THE DEVELOPMENT OF FRINGE STRUCTURES AND THEIR USE AS KINEMATIC INDICATORS.

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The formation of fringe structures around planar structures (e.g. veins, faults or dykes) in a non-linear viscous medium during non-coaxial deformation is investigated by comparing results of finite element models with natural examples. If the co-rotating planar structure is much more viscous than its host it does not deform and fringe folds with no displacement along the structure develop that have a vergence consistent with the overall sense of shear. However, if the planar structure is much less viscous than its host, strain is concentrated within the structure and a secondary shear zone is developed in which slip is opposite to the overall sense of shear. The, resulting fringe folds have a vergence, which is incompatible with the drag on the shear zone. Counter-rotations of planar structures resulting in shear band geometries are typical features of transpression zones and only form during general shear deformation. Such fringe shear bands are characterized by a deflection of markers within the host, which is consistent with the drag on the secondary shear zone. If the deflection of markers is not clearly preserved, then fringe folds can be easily misinterpreted as fringe shear bands indicating a wrong shear sense. The deflection of the foliation in fringe structures is very similar to deformed asymmetric pull-aparts and can therefore help to interpret these otherwise ambiguous shear sense criteria.