

Structural Evolution of the Western Makran

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Abstract: The Makran represents a huge accretionary wedge in SE Iran that resulted from the long-lasting subduction of the Neotethys Ocean since the Mesozoic. From west to east, this accretionary wedge extends ~1000 km between the Minab Fault in Iran, and the Ornach-Nal Fault in Pakistan. The ongoing oceanic subduction characterizes this belt between the Iranian Plateau and the Tibetan Plateau, both of which were generated by collision of Eurasian with the Arabian and Indian plates, and provides an ideal target to recover the tectonic history of subduction. The western Makran located in Iran can be subdivided into four units: The North Makran ophiolitic mélange, the Inner Makran, the Outer Makran, and the Coastal Makran. Based on our detailed structural analysis and geochronological dating, we obtain several new results that can help us to better understand the structural evolution: (1) The North Makran ophiolitic mélange includes thick piles of volcanic rocks and limestone that directly cover the mantle peridotite, so it is likely to be part of an Early Cretaceous volcanic arc by our zircon dating at ~115 Ma on mafic intrusions; (2) The entire western Makran underwent three phases of deformation. D1 is characterized by top-to-the S/SW thrusting as evidence by southward emplacement of the ophiolitic mélange onto the Eocene sedimentary rocks. D2 deformation strongly folded the pre-late Miocene/early Pliocene strata that also corresponds to the final emplacement of the ophiolite to the surface. D3 structures extends in a N-S direction with top-to-the W kinematics that overthrust the Miocene sandstone onto the Pliocene fluvial sediments along the Minab Fault; (3) Combined with geological and geochronological relationship, D1 occurred at ~45-35 Ma, D2 initiated in middle Miocene and ended with a regional late Miocene-early Pliocene unconformity, and D3 structures are still active as the subduction continues.

Key words: Makran, structural analysis, polyphase deformation,

Cenozoic

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