S. Piro (1) and D. Goodman (2)

(1) ITABC-CNR, Monterotondo Sc., Roma
(2) Geophysical Archaeometry Laboratory, Nakajima Otsuru

DETECTION AND VISUALISATION OF JAPANESE AND ROMAN ARCHAEOLOGICAL SITES

There are many methods available to the field archaeologist that enable them to remotely detect subsurface structures before beginning an excavation. Ground penetrating radar (GPR) is one of the most useful geophysical tools being employed. GPR equipment is capable of measuring structures to depths of several meters which is suited for many shallow archaeological sites. Because of the high quality of ground penetrating radar, it is now possible with new imaging software to easily manipulate the large datasets to create a variety of useful visualisation displays.

Data presentation and analysis can include: 3D time slices, amplitude isosurface rendering, render slicing, subsurface horizon correction, image overlay and anomaly enhancement.

![Image of GPR time-slices for Kofun Burial n. 111.](image)

**Fig. 1** - Saitobaru Archaeological Park. Horizon corrected GPR time-slices for Kofun Burial n. 111.

The unique and inherent value of GPR images are that they enable the archaeologist to distinguish shallower and more recent structures from ancient structures preserved at deeper levels. Dynamic presentation of the GPR data using image animation is also a useful tool to illuminate features in the data which can not be seen otherwise. GPR surveys have been used to detect burial mounds in Miyazaki Prefecture (Japan) as well as to find the remains of Roman marketplace...
and town called “Forum Novum” (Italy) beneath the ground. In Miyazaki Prefecture at the Saitoburu Kofun Archaeological Park, several burial mounds were surveyed with GPR and animation datasets created. Examination of the data indicate that burial moats and the general location, size and shape of the burial remains are successfully detected. At the ruins of the 1st century A.D. Forum Novum in Italy, dynamic displays of the datasets slow a large oval shaped structure 45 meter along its major axis. This structure is from a 1st century AD Roman amphitheater. The depth to overlain sediments, unseen in the individual static slices, is easily verified and imaged through the time/depth slices made through the surveyed site. 3D rendering of reflection isosurfaces showing incremental changes in the reflected amplitudes recorded is also being implemented in the data visualisation. 3D renders are enabling the archaeologists to examine the true orientation of subsurface remains without having to excavate. The advantages of answering archaeological problems without excavating is the true value of the GPR method, as any kind of intrusive excavation involves partial destruction of the site that can not be recreated once the soil is removed.

Fig. 2 - GPR time slice of the Forum Novum amphitheater at 6.7 ns.

REFERENCES

