance in KOhm. Did you measure contact resistance before collecting measurements ? Which range was measured? Did you compare textile and electrode contact resistance during the hybrid line collected ? When different instruments were used, internal resistance problem should be addressed too in the comparison of the electrodes performance.

Ln 395 Here contact resistance is cited but without values, as in Ln 567.

Ln 558-560 This speculation about increasing in resistivity is very interesting and maybe need more space in the discussion, rather than in the conclusion. Here again injected current and contact resistance may play a relevant role and should be compared in the time-repeated ERT section.

In all all the ERT sections I suggest to increase fonts of axes, legend scale and labels.

I encourage the publication of this very interesting study for the cryosphere community.