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Uncommon Facies and Geometries on a Jurassic Pelagic Carbonate Platform in Western Sicily (Italy)

The condensed pelagites capping drowned peritidal limestone on Western Tethyan Jurassic platforms are typically mud-dominated, indicating low energy environments. We describe an example (Sciacca Plateau, W Sicily) where, instead, these deposits have high-energy coarse bioclastic facies, also associated with growth geometries never reported before on Tethyan drowned platforms. Highlights include: a convex-up mound-shaped body made of thin-shelled bivalve pack- to grainstones, and thick (>20 m) ammonite and brachiopod coquina rudstones with large scale clinoforms.

The "mound" core has thick planar beds, thinning at flanks with tangential downlaps, indicating stationary growth. Erosional surfaces, foresets, and cross-bedded packages are missing. This enigmatic structure is not a mud-mound, nor a submarine drift. It can be interpreted as the product of build-up of sediment swept elsewhere from the sea bottom, favoured locally by the stabilizing effect of soft-bodied organisms (unpreserved), like fleshy algae or microbial mats.

The coquina rudstone also grew laterally, with foresets and clinoforms at different scales. The onset of this facies corresponds to the first of the three prominent Tithonian sea level drops, known worldwide. In relatively shallow water conditions, sea-level fluctuations could have produced punctuated high-energy, fast-deposition episodes under the influence of strong bottom or tidal currents. The persistence of relatively modest-depth conditions for about 45 Myr after the drowning indicates the Sciacca Plateau was subjected to low subsidence rates during most of the Jurassic.

Our data suggest similarities with rather shallow water pelagic shelves, like the Upper Chalk of northern Europe, or the Blake Plateau in its early history.