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The relative impact of inherited tectonic features and eustatic sea level variations on the Jurassic/Cretaceous evolution of the Dezful Embayment, Central Zagros, Iran

The Jurassic and Cretaceous sediments of the Dezful Embayment contain some of the most prolific petroleum systems of the Middle East. With most obvious structural traps drilled, attention is now focussed on the identification of stratigraphic traps. For this purpose a detailed understanding of the stratigraphic evolution of the area is essential, and in particular the distinction between the response of the sedimentary system to (local) tectonic control and eustatic sea level fluctuations. This paper makes this distinction based on a sequence stratigraphic analysis of these rocks, and the help of paleogeographical maps and isopach maps. Based on 10 outcrop sections, about 60 wireline logs and paleologs, a sequence stratigraphic framework is constructed. Ten tectono/sedimentary phases are distinguished, which group together third order depositional sequences that are similar with respect to depositional system, sediment flux and dominant controlling mechanism. Tectonic control is the dominant factor during the Lower Jurassic (Neyriz), the base of the Lower Cretaceous (Garau) and the Upper Cretaceous (Ilam, Gurpi, Tarbur). Inherited features play in particular a significant role during the first two, with the influence of the Qatar arch and NE-SW trending lineaments. In the Upper Cretaceous these old patterns are overprinted by the obduction related deformations. A clear eustatic control is observed in the Middle and Upper Jurassic (Surmeh, Hith, Gotnia), and most of the Lower Cretaceous (Fahliyan, Gadvan, Dariyan, Kazhdumi, part of the Sarvak). In these intervals, the dynamics of the sedimentary system controlled depocenter location, platform geometries and paleogeography.