

Tectonic Setting of Hinterland and Foreland Basins According to Tectonic Vergence in Eastern Iran

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Abstract : Various tectonic interpretations have been presented by different researchers to explain the geological evolution of eastern Iran, but there are still many ambiguities and many disagreements about the geodynamic nature of the Paleogene mountain range of eastern Iran. The purpose of this research is to clarify and discuss the tectonic position of the foreland and hinterland regions of eastern Iran from the tectonic perspective of sedimentary basins. In the tectonic model of oceanic subduction crust under the Afghan block, the hinterland is located to the east and on the Afghan block, and the foreland is located on the passive margin of the Sistan open ocean in the west. After the collision of the two microcontinents, the foreland basin must be located somewhere on the passive margin of the Lut block. This basin can deposit thick Paleocene to Oligocene sediments on the Cretaceous and older sediments. Thrust faults here will move towards the west. If we accept the subduction model of the Sistan Ocean under the Lut Block, the hinterland is located to the west towards the Lut Block, and the foreland basin is located towards the Sistan Ocean in the east. After the collision of the two microcontinents, the foreland basin with Paleogene sediments should expand on the Sefidaba basin. Thrust faults here will move towards the east. If we consider the two-sided subduction model of the ocean crust under both Lut and Afghan continental blocks, the tectonic position of the foreland and hinterland basins will not change and will be similar to the one-sided subduction models. After the collision of two microcontinents, the foreland basin should develop in the central part of the eastern Iranian orogen. In the orocline buckling model, the foreland basin will continue not only in the east and west but continuously in the north as well. In this model, since there is practically no collision, the foreland basin is not developed, and the remnants of the Sistan Ocean ophiolites and their deep turbidite sediments appear in the axial part of the mountain range, where the Neh and Khash complexes are located. The structural data from this research in the northern border of the Sistan belt and the Lut block indicate the convergence of the tectonic vergence directions towards the interior of the Sistan belt (in the Ahangaran area towards the southwest, in the north of Birjand towards the south-southeast, in the Sechengi area to the southeast). According to this research, not only the general movement of thrust sheets do not follow the linear orogeny models, but the expected active foreland basins have not been formed in the mentioned places in eastern Iran. Therefore, these results do not follow previous tectonic models for eastern Iran (i.e., rifting of eastern Iran continental crust and subsequent linear collision of the Lut and Afghan blocks), but it seems that was caused by buckling model in the Late Eocene-Oligocene.

Keywords : foreland, hinterland, tectonic vergence, orocline buckling, eastern Iran

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