Rhodes, Greece is widely known for the Colossus of Rhodes, one of the Seven Wonders of the Ancient World. A portion of the island, The Medieval Old Town of the City of Rhodes, was declared a World Heritage Site due to its preserved historical sites. Ground penetrating radar (GPR) was conducted at several sites throughout the Old Town using a pulseEKKO 1000 Sensors and Software system. We will focus on the value of GPR as a noninvasive method used in the archaeological investigation at the Palace of the Grand Master of the Knights of Rhodes. Through-out the palace grounds, 3 survey grids where collected. The investigation sought to locate remnants of a castle wall created during Byzantine rule and locate a portion of the wall which is hypothesized to have stood on the palace grounds. Over 100 GPR transects were collected with an antenna frequency of 225 MHz and step size of 0.05 meters. Processing of the data using various GPR software programs resulted in 2D profiles and 3D images. Analysis of the results show significant subsurface anomalies interpreted as historic remains, including the Byzantine wall. The results from the investigation can be used to facilitate future excavations.

INTRODUCTION

Ground penetrating radar (GPR) is a geophysical technique that uses electromagnetic (EM) energy to collect and record information about the earth’s subsurface. GPR has a wide variety of uses in fields such as geology, engineering, city planning, geomorphology, and archaeology (Johnston 2012; Basile et al. 1999). GPR is able to detect stratigraphic layering and man-made features such as walls, pipelines, tunnels, human burials, and objects. The purpose of the project is to show how GPR is a suitable tool for investigating archaeological sites. Our goal was to locate the remains of the Colossus of Rhodes, one of the Seven Wonders of the Ancient World (Figure 5) along with structures from the Byzantine Empire that were thought to be destroyed.

GROUND PENETRATING RADAR AND ARCHAEOLOGY

The use of GPR for archaeological investigation has been a growing field throughout the scientific community (Conyers 2016). When compared to excavation, GPR has advantages including:

- Cost effective
- Nondestructive
- Real-time results

METHODS

GROUND PENETRATING RADAR

GPR images the subsurface using high frequency EM energy. An EM pulse is sent into the ground from a transmitting antenna. The pulse travels through the subsurface until contacting a material with differing energy. An EM pulse is sent into the ground from a transmitting antenna. The pulse travels through the subsurface until contacting a material with differing energy. The EM pulse is then reflected back to the surface and collected by the receiving antenna (Jol & Bristow 2000).

DATA COLLECTION

A total of three grids were laid out using survey tape throughout the palace grounds for GPR surveys (Figures 6-9). Each grid was collected with 225MHz antennae, 0.05m step size and a line spacing of 0.25m. The noninvasive and nondestructive characteristics of GPR makes it an ideal method of investigation.

CONCLUSION

The noninvasive and nondestructive characteristics of GPR makes it an ideal method of investigation for archaeological projects. Using GPR allows for pinpoint excavation, a term used by project leader Richard Freund. This type of excavation results in minimal disturbance of the site and therefore less time and less damage to potential artifacts.

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REFERENCES


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By using GPR at the Palace of the Grand Master, our team was able to locate an area of excavation that allowed the excavation site to be protected. Further excavation is necessary to determine where archaeological excavations can take place. Before excavation occurs it is necessary to try and locate historical documents, blueprints, or other helpful information in order to ensure the interpretations made are accurate.