We would like to thank Reviewer 2 for his detailed review comments, which we addressed below in **bold**. All changes referred to in the manuscript are marked as tracked changes. We particularly focused on clarifications and changes requested to the figures.

Overall, the manuscript is well-written and clearly articulated. I do share some of the same concerns as reviewer #1, specifically that the manuscript could be refocused to tighten the discussions surrounding the relationship between the ultrasonic transmission (UT), AE locations and hydraulic stimulation.

We have not changed the structure to refocus the content but we have added more information to the supplementary material on the tangential parts of the manuscript (as Reviewer 1 suggested). Please see the first paragraph in the response to Reviewer 1 for more details.

Beyond this, I make some minor scientific and technical suggestions below, mostly surrounding clarifications to the figures:

Scientific revisions/clarifications:

1. Line 308-310: Is there a pre-amplification or band-pass stage to your AE data acquisition? **Yes, we added a few sentences about the amplification, filtering and dynamic ranges.**
2. Line 395-397: '…and more emergent, low-signal to noise ratio onsets,….' Does this refer to the s-waves here? Are the s-arrivals being weighted 50% less for relocations? Or do you mean there are two classes of p-waves, sharp and diffuse/emergent? **This refers to P-waves, only, which we now clarified in the text. We intended to downweight emergent picks but after double checking found out that these were given full weight, so revised this statement. Active source S-picks were not included in the velocity model determination or the error assessment as stated in Section 4.1**
3. Line 505-507: What do you mean by the 'best velocity model is tuned to the injection borehole'? This sounds like a sampling bias, because there are more samples here? If so, could you clarify this further? **Yes, there is a sampling bias, because the injection borehole and vertical validation borehole were sounded twice (before and after stimulation and with several orientations), whereas the other boreholes were sounded only once. Nevertheless, this is not unintentional because the velocity model needs to be most accurate at the injection and vertical validation borehole, because this is where most of the AE events occur. It effectively means we have a weight of 4 for data at the injection borehole (because of different orientations at each position), a weight of 2 for data from the vertical validation borehole and weight of 1 elsewhere. To show that the model is still accurate for all boreholes, we changed Figure 4b) to visualise this, see also comment 8.**
4. Lines 631-633: This statement confuses me a little, because in my experience, even aseismic slip has AEs associated with it during lab-scale AE monitoring, arising from grain-grain sliding/fracturing. This goes back to my comment 1 above whether the AEs you're monitoring are predominantly related to the co-seismic stage (likely no pre-amp, so requires more AE intensity and consequently picks fewer events).

   There is pre-amplification as addressed in 1. We cannot monitor deformation occurring on a smaller scale (e.g. grain scale) than observable by the AE recording system with a frequency band of 1 to 100 k Hz, corresponding to deformation on the cm to dm scale. We follow the definition of Dresen et al 2020, PAGEOPH that aseismic deformation is deformation occurring out of the seismic recording band. Please also note, that during the follow-up experiment STIMTEC-X we re-stimulated and hydraulically tested previously „aseismic" intervals with several AE hydrophones

placed in close vicinity to the intervals (3–7 m), but did not record any AE activity in the frequency band 1 to 40 kHz, either.

5. Line 718-719: It would be nice to see this correlation associated with pre-existing structures reflected in Figure 8 somehow, potentially by integrating the FMI scans into the figure? **We have marked the sections shown in Fig 2 in Fig 4b and Fig 8.**
6. Lines 720-722: Perhaps I missed this, but how do you estimate velocity and amplitude changes in the UT data? I assume it is some sort of cross-correlation technique, and if so, it would be useful to see the template, i.e., p, s-arrivals, and the amplitudes (peak-to-peak, rms, 0-to-peak or something else). What is the error in these measurements?

   To determine velocity change, we compared the measured values at 32 m and 33 m depth with the expected value of best fitting anisotropic model for the station at the depths surrounding the significant structure at 32.5 m depth in the injection borehole (see now with uncertainties in Fig 8a). We estimate changes in amplitude for these measurements by determining the difference between the measured value (median absolute amplitude for different window lengths between 0.150 and 0.5 ms) with the expected value for the data point from linear regression of three neighbouring measurements above and below the depth for nearby stations. We added a statement on the uncertainty in the velocity measurements to Section 4.2 and 5.3 as determined from repeated UT measurements from the same points in the borehole. The uncertainty estimates increase slightly for the measurements at 32 m or 33 m depth compared to neighbouring measurement points, but the drop is significant compared to the uncertainty estimates. Estimating the amplitude uncertainty is rather difficult because there are several factors (coupling of UT source and AE sensors, directional amplitude dependence of the UT source and AE sensors) that control repeatability of the measurements, with coupling at the source likely as the largest influencing factor.
7. All figures of the drftways (eg. 1, 3, 4a etc.) – Are these the same isometric projections? I see the cardinal directions annotated in a couple of them but not all, so it's not quite clear what the orientations of the various drftways, boreholes are. Also, the 5 m scale is not very clear.

   Yes, that is correct. We added the 3-D coordinate system to the figure and clarified the figure captions.
8. Figure 3 – I wonder if there's a better way to illustrate the ray-paths because it is not too useful for the lower (deeper?) boreholes since all you see is grey lines.

   We have added map- and side views for this figure to the Supplementary Material.
9. Figure 4b – The injection and validation borehole annotations, as well as the pre/post stimulation annotations are unclear relative to the figure and I'm not sure what they refer to.

   We have changed this figure now showing the location uncertainty estimates obtained for all boreholes (instead of pre- and post-stimulation measurements of the injection and the vertical validation borehole). We extended the caption.
10. Figure 5 could be more readable with a cross-sectional view in addition to the isometric view. Additionally, I also suggest exploring the possibility of scaling the AE dots by size and/or location uncertainty (depending on which one's more variable).

    We have added the cross-sectional view to the Supplementary Material figures. We do not have determined AE event size (magnitude), yet. Location uncertainty is largest in the vertical direction with a median value of 3.7 km. It is very similar for the events in the dense cluster and more variable for the more scattered events surrounding it. Displaying it visually only complicated the figure, but we will incorporate this in a future publication that discusses the AE events of individual stimulation intervals in detail.

Figure 7: I didn't catch the annotations in the figures until my final reading. I would suggest increasing the font size significantly and changing the star color on these.

We have adopted the proposed changes.

11. Figure 8: Similar to the vp drop, it seems like there's a recovery at ~45 m. Does this, then, correspond to a less heterogeneous, more competent formation?

Yes, that is correct, the abrupt velocity recovery at >47 m is seen outside the damage zone between 42 and 47 m. We have marked the acoustic log sections from Fig.2 to the figure (and added equivalent figures for other boreholes to the Electronic Supplement) to better illustrate the point that prominent structures influence the velocity.