Effect of lateral thickness variation of an intermediate decollement on the propagation of deformation front in the Lurestan and Izeh zones of the Zagros fold-thrust belt, insights from analogue modeling

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Abstract

Although the role of various basal decollement levels on structural style and deformation propagation is well documented in many folded belts, the effect of lateral variation in intermediate decollements is poorly constrained. This work uses results of three scaled sand-box models shortened from one end to study the variation in structural development between areas with a ductile intermediate decollement and areas without (or with a thinner) intermediate decollement. Combined results of scaled models with field observations are used to argue that the presence of mechanically different intermediate decollement horizons within the Zagros stratigraphy has resulted in deformation partitioning between the Lurestan and Izeh zones. A thick intermediate decollement facilitates a faster propagation of deformation front and a lower taper in comparison with a thinner (or non-existing) intermediate decollement during compression. However, the effect of lateral thickness variation in the intermediate decollement on propagation of deformation is less profound than the effect of mechanical differences in basal decollements.