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Sequence Stratigraphy of the Albian - Turonian Interval of Southwest Iran based on Outcrop and Subsurface Data

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SUMMARY

The Albian-Turonian of SW Iran is characterized by two types of carbonate depositional systems: an Albian muddy, benthic foraminifera-dominated, ramp type system, and a Cenomanian-Turonian rudist-rimmed platform to intrashelf basin type system. Third order depositional sequences have been defined in these, constrained by new biostratigraphic and outcrop information, which allowed to evaluate the relative influence of tectonics and eustatism on the sedimentation patterns.

This study is based on a large regional dataset, consisting of 100 wells and newly studied outcrop sections, which cover offshore and onshore southwest Iran (coastal Fars, Khuzestan and Lurestan). An age revision of some of the classic lithographic units (Kazhdumi, Mauddud and Sarvak formations) is proposed based on the analysis of benthic and planktonic foraminifera and ammonites. The Albian succession shows an overall transgressive trend, gradually flooding the previously exposed coastal Fars area, until in the Late Albian marine sedimentation was re-established in the entire study area, with shallow-water muddy ramp systems (Orbitolina Limestones, Mauddud Formation) surrounding a deeper, organic-matter rich intra-shelf basin (Kazhdumi Basin). The Cenomanian – Turonian succession was deposited in a depositional environment characterized by the presence of several intra-shelf basins, which shifted location during the third-order depositional sequences. Fine- to very coarse-grained platform rims were formed, which consisted dominantly of rudist debris. At the regional scale, very significant variations in accommodation are observed at that time. In coastal Fars, Cenomanian and Turonian deposits are locally completely absent, whereas further to the northwest, in Khuzestan shallow-water deposits of this age may reach a thickness of 1,200 m. Tectonic control at different scales is invoked to explain this period of instability, including local salt tectonics, regional subsidence along old lineaments (e.g. Kazerun Fault), and areas of persistent slow subsidence (coastal Fars).

The improved time control and large scale of this study allowed to analyse regional stratigraphic trends, which showed an overall important tectonic control, but also a clearly recognizable eustatic sea-level imprint on the sedimentation pattern.