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Solid Earth
Discussions

Interactive comment on "Sparse 3D reflection seismic survey for deep-targeting iron-oxide deposits and their host rocks, Ludvika Mines-Sweden" *by* Alireza Malehmir et al.

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Response to the referee#3 comments: We thank the positive and favourable review and comments of the reviewer and that the topic is considered "hot" these days. We agree with the reviewer and this is why we wanted to showcase how-to and example works in this current manuscript. We do not detail every detailed point rather the most important comments and how we will address them in the revised manuscript.

General comments:

1) shorten the abstract

We will shorten the abstract and omit a couple of sentences on the data acquisition works.

2) integrate the geology chapter adding at least a few of information and references (if available) about the known formations and geological (regional) evolution of the study area. More important, the structural information require integration on the light of the final interpretation proposed by authors. We can add additional references on the regional geology of Bergslagen. Published articles on the geology of the area are not so many.

Unfortunately, the same on the structural data. Structural data are not so much available on most geological maps produced in Sweden mainly due to the lack of outcrop observations. Only at places where mining is active and borehole data available these are better present. Structural data from our study area are mainly limited to topographic and magnetic lineaments.

Please add at least few sentences and references on the actual stress regime and therefore describe which type of regional (master faults) are mapped in the study area (the main lineaments can be added in Fig.1a as well). This info is important to aid readers not expert on the study region and guide them to the final interpretation.

We will show major structural lineaments from the study area. Stress is even more difficult to present and we think this will be mis-leading! None of the interpreted faults are likely related to the present stress, present stress is mainly dominated by the post-glacial rebound and far-stress from the Atlantic (the ridge). We have no measurement in this area about the state of the stress nor our intention is to say any of the faults interpreted from the seismics and topographic data are recent. They are likely all around 1.9-1.8 Ga.

3) the interpretation should be improved, particularly when introducing the figures 10 to 14 which should be mentioned sequentially in the text.

Figures 10-14 are sequentially mentioned in the text. Figure 10 is brought up in section 6.2 Unmigrated stacked section and Figures 11-13 in section 6.3 where 3D image of the mineralization and potential resources are covered. Figure 14 comes a bit later. We though this way of presenting would help the reader follow both the procedure and interpretation better and avoid going back and forth to these figures.

4) Figs. 12-13-14 can be reduced to three instead of four, and increased in size. Please consider using this scheme: a) only short labels (M1, F1 etc..) b) interpretation labels (such as “Mineralization” etc..) c) only the interpreted model without seismic data

We agree with this comments and revised figures of 3 sets will be presented following this scheme.

Figures and Tables:

We will follow most of the recommendations for reorganizing the figures and their representations such as avoiding white arrows etc. However as for Figures 10 and 11, this way of presenting is better because it honours true orientation of the cure and easier to follow features in their proper orientations. We prefer to keep them as they are. We unsure adding an amplitude bar would really help as the processing work did not honour true amplitude of the data.

Figures 12-14 will be reduced to 3 sets (see above).

We will also make sure parameters of the processing are consistent with those of the table and mentioned text.

F1 appears to have a totally normal movement but we are unsure at what stage this was normal. Most faults in Bergslagen are multiphase and have gone through several stages of compression and extension. Adding a normal fault is very appealing but may mislead. The Blötberget however is likely a “low land” due to this (lost likely) latest normal faulting! We can elaborate slightly on this in the revised table 3.

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