



The Triassic stratigraphic succession of Nakhlak (Central Iran), record of an active margin

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Nakhlak in Central Iran, is one of the key areas for the understanding of the Triassic paleogeographic evolution of Cimmerian blocks in Iran. The area was the subject of two different MEBE projects (“Stratigraphy of selected Permian and Triassic sections in Iran”, Leader M. Gaetani; “Tectonic evolution of the Yazd, Tabas and Lut blocks (Central Iran) by means of paleomagnetic, structural and stratigraphic data”, Leader M. Mattei), and detailed sedimentologic, bio-chronostratigraphic, paleomagnetic and structural analyses were carried out. The 2,400 m thick Triassic succession is thrust on a poorly exposed ophiolitic succession, consisting of gabbros and serpentinites, and it is truncated with angular unconformity by Upper Cretaceous shallow water limestones.

The Triassic succession, consisting of Alam, Baqroq and Ashin Fms., records a complex environmental and petrographic evolution, marked by the interaction of extrabasinal (mainly siliciclastic with volcanic component) and intrabasinal (shallow to deep-water carbonates) input.

The Alam Fm. (Olenekian-Middle Anisian) consists of about 1200 m of marine sandstones, limestones and, less frequently, siltstones and conglomerates. The deposition occurred in a marine setting, with different episodes of deepening and shallowing, but with an overall shallowing upward trend. Carbonate intercalations consist of nodular limestones (lower part) and of shallow-water mud-mounds (upper part). Tuff layers intercalate within the succession, recording a syndepositional volcanic activity, whereas the presence of megabreccias and the drowning of carbonate facies document synde-

positional tectonic movements. Petrographic analyses of sandstones demonstrate an evolution from undissected to dissected volcanic arc. The uppermost part of the Alam Fm. is marked by the transition to lagoonal-coastal deposits, with intercalations of conglomeratic bodies that rapidly evolve to the overlying Baqroq Fm. (Late Anisian-Early Ladinian).

The Baqroq Fm. consists of about 900 m of alluvial conglomerates and sandstones. The petrographic composition reflects the uplift and erosion of a metamorphic basement and volcanic centres, together with the erosion of older sediments from the Alam Formation. The upper part of the Baqroq Fm. is characterized by increased abundance of polycrystalline quartz with respect to the lower part of the unit. The overlying Late Ladinian-?Early Carnian Ashin Fm. (about 300 m are preserved) documents a rapid environmental transition from the continental deposits of the Baqroq Fm. to a deep-water turbiditic siliciclastic system. The lower part of the unit is also characterized by an important volcanic event that is documented by some meters of tuffs. The bathymetric evolution of this portion of the succession is ascribed to a tectonically-driven subsidence episode. The sandstone composition indicates an evolution from recycled orogen at the base to dissected-transitional arc toward the top.

On account of the petrographic data, of the rapid and frequent bathymetric and environmental changes and of the evidence of syndepositional tectonic activity, it is possible to frame the succession of Nakhlak in an active margin setting, close to a volcanic arc. The non-linear evolution (shallowing trend followed by a rapid deepening) and the absence of younger units prevent a clear geodynamic interpretation of the succession, nevertheless the available data support a forearc setting, characterized by an intermittent tectonic activity.