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Influence of fold kinematics on paleostress reconstructions

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In fold-and-thrust belts developing at the shallows structural levels, contractional deformations are mainly accomplished by translation of material above non-planar thrusts. Folding of the hangingwall produces kinematically-induced stress fields. Their magnitude, orientation, and spatial and temporal variability depend on several factors, including the folding process and the mechanical stratigraphy of the folded multilayers. The interaction among the kinematic and regional stress fields, and the overburden controls the development of deformational feature patterns.

Understanding the relationships between the folding process and the development in time and space of folding-related deformational features is of primary importance to unravel regional paleostress patterns. In this contribute we illustrate a working methodology designed for quantitatively analysing in three dimensions folding-related deformation patterns in thrust-related anticlines. By using sequential steps of data analysis and classification we correlate the spatial distribution of folding-related deformational features to the kinematic mechanism of folding. Such a correlation provides an effective tool for unifying apparently uncorrelable deformation patterns developed in different fold sectors otherwise interpretable as resulting from a multiphased, complex paleostress history.