Tectono-sedimentary framework of the Gachsaran Formation in the Zagros foreland basin

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Abstract
Continental collision between Iranian and Arabian plates resulted in the formation of the Zagros fold–thrust belt and its associated foreland basin. During convergence, pre-existing faults in the basement were reactivated and the sedimentary cover was shortened above two different types of basal decollement (viscous/frictional). This led to heterogeneous deformation which segmented not only the Zagros fold–thrust belt but also its foreland basin into different compartments resulting in variation in facies, thickness and age of the sediment infill. Based on this concept, a new tectono-sedimentary model is proposed for one of the most important syn-tectonic sedimentary unit, the Gachsaran salt in the Zagros foreland basin. In this proposed model, it is argued that differential propagation of the deformation front above decollements with different mechanical properties (viscous versus frictional) results in along-strike irregularity of the Zagros deformation front whereas movement along pre-existing basement faults leads to development of barriers across the Zagros basin. The irregularity of the deformation front and the cross-basin barriers divided the Zagros foreland basin into six almost alternating sub-basins where Gachsaran salt and its non-salt equivalents are deposited. In the salt sub-basins, two different processes were responsible for the deposition of Gachsaran salt: (1) evaporation, and (2) dissolution of extruding Hormuz salt and its re-precipitation as Gachsaran salt. Re-precipitation was probably the most significant process responsible for the huge deposit of Gachsaran salt in the extreme south-east part of the Zagros foreland basin.