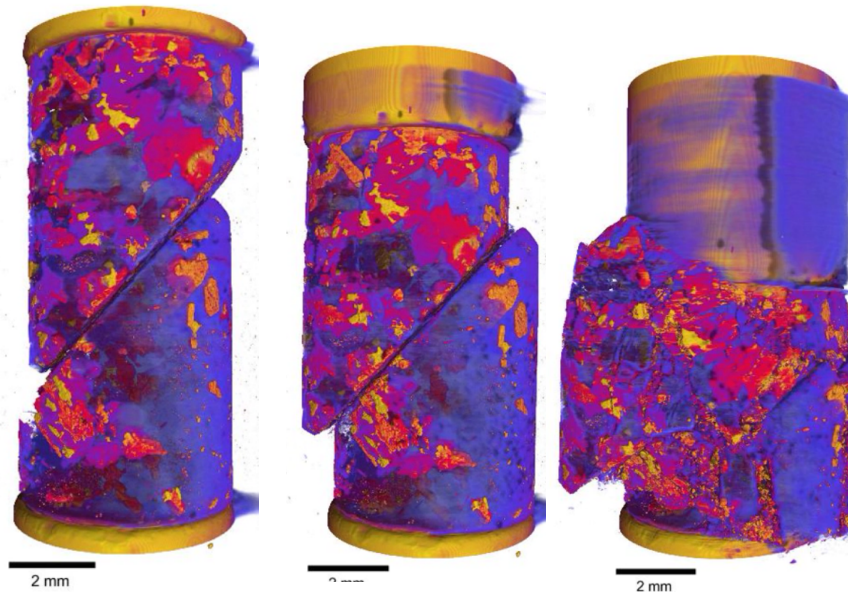


Decrypting healed fault zones: How gouge production reduces the influence of fault roughness

How does healing influence the dynamics, stability, and strength of fault zones?
What is the influence of roughness on fault strength ***following healing***? (under review at GJI)

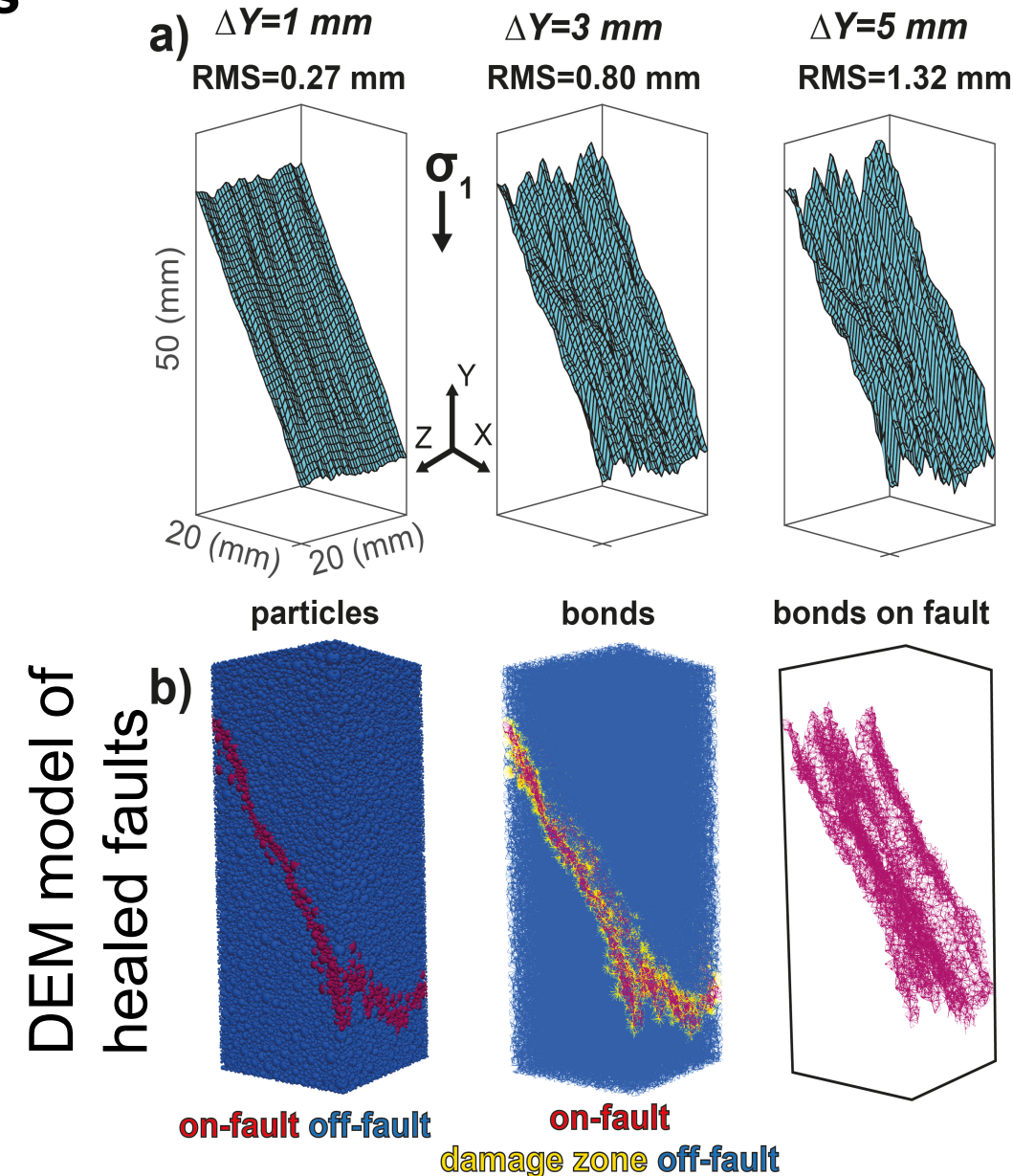
X-ray synchrotron experiments with pre-cut faults demonstrate the influence of roughness on fault stability for non-cohesive faults.



Jessica McBeck, Karen Mair, François Renard

1 The Njord Centre, Department of Geosciences, Uni. of Oslo

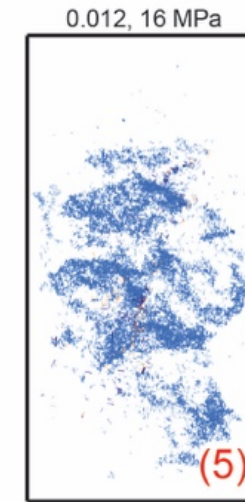
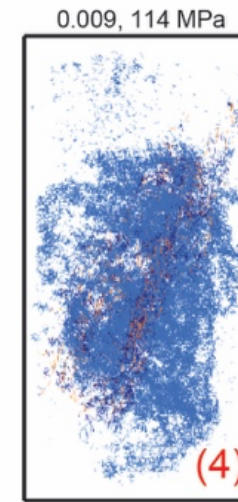
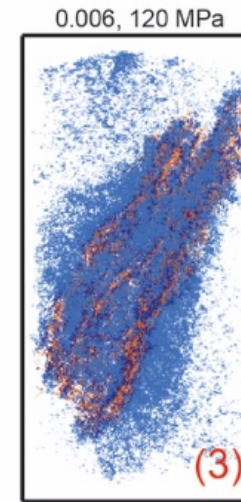
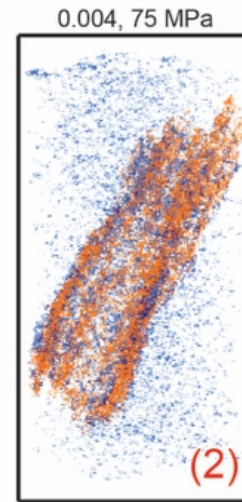
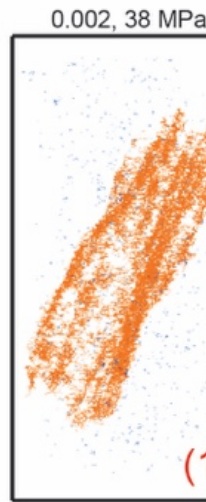
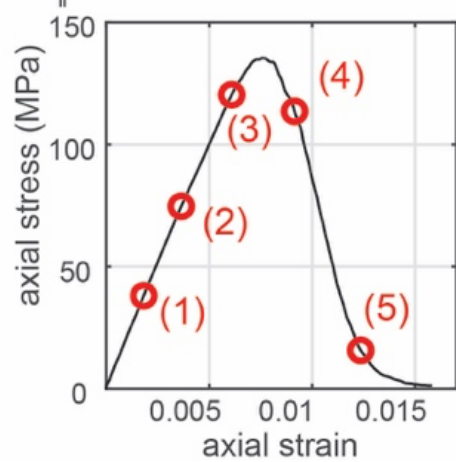
2 University Grenoble Alpes, University Savoie Mont Blanc,
CNRS, IRD, IFSTTAR, ISTerre, Grenoble



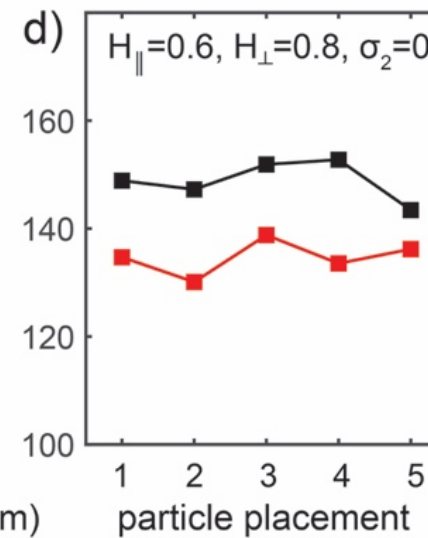
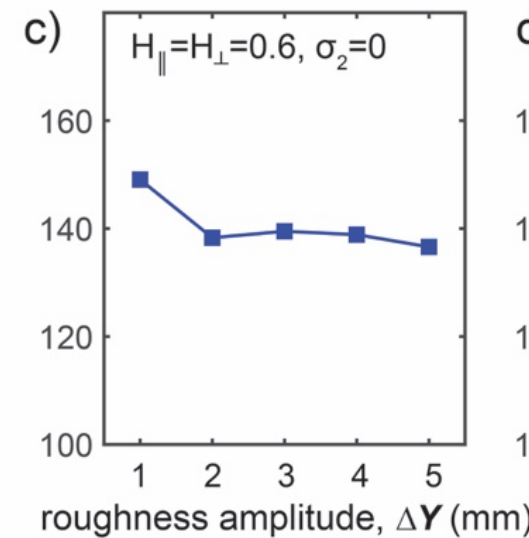
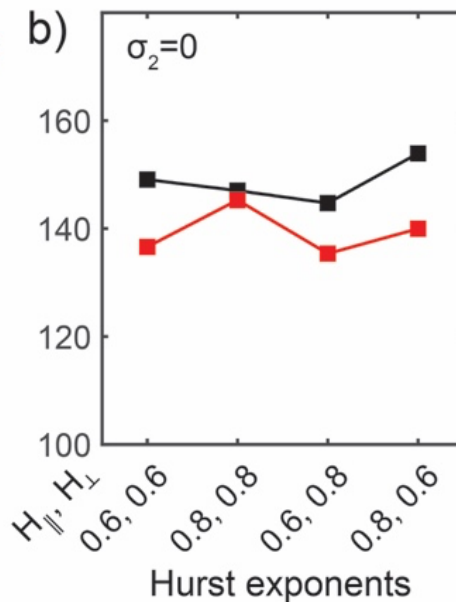
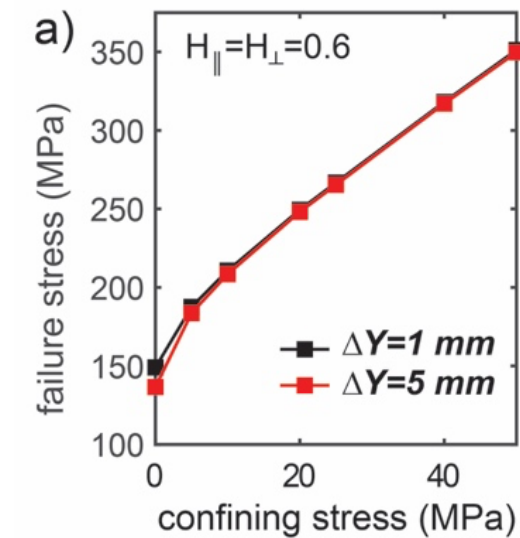
Characteristic fracture development

Orange: on-fault fractures
Blue: off-fault fractures

b) $H_{\parallel}=0.6, H_{\perp}=0.8, \Delta Y=5 \text{ mm}$



Below: Surprisingly, the tested combinations of Hurst exponents (b) and roughness amplitudes (c) **do not produce changes** in the macroscopic strength that are larger than those produced by random variations in particle packing (d).



We attribute this result to the greater gouge production along the rougher fault.

Schematic Summary: Influence of smooth and rough fault surfaces on a) fracture network partitioning, b) gouge production, c) fault slip, d) asperity interaction

