

Geochemistry and Cathodoluminescence Study on the Carbonate of Upper Cretaceous (Ilam Formation), Payun anticline, Zagros Basin, Izeh, Iran

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Abstract

Ilam Formation (Santonian – Campanian in age) is part of Bangestan Group. This Formation is disconformably overlain by Surgah and Sarvak Formations and underlain by Gurpi Formation in Payun Anticline, Izeh (Zagros Basin), southwest of Iran. Detailed petrographic investigation have led to the recognition of 13 microfacies and five microfacies belt associations: tidal flat, lagoon, shoal, slope, open marine in a ramp platform of Ilam carbonates. Major and minor elements and oxygen and carbon isotope values, indicate that mixed aragonite and calcite were the original mineralogy in Ilam Formation in Payun anticline. Change of original carbonate mineralogy through time needs to be re-evaluated in the light of mineralogical change that is related to water temperature or latitude. The isotopic composition of carbonate rocks is widely used for reconstruction of the paleoecological environments. Such reconstruction are based on the assumption of preservation of isotopic system during the entire lifetime of the rock. However, the validity of this assumption is not evident. The degree of preservation of rocks and their isotopic systems depends on many reasons and generally decreased with rock age. Sr/Ca vs. Mn and comparison of $\delta^{18}\text{O}$ and Mn indicate that diagenesis occurred in open system. In open system, the fluid flow is high, so there is no accumulation of Sr/Ca in the meteoric water and Sr/Ca of calcite is likely to be the same as that of the initial closed system. Based on the least altered carbonate sample, the highest oxygen isotope ($\delta^{18}\text{O}$) and δ_w of upper Jurassic about -1 ‰ SMOW, paleotemperature calculation indicates an ambient sea water temperature was 28° C. By petrographic and cathodoluminescence analysis, different generation of sparry calcite cement were recognized in Ilam Formation (Payun section). The cements, mainly originate in burial setting, although meteoric and marine cement were observed too.

Keywords:

Ilam Formation, Bangestan Group, oxygen and carbon isotopes, cathodoluminescence