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Development conditions of Cenomanian-Turonian carbonate platforms in central-southern Tunisia

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The geologic history of the Cenomanian-Turonian carbonate platforms in central-southern Tunisia, represented by the Late Cenomanian-Early Turonian Gattar platform and the Early-Middle Turonian Biréno platform, was studied to explore the lithofacies associations, depositional environments and the development of these Late Cretaceous carbonate platforms. The ultimate aim of this study is to identify the principal factors which control the different stages in the development of the Cenomanian-Turonian platforms in Tunisia and elsewhere (e.g., Egypt).

The facies distributions of the Gattar and Biréno carbonate platforms show two main depositional environments: (1) A shallow-marine platform (Gattar carbonate mid to outer-ramp), outcropping in central-southern Tunisia and marked by a rudist-rich, slightly dolomitized limestone facies; and (2) a more distal environment corresponding to an outer ramp domain (Biréno carbonate ramp), which is well-expressed at Jebel el Kébar (central Tunisia) and is characterized by an alternation of pelagic marls and dolomitized limestones rich in planktonic foraminifera. To the south, in Jebel Berda, the occurrence of rudist-rich carbonates, stromatolites, and massive evaporite beds suggests a shift toward sediment production in a tidal flat environment within an evaporitic setting.

Concerning the Gattar and Biréno carbonates development, the recurrent Late Cenomanian-Early Turonian distensive faulting, which reactivated NE-SW and E-W oriented Early Cretaceous paleofaults, caused rapid tectonic pulses that strongly influenced the geographical extension of the two carbonate platforms through time. Associated horst-and-graben structures developed, dissecting the existing carbonate platforms. Carbonate production continued on the horst blocks until the end of the Turonian and stopped during the Coniacian transgression.

Hence, the Cenomanian-Turonian tectonic events restricted carbonate sediment production to the tectonic highs while the combination of small-scale sea-level variations and localized sediment production determined the infill of accommodation space. This pattern is in line with interpretations for other parts of the Tethys margin, such as in Egypt. These new results help to further determine hydrocarbon exploration of similar deposits in the region.