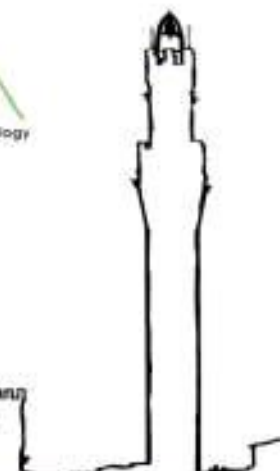


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University of Siena

Department of History and Cultural Heritage



The application of mathematical and statistical integration Approach on archaeological prospection data, case studies from Aizanoi, Turkey.

The success of geophysical prospection methods applied on archaeological sites, to detect and identify the buried structures under the ground, depends on the nature of the features such as physical and geometric properties and environmental effects such as soil conditions, sensibility of equipments and experience of researchers. Consequently, to obtain reliable and complementary results, it is recommended to apply multi-geophysical methods and integration approaches on archeogeophysical field data (Weymouth, 1986; Neubauer et al,1997; Piro,2000; Clay,2001). An application of geophysical integration methods which often appeared are divided into two class as qualitative and quantitative approaches. Qualitative approaches includes depicting the location of cultural features and interpretation of combined maps obtained from different geophysical methods. Besides that, quantitative approach includes the mathematical and statistical solutions for integration (Kvamme et al.,2006).

The purpose of this work is the application of mathematical and statistical integration approaches by using different geophysical data on archaeological site. For this purpose, the synthetic models were generated to correlate between integration approaches. The processes were applied on field data obtained by using ground penetrating radar and magnetic methods at the Aizanoi Archeological site, Kütahya, Turkey.

Primarily, the geophysical data were examined individually by referencing archaeological maps and the anomalies which are related to possible walls, roads or foundations were identified. In order to obtain clear informations about these anomalies, integration techniques were applied on field data. For the integration process, mathematical approaches as Sums and Products of the obtained processed maps and statistical approach as Principal Component Analysis were applied to elaborate the GPR and gradiometric datasets. The results of all integration approaches provided more details about the anomalies related to the archaeological features.

SESSION 3A

A DIALOGUE BETWEEN ARCHAEOLOGICAL SCIENCE AND COMPUTER VISUALIZATION

Particularly, the application of Principal Component Analysis is thought to be a technique for mathematical approaches. By using all those applications, it is clear complementary images about the archaeological relics under the ground.