Eagle Ford–A Depositional Setting and Processes in Southwestern Texas: An Example of Deeper-Water, Below-Storm-Wave-Base Carbonate Sedimentation on a Drowned Shelf

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ABSTRACT

The Upper Cretaceous, lowermost Eagle Ford Group (Eagle Ford–A member), southwestern Texas, displays an interesting array of depositional features interpreted to have been deposited on a deeper-water, inclined, drowned shelf below storm-wave base. The unit is landward of the Lower Cretaceous paleo–Stuart City shelf margin. Strata are composed of only deeper-water biotas, including coccoliths, globigerinids, calcispheres, pelagic crinoid fragments, inoceramid fragments, small ammonites, and rare radiolarians. No evidence of bioturbation is present, and argillaceous mudstones contain elevated TOC (total organic carbon) (up to 2 wt%). Sedimentary features include gravity flows (concentrated and surge-like flows), low-density turbidites, hummocky cross-stratification-like bedding, swaley cross-stratification-like bedding, bottom-current ripples and megaripples, load features, regional (tens of miles) slump and slide units, and regional-scale volcanic ash beds.

Biological assemblage and depositional features all support a deeper-water setting below storm-wave base, where bottom conditions were anoxic. Lack of any nearshore, shallow-water biotas and an overwhelming abundance of open-marine biotas support deposition distal of any shoreline. Planktic biotas support deeper-water deposition far out on a drowned shelf. Total absence of bioturbation and elevated TOC is strong evidence of anoxic bottom conditions below storm-wave base. Hydrodynamic sedimentary features, such as turbidites, hummocky cross-stratification-like bedding, swaley cross-stratification-like bedding, bottom-current ripples and megaripples, and load features can all be related to deeper-water, below-storm-wave-base processes.

Objections to a below-storm-wave-base depositional setting have been presented by authors who interpret hummocky cross-stratification-like bedding as storm-wave-related, hummocky cross-stratification. These researchers have taken this feature as irrefutable evidence of deposition above storm-wave base. However, other researchers have documented hummocky-like cross-stratification in deepwater carbonates and attribute the process of formation not to storms, but to deeper-water processes. Other depositional features, such as debrites, turbidites, bottom-current ripples and megaripples, load features, regional (tens of miles) slump and slide units, and regional-scale vol-

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canic ash beds, are more consistent with deeper-water deposition dominated by gravity flows, mass movement, and suspension deposition. Therefore, when all evidence is weighed and considered, a deeper-water, below-storm-wave-base setting is the logical interpretation for the depositional setting of Eagle Ford–A strata.