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Carbonate diagenesis in the Barremian-Aptian Tirgan Formation (Kopet-Dagh Basin, NE Iran): Petrographic, geochemical and reservoir quality constraints

M. Javanbakht, H.A. Wanas, A. Jafarian, N. Shahsavan, M. Sahraeyan



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1 **Carbonate diagenesis in the Barremian-Aptian Tirgan Formation (Kopet-**
2 **Dagh Basin, NE Iran): Petrographic, geochemical and reservoir quality**
3 **constraints**

4 M. Javanbakht^{a,*}, H.A. Wanas^b, A. Jafarian^{a,c}, N. Shamsavan^a, M. Sahraeyan^d

5 a. *Department of Geology, Mashhad Branch, Islamic Azad University, Mashhad, Iran*

6 b. *Department of Geology, Faculty of Science, Menoufyia University, Shebin El-Kom, Egypt*

7 c. *School of Earth Sciences and Resources, China University of Geosciences, Beijing 100083, China*

8 d. *Department of Geology, Khorasgan (Isfahan) Branch, Islamic Azad University, Isfahan, Iran*

9 *Email: mo_ja58@yahoo.com; hamdallawanas@yahoo.com; jafarian.arman@gmail.com

11 **Abstract**

12 This study aims to establish the diagenetic evolution of carbonate rocks of the
13 Barremian-Aptian Tirgan Formation (Kopet-Dagh Basin, NE Iran), with special
14 emphasis in their impact on reservoir quality to be used as analog for their equivalent
15 carbonate reservoirs. To achieve this target, basic petrography complemented by
16 elemental and stable isotopic ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) analyses of the studied carbonate rocks
17 was used. In addition, the visible porosity was detected. The recognized carbonate
18 diagenetic processes include micritization, cementation, dolomitization, compaction,
19 dissolution, stylolitization, fracturing, silicification and neomorphism. These diagenetic
20 processes took place in four diagenetic environments: marine-phreatic, meteoric-
21 phreatic, meteoric-vadose and burial. Early dolomitization of lime muds, micritization
22 of skeletal allochems and cementation by isopachous equant calcite represent marine-

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