AP09

Retreat of Shelf Margins in the Albian to Turonian of Northeast Arabia

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SUMMARY

Albian-Turonian carbonates in NE Arabia show a progressive retreat of their shelf margins towards palaeohighs. This retreat is controlled by localised tectonic collapse of the pre-existing platforms and re-location of platform margins onto structurally high areas.

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By the end of the Albian, there had developed an extensive clastic-backed carbonate platform across most of the northern Middle East. By the end of the Turonian, shallow-water platform carbonates were all but absent, restricted to a few locations on major palaeohighs. The demise of this platform system took place in two phases. An initial retreat from its maximum progradation in the Late Albian, took place in the latest Albian, when the majority of the northern Iraq platform was drowned and the platform margin re-located itself to a NW-oriented axis running through Baghdad into the Bala Rud shoal area of Iran. Behind this developed an intrashelf basin, with shelf carbonates reappearing in the Western Desert area of Iraq. Following a major lowstand in the later part of the Early Turonian, the study area was covered with deeper-water carbonates, excepting the area of Massive Limestone and Mardin Limestone deposition in northeast Syria and southeast Turkey.

Each phase of retreat followed locally significant tectonism that marks the initiation of the foredeep and coeval transtensional basin system that characterise the later part of the Cretaceous. In particular, collapse of the Albian platform margin and relocation of the shallow-water carbonates to the Baghdad area, was controlled by initiation of a transtensional structure in the Tikrit-Amara area, whilst to the southeast in Iran the Cenomanian margin sits directly above the older Albian margin and no retreat is shown. Retreat is significant in that it fundamentally affects location of reservoir rocks, their diagenesis (e.g. tendency to be karstified) and sealing capacity of overlying deeper-water facies. In the middle of the stratigraphy is the Mishrif Formation, which is arguably the most important reservoir in Iraq. The Mishrif Formation only succeeds as a play where it is covered by deeper-water and marly Khasib or Kometan formation carbonates as a seal; in East Baghdad, the more shelfal facies of the Khasib Formation do not adequately seal the Mishrif Formation reservoir.