

2.5 DIMENSIONAL INDUCTIVELY COUPLED RESISTIVITY STUDY OF KARST GEOHAZARDS

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Differential dissolution of Permian evaporite karst throughout the Gypsum Plains of west Texas has become a significant geotechnical problem. This is especially significant in Culberson County due to an increase in heavy vehicular traffic related to increased petroleum exploration, extraction, and transportation within the region. The Castile Formation which is the dominant formation within the study area, consists of gypsum/anhydrite and is highly susceptible to dissolution and karstification by meteoric and groundwater flow. Karstic features along roadways in the Castile outcrop are common and includes sinkholes, surface subsidence and caves of both epigenic and hypogenic origin.

Traditional methods of conducting karst surveys can be very effective in mapping the extent of subsurface features once they are located based on surficial expression. However, these methods sometimes fail to delineate the full extent of subsurface features that are not manifested on the surface. Department of Geology at Stephen F. Austin State University have collaborated with the Texas Department of Transport (TxDOT) to conduct a comprehensive resistivity study over several miles of roadway located along RM 652. Researchers utilized an OhmMapper TR5 resistivity meter, a capacitively coupled resistivity instrument, to scan and collect 2D resistivity data along sections of roadways. The 2D resistivity scans were inverted using the 3D EarthImager software to produce 2.5D models of the subsurface, and used to characterize the extent of karst geohazards. This presentation represents preliminary 2.5D model results from a broader and much more comprehensive study.