

The Lower Cretaceous Hensel–Glen Rose Stratigraphic Couplet in the Llano Uplift, Central Texas

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Abstract

The Lower Cretaceous Hensel Sandstone and Glen Rose Formation are lateral facies of the transgressive clastic/carbonate leg of the Trinity Division (or Group), whose stratigraphy in the area of the Llano Uplift is here mapped and characterized as a single depositional episode. The Hensel Formation represents alluvial-fan, fluvial, and coastal plain depositional settings, whereas mixed terrigenous and carbonate sediments of the overlying Glen Rose Formation represent peritidal and shallow-marine environments of deposition.

The Hensel–Glen Rose stratigraphic couplet (hence H–GR) thickens from the Llano Uplift eastward toward the Gulf of Mexico and southward toward the Rio Grande Embayment. The Glen Rose lithosome thins northward to zero across the southern and eastern margins of the Llano Uplift, primarily by facies change into Hensel arkosic clastics. Reciprocally, the Hensel lithosome thins eastward and southward by grading into Glen Rose strata, so that only thin terrigenous Hensel sandstones and mudstones are present at the base of the downdip H–GR.

At the start of H–GR deposition, the Llano Uplift was a hilly promontory projecting southeastward into the Late Aptian Gulf of Mexico and Rio Grande Embayment. Within the Uplift, the H–GR consists of poorly consolidated arkosic conglomerates, sandstones and mudstones. Its thickness varies widely due to the paleotopography of the underlying Wichita Paleoplain (hence WPP). The H–GR is thin or absent over high-standing Early Paleozoic fault-blocks, and thick over low-standing Precambrian terranes and “minibasins.” Hensel Sandstone thickness and configuration of the underlying WPP are mapped throughout the Llano Uplift based on such observed patterns around its margins.

The east-flowing precursor Llano River was the primary stream draining the interior of the promontory. The eastward course of the present Llano River coincides closely with its WPP valley, even though the WPP landscape had been completely filled-in and covered by the time of early Edwards deposition. The south-flowing Kimble valley drained the southwestern quadrant of the Llano Uplift, generating thick deposits of Hensel terrigenous clastics.

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