Structure of Zagros Suture Zone, Iran

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The Zagros orogen that located in the middle of the Alps-Himalaya mountain chain extends with a NW-SE trend from the East Anatolian Fault in the eastern Turkey to the Oman Line in the southern Iran. This orogen consists of the Urumieh-Dokhtar Magmatic Arc and the Sanandaj-Sirjan Metamorphic Zone as the internal part, and the Zagros Fold-Thrust Belt (ZFTB) as the external part. Lack of sufficient subsurface and surface structural data causes diverse interpretations on the location of the marginal zone between the internal and external parts of the Zagros, where the suture zone between the Afro-Arabian Plate and the Central Iran Block is located.

Two models have been proposed to explain the location of the Zagros suture zone. In the first one, the Main Zagros Reverse Fault (MZRF), along which discrete masses of ophiolite rocks emerged, is considered as the Zagros suture zone. In the second model the suture zone is located in the northeastern part of the Sanandaj-Sirjan Metamorphic Zone. In this model, the MZRF is an ordinary component of the ZFTB. Detail mapping and structural analysis of the thrust sheets accompanied by available geophysical data across the Zagros suture zone area showed that these thrusts have different duplex and imbricate fan system. The thrusts developed in more internal part of the orogen have duplex system and the basement is involved in crustal thickening. Conversely, the thrusts closer to the foreland, display emergent imbricate fan system have developed over a detachment zone above the basement and show similar geometry to their counterparts in the external part of the orogen.

The variation of structural style and deformation conditions of the thrust sheets suggest that they occur in the transitional zone from the internal to external part of the Zagros orogen. It is proposed that the more internal thrusts converge at depth to form a root zone to the Zagros orogen similar to the Appalachian Brevard zone. Therefore, the suture zone of the Zagros orogen is not a discrete thrust, i. e. the MZRF, but is a crustal scale fault, which acts as a root zone at depth and substituted with a series of thrusts at the higher structural level. To the northeast of this root zone, high grade metamorphic rocks, gneiss dome and ductile shear zones which represent the internal portion of the Zagros orogen are developed, whereas to its southwest an imbricate thrust system accounts the external part of the orogen.

References

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