

Kinematic of Thrusts and Tectonic Vergence in the Paleogene Orogen of Eastern Iran, Sechangi Area

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Abstract : The eastern Iranian range is a Z-shaped sigmoidal outcrop appearing with a NS-trending general strike on the satellite images, has already been known as the Sistan suture zone, recently identified as the product of an orogenic event introduced either by the Paleogene or Sistan orogen names. The flysch sedimentary basin of eastern Iran was filled by a huge volume of fine-grained Eocene turbiditic sediments, smaller amounts of pelagic deposits and Cretaceous ophiolitic slices, which are entirely remnants of older accretionary prisms appeared in a fold-thrust belt developed onto a subduction zone under the Lut/Afghan block, portions of the Cimmerian superterrane. In these ranges, there are Triassic sedimentary and carbonate sequences (equivalent to Nayband and Shotori Formations) along with scattered outcrops of Permian limestones (equivalent to Jamal limestone) and greenschist-facies metamorphic rocks, probably belonging to the basement of the Lut block, which have tectonic contacts with younger rocks. Moreover, the younger Eocene detrital-volcanic rocks were also thrust onto the Cretaceous or younger turbiditic deposits. The first generation folds (parallel folds) and thrusts with slaty cleavage appeared parallel to the NE edge of the Lut block. Structural analysis shows that the most vergence of thrusts is toward the southeast so that the Permo-Triassic units in Lut have been thrust on the younger rocks, including older (probably Jurassic) granites. Additional structural studies show that the regional transport direction in this deformation event is from northwest to the southeast where, from the outside to the inside of the orogen in the Sechangi area. Younger thrusts of the second deformation event were either directly formed as a result of the second deformation event, or they were older thrusts that reactivated and folded so that often, two sets or more slickenlines can be recognized on the thrust planes. The recent thrusts have been redistributed in directions nearly perpendicular to the edge of the Lut block and parallel to the axial surfaces of the northwest second generation large-scale folds (radial folds). Some of these younger thrusts follow the out-of-the-syncline thrust system. The both axial planes of these folds and associated penetrative shear cleavage extended towards northwest appeared with both northeast and southwest dips parallel to the younger thrusts. The large-scale buckling with the layer-parallel stress field has created this deformation event. Such consecutive deformation events perpendicular to each other cannot be basically explained by the simple linear orogen models presented for eastern Iran so far and are more consistent with the oroclinal buckling model.

Keywords : thrust, tectonic vergence, oroclinal buckling, sechangi, eastern Iranian ranges

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