

Solid Earth Discuss., referee comment RC2
<https://doi.org/10.5194/se-2021-124-RC2>, 2021
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Comment on se-2021-124

Anonymous Referee #2

Referee comment on "Utilisation of probabilistic magnetotelluric modelling to constrain magnetic data inversion: proof-of-concept and field application" by Jérémie Giraud et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-124-RC2>, 2021

The manuscript showcases a workflow for inversion of magnetic data constrained by magnetotelluric (MT) inversion, expanding previous works of the same authors. Using data or results of other geophysical methods as constraints or other a priori information directly in the modelling process is a relevant and interesting topic. The authors demonstrate the performance of the new approach both with a synthetic and field data example. I particularly value the comprehensive discussion of limitations and advantages of the new method as well as suggestions for further development and application in the future. Overall, I consider the presented work sufficiently novel and topical for publication.

In general, the manuscript is well structured, the language is clear and precise and figures are usually illustrative. Yet, explanations of procedures and modelling/inversion setups are rather brief and it is very difficult if not impossible at some places to follow and understand what was done exactly. In particular, parameters for magnetic inversion are introduced mainly by equations in section 2, but their meaning and effects are hardly illustrated by any words. For the examples, choice of these parameters is not explained or even omitted. The (geologic) motivation, if any, for manual adaptations in modelling of the field data remains unclear.

Overall, I recommend publication of the manuscript after major revision. Detailed comments on issues which I consider important to be addressed prior to publication can be found in the attached pdf.

Kind regards
A reviewer

Please also note the supplement to this comment:
<https://se.copernicus.org/preprints/se-2021-124/se-2021-124-RC2-supplement.pdf>