

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.

Y. Nishimura, D. Goodman

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

