

# Sequence Stratigraphy of Comanchean Cretaceous Outcrop Strata of Northeast and South-Central Texas: Implications for Enhanced Petroleum Exploration

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## ABSTRACT

An integrated sequence stratigraphic classification of the Comanchean Series, Cretaceous strata in the Gulf Coast is developed for northeast and south-central Texas by using the eastern Gulf Coast scheme of Mancini and Puckett and the western Gulf Coast scheme of Scott *et al.*. New outcrop biostratigraphic data are integrated with lithostratigraphic data to identify four Aptian-Albian to lower Cenomanian, second-order, transgressive-regressive (T-R) sequences in Texas. The lower T-R K1 sequence consists of the Sycamore, Hammett and Cow Creek formations. The base of this sequence in Texas is defined by the unconformity (Ap SB PR1 of Scott *et al.*) between the Paleozoic basement and the Sycamore Sandstone.

The T-R K2 sequence includes the Hensel, lower Glen Rose, and upper Glen Rose units and the lower beds of the Paluxy Formation. The base of this sequence is marked by the Cow Creek-Hensel unconformity (Ap SB PR2 of Scott *et al.*). The Hensel and lower Glen Rose comprise a lower, higher-order sequence, and the upper Glen Rose and lower Paluxy constitute an upper, higher-order sequence. These higher-order sequences are separated by a disconformity (Al SB GR2 of Scott *et al.*) a few meters below the base of the *Corbula* bed.

The T-R K3 sequence consists of the upper beds of the Paluxy and the Walnut, Goodland (Comanche Peak and Edwards), and Georgetown Limestone or lower part of the Washita Group. The base of this sequence is defined by an intraformational unconformity (Al SB FR1 of Scott *et al.*) in the Paluxy Formation. The upper part of the Paluxy, Walnut and Goodland comprise a lower, higher-order sequence, and the Georgetown Limestone and lower part of the Washita represent an upper, higher-order sequence. These higher-order sequences are separated by a disconformity (Al SB WA1 of Scott *et al.*) at the base of the Georgetown or Kiamichi Formation. The T-R K4 sequence includes the upper Washita Grayson/Del Rio and Buda formations. The base of this sequence is defined by the Georgetown/Main Street-Grayson/Del Rio unconformity (Ce SB1.1, Al SB WA6 of Scott *et al.*). The top of this sequence is marked by the regional unconformity (Ce SB3 of Scott *et al.*) that separates the Comanchean Series (upper Washita beds at its top) from the Gulfian Series (Woodbine or Lake Waco/Pepper Shale at its base). This unconformity correlates with the mid-Cenomanian unconformity in the Gulf of Mexico. These T-R sequences can be correlated from northeast to south-central Texas and from the western to eastern Gulf. Because the stratal architecture of these sequences delineates potential hydrocarbon reservoir facies, this classification has implications for developing enhanced petroleum exploration strategies for Comanchean Cretaceous strata in the Gulf Coast.