Geophysical Research Abstracts
Vol. 13, EGU2011-2246, 2011
EGU General Assembly 2011

Defining Buried Remains in the Eastern Site of the Great Mosque and Hospital of Divrigi, Sivas-Turkey with 3D GPR Imaging

Selma Kadioglu (1,4), Yusuf K. Kadioglu (2,4), A. Akin Akyol (3,4)

(1) Ankara University, Geophysical Engineering Department, ANKARA, TURKEY (kadioglu@eng.ankara.edu.tr), (2) Ankara University, Geological Engineering Department, ANKARA, TURKEY (kadi@eng.ankara.edu.tr), (3) Ankara University, Baskent Vocational Higher School Program of Restoration and Conservation, ANKARA, TURKEY (aliakinakyol@gmail.com), (4) Ankara University, Earth Sciences Application and Research Center,(YEBIM), ANKARA, TURKEY

The Divrigi Great Mosque and Hospital is the most elaborately decorated medieval monument in Anatolia. The mosque was built in 1228-1229, in the small Eastern Anatolian mountain town of Divrigi, now in Sivas Province in Turkey, by lord of Mengujek Feudals Ahmet Shah. At the same time the hospital was built by Ahmed Shah's wife Melike Turan Sultan. It is the oldest complex in Anatolia. The exquisite carvings and architecture of both buildings put them among the most important works of architecture in Anatolia and led to their inclusion on UNESCO's World Heritage List in 1985. Of particular note are the geometrical and floral reliefs on the main door. The 3D geometric styles and botanic designs were said "unique" by art historians and architects. Designs which embroider on doors and walls are asymmetric and every square have over then a thousand patterns.

The aim of this study was to determine old buried archaeological remains coming from Ottoman, Seljuk's periods respectively in the East site of the Great Mosque and Hospital of Divrigi with ground penetrating radar (GPR) method. Specifically, a wall from Seljuk's period was researched at the site which had topography slope.

Generally parallel 2D profile data is acquired in the archaeological area. 3D data imaging obtained from by lining parallel 2D profile data sets is used for slices of time at a constant depth. The locations and the depth of the remains in the study area can be determined with the slices of the 3D data volume. Therefore the GPR method gives more precise results than other geophysical methods. However, the obtained results and their interpretation can be further improved when the data set is visualized as a volumetric rendering of the remains. Thus anybody can imagine how that area looked like in the past by looking into the 3D image. Such imaging may be simulated by a transparent half bird's-eye view into the 3D data volume or its sub-volumes, particularly for difficult site which has an irregular topography. We attempted to realize this imaging by weighting the amplitude scale according to the time range and appointing an opaque interval to the weighted amplitude scale for each time range or depth range.

According to the visualization results, in the Eastern site of the Great Mosque and Hospital was identified under the remnants of Ottoman, Seljuk's periods respectively until 4m depths. The transparent 3D visualization results overlapped with the digging results of the site.

This study was supported by The Ministry of Culture and Tourism of Republic of Turkey and the Earth Sciences Application and Research Center (YEBIM) of Ankara University.