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Fault-related dolomites in the Lower Cretaceous shallow marine succession of the Maestrat basin, NE Spain: Field evidence

J.D. Martín-Martín (1,*), E. Gomez-Rivas (2,*), A. Travé (1,*), R. Salas (1,*), J. Vergés (3,*)

(1) Departament de Petrologia, Geoquímica i Prospecció Geològica, Universitat de Barcelona, Spain, (juandigeomartin@ub.edu), (2) Departament de Geologia, Universitat Autònoma de Barcelona, Spain, (3) Institute of Earth Sciences "Jaume Almera" (CSIC), Barcelona, Spain, (*) ExxonMobil (FC)2 Alliance (Fundamental Controls on Flow in Carbonates)

The study of fault-related dolomites is of increasing interest due to the existence of numerous associated hydrocarbon reservoirs around the world and its poorly known reservoir quality heterogeneities. Lower Cretaceous (Aptian) shallow-water carbonate succession outcropping in the Maestrat basin is partially dolomitised and is being characterised by a combination of field work, petrological and geochemical analyses. The Aptian Benassal Fm consists of a 1000-m-thick shallow marine limestone succession deposited synchronously with the movement of regional faults during the early Cretaceous rifting cycle. The dolomitised intervals are presumably related to fluid circulation through extensional faults, although detailed analyses have not been reported in the literature until now.

The purpose of this contribution is to highlight the most important field characteristics of the Aptian host rock and the dolomites in relation to the fault system. Related field work has focused in: a) constraining the distribution and geometry of the dolomitised bodies and the fault system; and b) constructing and correlating stratigraphical logs in order to locate the dolomitised intervals within the non-dolomitised limestone sequence. Two coloured, stratiform-like dolomitised intervals have been identified within the Aptian sedimentary succession: i) the lower interval is a matrix dolomitised grainstone with a brown surface colour; and ii) the upper interval is a coarsely crystalline sucrose replacive dolomite with a grey to orange surface colour. Field work-based results suggest that dolomitisation of the Benassal Fm succession is controlled by the regional structural setting, the stratigraphic position, and the predolomitic host rock texture.