




# Subsurface Structure of the St. Elmo Submarine Volcanic Mound and its Volcanic Conduits Imaged Using Geophysical Methods, Austin, Texas

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## ABSTRACT

Geophysical survey techniques including electrical resistivity imaging and magnetics were utilized to study the Late Cretaceous submarine volcanic mound of St. Elmo Railroad Cut located in south Austin, Texas. The St. Elmo site cut exposes a sequence of Upper Cretaceous volcaniclastic rocks in contact with the Dessau limestone, which is part of the Austin Chalk Formation. Resistivity imaging results provided subsurface evidence that the St. Elmo submarine-mound has high resistivity limestone blocks scattered randomly within the resistivity sections. These limestone blocks are interpreted to be erratic blocks of Austin Chalk, which were probably torn from the walls of the volcanic conduits (vents) and ejected. Resistivity data from eastern profiles of the St. Elmo Mound indicate three conduit-like anomalies, and are probably part of the eruption center in the study area. The high magnetic anomalies correlate well with the resistivity anomalies supporting the interpretation of the resistivity data. Resistivity results from the residential site, not far from the St. Elmo volcanic mound, indicate a conduit which is similar to the conduit anomalies observed on the St. Elmo Railroad Cut site. Combining these results and previous geological information suggest that the study area was part of a volcanic activity during the Upper Cretaceous time.

Results of this study showcase the effectiveness of integrated resistivity and magnetic imaging for mapping and characterizing volcanic mounds in detail, as well as constraining the lateral and vertical boundaries of volcanic mounds, and in this case, the adjacent Austin Chalk formation. These results also indicate that the combination of resistivity and magnetic data may provide valuable information in terms of delineating volcanic vents and dikes and defining the geological contacts of volcanic rocks in the state of Texas, and somewhere else in similar geologic settings.

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## NOTES