AAPG International Conference
Barcelona, Spain
September 21-24, 2003

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Structural Styles in the Zagros Simple Folded Zone, Iran

The Simple Folded Zone of the Zagros is one of the major petroleum provinces of the world, but the controls on both regional deformation patterns and local structural styles are relatively poorly understood. For example, there are no published balanced and restored cross-sections. This contribution presents results from current research into the structure and stratigraphic evolution of the Zagros and its context in the broader Arabia-Eurasia collision. Arabia-Eurasia convergence is achieved in the NW of the Zagros by a combination of shortening on NW-SE trending folds and thrusts, mainly in the Simple Folded Zone, and by right-lateral strike-slip on the NW-SE trending Main Recent Fault. A balanced and restored cross-section across this part of the range indicates ~49 km of shortening. This probably occurred since ~5 Ma, providing an estimate of the long-term shortening rate across the Simple Folded Zone of ~10 mm/yr. This agrees with recent GPS-based estimates for the active deformation rate. The geometries of exposed structures are compatible with both basement thrusts and thin-skinned décollement levels, with major folds possibly nucleated above basement faults. Several décollement horizons are indicated from the fold geometries; Mesozoic shale units are candidates, as well as evaporites in the Neogene, Mesozoic and upper Proterozoic successions. The SE part of the Simple Folded Zone deforms by N-S shortening on E-W trending folds and thrusts. The link between the NW and SE parts of the Zagros occurs via a set of fault blocks ~400 km wide in total, each bounded by N-S right-lateral faults. Incremental changes in the strike of folds occur across these right-lateral faults, with more east-west orientations to the east.