Dear Editor Niemeijer and Dr. Aben,

We have provided additional explanation in the text to clarify how larger apertures could provide greater access to preexisting fractures (lines 305-7). In particular, we reason that larger apertures could lead to larger fracture surface area, and thus larger available area to which other fractures can link. We agree with the point that when the load is removed, the aperture of tensile fractures could decrease as fractures close. However, as we only examine fractures under load, this point is not germane to this study. We have now worked to correct this confusion following the suggestion of the reviewer to state more clearly that we are considering the aperture, and corresponding surface area, to make this inference.

Thanks,
Jess McBeck

Comments from Reviewer #1:

The new version of the manuscript has a greatly improved and streamlined discussion section.
There is one argument in the discussion section that I still do not fully understand, and the authors may wish to clarify this (detailed below).

Line 303: I still do not fully understand the argument made here (initial comment and reply below), which the authors may wish to clarify. Tensile fractures indeed have a larger aperture at lower confining pressure and a larger aperture compared to shear or mixed mode fractures of the same size. But how does this provide greater access to preexisting fractures? On both sides of the tensile fracture, the solid material (including the preexisting fractures) is displaced sideways (with an axial load), and material on the top and bottom are displaced vertically (the fracture 'bulges' open), but the solid mass is not removed. When the load on the tensile fracture is removed, the aperture is reduced again and the fracture walls align (in a perfect elastic situation) – this would be akin to the geometry of a shear fracture with the same amount of fracture surface area as the tensile fracture, crosscutting the same amount of preexisting fractures. I believe some of the confusion arises from how shear and tensile fracture are compared here: Is it length (either in relaxed or in stressed conditions), fracture surface area, or aperture (in loaded conditions)?
previous comment #3: Line 320: Why does a tensile fracture enable greater access to preexisting fractures than a shear fracture? Line 322: Why do mixed-mode fractures have a larger surface area than shear fractures? Is their roughness larger? How does that relate to the aperture?
previous reply: We hypothesize that a tensile fracture may provide greater access to preexisting fractures because opening likely (necessarily?) increases the fracture aperture, as hinted by the reviewer. We have modified this paragraph accordingly to specify the link more clearly.

Kind regards,
Frans Aben