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Facies Analysis, Early Diagenesis and Depositional Environments in a Paleocene Reef, La Popa Basin, Northeast, Mexico

The Paleocene La Popa platform is an isolated carbonate platform exposed in the foot-wall of the La Popa salt weld structure within the Late Cretaceous-Paleocene La Popa Salt Basin (northeast Mexico). A detailed facies study of the reefal portion of the Upper Cretaceous-Paleocene La Popa isolated carbonate platform (400 m thick; 3-6 km wide) located in northeast Mexico was undertaken to define the three-dimensional geometry and facies architecture of the massive reef margin, steeply-dipping fore-reef and toe-of-slope basinal facies. The La Popa platform is one of several buildups that nucleated on paleotopographic highs supported by salt diapirs in the Laramide-aged clastic foreland succession of La Popa Basin. La Popa platform contains three-dimensional exposures of the reef facies with a 5 km wide strike panel (south face) and a 13 km dip panel (northeast face) defining the platform limits. Three depositional sequences (third-order; 100-150 m thick) arranged into a progradational stacking architecture are observed along dip-parallel cliff faces along the northeast side. These sequences record reef development on top of the La Popa salt wall and offlapping progradation of fore-reef clinofolds. Paleo-bathymetric relief from reef top to toe-of-slope basinal mudstone is approximately 100-150 meters. Initial work has resulted in the definition of the different platform margin facies (massive reef composed of coral-sponge-red algal boundstone and framestone, fore-reef bioclastic, red algal packstone-grainstone, and toe-of slope allodapic packstones). Conspicuous early diagenetic features within the reef core include cement-filled sheet cracks, Neptunian dikes, and abundant isopachous cements as well as replaced aragonite botryoids.