

Geomagnetic Survey of the Middle Neolithic Circular Ditch System Glaubendorf II, Lower Austria

The circular ditch system of Glaubendorf II was detected by aerial archaeology and is situated north of Vienna in Lower Austria. The monument lies on a slightly sloping terrace of the river Schmida. The site situated in loess soil is already heavily eroded. A first interpretation of the aerial evidence showed three concentric ditches and six regular entrances were suggested. A first archaeological excavation in 1986 opening a small 70 m trench proved the triple ditch monument with a single inner palisade as to date to the Middle Neolithic (4,800–4,500 B.C.).

Fig. 1. Magnetogram of the Middle Neolithic circular ditch system Glaubendorf II and the surrounding area; caesium gradiometer 0.35–2.85 m, area: 42,800 sqm; measuring grid: 0.125 m x 0.5 m; dynamic range [-3,6] nT

Fig. 2. 3D Visualization of the reconstruction of the Middle Neolithic circular ditch system Glaubendorf II. The reconstruction is based on an archaeological model of the filled ditch with four differently magnetised layers. The resolution of the reconstruction is 0.25 x 0.25 m and 10 cm in depth

Fig. 3. Archaeological interpretation with hypothetical houses (shaded grey). The ditches have diameters of 71 m, 90 m and 109 m and are between 3.5 m and 4.5 m wide. Inside the ditch system there are the remains of a palisade that has a diameter of 53 m.

The site was magnetically prospected in spring 1998. The magnetic survey covered 4.28 ha and was measured in a 0.5 x 0.125 m raster using a PICODAS MEP750 multisensor caesium-gradiometer with 0.005 nT resolution. The magnetic data was visualised as digital image and georeferenced for archaeological interpretation. The digital image representation shows a triple circular ditch system surrounded by various pits indicating the last remains of the former settlement. The circular ditches with diameters of 71.90 and 109 m are 3.5 to 4.5 m wide. They are interrupted by five entrances. The monument was actually constructed on a regular hexagon, but the sixth entrance was only built on the inner ditch and was dug through later. This could be shown by 3D modelling of the ditches and the according 3D reconstruction of the monument. In the centre a 2,000 sqm free area was surrounded by a palisade 53 m in diameter with only two entrances in the east and in the west. The palisade is only partly visible in the magnetogram due to erosion. In magnetics the area already excavated in 1986 no longer shows the traces of the palisade. Looking at the excavation results we have taken in account a mass of at least 40 cm eroded during the last 12 years. Due to this rapid erosive processes geomagnetics is the only way for the documentation of these oldest monuments in Middle Europe. More than 30 of them are situated in the Eastern part of Austria and half of them still awaiting geomagnetic prospection.

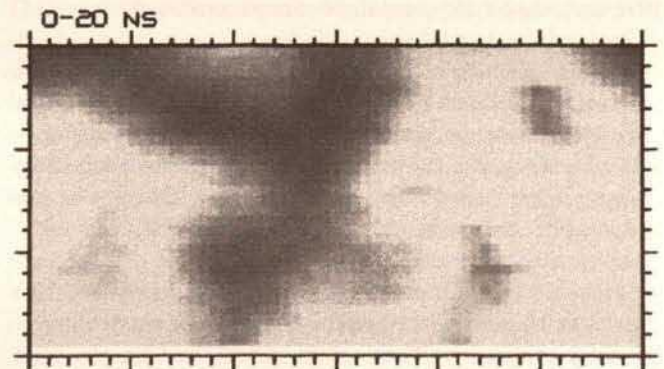
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A trial GPR Survey for Accomplishment of Deeper Penetration in Wet Soil Conditions

In the GPR method, the penetration of microwaves strongly depends on the soil conditions, and especially on the soil wetness. Soil wetness increases conductivity and thereby attenuates propagating radar waves. For accomplishing deeper penetration, an experimental survey has been carried out on Iki-Island, Japan, at a site where a channel was constructed 2,000 years ago for connecting a small port to a river. The channel is currently buried in a highly water saturated paddy field by up to 3 meters of soil. The soils currently within the buried channel and those buried below the channel floor are both primarily clayey wet soils.

A GPR survey using a 400 MHz antenna and a recording window of 200 ns was conducted on the site. The effective depth of relatively noise free reflections was down to about 100 ns or 3 meter depth. Special gain settings for the recorded signals and post-processing filtering of the radargrams was performed on the data prior to applying time slice analysis.

Fig. 1. Radar Time Slice Image at Haruno Tsuji from 0–20 ns



For helping to corroborate the GPR results, EM methods were used as a comparative study. The results using EM31 instrument

with a 3.6 meter coil spacing show very similar results recorded on GPR time slices between 80–100 ns.

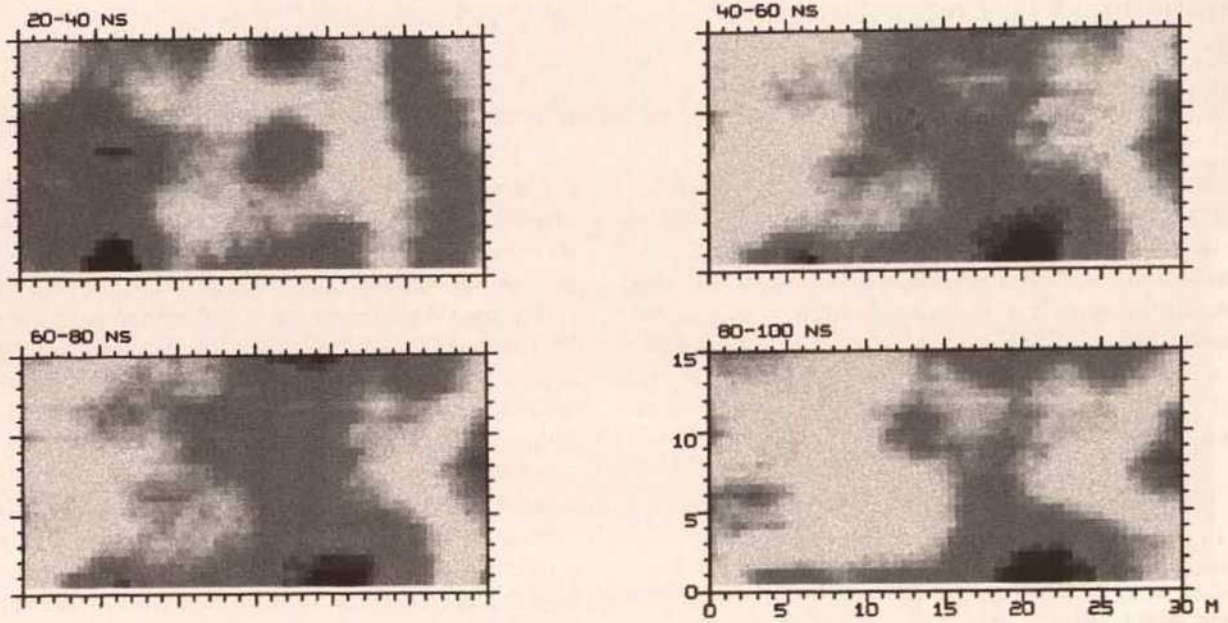


Fig. 2-5. Radar Time Slice Images at Harunotsuji from 20 to 100 ns

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Prospecting Roman pottery industries in the Argonne, France

The Argonne is a region in the north-east of France that is very well known for two reasons. First of all, it was an industry of Roman-age terra sigillata slipware, secondly the region was ravaged in the First World War. The area covers about 700 square kilometres and has several valleys running roughly north-south that cut through a chalk bedding. The French government has plans to develop the region. Prior to the development a large scale archaeological prospection took place. It was coordinated by Sander van der Leeuw from the University of Paris. The work started in the summer of 1996 and was finished in the autumn of 1998 covering 6 field-campaigns of one month each.

The work was carried out at 4 levels.

- Desktop analyses by importing a wide range of information into a GIS system. Geological maps, height-models, hydrological information, previous finds etc, etc, were all analysed.
- Field-walking was carried out at sites selected by the desktop analyses, producing many potentially new locations of Roman-age pottery ovens, but also locations of Roman settlements and road-structures.
- Geophysical surveys were carried out at sites discovered in the field-walking that looked promising for a close inspection.
- Pottery analyses produced additional information like dates and technical information on the pottery industry.

The results from the field-walking, the geophysical surveys and the pottery analyses were then imported back into the GIS, so a new analyses could be carried out. These new analyses were then used to guide the following field walkings and geophysical surveys. This iterative process made sure that a full representative sample of the region was prospected taking geology, hydrology and height into account.

A total of 7.5% of the 700 square kilometres were field walked, 32 sites were surveyed with geo-electrical and magnetic measurements covering a total of 47 hectares. With the help of students from the University of Utrecht, Department of Geophysics and the University of Patras in Greece, some geophysical experiments took place at several sites, trying to extract as much archaeological information from the discovered sites as possible. Many of the measured sites were also augered and the combination of the multiple measurements and the augering resulted in some remarkable archaeological information on the oven-sites.

Due to the integrated techniques and zooming in from large-scale surveys into close detailed inspections, a result was obtained that offers a good insight in the archaeology of the complete region.