



A retrospective review of inverted fault systems and inversion tectonic settings

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Inversion structures are now recognized in most orogenic belts and in many other tectonic settings. Identification of inversion structures has been facilitated by the classic paper of Bally (1984) that illustrated initial extensional fault geometry and its subsequent compressional reactivation as essential components of an inversion structure, and by improvements in seismic imaging. Following the publication of SP44 on Inversion Tectonics by the Geological Society of London in 1989 inversion structures have been described from many basins using the criteria established in that volume. However, many inversion structures in the outer parts of orogenic belts are still misinterpreted as either thin-skinned thrusts or strike-slip structures. Inversion structures are also commonly misinterpreted in extensional basins. Inversion structures should also not be confused with structures that are the result of:

- thermal or isostatic responses to deformation processes at the plate scale
- structures developed by halokinesis
- deformation related to mobile shale
- ongoing deformation without a change of regional stress regime
- a change from infilling accommodation space to regional uplift and erosion not related to specific fault movements.

This review presentation focuses on: criteria for recognizing inversion structures, their geometric signatures, different structural responses to inversion, tectonic settings for inversion and the variation in the time interval between extension and compression. A series of cross-sections of inversion structures from a variety of tectonic settings are used to provide a reference catalogue of examples of inversion structures that cover the broad range of structural geometries that can be developed.