

Solid Earth Discuss., referee comment RC1
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Comment on se-2021-75

Anonymous Referee #1

Referee comment on "Ground-penetrating radar signature of Quaternary faulting: a study from the Mt. Pollino region, southern Apennines, Italy" by Maurizio Ercoli et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-75-RC1>, 2021

General comments:

This is a relevant paper with substantial contribution to the understanding of Italian tectonics and seismicity. A bonus to this paper is the 3D tectonic analysis, it is always good if authors attempt a 3D model as it inspires readers to think of new conceptual tectonic and geomechanical models. The study rationale is good, background history is comprehensive and informative. The discussion and conclusions could have been sharper, attempting to do less conjecture and put more numbers on age, displacement, slip rates and earthquake recurrence etc.

Specific comments:

- How recent is the faulting? Is there any age control? How many meters displacement were observed and what slip rates could eventually be derived? What is the estimated seismic recurrence and risk? I see much conjecture, but little numbers. Are such numbers available or obtainable?
- Why was 3D GPR not attempted, it could have answered many of the questions above?
- About the strong continuous wavy and undulating reflections with much attenuation as mentioned on page 10 and in Figure 5 and 7; could these also be the base of soil slips or landslides deposits coming from the surrounding foothills? It is not seldom that such landslides occur under heavy precipitation and glide over conductive clay or muscovite layers.
- On page 12, en-echelon faulting is suggested as a mechanism in the 3D fault model. However, I believe that en-echelon faulting occurs only in strike-slip or oblique-slip systems. Where is the strike-component in the VCT fault system? I thought it was only extensional/normal faulting?

Technical corrections:

- Make the GPR sections larger with more zoom. I believe the data is high quality but it is not well visible in some Figures.
- Figure 5: so the final migrations were 2D time migrations with variable 2D velocity models?
- Annotate Figure 7 outcrops photos with interfaces and structures
- Figure 9c: what are blue and red faults again?