



Re-evaluation of the epicontinental paradigm for genesis of the Triassic succession in southern Israel

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The Middle and Late Triassic succession in southern Israel has been regarded as part of the epicontinental marginal marine zone of the Gondwanan margin. This scenario is at odds with field evidence in southern Israel.

The clastic-dominated Pelsonian succession and the carbonate-evaporite late Anisian to Carnian successions were largely marine low energy settings below storm wave base. $\delta^{13}\text{C}$ values occur within a range characteristic of the Triassic open marine environment. Some deeper settings were marked by downslope transport to the deep ramp. Sea level falls are evidenced by shallowing to proximal subtidal zones of wave or storm activity. Subaerial exposure features are absent except in the late Pelsonian, when rate of sedimentation of continental clastics briefly exceeded subsidence, and at the termination of tectonic subsidence in the Carnian, when evaporites were superseded by prograding microbialites.

Early Pelsonian mixed siliciclastic/carbonate sediments initially accumulated below storm wave base. Sea level fall and aridization in the hinterland led briefly to reduction of siliciclastic influx, This transition was in the lower –Balatonicus ammonoid zone, correlative to a Bithynian/ Pelsonian humid pulse followed by a Pelsonian semi-arid regime recorded elsewhere in the Tethys. Subsequent increased rainfall and concomitant siliciclastic influx caused delta progradation and inhibition of carbonates. The delta front zone was mostly below or near fair weather wave base, with the proximal subtidal zone reached only at the time of sea level fall. Rising sea level of the later Pelsonian led to flooding of clastic-dominated deltaic lagoons and the increasingly carbonate-dominated, fully marine settings of the Illyrian and Fassanian. The Longobardian stromatolitic and incipient evaporite facies indicate both lowered sea-level and climate change to aridity. Ocean connectivity fluctuated between deep hypersaline waters pooled behind a deep barrier at sea-level highstands, and stromatolite-dominated biofacies during lowstands. The low overall rate of sedimentation was consistent with condensation.

In the Longobardian, thin clastic-type evaporite horizons are interbedded with fossiliferous carbonates. Evaporites vs. carbonates formed on the proximal shallow margins of the basin according to whether climate was arid or humid, and were transported downslope. An early Carnian carbonate-free interval indicates a humid pulse, followed by development of thick cycles of shale, dolomite, and laminated gypsarenite, the latter representing resedimented evaporite crystals on the deep ramp and toe of slope of a subsiding basin. Subsidence terminated in aggrading subtidal microbialites beneath a major regional truncation surface. Termination of differential subsidence in the latest Carnian – Norian is coeval across Israel from south to north, but coincides with establishment of a reefal succession on the northwestern Israel coast.

The Triassic succession of southern Israel formed within a varied bathymetric shelf-edge depositional setting of variably restricted basins and highs, responding to eustatic sea level changes, remote climate conditions and events, and local and regional tectonic movements. The dominance of deep, open water settings calls into question the extensive ramp- or platform- like nature assumed for epicontinental marine environments of the Triassic in Israel.