Evidence of the drowning of the Fars carbonate platform in the Jurassic, southern Iran

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Abstract

The study of facies stacking and depositional environment of the Jurassic successions in the Fars region indicates important changes in the evolution history of the Zagros Basin, including subaerial exposure and drowning of the platform during that period. To investigate the different aspects of these geological events, two sections of the Jurassic sedimentary rocks in Gadvan anticline and Kuh-e Siah oilfield have been studied by sedimentology, stratigraphy and well logging. The results indicate that the Lower Jurassic sedimentary sequence is composed mainly of carbonate rocks and shales deposited in the inner part of a homoclinal ramp. This sequence terminated by a calcareous soil horizon (calcrete) which formed simultaneously with the Aalenian unconformity and related platform emergence. Subsequent marine transgression and re-establishment of the platform during early Middle Jurassic resulted in the discontinuity surface covered by peritidal carbonates, deep-marine shales and pelagic limestones. Immediate overlap of the platform deposits with the Bajocian deep-marine facies indicates a sudden increase in accommodation space and drowning of the Fars carbonate platform. The drowning was the result of rapid deepening of the basin caused by tectonic subsidence and a coeval global sea-level rise. This time slice represents a significant environmental change across the Zagros Basin during which the Early Jurassic undifferentiated platform (epeiric shelf) evolved into a new sedimentary system. This system containing deep-marine basins separated by platform areas reflects a change to more open marine conditions. Similar sedimentary environment of the Bajocian deposits in Fars and Gotnia Basin (Lurestan and northern Iraq) indicates the extension of deep-marine environment in most areas of the Zagros. Therefore, drowning of the Jurassic carbonate platform is a pervasive event and turning point in sedimentation history and structural evolution of the Zagros Basin that the sedimentary regime has since been quite different.

Keywords*: Platform drowning, Jurassic, Fars region, Zagros basin*