The interpretation of depositional environment, diagenesis and reservoir quality of Tirgan Formation, a possible reservoir rock in the eastern of Kopet-Dagh Basin

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Abstract

In this research, the Tirgan Formation, Barremian-Lower Aptian in age, has been studied at two areas, Radkan and Geliyan, in the Kopet-Dagh Basin. Lab was focused on 57 samples for petrographic and porosity studies and 15 samples for estimation of permeability. The objectives of this study are depositional environment interpretation, recognition of diagenetic history, and estimation of porosity and permeability. Based on field and laboratory studies four facies associations are recognized. Most of the carbonate rocks were deposited in an open marine, barrier, lagoon and tidal flat setting. Using petrographic results, the main diagenetic processes that affected these rocks are micritization, cementation, neomorphism, compaction, fracturing, dissolution, silicification, and dolomitization, with eodiagenetic, mesodiagenetic and telodiagenetic effects evident. Fracturing, intercrystalline, interparticle and intraparticle porosity are the main types. The average porosity and permeability at Radkan are 8.31% and 0.574 md, and at Geliyan 4.28% and 0.212 md. Based on these results, the Tirgan Formation does not appear to have reservoir capability in the region.

Keywords: Tirgan Formation, Kopet-Dagh basin, Barmian-Aptian, diagenese, porosity, permeability