

AP19

Diagenesis of the Albian-Turonian Formations of the Middle East

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SUMMARY

Diagenetic modification of the Albian-Turonian in the Middle East is complex and multiphase, and has provided a critical control on reservoir quality. This paper presents a summary of this diagenetic overprint, gathered from published case studies from across the region. The most important diagenetic events comprise marine cementation, along discontinuities and overprinting bioturbation, incipient karst formation at intraformational sequence boundaries and deep cutting karst at the late Cenomanian/early Turonian unconformity. Finally, leaching of micrite and early diagenetic cements has often created large volumes of secondary micro- and macroporosity. This leaching could have taken place from meteoric pore waters or deep burial brines. This paper will assess the relative importance of these key in order to provide the basis of a predictive regional diagenetic model for the Albian-Turonian of the Middle East.

Diagenetic modification of the Albian – Turonian in the Middle East is complex and multiphase, and has provided a critical control on the distribution of an effective matrix pore system in reservoirs of this age. Data has been gathered from outcrop and subsurface case studies, which span a period of over 20 years, from across the region. During this time, there has been a significant evolution in our understanding of the depositional setting, tectonic evolution and burial history of the succession. Furthermore, conceptual diagenetic models have evolved, and interpretations presented in the literature in some way reflect this. Nevertheless, the published data (from Iraq, Iran, Kuwait, United Arab Emirates, Saudi Arabia and Oman) also reveal a surprising number of consistent trends.

In particular, three key paragenetic events appear to control the distribution of matrix porosity. (1) Marine cementation, along discontinuities formed during falls in relative sea level, and within *Thalassionoides* burrow fills. (2) Formation of incipient karst at intra-formational sequence boundaries and (locally) deep-cutting karst associated with late Cenomanian – early Turonian exposure. (3) Leaching of micrite and early diagenetic cements to create large volumes of secondary micro- and macroporosity. Historically this leaching has been attributed to the ingress of meteoric pore waters, but more recent models point to dissolution from deep burial brines.

This paper will assess the relative importance of these key events across the region, and consider the influence of depositional setting, burial history and hydrocarbon charge on controlling the spatial distribution both diagenetic products and matrix porosity. This will provide the basis of a predictive regional diagenetic framework, a necessary first step to truly understanding the controls on reservoir quality in the Albian – Turonian of the Middle East.