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The Effect of Non-Passive Clast Behaviour in the Estimation of Finite Strain in Sedimentary Rocks.

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Crustal deformation is quantified using techniques of strain analysis that are most commonly based on populations of approximately ellipsoidal objects, which are almost ubiquitous constituents of natural rocks. Most existing methodologies make the assumption that the ellipsoidal markers acted passively during deformation, i.e. the marker and surrounding rock matrix responded to deformation identically. This requirement, if fully respected, greatly limits the number of valid strain markers available to quantify strain in mountain belts. This is especially true when clasts in sedimentary rocks are utilized to measure strain; the competency contrast between clasts and matrix possibly leading to marked ‘non passive’ behaviour. In many cases there may be no direct evidence of deformation (e.g. cleavage development, intra-granular deformation) in rocks that behaved in this ‘non-passive’ fashion, which can lead to significant strain being overlooked when constructing orogenic foreland cross sections. However, the systematic nature of this finite strain underestimation will allow for a correction of strain estimates when this type of behaviour is evident.