Genesis and distribution of dolomites in early Permian lacustrine strata of the Junggar Basin, Northwestern China

YOULIANG FENG[1]

[1]Research institute of petroleum exploration and development, Petrochina, Beijing, 100083, China

Junggar basin is a Paleozoic to Cenozoic petroliferous basin located in northern part of Mountain Tianshan, northwestern China. During early Permian period, the basin was a continental rift basin. Fengcheng Formation (P_1f) in Mahu depression, corresponding to Lucaogou Formation (P_1l) in Jimusar depression and Pingdiquan Formation (P_1p) in Shazhuang-Shishugou depression, consisting of deep lake mudstone, shale, dolomitic mudstone, shaly dolomite, tuffaceous dolomite interbeded with siltstone and dolomitic sandstone, is deposits of rift climax. Trace elements ratios such as Sr/Ba B/G, V/Ni, and isotopes of Carbon and Oxygen were used to analyze sedimentary environment and genesis of dolomites. The results show that the Fencheng Formation was deposited in saline semi-deep lake: the Z value exceeds to 120, the Sr/Ba is about 0.41 ~ 327.09, the B/Ga is about 0.55 ~ 369.37, the V/Ni is 0.06 ~ 6.01. The dolomites are divided into lamina dolomites, thin-bed dolomites, and spotted dolomites. They are mainly the penecontemporaneous and epigenetic dolomite, the former was deposited in a saline semi-deep lake, while the latter resulted from the dolomitization of lime mud that was deposited in a salinesemi-deep lake during the diagenetic stage. The Mg^{2+} ions resulted from saline water and basalt hydrolyzing. The temperature of dolomite formation was about 34.86 ~ 57.27℃. The dolomites distributed at ramps of semi-deep lake controlled by paleoreliefs which could be the underwater high caused by volcanic eruption and structural movement. The dolomites and dolomitic sandstones interbeded with grey mudstone and shale are tight reservoirs. The “sweet spots” of the tight reservoirs distributed near faults, the main reservoir spaces of them are dissolved pores and fractures.

Key words: Dolomite, Early Permian period, lacustrine strata, Junggar basin