



Evolution of the Albian-Turonian Levant carbonate platform in response to the long term transgressive forcing

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The extensive availability of Cretaceous outcrops, as well as onshore and near shore boreholes in Israel offer a unique aperture into the evolution and dynamics of carbonate deposition. This study revisits these onshore and near shore sites integrating data from multiple boreholes, outcrops and seismic data to generate a comprehensive depositional model from the Albian to the Turonian.

Following the shift from siliciclastic dominance during the Aptian and Albian, an extensive carbonate platform was established on the southeastern margin of the Levant Basin. This platform extended from the southern margin of the Palmyride trough and the modern Israeli shelf/coastal plain in the northwest and ~ 100km inland (south east) in the Albian to >200 km in the Turonian. The outer part of this platform was characterized by rudist buildups while the inner parts of the platform were dominated by shallow water depths, characterized by relatively low energy conditions. Outer clinoforms are encountered near the modern coastal plain and intertidal microbialites characterize the shallowest part. Consequently, extensive early dolomitization occurred across the platform until its subsequent drowning at the end of the Albian.

Two additional cycles of shallowing and deepening occurred atop the platform during the Cenomanian, both marked by extensive dolomitization of the platform during periods of relative low sea level conditions.

Volcanoes developed in the platform margins and were rimmed by short lived neritic carbonate buildups. Finally, during the Turonian and following Oceanic Anoxic Event 2, the principal depositional platform areas experienced a major backstep, which resulted in non-deposition and bypass of the Albian/Cenomanian platform edge. The outer clinoforms facies migrate proximally over 100km while the abandoned platform edge experiences significant erosion and formation of submarine canyons concurrently to the supply of reworked material of the platform outer margin. Early dolomitization became extremely rare at this phase. The Turonian backstep marks the shift to hemipelagic dominance atop the Levant margin, which persisted until the Middle Eocene. Overall, the Levant margin maintained a large carbonate platform as of the Aptian. This platform exhibits a continuous transgressive trend through the Albian, Cenomanian and Turonian, transitioning to deep water in the late most Cretaceous. This transgression moves the main grain factory (rudists) farther away from the platform edge to the southern east. This transgression is punctuated by periods of shallowing which became exceedingly shorter, and are characterized by dolomitization in the Albian and Cenomanian but not in the Turonian or afterwards. While onshore epicontinental flooding accommodates this increase in relative sea level, offshore on isolated carbonate platforms it may have led to the drowning and termination of shallow-water, porosity-rich facies.