O13-5	GPR EXPLORATION FOR CONCEALED ANTIQUITIES IN THE ARCHAEOLOGICAL SITE OF VERGINA (MACEDONIA – HELLAS)

I. C. MERTZANIDES [1], P. M. SOUPIOS [1], G. N. TSOKAS [1], G. VARGEMEZIS [1] and C. PALIADELI-SAATSOGLOU [2]

[1] Geophysical Laboratory - School of Geology, Aristotle University of Thessaloniki, Greece.
[2] Department of Archaeology and History of Arts, Aristotle University of Thessaloniki,540 06 Thessaloniki, Hellas Greece.

GPR (Ground Penetrating Radar) method has been successfully used in archaeological prospection over the last fifteen years (Vaughn, 1986, Goodman, 1994, Goodman et al., 1995). The present paper reports the investigation carried out in the archaeological site of ancient Aegae (Vergina), the first capital of the ancient Macedonia and the place where the tomb of Phillip the 2nd (Alexander the Great ‘s father) has been found.

The site was investigated using a pulse EKKO GPR system, carrying two antennas of 450 MHz centre frequency. Data were collected along 0.5 m spaced traverses getting one trace every 10 cm. These common-offset single-fold profiles covered an area of 400 m^2 approximately.

The data were subjected to A.G.C. to equalize all signals by applying a gain that is inversely proportional to the signal strength. To remove the low frequency inductive component which is superimposed on the high frequency reflections, a running average filter was applied on each trace. The average value of all the points in a window, with a width the same as that of one pulsewidth at the nominal frequency, was calculated and then subtracted from the central point, process known as signal saturation correction. Special types of temporal and spatial filtering were applied to suppress the unwanted signal and enhance the dipping events (Annan, 1993). So the results are shown in Figure 1.

The requirements of the archaeologists for an easy and more perspective way of viewing the subsurface, in order to make a more sufficient interpretation, brought the need for creating sectional plans of the GPR profiles. This was achieved by considering the data set as a volume of data that can be sliced in various ways. As often happens in the case of seismic reflection, data can be sliced along vertical or zig-zag lines and along reflection horizons or horizontally to provide time slices (Telford et al., 1988). Time slicing is attempted to image the subsurface by providing a planimetric vision of the buried bodies (Goodman et al., 1995). Records in specific time windows were averaged out along the GPR sections. The time window used was several pulse widths of the transmitted radar signal. Selecting early or late time windows along the GPR time sections, shallow or deeper structures can be distinguished, respectively. Changing the width of the time slice (e.g. 5 or 10 ns), affects the clearness and resolution of the results. The gridded values were used to create time slice maps. Strong reflections, previously masked when comparing the individual radargramms, became clearly detectable. This energy comes from geometrical structures which are interpreted as concealed antiquities.

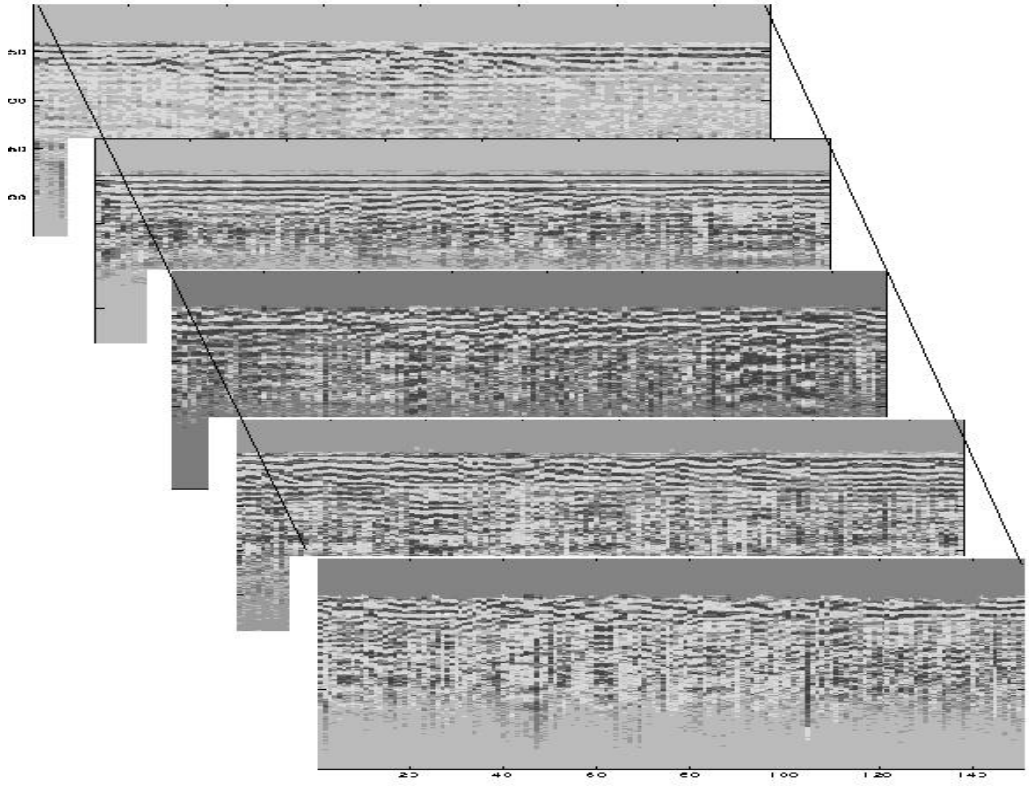

Fig. 1. GPR sections on the archaeological site of Vergina. Reflections are coming from structures of limited areal extent. Also reflections from flat horizons are present which reflect the near surface stratigraphic layering.

References

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