Solid Earth Discussions

Solid Earth Discuss., author comment AC1
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Reply on RC1

Felix Hloušek et al.

Author comment on "Three-dimensional reflection seismic imaging of the iron oxide deposits in the Ludvika mining area, Sweden, using Fresnel volume migration" by Felix Hloušek et al., Solid Earth Discuss., https://doi.org/10.5194/se-2021-101-AC1, 2021

We are very thankful to Juan Alcalde for his constructive review. Please find below our replies to his comments:

- *There is too much detail on the methodology used and the results obtained in the introduction. IMHO the introduction should serve to introduce the reader the background, the problem(s), and how the authors are going to deal with them in the paper, but not to provide too many details on this last bit (because that's what the paper is about!). I strongly suggest to reduce the last paragraphs in the introduction by limiting the details on the methods and results obtained. Also, please use of more references in the first lines of the introduction when possible, when referring to general aspects of the mineral exploration history (e.g. need for RM, mine abandonment in the 60s and 80s…).*

We reduced the details about the methodology and results in the introduction and added more references.

- You should include more geological information in the manuscript. Critically, the paper lacks of (1) a lithological column, and (2) a geological interpretation of the results. Currently, the results are only described (reflector x appears at this depth with this dip), but there is no trace of a geological interpretation of these reflectors. I understand the value of a methodological paper like this one, especially given the excellent results that you obtain, but the readers will like to see what can you do with these results, even if the interpretation is subtle. There is only a hint of an interpretation in Figure 10, but the clarity of this image (particularly of fig. 10d) is very poor.

We tried to improve the chapter about the geological interpretation, in conjunction with more details about the lithology. We also improved the quality of the figures and tried to change the view angle such that the 3D orientation of the picked surfaces appears clearer.

- Given that you compare your results with the data in Malehmir et al, 2021, I wonder if it'd be possible to have a new image explicitly comparing one of yours and Malehmir's section, so that the readers don't have to go back and forth to the other paper. -Only if there are no copyright issues-

Such a direct comparison would increase the length of the manuscript considerably. We would also need to give several details about the different processing steps, stacking

velocities and imaging techniques. It is planned that there will be a summary and comparison paper including all results published about this 3D data set, so we do not include such a comparison here in our paper.

- Same for the velocity model. It seems to be a very important input to achieve your final image, would it be possible to show a section of this model crossing the mineralisation to perceive the level of detail and resolution?

It is important, but it is still very simple (1D gradient model), see figure included as supplement. Such an additional image would not show any important additional relevant information, so we decided not to include it.

- The axes values are not readable in most figures. I couldn't read the depths in any of the figures.

Thank you for this really important hint. We revised all figures to increase the readability of the axes.

We also took care of the specific comments in the commented manuscript.

On behalf of the co-authors
Felix Hlousek

Please also note the supplement to this comment:
https://se.copernicus.org/preprints/se-2021-101/se-2021-101-AC1-supplement.zip