



Origin of dolomites in the Late Jurassic-Early Cretaceous Berdiga Formation, Eski Gümüşhane Region (Gümüşhane), NE Turkey: Implications for Hydrothermal Recrystallization

Merve Özyurt and M. Ziya Kırmacı

Geology Engineering Department, Karadeniz Technical University, Trabzon, TURKEY (merveyildiz@ktu.edu.tr)

Upper Jurassic-Lower Cretaceous carbonate succession (Berdiga Formation) is widely exposed in the Eastern Pontides (NE Turkey). The succession is characterised by platform carbonates from intertidal to fore-reef slope revealing marked lateral and vertical facies alternations. The studied Eski Gümüşhane Region (Gümüşhane, NE Turkey) comprises one of the best typical exposures of the succession in southern part of Eastern Pontides. In this area, the whole of the sequence is pervasively dolomitized. An integrated study of sedimentology, petrography and geochemical analysis ($\delta^{18}\text{O}$, $\delta^{13}\text{C}$, $^{87}\text{Sr}/^{86}\text{Sr}$ isotopes and major-trace elements) was carried out on the Upper Jurassic-Lower Cretaceous carbonate succession of the Eski Gümüşhane Region section in the Eastern Pontide (NE Turkey) in order to reveal the origin of the dolomite. Dolomite sequence is represented by fabric-destructive and fabric-preserving replacement dolomite which are Ca-rich and nonstoichiometric ($\text{Ca}_{56}\text{-}^{58}\text{Mg}_{44\text{-}42}$). Replacement dolomites (Rd) are represented by $\delta^{18}\text{O}$ values of -11.38 to -4.05 (VPDB), $\delta^{13}\text{C}$ values of 0.69 to 3.13 ‰ (VPDB) and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of 0.70753 to 0.70884 .

Petrographic and geochemical data indicate that Rd dolomites are formed prior to compaction at shallow-moderate burial depths from Late Jurassic-Early Cretaceous seawater and/or partly modified seawater as a result of water/rock interaction and they were recrystallized at elevated temperatures during subsequent burial. In the subsequent diagenetic process during the Late Cretaceous when the region became a magmatic arc, as a result of interaction with volcanogenic massive sulfide deposits, Rd dolomites were recrystallized by hydrothermal fluids of marine origin.

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