APPLICATION OF A TERRAIN MODEL IN THE INTERPRETATION AND EVALUATION OF A MAGNETIC SURVEY CARRIED OUT FOR ARCHAEOLOGICAL PURPOSES IN POROLISSUM, ROMANIA

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Presently, both geophysical surveying and archeological excavation requires precise determination of local coordinates and occasionally, the creation of a Digital Terrain Map. Besides topography implies essential information for archeology in itself, combination of topography with geophysical data is able to give further knowledge about the archeological objects. We carried out a high-resolution magnetic survey over the Roman-age ruins of the ancient town, Porolissum located in NW Romania. We surveyed an area of 100 m x 120 m with grid spacing of 0.5 m and we measured the total magnetic field and its vertical gradient. In this case study we present how joint application of magnetic and geodetic data can be used for topographic correction and interpretation of the magnetic anomaly map. Magnetic topographic correction is defined here as the removal of disturbing magnetic signals caused by the topography. In this procedure the induced magnetic field is calculated using the geomagnetic field of the Earth and the magnetic susceptibility of the soil. The induced magnetic field is subtracted from the measured data. We also investigate the magnitude of the induced field considering three different susceptibility values (0.0035, 0.005 and 0.01 SI) of the soil. In the correction the remanent magnetization of the soil is neglected. The correction was made for both the total field and the gradient. With the help of the topographic correction the obtained anomaly maps contain more details and they are easier to interpret. The corrected magnetic gradient map shows streets and foundations of houses like a present day city map. In some places two generations of houses built on top of each other's foundation can be recognized as the walls of different ages have different directions. The magnetic maps proved to be very useful in reconstructing the structure of the ancient city.

magnetic surveying, digital terrain model, magnetic susceptibility

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