

We would like to acknowledge the work of the topical editor Guilda Currenti and the anonymous reviewer for their comments and suggestions that helped to improve the paper. We include the original comments followed by our reply.

The references to pages and document lines are made using a "clean version" of the manuscript.

### **Editor's note**

Dear Author,

I am glad to announce that the manuscript could be accepted to final publication after minor revisions. Please, address the points raised by the second referee in his report and my suggestions reported below.

Best Regards

Gilda Currenti

### **Editor Comments**

1. **Figure 8 panel b: The inlines are reported as IN. Please, correct "IL 103995" in "IN 103995", if it is the inline shown in the inset. Otherwise explain what IL is.**

IL 103995 was corrected to IN 103995. (Page 14, Figure 8)

2. **Figure 9 panel b: As in Fig 8, please correct "IL 103975", if it is appropriate.**

IL 103995 was corrected to IN 103995. (Page 16, Figure 9)

3. **I suggest to update the reference list about the use of DAS in volcanology, adding the recent published papers:**

The list of publications for DAS applications in volcanology was updated according to the suggestions listed below. (page 2, line 27)

**Klaasen, S., Paitz, P., Lindner, N., Dettmer, J., & Fichtner, A. (2021). Distributed acoustic sensing in volcano-glacial environments—Mount Meager, British Columbia. *Journal of Geophysical Research: Solid Earth*, 126, e2021JB022358. <https://doi.org/10.1029/2021JB022358>**

**Jousset, P., Currenti, G., Schwarz, B. et al. Fibre optic distributed acoustic sensing of volcanic events. *Nat Commun* 13, 1753 (2022). <https://doi.org/10.1038/s41467-022-29184-w>**

**Currenti, G., Jousset, P., Napoli, R., Krawczyk, C., and Weber, M.: On the comparison of strain measurements from fibre optics with a dense seismometer array at Etna volcano (Italy), *Solid Earth*, 12, 993–1003, <https://doi.org/10.5194/se-12-993-2021>, 2021.**

### **Report #2 from Anonymous referee #3**

Dear Authors,

Thank you for submitting your interesting work to Solid Earth. Indeed, applying novel methods, such as DAS, to carbon-neutral energy projects, such as geothermal, are of great interest and importance.

The paper demonstrates the successful application of 3D DAS VSP imaging using wireline fibres. In addition, the authors did great work addressing the issues and challenges related to such dataset and showed the value of the received image for a decision on further wells placement for harvesting geothermal energy.

The paper is well written, the abstract is to the point, and the conclusion provides a complete summary of the presented work. Especially I want to praise the authors for their work on the quality of illustrations and detailed explanation of the processing steps in Table 1.

Below is the minor suggestions which may further improve this work:

1. **24-25: "measure particle displacement" -- despite the usage of the hDVS system, it is commonly assumed that DAS measures strain change or strain rate. Please clarify.**

"measure particle displacement" was changed to "measure strain". Page 2, line 24.

2. **47: it would be beneficial to mention reservoir temperature in the considered case to understand if high-temperature geophones could be used or not.**

"in the subsurface with elevated temperatures up to 175°C" was added to the text on page 2, line 43.

3. **111: it would be great if authors could bring their hypothesis on "unknown reasons"**

We added some explanation regarding what possibly caused amplitude heterogeneities in the data. These two sentences were added to the text: "This behaviour could be related to the local repositioning of the cable inside the borehole since similar reduced-amplitude patterns were observed in the recordings with extra slack provided to the cable (c.f., Henniges et al., 2021). Further research is required for a systematic understanding of the here qualitatively explained effects.." (Page 5, lines 110-113)

4. **Figure 2: it could be beneficial to highlight the changes in the seismograms, which the reader should pay attention to between processing steps.**

We added colour-coded arrows to point to intervals affected by the ringing noise, downgoing P-wave arrival and reflections (Page 7, Figure 2). In addition, corresponding references were added to the text, describing Figure 2: Page 5, lines 130 and 132, page 6, lines 135 and 145-146. Also, we better refined the already mentioned noisy intervals and added a few new ones: page 5, line 131 and page 6, line 135.

5. **157: were Thomsen's parameters chosen only based on DAS VSP data, or some logs were used to estimate them? Please elaborate.**

Thomsen's parameters were chosen only based on DAS VSP data. This reduced the standard deviation of drift for many of the longer offset VPs. It should be noted that this was not a comprehensive anisotropy study, and the parameters used are only a guide or fix to make better the data fit the layered model. (Page 8, lines 161-162)

6. **Figure 3, 4b, 5, 6: North arrow is confusing. Consider changing the north arrow on 3D plots or using northing and easting if x and y coordinates match these orientations. Also, some figures have "N" on top of the arrow; some do not.**

A more straightforward and more intuitively understandable North arrow sign was used for updated Figures 3 (Page 9), 4b (Page 10), 5 (Page 10) and 6 (Page 12).

7. **304: "constelation fibres" -> "engineered fibres", as constelation is a trademark**

Corrected. Page 18, line 307.

8. **325: "geothermal fiel, which are limitd to the depth up to 600 m." -> "geothermal field, which are limited to the depth of 600 m."**

Corrected. Page 18, line 329.

9. **399: 'borehole seismics" -> "borehole seismic"**

Seismic is an adjective. We believe that the noun "seismics" should be used in this sentence. Therefore, the sentence was not changed. Page 21, line 400.

**I recommend accepting the paper for publication after incorporating these minor suggestions.**

Thank you. We followed all suggestions for corrections as close as possible to clarify the residual issues with the manuscript.

Meanwhile, the paper on 3D surface seismic interpretation/ geological modelling was submitted and was published as a preprint in Geothermal Energy. Therefore, we change the reference B. Norden, personal communication, April 28, 2022, to Norden et al., in revision (Page 11 line 210, Page 13 line 238, page 14 line 252, page 15 line 266, page 17 line 288, page 20 line 376-377 and 386-387). The corresponding reference was added to the reference list:

Norden, B., Bauer, K., Krawczyk, C.M., 2022. From pilot site knowledge via integrated reservoir characterization to utilization perspectives of a deep geothermal reservoir: 3D geological model at the research platform Groß Schönebeck in the Northeast German Basin. Geothermal Energy, in revision, doi:10.21203/rs.3.rs-1660889/v1

In addition, we added two sentences to the acknowledgement section: "The publication of this work is supported within the funding programme "Open Access Publikationskosten" Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) - Project Number 491075472." and "Additionally, the authors thank the editor Dr Guilda Currenti and three anonymous reviewers for their comments and suggestions that helped to improve the paper."