

RESULTS OF PRIMARY GEORADIOLOCATION SEARCHING OF SVETITSKHOVELI TEMPLE

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Abstract:

Radiolocation searching was carried out in 2010-2011 in order to study Svetitskhoveli Temple and its surroundings by archeogeophysical methods. Several profiles are drawn on inner and outer perimeters of Svetitskhoveli Temple. Anomalies, may be caused by artificial emptiness, are revealed by profiles. Anomaly revealed at the depth, perhaps is the water location.

Keywords: Radiolocation searching, geological structure.

Introduction

Svetitskhoveli Temple, as ancient structure, keeps numerous secrets inside itself [1].

In the XIX century three formal restorations of Temple took place but they were substandard and in vain. At the beginning of XX century Svetitskhoveli Temple appears in deplorable condition: water flowing and arches dilutions were fixed because of destroyed roof.

The first serious searching in order to study stability of Temple foundation was carried out in 1950. Commission of Svetitskhoveli Temple foundation studying fixed that width of foundation was not the same. Structure is built up in complex hydrogeological medium. Complicated condition of foundation is caused by soil settling during centuries [1].

Opening and searching of Temple floor was obligatory one during restoration workings in 1963-1975. The layers of old building were founded. At the south door of Svetitskhoveli it was appeared remainders of wood temple which, by historical data, was built up in days of Mirian King.

It was confirmed that foundations of walls by all perimeter were not more than 0.5 meters. But on the other hand, foundations of the posts varied from 3 meter to 4 meter.

Important and necessary archeological workings were carried out in large territory in 2005-2006 in result of which it was gathered very significant material for Temple history: there are fixed old graves and samples of floors of various period; it was contoured limits of foundation by more or less accuracy, there were revealed huge archeological material- ceramics, remainders of ceiling of various period, floors of clay and ceramics of various epoch on the various levels etc. The manifold construction materials are found out: irregular grout, coal taking from burnt "floors", cloth and etc. the laboratory searching of which is going on up to these days.

According to archeological searching it is supposed that the remainders of Mirian King Palace must be in the yard of Svetitskhoveli Temple.

Goal of searching and method

Svetitskhoveli always was the object of searching of Georgian scientists – historian, art historian, archeologist [2-4].

Archeological searchings were worked out in 2010-2011 and two main tasks were considered:

1. Search of archeological remainders in the territory of Svetitskhoveli Temple and its surroundings by radiolocation method.
2. Study of the geological structure of Temple surroundings by the same radiolocation method.

The idea of searching by georadar method is pretty simple: electromagnetic waves radiated by feeding antenna are reflected on underground object and are observed on the surface by receiver antenna. Visualization of getting results is implemented by graph of relation between the time of entry of reflected wave and distance which is analogous to the hodograph method. The wave frequency, used in the georadar method, is sorted relevant to the task.

Gepradar “zond12” with its 150 MHz and 2 GHz antenna was used for georadiolocation works. Data was elaborated by programme “Pizm2.5”.

Several experimental profiles were drawn (fig.1) inside and outside of the Temple.

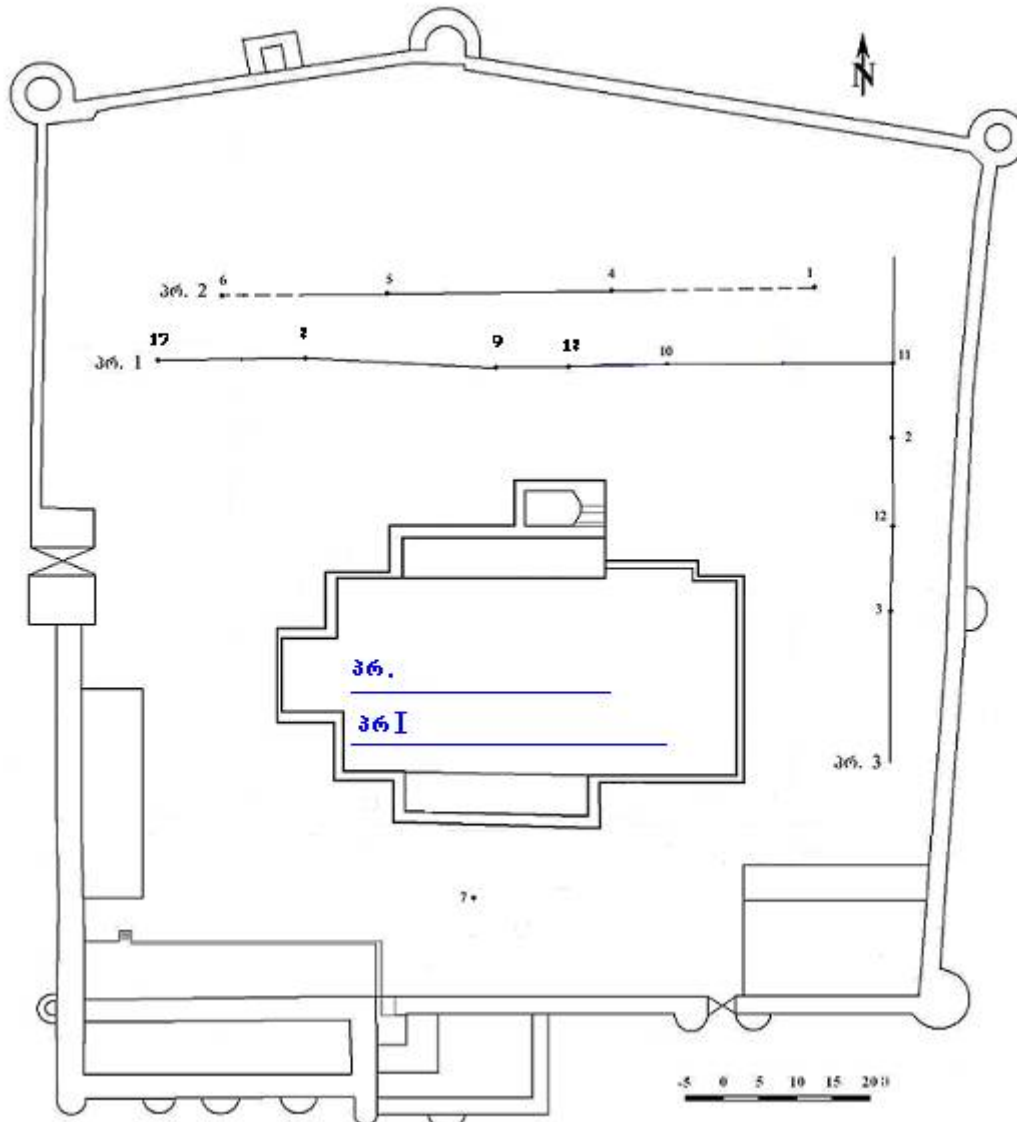


Fig.1. Scheme of profiles location

ORSMB digital filter and option of Fourier fast transformation were used in radiogram elaborating. It was selected special function of amplification which let us to separate anomalies.

Results of searching

Let us consider the first georadiolocative inner profile of Svetitskhoveli Temple getting by using of 2GHz antenna (fig.2)

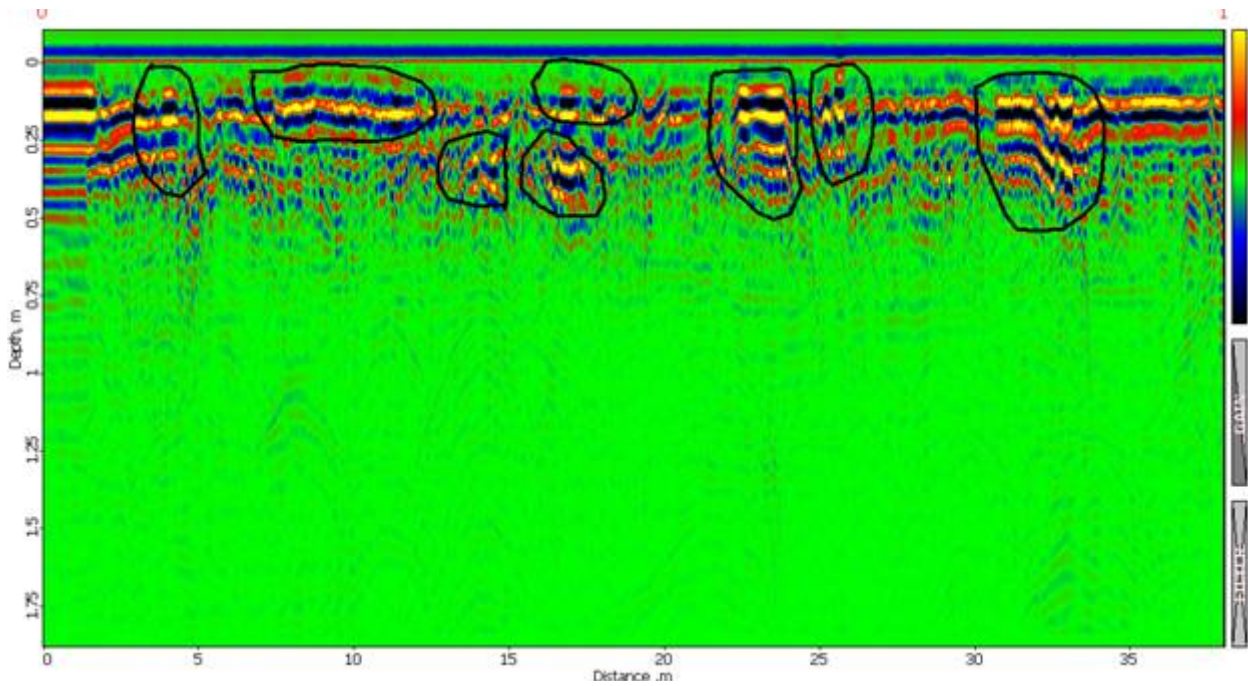


Fig.2. Radarogram getting in result of 2 GHz antenna in the first profile in the inner part of Svetitskhoveli Temple

Eight anomalies are separate in the profile. Objects with parallel synchronism axis 2-2.5 meter long (at 20m, 25m and 30.35m distance) among them may be identified as artificial emptinesses. It is not excluded that symmetrical object at 15 m distances has artificial origination.

Radarogram of the second profile drawn in the inner part of Svetitskhoveli Temple is presented in fig.3.

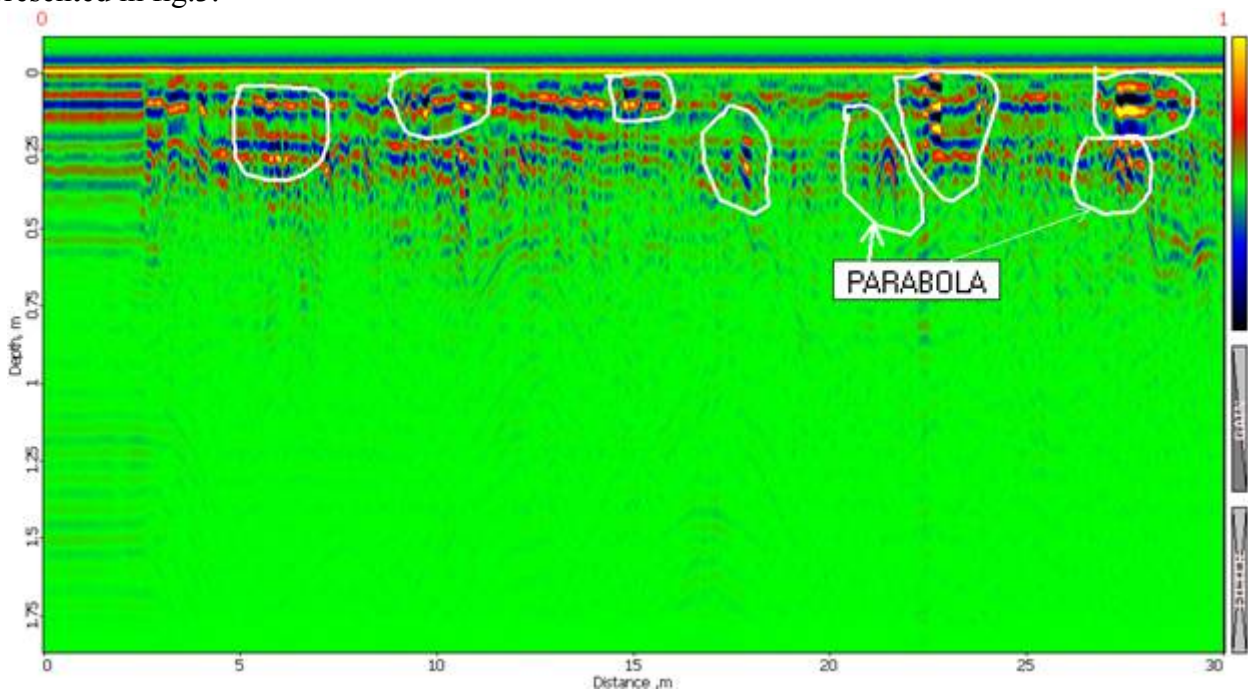


Fig.3. Radarogram getting in result of 2 GHz antenna at the 30 m distance in the second profile in the inner part of Svetitskhoveli Temple

There is separated symmetrical heterogeneity at 15 m distance and possible artificial emptinesses at the 25 m and 30 m.

We used so-called comparison method of parabols elaborating. Correlative dielectric conductivity of the medium upon a reflective object is calculated. It equals to 5 along a second profile. It means that there may be sandstone.

Georadiolocation profile was carried out in the same profiles by 150 MHz antenna. Radarogram getting in the first profile is shown in fig.4.

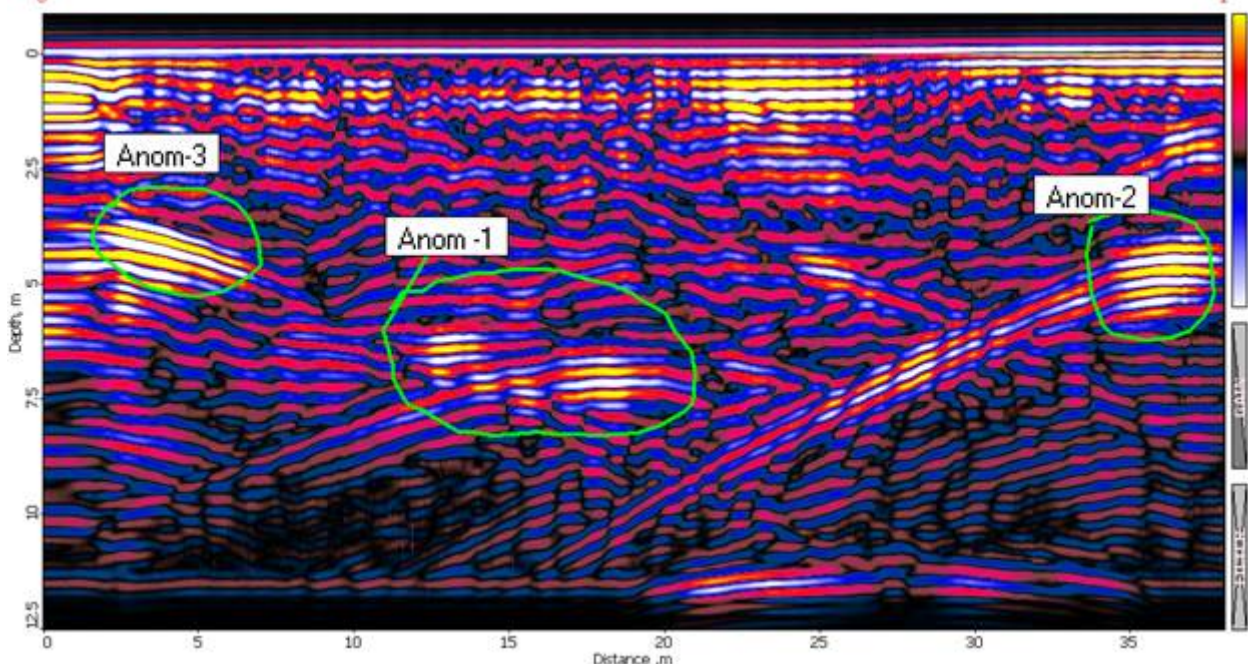


Fig.4. Results of georadiolocation profile in the inner part of Svetitskhoveli Temple by 150 MHz antenna. Possible emptinesses are located by curve lines.

Possible emptinesses are contoured. Anomalies located at the surface correlate with georadiolocation results getting by 2GHz which is shown in fig.3. Contoured anomalies may be identified like artificial emptinesses in the section.

Two strong anomalies are separated in the section 2X3 m (fig.5). Anomalies revealed in the first profile, relevant them, are very weak but they appears in the following profile. Very good located shallow and deep (about 10 m) objects are revealed in fig. 5.

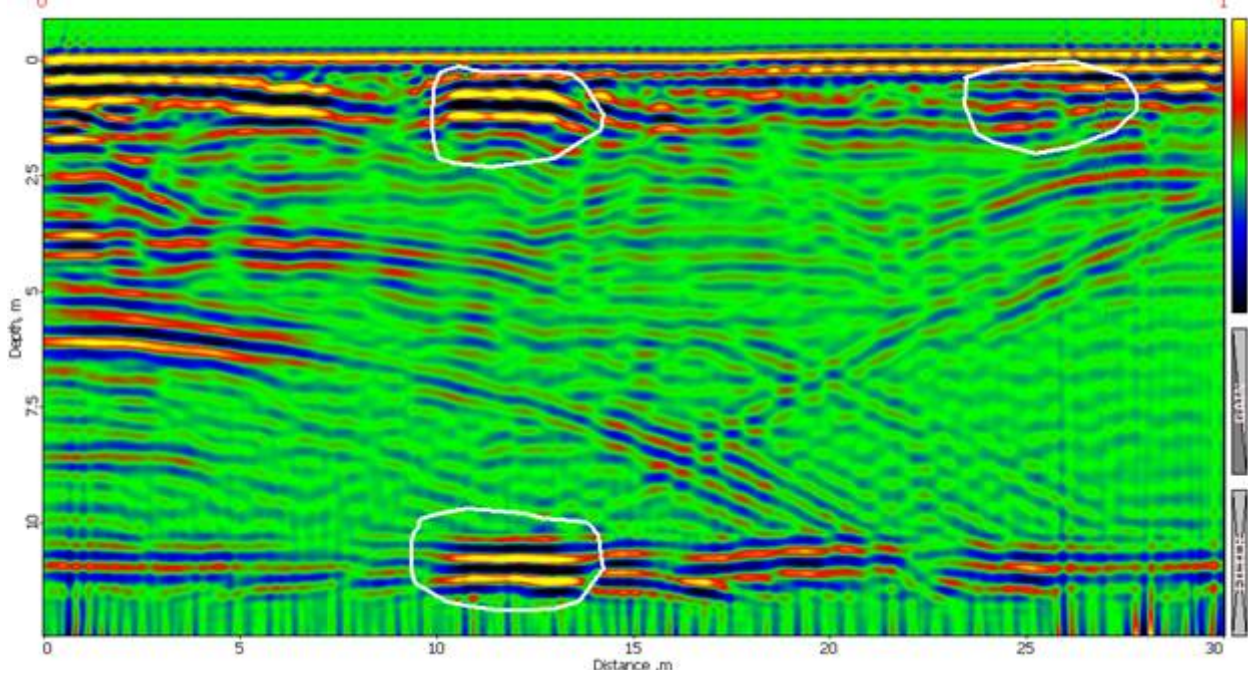


Fig.5. Second profile (at a distance 5-6 m from the first profile) working out by 15 MHz antenna.

It is considerable that several common anomalies are fixed in fig.-es 4 and 5.

CONCLUSION

The several anomalies by 4 profiles drawn in the inner and outer parts of Svetitskhoveli Temple surroundings are revealed in result of archeogeophysical (georadiolocation) searching which may be caused by artificial emptinesses. The depths of these emptinesses are about 2-2.5 meters.

There are revealed 8 anomalies at all in the first profile during working by various antennas.

Data interpretation let us say that these anomalies are caused by artificial emptinesses. We can not exclude that the reason of anomaly, fixed at 15 m distance from the reference point, is emptiness too.

There are very well located objects in the first and second profiles at the depth 3-4m, 4-5m, 7.5m and 10m by 150 MHz antenna.

Especially considerable is the fact that two anomalies, parallel to each other and about the same size, are separated near surface and approximately at the 10 m depth which are identified as emptinesses.

Anomaly, elaborated by data of the same two profiles and revealed below 10 meters, should be location of water.

Getting results because of their complexity need future compound studying which, at the present time, is beyond the frame of primary searching.

Work carried out for Svetitskhoveli Temple and its surroundings, shows efficiency of radiolocation methods.

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