

Solid Earth Discuss., author comment AC1
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Reply on CC1

David Healy and Stephen Paul Hicks

Author comment on "De-risking the energy transition by quantifying the uncertainties in fault stability" by David Healy and Stephen Paul Hicks, Solid Earth Discuss.,
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Thanks for the comment. In general I agree, a fair point.

However, in terms of the overall model for fracture susceptibility, I think it is useful to include cohesion as a variable. We can run models for cohesion set to 0 to address your point.

In terms of the fault zone itself, I haven't seen cuttings or core from the boreholes, nor outcrops of the PFZ. So I don't know if this fault zone is best characterised in terms of fault core + fault damage, with gouge and cataclasite in the core; or, if it is better considered as a fracture corridor of pre-existing joints and veins. In the latter case, we might expect some, albeit small, cohesive strength (perhaps a few kPa). In the former case, "strength" would be better captured as frictional strength. But there would then be a dynamic aspect to that, beyond the simple Mohr-Coulomb analysis we have used (e.g., experimental evidence for frictional strength increasing with longer hold times between slip events).

In the case of zero cohesion, the comments we make still stand: that our knowledge of friction coefficients, and especially their statistical distribution - skewed high or low - could be better.