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Large scale Fault Drag along a planar brittle Fault Zone

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Deflection of planar markers along fault planes have been abundantly observed on cm to dm scales and are generally described as *fault drag*. For viscous host rock rheologies and on scales independent of body forces, mechanics and progressive evolution of fault drag has been extensively investigated in numerical (Wiesmayr & Grasemann 2005; Kocher & Mancktelow 2005) and analogue (Exner et al. 2004) models. The observed deflection of markers is induced by the *perturbation strain*, a compensation of the variable displacement along the fault plane. Even though the geometric response to perturbation strain is scale independent, the applicability to large-scale analogues may be questionable, especially if additional or competing processes (e.g. gravity) prevail. However, drag of strata along fault surfaces is frequently observed in seismic sections, where hanging wall antiforms provide potential hydrocarbon traps. Generally these structures are interpreted as roll-overs forming above listric faults, even though many reported examples of fault drag do not occur along listric faults (Barnett et al. 1987).

We present an outcrop example from the W’ Cyclades, Greece, of large-scale fault drag around a cataclastic planar fault zone of several tens of meters in length. A clear deflection of the elsewhere planar marker layers with increasing intensity towards the fault zone can be observed. In contrast to folding in viscous material, the perturbation strain around this cataclastic fault is accommodated by numerous smaller brittle faults and sets of veins, collectively producing a geometry similar to ductile folds, maybe also accommodated by a smaller amount of ductile strain. Detailed documentation of this well-exposed field example provides a dataset which may facilitate the predic-

tion of structural characteristics and geometries accompanying brittle faults, which strongly influence the mechanical properties of the host rock. We therefore suggest that the concept of roll-over anticlines forming above listric extensional faults may be alternatively explained by perturbation strain.

References:

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