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Eustasy and Tectonic Controls on the Sedimentary Patterns in the Albian-Cenomanian Succession in the Lurestan (Zagros)

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SUMMARY

The Upper Albian-Turonian deposits in the Lurestan Area are attributed to the Sarvak Formation. Field observations and facies analysis indicate absence and presence of quartz grains and calciturbidites respectively which reflect the different tectonic regimes. Sudden establishment of Upper Cenomanian pyritic and glauconitic pelagic and hemipelagic facies containing packed ammonite even on the top of paleohighs, most probably suggest drowning of carbonate platform in the study area during late Cenomanian.

The Upper Albian – Turonian deposits in the Lurestan area are attributed to the Garau and Sarvak formations. This interval is dominantly composed of carbonate facies and forms the second most important hydrocarbon reservoir in southwest Iran after the Oligocene – Lower Miocene deposits (Asmari Formation). The Lurestan area is located in the NW-most part of the Zagros Foreland Fold-Thrust Belt. The succession is gradationally underlain by Lower Cretaceous sediments of the Garau Formation, known as an excellent source rock in the area, and disconformably overlain by the Coniacian shales/marls of the Surgah Formation grading partially to, the Sarvak Formation.

Fifteen surface sections and ten wells are organised in four regional transects. The results are considered in the field observations and microscopic investigations of the surface and subsurface sections along with eight paleogeographic and isopach maps. Field observations and facies analysis indicate absence and presence of quartz grains and calciturbidites respectively, which reflect the different tectonic regimes. The calciturbidites are composed mainly of non-skeletal grain such as intraclast and peloids that distally interfinger with the pelagic facies. Based on the correlation, paleogeographic and isopach maps, sedimentation have been deposited in a rimmed-shelf and isolated platforms. It is believed that deposition on the rimmed-shelves and carbonate ramps are mainly controlled by regional and local tectonism, but our results suggest considerable facies and thickness variation of depositional sequences in the Lurestan area that are related to both tectonic and sea-level changes; whereas eustasy played the main role from Middle Cenomanian onwards. Dolomitization, Fe-staining, pyritization and glauconitization are the common diagenetic features on the top of Middle Cenomanian carbonates that indicate the presence of an unconformity. Sudden establishment of upper Cenomanian pyritic and glauconitic pelagic and hemipelagic facies containing packed ammonites, even on the top of paleohighs, most probably suggest drowning of the carbonate platform in the study area that was accompanied by more open-marine facies in Fars and Dezful embayments. Progressive deepening of facies continued during Turonian in the Lurestan area, whereas restricted inner platform carbonates and even non-deposition occurred in the Dezful embayment and Fars area respectively at the same time. All the data resulted in the understanding of both tectonic and sea-level changes, which controlled deposition in Lurestan that is compatible with the maximum of sea-level rise during Turonian.