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# Fault drag – extension, inversion or flanking structures?

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The bending of material lines in the proximity of faults is commonly referred to as "drag" in the context of upper crustal deformation, whilst similar structures have recently been referred to as "flanking structures" and interpreted in terms of viscous flow in lower crustal rocks.

Flanking structures include both normal and reverse drag adjacent to faults during extension. This is due to displacement gradients along (pinned) faults and passive rotation of faults during extension. Although these concepts have been developed for viscous flow of material we believe that they are also applicable to upper crustal deformation especially for mudstone dominated sequences that often show ductile deformation of wallrock adjacent to faults.

Reverse drag-structures on normal faults are commonly interpreted as due to "roll over" in listric growth faults or to reverse reactivation of fault planes during basin inversion. Based on field observations from the Bristol Channel Basin (UK) and geometrical and numerical models we discuss how normal and reverse drag structures can be formed in the proximity of normal faults during extension. We show how normal drag can be overprinted by reverse drag during ongoing extension and that this can produce apparent inversion structures.

Our observations and modelling results suggest structures that appear to be due to inversion may be generated on normal faults during continuous extension. Thus, we conclude that care should be taken when interpreting such geometries and that some "classic examples" of compressive inversion may turn out to be purely extensional structures.