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Neothetys Closure and Development of Transpressive Pop-up Structure

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The Zagros fold-and-thrust belt of Iran is a result of the Alpine orogenic events (closure of neothetys) in the Alpine–Himalayan mountain range. The High Zagros Belt (HZB, also known as the crush Zone) marks the northeastern part of the Arabian passive paleomargin separated from the Iranian plate along the so-called Main Zagros Thrust (MZT) and the Main Recent Fault, (MRF). There have been controversial challenges among geologists about timing of the final Neothetys oceanic closure (e.g., Late Cretaceous: Alavi 1994; Berberian and King 1981; Eocene: Braud 1987; Sengor et al. 1993; Neogene: Berberian et al. 1982; Miocene: Jackson et al. 1995). and how Arabian plate crust collides to central Iran, and finally about the structures that could be formed in this tectonic regime. For further studies in this paper, we've selected four areas on the Neothetys suture zone. The distance between these selected areas is approximately about 100 kilometers, which include Alut, Nahavand, Oshtoran-Kuh, and Daleneshin from NW to SE In these areas, Cenozoic sediments had been deposited. Existence of such sediment units, indicates the openness of Neothetys during Cenozoic; But the considerable matter that arises is that Cenozoic units are seen locally on the suture zone.
In Alut, Miocene limestone units are surrounded by two sets of faults with opposite dip dirctions and causes the units up-lift and thrust on the Ophiolite units. In Nahavand, four fault zones were identified. In this area, fault dip directions are opposite to each other, too; And Jurassic limestone units in the central part of the area are thrusted on Cenozoic units. In this area, Oligo-Miocene facies is Flish type and indicates depth of basin. In Oshtoran-Kuh, Cenozoic units are seen as narrow stripes on the suture zone and, dip directon of all faults are towards NE. In Daleneshin, old units of Cretaceous have thrusted on Eocene and Miocene units, and dip direction of all faults are in an opposite direction to each other. The three areas of Daleneshin, Nahavand and Alut show common characteristics in structure. These areas are observed lozenge-shaped to rhomboidal in LAND SAT satellite images, and have higher elevation in comparison to the neighborhood. Mountain trend is from NW to SE in Zagros, but it is E to W in these areas. And also, MZT deflexes from its general NW-SE trend and becomes E-W. Beside MZT, remainders of Ophiolite units related to Neothetyse oceanic crust are found. Surveillance commited on fault dip direction in this areas, shows that generally we have two sets of high-angel (dip 50) reverse faults with directions toward NE and SW. Regarding to the morphology of plates colliding in suture zone, we suggested that the whole Neothetyse in length of suture zone, did not close simultaneously. Rather , these basins of Neothetyse in deflexion points of margins on colliding plates, have been left locally open and Cenozoic sediments deposit in these basins. Continuation of Arabia plate movement caused the existence of a transpressive tectonic regime that made the Cenozoic sedimentary basins close. Structural evidences show that the structure created in the area is a transpressive pop-up structure made under effect of reactivation in high-angel reverse faults.
Key word: Neothetys, suture zone, pop-up structure