Control of Deep-Seated Salt Tectonics and Eustacy on the Stratigraphic Architecture of Mid-Cretaceous Carbonate Strata in the Central Arabian Gulf, Offshore Iran: A Seismic Sedimentological Study

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The mid-Cretaceous (Albian to Turonian) stratigraphic interval of the eastern Arabian plate is dominated by widespread carbonate accumulation. The Sarvak Formation of south Iran is part of this carbonate system. Seismic mapping of the entire Sarvak Formation interval within an extensive (ca 80x80 km) 2D seismic survey located in the central Arabian Gulf, offshore Iran, allowed to reconstruct the stratigraphic evolution of the carbonate systems in this area.

The results of the seismic mapping point to four sequences within the Sarvak Formation. The first two seismic sequences (late Albian to early Cenomanian) comprise the deposition of the lower Sarvak Formation (Mauddud Member), while seismic sequences three and four cover the upper Sarvak Formation (Ahmadi Member). Further analysis of the results suggests that deep-seated salt tectonics, related to the rock salt of the Infra-Cambrian Hormuz Formation, was a major controlling factor for the mid-Cretaceous platform development. Salt-related uplift, which also influenced basement structures like the Qatar-Fars Arch, started during the early Cretaceous. Peak uplift and salt withdrawal-related subsidence occurred during the mid-Cretaceous (Cenomanian to mid-Turonian). These large scale morphologic changes interacted with eustatic sea-level fluctuations and resulted in the formation of sub-aerially exposed topographic high areas within the entire Sarvak Formation (sequences one to four). In sequence three and four intrashelf basins were created and filled during the late Sarvak Formation. The top of the Sarvak Formation is marked by the mid-Turonian Unconformity, which exposed the entire platform.