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2010

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Kevin W. Stafford

College of Sciences and Mathematics, Department of Geology, Stephen F. Austin State University,
staffordk@sfasu.edu

Melinda G. Shaw-Faulkner

College of Sciences and Mathematics, Department of Geology, Stephen F. Austin State University,
mgshaw@sfasu.edu

Wesley A. Brown

College of Sciences and Mathematics, Department of Geology, Stephen F. Austin State University,
brownwa1@sfasu.edu

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Stafford, Kevin W.; Shaw-Faulkner, Melinda G.; and Brown, Wesley A., "Pseudokarst of East Texas: Geomorphic Features and Evolution [Abstract]" (2010). *Faculty Presentations*. 9.
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Pseudokarst of East Texas: Geomorphic Features and Evolution [Abstract]

Numerous springs, both artesian and gravity-drained, are found throughout the Tertiary clastics of east Texas. Groundwater flow is generally concentrated at the boundary between clay-rich, transgressive facies and sand-dominated regressive facies. Descending meteoric waters migrate near-vertically through surficial regressive sands and are transmitted horizontally along the top of low-permeability transgressive strata to often discharge as continuous series of diffuse seeps. In fractured zones, artesian fluids migrate upward through confining facies and discharge as focused springs through poorly consolidated sands.

Pseudokarst features are commonly observed at the contact between regressive facies of the Sparta Sand and transgressive facies of the Weches Formation. Seeps are common at potentiometric lows where the Weches Formation is exposed at the land surface. Focused discharge features are sparsely distributed where ascending fluids derived from the Queen City Formation pass upward along fractures through the Weches Formation aquitard to discharge laterally through the Sparta Sand. These focused discharge features can produce isolated caves through mechanical erosion by ascending fluids and exhibit morphometric features similar to those observed in hypogene karst.

Much recent research in karst science has focused on hypogene karst systems, their hydrology, geochemistry and the associated suite of cave patterns and geomorphic features. Similar geomorphic features have been documented in eogenetic island karst while current research on pseudokarst of east Texas shows similar morphologies. However, in both eogenetic carbonate karst and clastic pseudokarst, the complete suite of hypogene features are not observed, indicating that individual geomorphs may form by multiple processes but are only found in continuous packages delineating mixed convection flow in hypogene caves.