
Uplift and Subsidence of the Southeastern Portion of the Arabian Plate from Triassic to Early Cretaceous

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We interpret tectonostratigraphic responses of the Arabian plate to Triassic through earliest Cretaceous events, based on areal extent and amount of erosion at three unconformities (intra-Hettangian, 202 Ma; intra-Toarcian, 186 Ma; intra-Tithonian, 148 Ma) and Triassic to Cretaceous isopachs and depo-environments.

Depositional thickness of the Middle to Upper Triassic varied little in southern Arabia. Hettangian erosion removed <200m of section in most areas NW of the Qatar arch. That event removed even larger amounts from the arch southeastward, but in a broad, undulating pattern that preferentially removed more from the arch (600-800 m) and most of Oman-Yemen (700-800 m) than from the intervening Rub al Khali (300-500 m). Toarcian erosion also removed more section (300-400 m) from SE Arabia than elsewhere, but preferential erosion of the Qatar arch and Oman-Yemen relative to the Rub al Khali was reduced. Thus, uplift of SE Arabia became more uniform from Hettangian to Toarcian.

The Middle to Upper Jurassic south of Kuwait comprises 800-1500 m of mainly platform carbonates and evaporites, consistent with slow and areally nearly-uniform subsidence. The Gotnia basin (Kuwait and most of Iraq) also subsided, although the section there is thinner owing to sediment-starvation until the Kimmeridgean (ca. 152 Ma). Areal coincidence of Toarcian erosion with subsequent subsidence suggests mantle-induced thermal uplift and relaxation.

Deep intra-Tithonian erosion characterized all areas east of a NNE-trending limit close to the Saudi-Oman border and Musandam peninsula. Late Tithonian-Early Valanginian subsidence exceeded 500 m only in two areas (Gotnia and northern Oman). Absence of areal coincidence of greatest intra-Tithonian erosion with greatest Late Tithonian to Early Valanginian subsidence suggests that local tectonics, not regional thermal processes, drove the subsidence.
