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# Scales of deformation caused by fault zone complexity within a compressional flower structure

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We analysed a 120 m long and 20 m high fault zone within Triassic limestones. It form part of a transpressive positive flower structure that outcrops in central Germany. The fault surface topography was determined with a LIDAR device with a spatial resolution of 4 cm. We ascertained 5 fabrics on the fault surface: they are, in order of decreasing size;

1. 20 m long and 5 m short segments, which are Riedel shear surfaces,
2. each long segments is helicoidal,
3. a strong relationship between fault angle and bedding stiffness,
4. ca. 4 m wide zones of positive and negative Gaussian curvature, and
5. a dip-direction parallel fabric with amplitudes of ca. 5 cm.

Our analysis shows this was a sinistral strike-slip fault that was later reactivated as a dip-slip thrust.
Using the fault geometry reduced to the different scales of the fabrics, we show the resulting strain around the fault when the fault blocks are kinematically displaced. The strain distribution is determined by the kinematics and fault geometry, the strain quantities increases with the resolution of the model. We show how simplification of the fault geometry can lead to gross underestimation of the related strain in the fault near-field.