Reviewer 2:

general comments

This manuscript presents the use of an A-ERT system at the alpine site AdM in France. Calibration in the laboratory, a petrophysical model and borehole data are supporting the interpretation of results.

Originality (novelty): 4
Despite the study presents an interesting application of A-ERT, this is not a novelty, since it has already been applied at other sites many years ago (e.g. Keusching et al, 2015). Due to the big measuring gaps and the authors' choice to show only a selection of results, the outcomes presented and the conclusions that are obtained here are not different from any other permafrost monitoring study.

Answer: Keushing et al., 2017 is 1 year of measurement, over a single profile and in a different lithology? Those are emerging methods, and we contribute to the exploration of its potential. The topography, lithology and climatic conditions are special at AdM, and the A-ERT still emerging methods where few sites are investigated using A-ERT. And we present the challenges and the advantages of using the A-ERT.

The concepts and methods used here are state-of-the-art methods in permafrost research (see Herring et al. 2023). There is no originality and novelty in the suggested data analysis and in the offered outcomes, especially due to an overall insufficient graphical presentation.

Answer: Not state of the art but emerging. We improved the graphical presentation of data and results.

Scientific quality (rigour): 4
The purposes of the work are clearly articulated. The methodology to achieve these purposes is insufficient. Example 1: The potential of A-ERT in high alpine environments is not properly evaluated with statistics in the results section. What you expect to be the core topic point of the paper (give the title) becomes just a secondary theme just mentioned in the methods.

Answer: Title is « « Rockwall permafrost dynamics » and this is what we explore by conducting analysis of ERT data over seasonal and interannual time periods. We have repeated and A-ERT data, we did not make statistical analysis of the times series, but we selected datasets that serve the objective of the study.

Example 2: The accuracy of temperature derived from resistivity is reported as a single number without graphical or numerical proof. Many theses are presented in the results and discussion section without being compellingly underpinned by the evidence. One important example is chapter 6.3 "Hydrogeological dynamics", which is only based on the interpretation of tomographies of the authors without any proof Let me know if there is anything else I can help you with. measure of water presence.

Answer: we added on the figure a red shadow zone of ±1°C, and we reduced the range of x-axis to help reviewer and reader to evaluate the accuracy of the temperature estimation. Measuring water presences requires invasive and expensive measurements. Her we test the potential of the A-ERT as a standalone, non-invasive and non-expensive approach that would

be promising in a hazard assessment approach. Some others studies have highlighted this potential and we want to validate it in another topographical and lithological settings. We found that the time series signal is not as clear as in other studies, which is important to consider regarding the site condition. But we know that water flow exists (reported by local staff who protect the galleries from these flows with metallic roof to redirect water in away from the touristic galleries.
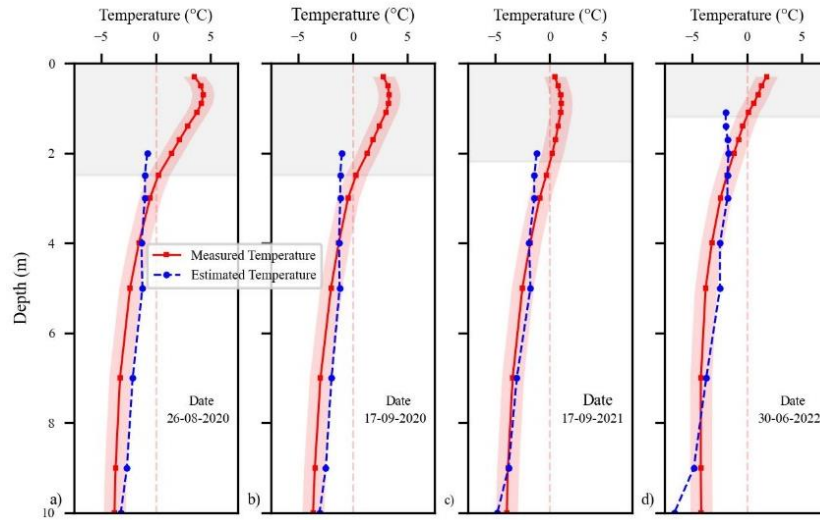
Figure 7: Comparison between measured temperatures in BH-NW and estimated temperatures derived from geophysical measurements (i.e., extracted resistivity values at different dates) using the petrophysical model in Equation 2. The gray-shaded area indicates the extent of the active layer at the time of measurement. The red-shaded zones show the ±1 °C range around the measured temperature.

As far as I can evaluate, measuring methods and techniques are valid and suitable. Information on the data processing and the inversion process is incomplete (e.g. what are the parameters used for measuring, filtering, and inverting the data?), therefore it is not possible to fully evaluate this aspect. Methods for analytical and graphical presentation of results are inadequate, from the choice of words, to layout of all the graphs, and do not reach scientific standards. One of the main suggested outcomes, the use of resistivities to obtain temperatures, is not working in winter.

Answer: in the new version of the manuscript, we added more information about the measuring, filtering and inversion parameters. For the processing see point 6 in response to reviewer 1. Concerning measuring in winter: measurements in winter is not working well in most studies. But these measurements could be of great interest because this is when the heat waves from the summer propagate at depth. Many important rock falls and avalanches happen during winter (Chiarle et al., 2023). However, we show that this remains a technical challenge.

Presentation of results is faulty: some analyses are incomplete since they only describe one part of the results, not the entire situation. Some methods are presented in the result part, half of the discussion is occupied by results that should be moved to the appropriate section. This shows

that the authors don't have a clear overview of the structure of their own article. Very few related works are mentioned to discuss the results.

Answer: we changed the results and discussion section and tried to better discuss our results in light of previous studies.

Significance (impact): 4
This manuscript is not contributing to changing our scientific understanding of a subject substantially and does not introduce new practical applications of broad relevance. This article definitely doesn't represent substantial progress beyond current scientific knowledge.

Answer: Our work does introduce new practical application: A-ERT over several years and not only several months, specific topographical settings with 3 long profiles (and not only one, usually short), specific lithologies. It also presents for the very first time an in-situ temperature-resistivity calibration, shows that the detection of water flows is not always as evident as presented in other papers, that the thawing of active layer is not detected in the same way on all faces.

Presentation quality: 4
Very low quality of results presentation. E.G. *"resistivity decreased over time… indicating degradation of the permafrost. However, this decrease in resistivity is minor because the observation period is short."* –> Two imprecise statements, of which the second actually contradicts the first. Impossible to read.

Answer: This sentence is clear and evokes previous temperature monitoring studies which both highlight permafrost degradation but also mention the lack of long term records (e.g. Noetzli et al., 2024).

The presentation of results requires a lot of improvement. Many sentences are not clear and concise, and the structure of the text needs profound improvements. The English language is just ok. The terminology is often very general and vague, presenting facts only on a qualitative level and missing quantifying differences and changes. The number of figures is acceptable, but the content and the layout of the figures are unsatisfactory.

Answer: We improved the content and the layout of the figures

Conclusion:
To be honest and straightforward, this text has the level of an average master's thesis - not even the best one. Given the list of experienced authors of this paper, it is actually a bit disrespectful to see work with this scarce quality that is proposed to this journal. An internal review process and much work could have made this draft acceptable, but in this condition, in my opinion, this work should be rejected. Profound improvements in all chapters are required; much more data and detailed analysis are expected to properly evidence rockwall permafrost dynamics by A-ERT. I am sure the ERTs collected at the AdM are incredibly precious and worth publishing. Therefore, I suggest that the authors strongly review the paper internally and resubmit the manuscript.

Answer: We improved the content and the layout of the figures

Note of the reviewer: The line number (L) refers to the sentence starting in that line, unless otherwise
specified.

ABSTRACT
Missing quantitative information on PF dynamics:
Answer: we added information in text.

L38: "slight decrease" … quantify:
Answer: we added information in text.

L39: Open system / closed system – clarify or remove:
Answer: removed.

L46: IP measurements are not at all part of this work. Why is it in the abstract? Remove.
Answer: We suggest the IP which could carried out with ERT and could provide valuable information about the surface.
Changes made to clarify the sentence (This research underscores the efficacy of ERT as a promising, non-invasive tool for monitoring permafrost dynamics in Alpine environments, and highlights the need for further methodological refinement to better resolve subsurface properties, potentially using 46 induced polarization data).

INTRODUCTION
Your introduction is missing a story and a flow. It sounds more like many pieces glued together. Some quotations are not precise. Please improve the general flow and be precise.
Answer: we improved the introduction.

L51: accelerates? This is not stated in the source you cite. This sentence supposes that without climate change PF degradation would be less….

L69-84: why are you citing all these methods?
Answer: a general review of the geophysical methods used in the permafrost context.

L85: "LAST FEW years"? last 2 decades!
Answer: changed to "in the last two decades".

L95: REFERENCE Please cite the first article using this methodology, not the last: someone did that more than a decade before. Substitute this reference with more appropriate works.
Answer: we agree with reviewer, we added older reference.

L107: "directly related" CITE SOURCE. There are many other possible interpretations of TL differences, in addition to thermal or hydrological changes… mention and cite.
Answer: we added references.

L110: What are the challenges? Are there other articles with these challenges or are you the first facing these problems?

Answer: in this study we have many challenges from the climatic conditions to the topography of the site and duration of the measurements, they are almost unique. It is not a simple ERT measurements of a short profile without topographical variation.

L111: "However, it could provide valuable information about the evolution of permafrost." Unnecessary sentence, remove. Even before reading your article, I can tell you will get valuable information.
Answer: No change was made.

L124: You use only one borehole in this article. That the others are there is only partially important. STUDY SITE This introduction to the study site is poor. You include secondary information but forget important points: what previous permafrost/cryo-research (only Magnin 2025 and 2015?). No other studies here? What about rock stability? Are there known/visible/investigated effects? Add some information on the region's climatology (precipitation amount and type, snow cover, etc..)

Answer: I used data from one of the boreholes and now we added in the appendix A information about the second borehole (BH-S), where we have enough ERT data to analyses. We have air temperature information but not precipitation, which is very important information to consider for the future studies.

L 127: remove "iconic":
Answer: Ok, it was removed.

L129-135: Rephrase, shorten, keep only the important information, and remove what is superficial (e.g. "Panoramic Mont-Blanc"):
Answer: we did the necessary changes.

Fig. 1– A: You use areal images with some MARST superimposed. These are impossible to read, both the aerial images and the temperatures. Please replace with proper maps at the right scale to see the right location. D: I think it would be better to have snow cover images from all sides to evaluate snow accumulation. Replace the image if possible.
Answer: we think the figure is clear, and the caption contains the reference to the origin, for more details. Actually. we don't have photo with the snow cover at the period of measurements.

FIG2 – Please plot a longer time series. Permafrost dynamics often present a delayed response to thermal signals (e.g., as shown in Hauck und Hilblich, 2024). 10 years minimum; the longer, the better. What is the difference between your temperature and the climatic average (30-year reference period)?
Answer: The idea here to get some information about the climate condition at the period of the ERT measurements. We put a reference to get more details about the temperature variation over the last 15 years (Magnin et al. 2024), we think this information is sufficient for the objective of this study.

L137: "tend to be steep" - Replace with some measures, like average steepness in degrees!
"in places" -> partially
Answer: we added the information about the average steepness.

L143 move reference to Fig 1 at the end of the sentence here.   **Done**

L144: "were" -> was.   **Done**

Fig4: y-Axis label is not English:
Answer: correction was done.

L150: ALT – remove the explanation after "i.e.", it is not necessary in this context.
Answer: we think that as there are non-specialists who will read the paper and may not be familiar with the permafrost expressions and abbreviations. No change was made,

L153: "all along the year" – remove. Otherwise, it would not be permafrost. "see details in" – remove. **Done**

L163-166: Avoid boring repetitions in text. Rephrase: **Done**

METHODS
Are some of these methods take form from other previous studies? If so, please cite them.
Answer: we added references.

L201: What is the size of the sample?
Answer: it is a cubic of 5*5*5 cm^3. We added this information in the text.

L211: Ok the frequency, what about the other setting used for measuring in the lab? Current injected? Electrode resistance? Stacks? Error limit? Reciprocal measurements? The same for field measurements. Please add all the ABEM setting used for measurements, I suggest in tabular form.
Answer: we added references for lab measurements. And we added information about field acquisition parameters.

L219: Move the measure of porosity at the beginning of the chapter, where you present the sample. **Done**

L236: "The installation of cable was gradual from June 2020 to March 2021."
Answer: the accumulation of snow at the east face was the raison for that.

L241: "specially designed jumper" - Designed for this study or before? It would be good to provide an image of the field set-up: electrodes, jumper, anchors.
Answer: we don't think that will add valuable information, see photo below.

Photo 1: specially designed stainless-steel jumper used to attach the cable takeout onto the climbing bolt, with maximum electrical contact (duplicated electrode).

L241: "The electrodes remained embedded in the rock wall for all subsequent resistivity measurements." That's pretty obvious if you use climbing bolts. Remove.
Answer: we agree with reviewer, information removed.

L250: "Configuration" -> array. Your explanation of the Wenner array is approximate and insufficient. I think there is no need to explain it in this context. Therefore, I suggest removing the content of the brackets.
Answer: information removed.

L261: What about the third profile? Add the information at least to supplementary material, even if incomplete. When exactly was it damaged by lightning? No useful data?
Answer: it was damaged by lightning, few days after installation, this is characterized by a steady value of the contact resistances (no variation over time).

Photo 2: Effect of lightning on the ERT cables

L268: One comma too much or the point. **Done**

L269: Either you list the several reasons or you rephrase the sentence. **Done**

L270: How many datasets?
Answer: We added and information about this point.

Figure 4: Please add more information on the reason for gaps: what happened in October 2021, summer 22, winter 2022-23, and spring 2023? Improve caption (are data missing ONLY due to cable defects?). I suggest adding a table/list of the issues that you experienced. This is a very interesting "learning lesson" for the bedrock permafrost community.
Answer: information added to text.

Please also comment in detail on software issues …you just mention it shortly. I would also suggest adding some statistics on the efficiency of the A-ERT in the results and talk about possible improvements in the discussion part. Please mention if you used reciprocal measurements and if not, why.

Answer: the issues are related to mesh generation when the site has a sharp topography like Res2Dinv. No reciprocal measurements were conducted, we made 3 stacks to evaluate the error at each measurement.

DATA PROCESSING
L284: "We tolerated…pseudo-section." – Repetitions, rephrase in a clearer way.
Done

L288: How did you detect the outliers? Please be precise.
Answer: We analyzed few data sets from different times (see point 6 in response to reviewer 1).

L289: The fact that most datasets have more than 80% of the data is because of your previous selection (up to 4 unconnected electrodes). Rephrase for clarity. Do you also happen to have 100% data? Interesting that this is never the case in the data you selected. Or you don't reach that because of the outliers? In that case, I'm very curious about the outlier selection.
Answer: yes, there are completed datasets (max 154 of 155 datum points), especially in august and September.

L291: Table 1 is a bit of a waste of space since it represents only a few measurements. I would move it to supporting material. The space could contain much more information… Use this space (almost a whole page) to present statistics about all the measurements you did. Your novelty is the A-ERT, here you have the chance to show numbers about all the data measured and you should use it. What is the overall reliability of this system? Is this changing from summer to winter? Further statistics should be addressed and presented with graphs or tables.
Answer: We added in the text information

L299: "The topography is characterized…" This sentence goes in the study site section, not here. The problem is not the steep topography since you measure perpendicular, but the changes of direction when you unite more transects! Actually, the software you use for the inversion can deal very well with steep topography.
Answer: we agree with reviewer about software and we moved the sentence into the study site section.

L303: package -> library
: Please also present the parameters of the inversion in a table.
Answer: we added information about inversion.

L306: A linear error model is always defined by two parameters. Do you neglect the absolute error? The relative error seems to be in a realistic range, but on which base did you choose it? References? Have you conducted a sensitivity analysis on the data to check the influence of the selected error model?
Answer: the absolute error has no or very small (no detectable) influence on the inverted result. We tested different relative error, higher value of relative error we get faster convergence and higher larger dispersion of data.

L310: You are interpreting the data. Therefore, I would rename the chapter "results and interpretation." **Done**

L 311 raw data – before filter?
Answer: yes, before filtering. And we built our filter after analyzing these data sets. Completed data sets and com from different dates.

L314: How did you compute the apparent resistivities? Please add at least one sentence on how this information is obtained.

Answer: we used pyGimli library to calculate the apparent resistivity using the measured resistance (after taking into account the real positions of electrodes). And it is known for PyGimli users the use of resistance instead of apparent resistivity as input for the inversion.

L315: (i.e. …) remove text in brackets, is a repetition. **Done**

Fig 5: I find it very hard to read this figure. I think the graph style (thin bars) and the overall layout do not clearly express your message. You should guide and facilitate your reader in the interpretation of the data in the figure. Consider reviewing the layout. I would use lines instead of bars and superimpose a grid on all graphs. Add labels for summer/ winter to facilitate understanding. Consider differentiating between years by using improved color schemes … there is a lot that can be done. I would also consider a logarithmic y-axis, which is typical in resistivity graphs.
Answer: We simplified it and removed part of data and we kept data that could support the objective of the figure.
Answer:
L320: the "*high values near the surface*" are only for 3 out of 5 datasets. Why? What is happening to "*the fractured area filled with air*" in 2020, August and September?
 Answer:
L324: What is your interpretation of the different values for the NW profile in May 2022? And for the S profile in April 2021?
Answer: why this comparison between data of different date, different profiles! simply, the snowmelt or ice melt in May 2022 could be the raison of decreases of apparent resistivities at NW side.

L327: "various" -> substitute with "selected". How did you select these quadrupoles out of the 155 of your profile? Why these quadrupoles and not others? Fig6: Add grid. Why are you plotting only a selection of your data? I don't see the reason in this Figure. I understand you cannot show a tomogram for each day of measurement, but this simple graph can host all measured values. I expect the authors to improve the Figure, adding all available measurements for the 8 selected quadrupoles. Otherwise, the advantages of the A-ERT are lost, and your study is comparable to that of permafrost campaigns with single repetitions. Consider also reporting the theoretical depth-of-investigation (DOI) for each quadrupole. This is more interesting than the electrode numbers.

Answer: Figure was removed. And replaced by a presentation of raw datasets with time series of few quadrupoles.

L331: *"Furthermore, the seasonal variation of apparent resistivity is more pronounced for shallow data."* True for the NW profile, but it seems that in the S profile, this is not the case. In fact, green line (DOI = 3) and the red line (DOI = 10) behave parallel – apart from April/Mai
Answer: there is less variation at the green line at S side, may be because of the topography effect, with the large distance between A and B.

2022. Fig7. Which additional knowledge is the insert adding to the whole picture? Actually, you are plotting twice the same information. I don't see the point in doing it and would remove it. Further on, why are P1 and P4 perpendicular to the surface while P2 and P3 are not? Did you filter this image for outliers? What is the low resistivity point in the middle of the S profile?
Answer: insert figure was removed. We explained our idea with the profiles from the time laps inversion (Fig 9 in new version).

L351-355: I can accept the names "warm-colored", "cold-colors", "moderate resistivity", etc… but the whole concept behind this sentence it too general and undefined. Please be precise by numerically defining (if needed, also with a range of errors) your resistivity limits for frozen and unfrozen part, as well as the active layer. This should be also clearly visible in the color bar of your images.
Answer: information was added in the text.

L356: do S and NW walls have the same aspect? What do you mean here by aspect? Please explain why the resistivity values are "expected" to be the same on two opposite faces of the mountain –this is new to me.
Answer: We mentioned in the text that the profile S starts at the south face and finish down in the north face (Line 235 version 1) and in figure 1.c we put both profiles. that is why we expect the same values of resistivities.

L369: *"This variation is attributed to heat transfer, particularly in areas close to the sun-exposed face."* please explain better this concept, why?
Answer: We explained in the text

Fig8: add antropogenic installation and electrode numbers.
Done

L382: How can you differentiate at this stage whether the high resistivities are due to dry layers or to permafrost?? Or maybe just to less fractured bedrock?
Answer: Our knowledge of the site

L 386 *"On the other hand…"* move this whole sentence to methods. Here it´s not the right place. Also the sentence at L394 "T*he last 10 electrodes…*" should be moved to methods.
Answer: we moved the sentences.

Fig 9: Hard to read the date. Improve. Why don't you show 25-09-2021?
Answer: Figure was changed.

Fig 10: sometimes 1 month in between, sometimes 7 months. You are comparing different entities in the same graph.
Answer: Figure was changed.

L404: Mot true, I see relevant differences also in the PF area. How did you quantify "the most significant variations "??
Answer: the relevant difference close to surface is higher than 10 or less than 0.1 of resistivity variation ratio. Other anomalies deeper could be related to the heat wave or cool wave.

L407: *"A more prominent cool-colored zone (more permafrost)."* This sentence and all the other similar ones in this text would have been acceptable 2 decades ago, at the beginning of ERT research. Nowadays, it is required to quantify changes and be more precise.
Answer: we added more information in the text.
L410: This is a thesis. demonstrate it. Limit yourself to your results, no citations in the result part.
Answer: we changed this part.

L424: This sentence is obvious. Remove. **Done**

Fig. 11: The plot order of tomograms is not helping the reader to understand PF dynamics.
Answer: The figure was simplified

L454: This sentence is not true.
Answer: Changed.

L465: when do you have snowmelt in this area? provide data or cite literature
Answer: we don't have the data about this, we could notice the air temperature.

L 458: All teories, but you need to prove it.
Answer: we tried to prove this information in the new text.

L469: Is water infiltration the only explanation you have for these processes?
Answer: yes the only for the moment

L509: ok, you are using inverted resistivities, but I find it very hazardous to analyze these values at this detail (0.5m resolution). These are interpolated values from an inversion model ... there are many uncertainties you are not considering. Your measuring resolution is much higher.
Answer: we agree with reviewer that close to surface is interpolated information and we mentioned that in text. We tried to avoid discussing the resistivities close to surface.

L540: Which are "the other parameters" you are mentioning? Which parameters are you using in the petrophysical model? Are they constant along the transect?
Answer: all used parameters were explained (section 3) and they are all constant over time.

L544: The only quantitative result of the whole paper cannot be validated because your graphs don't have the proper scale… improve!
Answer: the figure was improved.

L546: Calibration is not working for cold temperatures!
Answer: yes, we think it is related to the high CR.

L550: *"The estimated temperature presented in Figures 14 indicate that the proposed model (Equation 2) can accurately reproduce the temperature".* This is not the aim of the paper, since this model (equation 2) has been proven already in other articles. Remove. I also don't agree with the use of accurate, since you don't show any measure of this. The graphs have a range of +/- 10 °C and it is not possible to compare precisely the results.
Answer: the figure was improved.

L552: How would you adjust inversion parameters? According to measured temperatures? Random coment not Doing so, you would calibrate the resistivity values with the same temperatures you use to validate.
Answer: We did time lapse inversion. So, the RMS could be high for some results or times. Individual inversion could be better controlled to reduce RMS. In our response to reviewer 1 you can find more information about inversion and used parameters.

L556: "However…" Here again, you contradict your previous sentence. Is the model working here or not?

Answer: we intended to create a 2D tomogram of the temperature distribution as done in Duvillard et al., (2021), but the conductive zone at AdM made this approach unsuitable. Therefore, we limited our analysis to estimations and comparison in 1D.

L557: What does it mean that the infrastructure creates a "conductive zone"? For temperature or for resistivity? How did you evaluate this effect? Could you measure it and prove it? or is this just an assumption you are making?
Answer, we could notice it is effect on the tomograms and on the extracted resistivities of the P2.
Figure 14: Not possible to evaluate the error with this visualization. How do you explain the differences in Figure d) at 10 m depth?
Answer: as you know that in ERT, we lose of sensitivity and precision with depth. One point out of range.
Figure 15: Also here, again, you are poorly using the visualization possibilities of a figure. There is no effort in helping the reader to understand your messages. Grid, zoom, colors, and much more can be really improved.
Answer: the figure was improved.
L585: "smaller dispositive" – Wrong terminology: what do you mean?
Answer: changed to "shorter electrode spacing configuration".

L586: "Clarity" – Wrong terminology: choose a proper word. – Poor discussion style: Many hypotheses are without references and without a real explanation. – When are you varying pore size?
Answer: changed to "the observed discrepancy ".

L601: "we did observe several instances that could be classified as evidence of water flux" there is really no evidence for it. This is one possible explanation but you need to prove that. Because the other researchers are working on this topic, it doesn't mean that you can also just make out water in your ERTs without justifying it. For example, show us measurements of rain events or snow-melt rates in the periods of interest.
Answer: we don't have precipitation data of the site over the measurements period to make this analyze. Maybe in the future work we will take into account this important information.

L607: "Near-surface desaturation" – this could be measured in the field to prove your theory.
Answer: it is difficult to realize correctly in rock fractured zone, and the data was carried out few years ago without estimation of saturation.

L618: To be honest, you cannot say much about climatic variations with 3 years of data…
Answer: there is a clear decrease at both sides. Despite it is small, we mentioned that in the text. That does not mean we could not interpret dataset of three years, or that we should wait to get ten years dataset.

L620: "*That the temperature-dependency of resistivity in field conditions is less pronounced than in*
controlled laboratory settings."
I think this is a dangerous statement, which is not properly based on evidence from your study. The provided data are too little and the analysis conducted not sufficient. Probably you are just comparing two different things: one single sample in the lab and many different samples in the field, with conditions that change in space – heterogeneity, as you say. Of course, in the field you have more variables, but this doesn't mean that "the temperature-resistivity dependency is

less pronounced". With some effort you could probably reproduce all field conditions in the lab….

Answer: we changed the term. However, it was used to describe the observation from the field data and the context of site explained in the text (i.e., discontinuity at large scale fractures or faults that could be filled with ice, air or water), noticed this, however, we explained in the text the raison behind such results as the reviewer mentioned the heterogeneity.

The second point about reproduce the filed condition in lab: we disagree with this point, it is very difficult to get or to predict the discontinuity at large scale in lab.

L628: "*we were able to characterize the active layer and identify significant seasonal and multiannual changes in permafrost dynamics. Importantly, we observed that the ALT varied significantly from one face to another*" - What is your innovation? This knowledge is state-of-the-art since almost 20 years in permafrost research.

No comment

L631: "climate signal" - the choice of this word is unjustified and misleading in this short-term study. No data presented here has the appropriate scale for climate analysis.

Answer: we changed the term and added the period of the observation (2 years or 4 years).

L636: Your "*assessment of the hydrogeological system*" is absent and your hypothesis on these fluxes lacks complete proofs that demonstrate the presence of water.

Answer: there are some information that could not be confirmed with the data and dispositive used so, we propose to use shorter electrode spacing in the next study.