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The Albian Sedimentary Record of Southeast Arabia - Facies, Sequence Stratigraphy and Depositional Environments

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SUMMARY

This contribution aims at summarizing the presently published data set on facies, sequence stratigraphy and depositional environments of the Albian units in southeast Arabia. The latest Aptian to Albian argillaceous units in southeast Arabia, forming a regionally significant seal, have received comparably little attention in the past because they do not form a source or reservoir rock themselves. During the latest Aptian to Late Albian, a major influx of terrigenous material from the emerged Arabian-Nubian Shield to the northwest onto the Arabian carbonate platform led to the deposition of the argillaceous Nahr Umr Formation within the Bab Basin. Throughout the southern Gulf, the Nahr Umr is principally an impermeable unit of clayey facies acting as a seal for the Shu'aiba carbonate reservoir rocks. To the northeast, in the present-day Jabal Akhdar, this shaley facies gradually changes into rudist and coral dominated limestone facies termed Al Hassanat Formation. The Al Hassanat Formation was deposited on a wave-impinged oceanic swell facing the Neo-Tethys Ocean. The Al Hassanat probably formed a rather narrow ribbon (not more than a few kilometres in width) trending approximately parallel to the present-day oceanic margin of North Oman. During the Late Aptian and Early Albian, an uplifted and exposed high separated the Al Hassanat Platform from the coeval Nahr Umr deposits of the intra-cratonic basin. This high was submerged during the middle Albian, and the Nahr Umr records three pulses of Al Hassanat rudist floatstones prograding southward into the intracratonic basin (forming the marker units in the Nahr Umr). During the latest Albian, the Nahr Umr reflects a cleaning upward and during the Cenomanian is overlaid by calcareous units of the Natih Formation. At Jabal Akhdar, the Nahr Umr was overthrust during the Cenomanian by nappes of the Hawasina Complex and the Semail Ophiolite. The Nahr Umr is characterized by important orbitolinid foraminifera accumulations. Similar Orbitolina facies is found for example in the Albacete-Prebetic area of southeast Spain. Commonly, Orbitolina-dominated sediments are related to episodes of terrigenous influx, increase in water depth, and a tendency of platforms to evolve into more ramp-type depositional settings.