

2006 Philadelphia Annual Meeting (22–25 October 2006)

Paper No. 49-9

Presentation Time: 3:45 PM-4:00 PM

EXTRACTING HIGH-RESOLUTION RECORDS OF DEFORMATION FROM WELL-IMAGED SECTIONS

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Traditionally, the balancing constraints of conservation, continuity and compatibility have provided powerful tools for generating self-consistent solutions to what might otherwise be data-limited structural problems. These same balancing constraints have assumed a new role in recent years because of improved imaging, including both seismic imaging of large-scale structures and surveying of folds exposed at the surface using photogrammetric, geodetic, laser and other techniques. In these instances of essentially complete imaging, the same balancing constraints are no longer used to constrain what is not imaged, but rather provide the basis for fine-scale determination of shortening as a function of stratigraphic level. The emerging new techniques allow us, for example, to measure the fractions of the deformation that are layer-parallel pure shear, simple shear, and flexural, and to measure the excess area of fold cores caused, for example, by flow of evaporites. Furthermore, when applied to growth strata, they provide a fine-scale record of shortening history, as is illustrated with both seismic and outcrop neotectonic examples from western China and elsewhere. In these examples we find nearly constant rates of shortening in individual structures for as long as 6 ma, hiatuses in deformation as long as 300 ka, and abrupt changes in long-term shortening rate by as much as an order of magnitude.

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Session No. 49

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Pennsylvania Convention Center: 108 B

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