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Controls of Tectonic and Paleoclimate on the Middle-Late Triassic Dashtak Formation in the Zagros Domain, Iran: A Regional Seal and Subordinate Reservoir Rock

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SUMMARY

The Middle-Late Triassic Dashtak Formation provides an effective, regional seal for the Permo-Triassic Dalan-Kangan (Khuff) reservoirs and also forms the subordinate reservoir in a number of gas fields in the Zagros domain. The evaporite-dominated formation is subdivided into six members.

Lithofacies and isopack maps show strong controls of deep-seated faults, particularly Kazerun and Balarud during deposition of this formation. Comparison of isopack maps of the Dalan and Dashtak formations indicates that there is a shifting of depocenter from east- to westward of Kazerun Fault from Permian to Triassic. This shifting is interpreted to be the effect of the fault reactivation caused by the Neotethys opening.

The Dashtak Formation consists of four large-scale carbonate-evaporite cycles, which was deposited in a carbonate/evaporite platform. Periodic development of carbonate and anhydrite intervals was controlled by relative sea-level fluctuations under a prevailing arid paleoclimatic conditions.

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Strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}=0.7074\text{--}0.7085$) record varies age from Early to Middle/Late Triassic for the studied formation.

Controls of tectonic and paleoclimate on the Middle-Late Triassic Dashtak Formation in the Zagros domain, Iran: a regional seal and subordinate reservoir rock

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Abstract

The Middle-Late Triassic Dashtak Formation provides an effective, regional seal for the Permo-Triassic Dalan-Kangan (Khuff) reservoirs and also forms the subordinate reservoir in a number of gas fields in the Zagros domain (such as Aghar, Dalan, Shanul, Varavi, Zireh fields). The evaporite-dominated formation is subdivided into six members, including Aghar shale, Evaporites A to C, Sefidar dolomite and Evaporite D in ascending order. It is gradually underlain by Kangan Formation and unconformably overlain by Neyriz Formation. The formation passes laterally into the dolomitic Khaneh Kat Formation in the interior Zagros.

Lithofacies and isopack maps display that a paleohigh without sedimentation has emerged during Permian to Triassic in the Kuh-e Dinar area, close to Zagros suture zone. These maps also show strong controls of deep-seated faults, particularly Kazerun and Balarud during deposition of this formation. The formation is thicken toward these faults and reaches more than 800 m in thickness. Comparison of isopack maps of the Dalan and Dashtak formations indicates that there is a shifting of depocenter from east- to westward of Kazerun Fault from Permian to Triassic. This shifting is interpreted to be the effect of the fault reactivation caused by the Neotethys opening.

The Dashtak Formation consists of four large-scale carbonate-evaporite cycles, which was deposited in a wide carbonate/evaporite platform. Each cycle starts with a transgressive lagoonal-intertidal facies and gradually is overlain by anhydrite-dominated, sabkha facies of the regressive phase. Periodic development of carbonate and anhydrite intervals was controlled by relative sea-level fluctuations under a prevailing arid paleoclimatic conditions. Petrographic study indicates that dolomitization and anhydrite precipitation are two main early diagenetic processes in this formation, which significantly affected depositional facies. Fracturing and compaction are the late diagenetic alterations.

Because of lacking of index fossils, this formation is considered to be of mid- to late Triassic age, based on stratigraphic position and correlation. Strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}=0.7074\text{-}0.7085$), measured in 20 samples at the South Pars Field, record varies age from Early to Middle/Late Triassic for the studied formation.