

## ***Interactive comment on “A temperature- and stress-controlled failure criterion for ice-filled permafrost rock joints” by Philipp Mamot et al.***

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First I'd like to apologize for the delay in providing feedback for your manuscript. Unexpected project work and travel did not allow me to have your manuscript reviewed earlier, unfortunately.

I really enjoyed reading your paper and like to congratulate you on your research work, in particular the lab work is very impressive. I have attached an annotated version of your manuscript in which you will find editorial comments as well as technical questions. I think you do miss a couple of key publications to which you can compare your results. I have listed those in the comments. I also would like to see a better discussion on the differences between your findings and those presented by Davies and his

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co-workers. One of the key findings by Davies et al. was that the factor of safety is the lowest at temperatures just below and not at zero degrees, which was attributed to the presence of unfrozen water. Your results do not show such a behaviour, but your strength parameters decrease linearly as the temperatures increase.

I would also reconsider your linear fits. Based on your data extrapolation you are implying that the cohesion of the unfrozen joint is  $>0$  kPa. Do you have physical evidence or a mechanical explanation for this value? If not, it is strongly suggested that you are using 0 kPa cohesion in unfrozen conditions as a data point your interpolation must include.

I look forward reading your revised version of the paper. Kind Regards, Lukas Arenson

Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2018-57/tc-2018-57-RC1-supplement.pdf>

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-57>, 2018.

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