This paper presents a result of seismic studies of iron oxide-apatite mineralisation in Kiruna mine area of Northern Sweden. The paper is well structured and describes 2D and 3D surface seismic studies, downhole seismic data recorded with DAS and key rock physics properties defining the host and ore formations.

Limitations in seismic acquisition and poor seismic data quality, that is typical for crystalline environment, resulted in fragmented subsurface picture. Nevertheless, the integration and interpretation section of the studied geophysical data presents convincing analysis of iron mineralisation. Although, there is a great room for alternative interpretations.

Overall, I would recommend this paper for publication but would like to see more detailed comparison between the three types of seismic data at the pre-image level. One of the important decisions to make before any further seismic exploration here or in similar geological environments is the trade-off between the value and the cost of the presented seismic methods.

Assessment of the 2D, 3D and VSP gathers from close by locations, their respective frequency spectra and signal-to-noise ratio at raw and pre-processed stages will be helpful in evaluation of the significance of each dataset.

The reviewer wishes to see a comparison between the various survey types (2D, 3D, and VSP). But this is not the aim of the paper, and making the suggested changes would in my view require restructuring of the paper and significant changes or additions to the illustrations.

Some minor comments and suggestions:

Line 51: typo: accelerated wight-drop – should be - accelerated weight-drop Corrected.

Line 120: typo: source have been used - source has been used Corrected.

Line 141: However, as both holes were waterfilled the coupling should have been adequate.

DAS is sensitive to axial strain, so coupling via water is not adequate for shear contact of the cable with the media. The reviewer has a valid point, which I had not considered. The text has been changed.

Figure 4: add arrows pointing at the reflections discussed in the text Arrows have been added.

Also, this figure is a good place to add illustrations of the 2D, 3D and VSP gathers from close by locations, their respective frequency spectra and signal-to-noise ratio at raw and pre-processed stages. See reply above.

Line 181: more moderately dipping or sub-horizontal along Profiles 1 and 3 (Fig. 5) - there is no profile 3 in Fig 5 Have changed, hopefully it is clearer now.

Figure 5: it will be more convenient for readers to see West on the left and East on the right side for profile 2 - to be consistent with the map. Have changed profile direction.

Line 186: Note that the fold is varying much along Profile 2, which is clearly noticeable in the stacked time section (Fig. 5). - no CMP fold presented in the figure or elsewhere – need to add if refereeing to it in the text. I have made a comment that the fold causes the change in reflection character, hopefully this is sufficient.

Also, as Profie2 is bent, the image deficiency might be due to the geometry and, hence, it is good to see CDP location at the bending point or schematic plot of the profile XY geometry on top pf the section to have a reference. The CDP stacking profile is shown in Fig. 2.

198: The reflection at about distance 4 km along the profile, and at a depth 1.5 km,

coincides with the Per Geijer Deep mineralization – indicate by arrows in the figure. The reflection has been marked.

Line 217: All surface seismic data have been depth-converted using a constant velocity of 6000 m/s.

Why velocity used for surface seismic is 6000m/s here, but it was 5000m/s for the downhole processing (Line 243)?

Line 243: A velocity of 5000 m/s was chosen for the migration, and the inherent depth conversion.

The constant migration velocities have been chosen by trial and error, and one common velocity was not optimal for all surveys. The eastern part of the area (where the VSP survey is located) is dominated by quartzites, which appear to have a lower velocity than the volcanic units further west.

Figure 7: East-West indications are missing; similar to profile 2 in Fig 5, the section should be flipped to be consistent with the map orientation: West - left, East – right. The profile direction has been reversed.

Figure 8: West-East orientation is good here, should be the same in Fig 5 and Fig 7. OK.

It would be good to have an example of inline from migrated 3D depth volume coinciding (or located as close as possible) with profile 2 for one-to-one comparison of the 2D and 3D products. See my reply above.

Figure 13A: indicate reflection from the '2.40-1.96 Ga basalt-andesite units' The reflection has been marked.

Show amplitude spectra for all datasets 2D, 3D, VSP for raw and pre-processed, just before stack (or before migration) See my reply above.

Appendix:

Bandpass filter: 10-20-150-220 Hz

Bandpass filter: 6-12-130-200 Hz

Bandpass filter: 7-14-50-80 H - why frequency content is so different for 3D processing post-stack in comparison to the other two? The processing was aimed at imaging deeper reflections, for which the higher frequencies have been damped. Also, using a lower frequency content might make it less important to have accurate statics.