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Sedimentology and Diagenesis of an Oligocene Cool-Water Carbonate Platform and Basin, Costa Blanca, Southeast Spain

A 340 m thick Early Oligocene shallow-water succession was studied to understand the controls on morphology, facies belts and diagenesis of carbonate platforms from a time slice with rare exposures. This platform was attached to a continent, with a steep, possibly faulted, margin. Deposition began after folding and prior to the opening of the Valencia Trough; tectonism was thus a major control in the accumulation of this thick sedimentary package. Five Facies Associations are defined: Semi-restricted inner shelf, Open marine inner shelf, Open marine middle shelf, Open marine shelf margin, and Basin. The dominant biotic components (red algae, benthic foraminifera, bryozoans, mollusks) are interpreted as cool water assemblages. This assemblage is in contrast to other coral-dominated Oligocene strata in the Mediterranean. Petrographic study shows that little marine cementation occurred at the Costa Blanca, as is common for other cool-water carbonates. The lack of cementation permitted intense compaction and collapse of grains, which created a mesh of connected fractures. This process occurred early in diagenesis, prior to burial, as documented by intraclasts. Such porosity evolution of cool-water carbonates, which occur throughout the rock record, have significant implications for their reservoir potential. The studied succession is composed of five platforms, which show an overall deepening upward trend in facies, and a change from more restricted facies in the lower portion to more open marine facies in the upper portion. This change from the base to top of the platform may also reflect a change to cooler climate and/or an increase in upwelling.