Balanced cross-section across the Ziarat Block, western Sulaiman fold belt and hydrocarbon exploration

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In order to understand foreland deformation in the western fold-and-thrust belt of Sulaiman ranges, Pakistan, subsurface seismic reflection and well data was acquired while mapping a balanced-cross-section. Interpretation of seismic profiles show the geometry of a petroleum play as vergence of asymmetrical hinterland folds and foreland folds. The Triassic age detachment folds (~6 km depth in the pelitic strata) are located over the tip of blind thrusts of flat-ramp and flat-ramp-flat geometry. Whereas, the decollement floor thrust (~11 km depth in the Triassic strata) was interpreted with stacked duplexe s covered by a passive roof-thrust of hinterland vergence in Ghazij strata of Eocene age. The deformation is represented by passive-roof duplex with presence of a monocline and absence of an emergent thrust with duplicated strata between floor and roof thrust in the foreland. The balanced cross-section reveals deformation of intraplate in series of frontal duplex at the hanging-wall. The deformed balanced cross-section of 33 km was restored to an original length of ~71 km with 54% shortening in the foreland. About 12 km (17%) of the overall shortening is marked by an out-of-sequence blind hinterland-vergent thrust. The geometry and kinematics of deformation based on this study serves as an example of complex foreland deformation for successful exploration and exploitation of hydrocarbons.