Solid Earth Discuss.,
https://doi.org/10.5194/se-2017-47-RC3, 2017

Solid Earth
Discussions

Interactive comment on "Methods and uncertainty-estimations of 3D structural modelling in crystalline rocks: A case study" *by* Raphael Schneeberger et al.

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Received and published: 13 July 2017

1 General comments

This paper presents a good application of stochastic modelling of faults to a dataset combining data from surface and subsurface field work. The paper is overall well written and presents an interesting approach to fault modelling. One of the principal assets of this paper is that it combines field work, automated lineament extraction, modelling and a probabilistc study, which has to be acknowledge. The results and conclusion are of interest for the scientific community and mostly well supported by the study. There

is only the conclusion about the misfit being below 6

I am convince that the paper will be of sufficient quality for publication in SE after the comments and corrections have been addressed.

2 Specific comments

- Try to go to the point in your introduction. Being too general is always risky as it diverts the read from your main point and takes you into topics that are not directly relevant to your point. Namely here, avoid getting into the explicit/implicit modelling swamp land. I don't agree with the way you explain it and I think one should be very meticulous when tackling this topic becaus eit is quite intricate, and at the same time it is not really the topic of your paper. So I would simply skip it.
- You should reference Cherpeau and Caumon 2015 (10.1144/petgeo2013-030) for the topic of stochastic fault network modelling. It is very similar topic even though the approach is different.
- The quality of pictures is not very good. Try to upload pictures with a higher resolution. Most of them are very difficult to read. It might be due to the sytem and the uploading process. If not, please be careful with te quality of the illustrations.
- page 5, line 15: I disagree with your statement "This study aims at reconstructing the present day 3D geometry and the kinematic evolution is thus of secondary interest." Fault network geometry, topology and kinematics are inter-related and you cannot forget kinematics without willingly missing important information. I understand the kinematics might be quite complex and unresolved in this area, so you might want to consider only current geometry, but you can't suggest that this is just simplifying some details. When you will make decisions about the way

faults connect, you will either incorporate kinematics in you reasoning or face the risk to produce models that are kinematically inconsistent.

- fig8: to continue on the remark about kinematics, here you shown different groups of faults, among which B and C, that are presenting horizontal stretching lineations, but there is no trace of any displacement. Do you have an explanation or is it a simplification as well?
- It seems to me that you haven't consider the probability that a fault stops before reaching the GTS or that it is branching on another one. In a sense, you are forcing the between the surface and depth observation and might end up with an overestimation of connectivity. Unless I missed something?
- page 7 line 37: I am not convinced by the distance misfit.this is not well defined... unless your plans are parallels. Are using the center of the segments? But then, is it relevant, because the location of the center would depend primarily on where the tunnels are located?
- Your approach is interesting in the framework of your study, because you have the chance of having both surface and subsurface observations, but your dataset is unique in the sense that we generally don't have such high quality data at depth. Data is generally sparser and less certain. How would your approach be applicable in a more general context? I would suggested to add this discussion to your conclusion.
- Similarly, you have the chance that the faults you are considering seem relatively straight at the scale of your study. How could your approach be applied to more general fault networks?

3 Technical Corrections

Further technical corrections are detailed in the attached annotated pdf. Please review them carefully.

Please also note the supplement to this comment:
https://www.solid-earth-discuss.net/se-2017-47/se-2017-47-RC3-supplement.pdf

Interactive comment on Solid Earth Discuss., https://doi.org/10.5194/se-2017-47, 2017.