Magnetometric and ground penetrating radar investigations in the Aegyssus archaeological site

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The Aegyssus archaeological site is located on the Monument Hill in the North-Eastern section of Tulcea, the fortress was built at the end of the 4th century B.C. Its name, of Celtic origin, derived from a legendary founder, Caspios Aegyssos. At the beginning of 2nd century, the town was included in the Danubian limes (boundary). Then, starting with the 3rd century, it became an important military headquarters. The 6th century finds it as an episcopal residence. Urban life knows an end in the first quarter of the 7th century and a revival in the 10th and 11th centuries.

The geophysical investigation has been performed by means of the integrated use of three different high resolution and non invasive geophysical techniques: magnetic mapping, ground penetrating radar profiling (GPR) and magnetic susceptibility measurements.

Magnetic and ground penetrating radar methods are widely used for archaeological prospecting as very effective methods able to detect buried structures at small depths. These methods were applied for the investigation of two perimeters within the site of the ancient city of Aegyssus, an ancient Roman fortress from North Dobrudja, Romania, which was built in the first century. The primary objective was to determine the extension in the underground of a partially excavated wall. The maximum magnetic anomalies revealed the possible location of the buried wall.

The magnetometric investigation has been carried out using a protonic magnetometer G-856 GEOMETRICS in gradiometric mode, with the two magnetic sensors set in a vertical direction separated by a distance of 1 m.

A total of 20 ground penetrating radar profiles were acquired with 250 MHz antenna aiming in identifying geological and archaeological anomalies in order to assist archaeologists in an excavation program.

The GPR results indicated clear geophysical anomalies characterized by hyperbolic reflections. These anomalies were confirmed by the excavation of test units, allowing the identification anthropogenic features such as a fire-hearth structure and wooden artifact, and natural features.

The results showed the efficiency of GPR and magnetometric methods in identifying potential buried archaeological targets, and they are oriented towards reducing costs and increasing the probability of finding archaeological targets.
Our geophysical results helped to define spatial pattern of the buried remains, to define the geometry of the anthropogenic settlements and to obtain detailed information about the composition and the manufacturing processes of different building materials.

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