

Interactive comment on “Controls on fault zone structure and brittle fracturing in the foliated hanging-wall of the Alpine Fault” by Jack N. Williams et al.

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This short and concise manuscript describes fractures in the hangingwall of the Alpine fault. It is very well written and illustrated (assuming that the quality of the real images is much better than the ones in the pdf), and contains some useful data. One of the conclusions about the width of the damage zone and how it is defined is well supported by the data.

One question concerns the attribution of the open fractures to low confining pressures. It is argued that the type of fracture varies independently of rock type and therefore that confining pressure must be an additional variable. However, there are other factors that

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can affect fracture styles, most notably pore fluid pressure. The presence of an open fracture alone does not mean that it formed under low confining pressures (though it is quite possible).

This discussion highlights a related issue: what are the kinematics of the fractures? This is one area of weakness in the descriptions. Presumably the gouge filled fractures have a shear displacement, but how much and in what directions? What about the open fractures? Do they have any fractographic features giving information on the fracture type? What do the variety of orientations of the gouge filled fractures mean for paleostress? What is their relation to seismicity? Could the differences between the fractures be simply that the open fractures are mode I and the gouge-filled, other modes? Would this necessarily imply lower pressures?

No doubt some of these questions are answered elsewhere or in the process of being answered, but they are relevant to this manuscript. In general it would, however, be good to have a more description of the fractures.

The scan line methodology needs some further justification in the light of recent literature about the circular scan line technique.

Please see other comments on the uploaded pdf.

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2017-112/se-2017-112-RC2-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2017-112>, 2017.

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