

**DOLOMITIZATION IN JUTANA FORMATION (CAMBRIAN), SALT RANGE,
PAKISTAN: PRIMARY OR SECONDARY IN ORIGIN?**

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Abstract

Jutana Formation (Cambrian) is mostly comprised of two distinct units; (i) Oolitic-pisolitic, medium to thick bedded interlayered dolostone and sandstone, and (ii) massive dolostone in the eastern Salt Range (Pakistan). Field observations revealed that dolostone mostly comprised of dirty white, light green, hard, micaceous, sandy towards the base and light green to dirty white massive towards the top of the formation. In the lower unit, sandstone is mostly whitish grey in nature. Primary sedimentary structures preserved in the sandstone are trough-, herring bone- and hummocky-cross bedding structures are the characteristic features of the sandstone unit, while preserved ooids and faunal assemblages are restricted to dolomite beds. Based on field observations and petrographic studies, three dolomite phases have been identified ; (i) fine crystalline dolomite (Dol-I), (ii) medium-coarse crystalline dolomite (Dol-II) and (iii) fracture associated saddle dolomite (Dol-III). Stable isotope studies indicate less depleted $\delta^{18}\text{O}$ values for Dol-I (i.e., -6.44 to -3.76‰ V-PDB), slightly depleted $\delta^{18}\text{O}$ values for Dol-II (-7.73 to -5.24‰ V-PDB), and more depleted $\delta^{18}\text{O}$ values for Dol-III (-7.29 to -7.20‰ V-PDB) respectively. In addition, $\delta^{13}\text{C}$ values of the corresponding dolomite phases are well within the range of Cambrian sea-water signatures. Furthermore, $\delta^{26}\text{Mg}$ - $\delta^{25}\text{Mg}$ signatures (Dol-I; $\delta^{26}\text{Mg}$ = -0.19 to -0.67, $\delta^{25}\text{Mg}$ =-0.61 to -0.86 and Dol-II; $\delta^{26}\text{Mg}$ =-1.43 to -1.59, $\delta^{25}\text{Mg}$ =-0.75 to -0.83) revealed that dolomitization occurred in three diagenetic settings. Appendix 1 2. In conclusions, initial stage of dolomitization occurred in mixing zone condition, followed by dolomitization associated with burial conditions in later stages.

Keywords: Dolomites, Jutana Formation, Salt Range, Isotopic studies.