

AVOIDANCE OF HYPOGENIC KARST CAVERNS FOR OIL AND GAS DRILLING THROUGH THE USE OF FULL TENSOR GRAVITY GRADIOMETRY DATA

Alan Morgan, Bell Geospace; Scott Payton, Bell Geospace; Greg Jorgensen, Flat Irons Geophysics; Kevin Stafford, Stephen F. Austin State University

Surface topography often dictates where oil and gas drilling pads are placed primarily due to the economics of site preparation. Sites with flat topography require less fill material and are chosen in favor of sites with sloping relief. Many surficially-expressed karst features are avoided by drilling pad site selection over flat terrain, but not all subsurface karst manifestations are avoided as per drilling fluid losses encountered by multiple boreholes from two pad sites within the Delaware Basin of West Texas. Full Tensor Gradiometry is used to map out dissolution trends within the Rustler and Castile formations and also high grade lower risk drilling pad sites for future drilling. Data indicate spatial trends consistent with previously documented karst development and have been interpreted to represent solutional karst porosity, either open caves/cavern systems or brecciated zones.