

Interactive comment on “Deformation mechanisms and evolution of the microstructure of gouge in the Main Fault in Opalinus Clay in the Mont Terri rock laboratory (CH)” by Ben Laurich et al.

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The paper is a very good work concerning structural and microstructural evolution of foliated clay-bearing gouge along a thrust fault. In particular, the paper investigate in depth the deformation mechanisms acting both at microscale and at nanoscale.

Watching the Fig. 9, could be possible that the intruding black structures with irregular and convolute margins are fluid-like structures? they look very similar to those observed by Brodsky et al., (2009), Demurtas et al., (2016) and interpreted as generated

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by high-fluid pressure (Fondriest et al., 2012). Maybe such structures could be the result of fluid overpressure within such low-porosity gouge. The occurrence of overpressured fluids was also suggested by the author at pag. 11 (line 24) and at page 13 (line 22).

Moreover, the nano-size clay spherules observed along sharp slip surface (Fig. 5) could also contribute to make the gouge far weaker than the host rock, as recently suggested by Chen et al., (2017, and reference therein, in *Fault Zone Dynamic Processes: Evolution of Fault Properties During Seismic Rupture*, Geophysical Monograph 227) for nano-particles occurrence within gouges. Maybe this point could be strengthened reinforcing the point stated by the author of a very weak gouge.

Thank for this excellent contribution.

Best regards, Luca Smeraglia

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