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## Field Evidence for a Major Early Paleogene Folding Phase Across the Zagros Simple Folded Zone (Lurestan Province, Iran)

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### SUMMARY

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We report here the presence of fold growth strata in lower Paleogene beds across Lurestan. Those are associated with a compressional phase much older than the typical Zagros folding which affected the eastern side of the Simple folded zone 12 Ma ago (Emami, 2008) and spread to the mountain front, on the western edge of the Simple Folded Zone around 8 Ma ago (Homke et al., 2006) with the deposition of Agha Jari-Bakhtyari and Quaternary sediments. Early folding accounts there for up to half of the total shortening measured in cross section and corresponds to a shortening of around 10%.

The Zagros fold and thrust belt is a seismically active orogen resulting from the collision between the Arabian and Eurasian plates during the Cenozoic.

It contains some of the most prolific hydrocarbon fields in the world most of which are producing from the folded upper Eocene-lower Miocene Shahbazan-Asmari reservoirs units, which were flat lying and relatively underformed during sedimentation.

Recent paleomagnetic remanence works in giant fold growth strata in the simple folded zone in Lurestan indicate that the onset of folding took place over the last 12 Ma on the eastern side of the Simple folded zone (Emami, 2008) and over the last 8 Ma (Homke et al., 2006) along the mountain front, on the western edge of the Simple Folded Zone with the deposition of Agha Jari-Bakhtyari and Quaternary sediments. Deformation in the Simple Folded Zone clearly post-date flat lying, strata underformed at the time of deposition, late Eocene to early Miocene (Shahbazan and Asmari) and early-middle Miocene (Gachsaran and Agha Jari) strata deposited in a dynamic flexural basin.

Our fieldwork observations in southeastern Lurestan (this work) indicate though that many of the giant folds in the Lurestan province have recorded a phase of growth pre-dating the deposition of the Shahbazan-Asmari formations. Kinematic restoration even indicates that Paleogene early folding accounts there for up to half of the total shortening measured in cross section and corresponds to a shortening of around 10%.

The origin and driving mechanism of this Paleogene deformation is currently being investigated. Is it not known whether this widespread folding indicates:

1. the local onset of continental collision;
2. the collateral damage zone of a obducted ophiolite thrust sheet onto the Arabian passive continental margin;
3. widespread eastward gravity induced salt tectonics collapse over Paleogene flexural basin.

Regardless of the origin of these Zagros folds, their identification has several hydrocarbon implications. One of them being that areas in the Zagros fold and thrust belt which have been previously classified as non prospective because they lie in zones where HC maturation pre-date the Zagros orogeny may be, after all, locally prospective.