

**Carbonate Cementation Patterns in a Mixed Siliciclastic/  
Limestone Sequence : Evidences from the Fayed Formation  
(Lower Cretaceous), Southern Ismailia, Egypt**

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The shallow marine, Lower Cretaceous sequence (Fayed Formation), Gabal Shabraweet area, represents a series of sandstone and sandy clays intercalated with sandy limestone and dolomitic limestone beds. Diagenetic carbonate cements in these sediments are represented by microcrystalline to sparry calcite and zoned dolomite rhombs (5-50  $\mu$ m) that occur as pore-filling cements and as replacive minerals. The sources of the carbonate cements included seawater, carbonate intraclasts and bioclasts, and Albian carbonate rocks.

Petrographic and geochemical data revealed that carbonate cementation followed three distinctive patterns: 1) early, pre-compactional calcite ( $\delta^{18}\text{O}_{\text{PDB}} = -7.8\%$ ) precipitated as displacive and grain shattering cement from a dominant meteoric water component, 2) early pervasive cementation by calcite ( $\delta^{18}\text{O}_{\text{PDB}} = -0.5\%$  to  $+1.8\%$ ) and dolomite ( $\delta^{18}\text{O}_{\text{PDB}} = -0.8\%$  to  $+1.1\%$ ) typically from marine porewaters, and 3) dolomitization and calcitization of early formed carbonate cements due to recrystallization process. The relatively light  $\delta^{18}\text{O}_{\text{PDB}}$  values of the dolomite and calcite ( $-2.2\%$  and  $-3.8\%$ , respectively) compared with the early marine cements are due to increase in temperature and water-mineral reaction.