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Numerical modeling of strike-slip deformation

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I present simple models of strike-slip deformation in 2.5 and 3 dimensions to study the natural spacing and surface morphology of shear banding in a numerical model of a highly simplified viscoelastic-plastic system undergoing large shear strains. The numerical models are based upon the Underworld particle-in-cell finite element framework (http://www.underworldproject.org).

Models are directed towards understanding the interplay between the rheological layering, imperfections and inhomogeneities in the structure of the various layers, and in the potential for delamination of the deep, negatively buoyant "lithosphere" to drive and control the surface expression of deformation. The spacing of mature shear bands parallel to the sense of shear is controlled by the relative capacity of brittle and ductile layers to carry stress much as predicted by analytic models developed for understanding extensional deformation.