



GEOGULF2021

A U S T I N
October 27–29, 2021



Subsurface Structure of the Pilot Knob Submarine Volcano (Austin, Texas) Imaged Using Resistivity and Magnetic Methods

Mustafa Saribudak

ABSTRACT

Pilot Knob represents an extinct submarine volcano in a shallow sea that had a brief period of eruptive activity during the Upper Cretaceous time. The Pilot Knob is located in south Austin and is part of the Balcones Magmatic Province (BMP), which includes approximately 200 occurrences of igneous rocks emplaced during the deposition of the Austin Chalk (limestone) Formation. Pilot Knob, however, is the best exposed volcanic marine eruptive center in the BMP of Texas.

Several resistivity imaging and magnetic surveys, two of which cross the entire apex of the volcano, indicate significant information about the internal structure of the volcano. These findings are: (1) several dikes and eruption centers (craters), (2) a buried volcanic core overlain by layers of low resistivity basaltic flow and resistive Austin Chalk layers, (3) scattered, slumped and rotated Austin Chalk blocks through the volcanic matrix of the volcano, especially near the apex of the volcano, (4) a huge volcanic eruption center cutting through the tuff units in the west part of the volcano, (5) horizontal basaltic flows in the northern and southern part of the volcano, and (6) long resistivity and magnetic profiles crossing the volcano helped define the buried boundaries of the basaltic eruption centers and tuff units (pyroclastic). One of the striking results of this study is that magnetic and resistivity data indicate peculiar low magnetic and low resistivity values, respectively, across the majority of the Pilot Knob volcano. This could be due to the extensive alteration of volcanic rocks, which formed almost entirely beneath the sea level.

NOTES
