

Interactive comment on “The seismo-hydro-mechanical behaviour during deep geothermal reservoir stimulations: open questions tackled in a decameter-scale in-situ stimulation experiment” by Florian Amann et al.

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The seismo-hydro-mechanical behaviour during deep geothermal reservoir stimulations: open questions tackled in a decameter-scale in-situ stimulation experiment

Dear Editor, dear reviewers,

Thank you very much for the fast review process and the constructive and valuable comments on our manuscript. We are pleased to provide answers to the reviewer's comments and a substantially revised version of the above manuscript. The major

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points of both reviewers were 1) the combination of a review and an original experiment part in one manuscript and 2) the timing of writing the second part of the paper versus the timing of the test. Both reviewers provided suggestions how to proceed with these two issues. Reviewer 1 suggests splitting the paper in a review paper and an experimental paper with much more details on the experimental design. Reviewer 2 suggests to substantially shortening the second part by providing much less details and higher-level information. The timing was straightforward to address, since meanwhile the experiment has been completed. The more severe issue during the revision process was associated with the question to split the paper into two separated papers. We decided not to split the paper in two parts, since a description of the experiment is important to discuss how we address the identified research questions. At the same time, the sensor and installation details will be published in subsequent papers. Thus, we decided to follow the advice of reviewer 2 and substantially shortened part two and report only about higher-level information of the experiment. We hope you find the revised manuscript suitable for publication in “Solid Earth”.

Florian Amann

Reviewer 1:

This is a review paper. It provides information on two aspects of hydraulic stimulation used for creating engineered geothermal systems (EGS):

I. extensive literature reviews on (i) the nature of the stimulation process and dedicated experiments on reservoir, intermediate and laboratory scale performed for enhancing low permeability of reservoir rocks; (ii) hydro-fracking experiments on reservoir, intermediate and laboratory scale performed for creating extensive fractures enabling flowrates sufficient for extraction of relevant amounts of heat, and the associated rock mass deformation, seismic and aseismic slip, and induced seismicity.

II. A description of the scientific and experimental infrastructure in the Grimsel test site in the Swiss Alps implemented for the experiments to be performed in the In-situ

C2

Stimulation and Circulation Experiment Part I is of great value for all present and future researchers in this field as it covers most if not all relevant work. Part II is probably intended to describe the infrastructure in a separate paper to be referenced by future papers describing and discussing the experiments currently under way and planned in the future. The value of combining these two aspects in one paper is not obvious. These are separate topics and would merit separate papers. Also, this would allow to go into more technical detail the second part. Here, it should be made more clear, which experiments are intended and which ones have been performed already. At first reading, it was a bit confusing discriminating between completed and planned experiments.

The m/s should be divided into two ones: I. the literature review. This part may stay more or less as it is; II: the description of the test site infrastructure: This would need to be revised a probably expanded for more technical detail.

Answer: We agree with the reviewer that the second part of our paper did not consort very well with the review part. We also agree that the timing of writing was confusing. We thus shortened the second part substantially and made clear that all parts of the experiments are completed. We prefer not to split the paper into two separate papers, with more details on the experimental infrastructure. This is because the results of the experiments will be published with detailed descriptions of the various infrastructure components.

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