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Scaling properties of fault rocks

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Damage structures in fault zones are well known to exhibit various scaling properties. Typically, previous studies have separated different structural descriptions of localised shear zones in order to extract their scaling properties. In this study, however, we examine simultaneously scaling properties of particles found in shear zones, described here by the particle size distribution power law exponent D, and scaling properties of fracture surface roughness in these same zones, described here by the Hurst exponent, H. We study thin sections of samples of Sidobre granite sheared in the laboratory but left unopened, thereby maintaining the original spatial context of the structures examined. Through spatial analysis we track increase of the particle power law exponent D with increasing local strain state, and slight decrease of the surface roughness Hurst exponent H with increased slip component on fracture surfaces. The progression of these two parameters occurrs in parallel with increasing proximity to the centre of shear zones. This preliminary article leads to further work on direct spatial overlap of the two parameters.