

The Future of the Past: Study and Enhancement of Ancient Doclea (Montenegro)

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Since 2018, the ISMA and the ITABC of the National Research Council of Italy (CNR), in collaboration with the Historical Institute of Montenegro – University of Montenegro, under the auspices of the Ministry of Foreign Policy and International Cooperation of Italy and the Ministry of Science of Montenegro, started a series of integrated activities in order to launch new scientific researches on the roman town of *Doclea*.

The application of geophysical methods for archaeological prospection and cultural heritage dates back to the early 1950s. The main techniques used for diagnostics of cultural heritage are: the magnetic-field method, gravitational surveying, electromagnetic methods, Ground Penetrating Radar, Electrical Resistivity Tomography, and the Self-Potential method. In the case of *Doclea* Ground Penetrating Radar was chosen.

GROUND PENETRATING RADAR SURVEY

Fig. 1a reports the results of GPR investigations carried out around the *thermae*, the *capitolium*, in the space in the southern part of the private house and in the southern sector of the northern walls, relative to the time window 14-18 ns (about 0.7-1.4 m in depth), overlapped on the satellite image of Google Earth™. The anomalies seen in these representations depict the spatial distribution of the amplitudes of the reflections at specific depths within the grid. Within the slice, low amplitude variations express small reflections from the subsurface and, therefore, indicate the presence of homogeneous material. High amplitudes denote significant discontinuities in the ground and evidence the presence of probable buried objects.

In Fig. 1b, an interpretation of anomalies is attempted and the plan of probable inner walls is given. In particular, both different rooms around the *thermae* and an open space (a probable courtyard, signed with letter A) between the two thermal baths are well imaged, as well as some hypothetical bases of columns (black circles equally spaced) at the southern border of the *decumanus*. The G1 anomaly (Chart 1) could be related to a border of the *cardo* that cross the *thermae*. In the southern part of the private houses, even if there are some disturbance due to the presence of modern paths (signed with dotted black lines), interesting anomalies are shown.

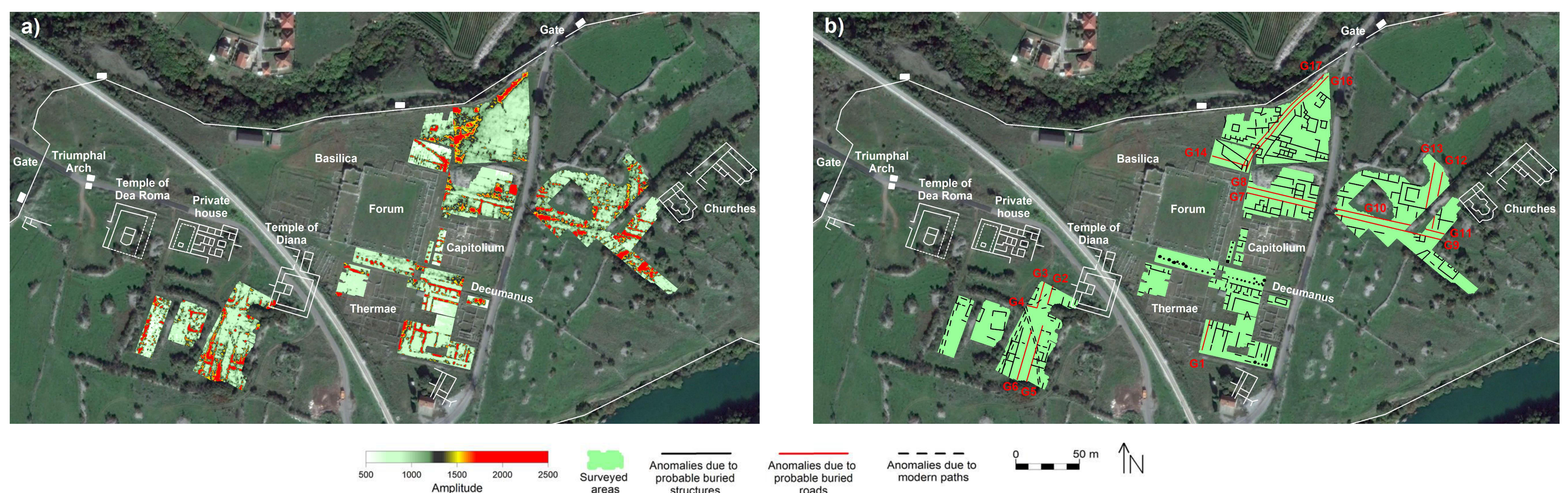


Figure 1: GPR results: time slice relative to the time window 14-18 ns (about 0,7-1,4 m in depth), overlapped on the satellite image of Google Earth™ (a) and identification of anomalies (b).

Different squared maxima of amplitude are associated with a linear linear anomalies (signed with red lines, G2-G6 anomalies in Chart 1), whose projection in the northern sector of the city cuts the *decumanus* perpendicularly: it can be attributed to a *cardo* and gives important information on the division of the city into *insulae*. Other traces of the roads are visible in the northern eastern part of the *capitolium* (G7-G16 anomalies in Chart 1). Finally, some irregularities have been highlighted in the urban scheme: in the northern sector the road curves towards the north gate (G15 and G16 anomalies in Chart 1), breaking the regular pattern visible in the south (G9-G13 anomalies in Chart 1), and to the west of the churches, the streets identified, allow to measure a block with a width of 75m. The work are still proceeding: the main objective is to produce a full map of the hidden structures inside the walls of the city – such would be most useful in guiding archaeological excavation and in assisting in the valorization of the site.