Geophysical survey contribution in Archaeological Prospection: Survey at the Tobiotsuka Burial Mound – Okayama Prefecture

A geophysical survey was implemented in Tobiotsuka burial mound of the Kofun period (300-700 AD) in the framework of "*BEyond ARCHAEOlogy: an advanced approach linking East to West through science, field archaeology, interactive museum experiences*" EU project.

The geophysical survey was applied in the chamber and the outer part of the burial mound prior to the archaeological excavation aiming to facilitate the archaeological process pointing areas of interest.

TerraMarine was responsible for the Ground Penetrating Radar (GPR) survey – processing – analysis of the raw data interpretation & correlation with Electrical Resistivity (ERT) data.

Table of Activities:

Date DD/MM/YYYY	**Activities**
28/02/2019	- Mobilization to the Kofun, - Grid preparation in the chamber - Use of laser lever to mark the grid in the chamber - Data acquisition
30-31/03/2019	- Mobilization to the Kofun, - Grid set up at the outer part of the Kofun - Use of string to mark the routes - Data acquisition
05-06/03/2019	- Data acquisition - Demobilization
07/03/2019 – 10/05/2019	- Data Analysis -Processing & Reporting

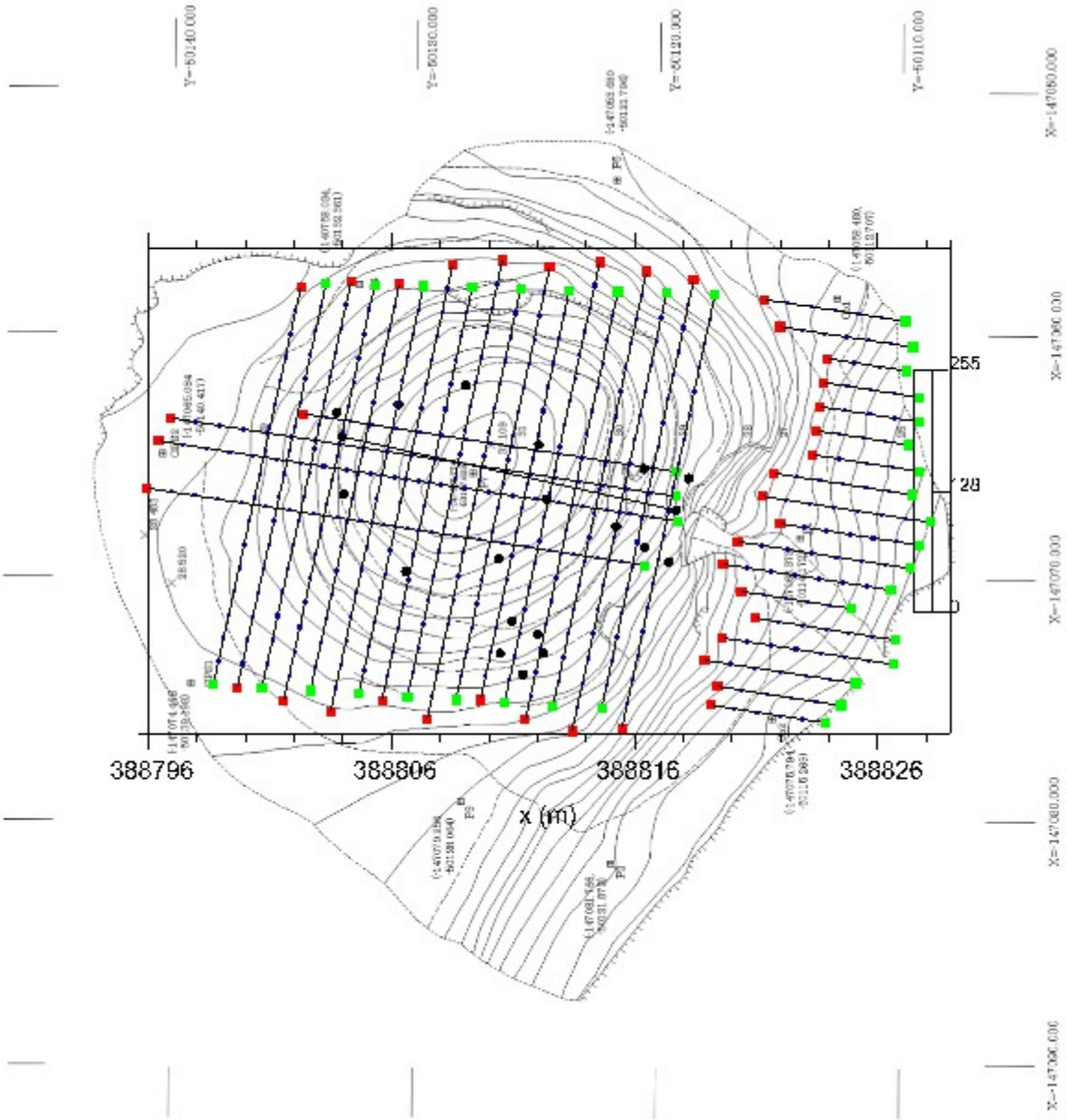

Figure 1: GPR grid in the outer part of the Tobiotsuka Kofun.

Figure 2: Photo during Data acquisition at the wall of the chamber.

The survey was designed and implemented to meet the requirements of the scope of work in terms of mapping with the best analysis and depth coverage the under study area.

GPR

The settings of the GPR system and the antenna frequency were set according to the local geological conditions. Trial recordings were performed with both 160 & 450 MHz before the data acquisition in order to define the settings and the parameters for the signal attenuation from the presence of conductive top soil, roots from the dense vegetation and the “electronic noise”.

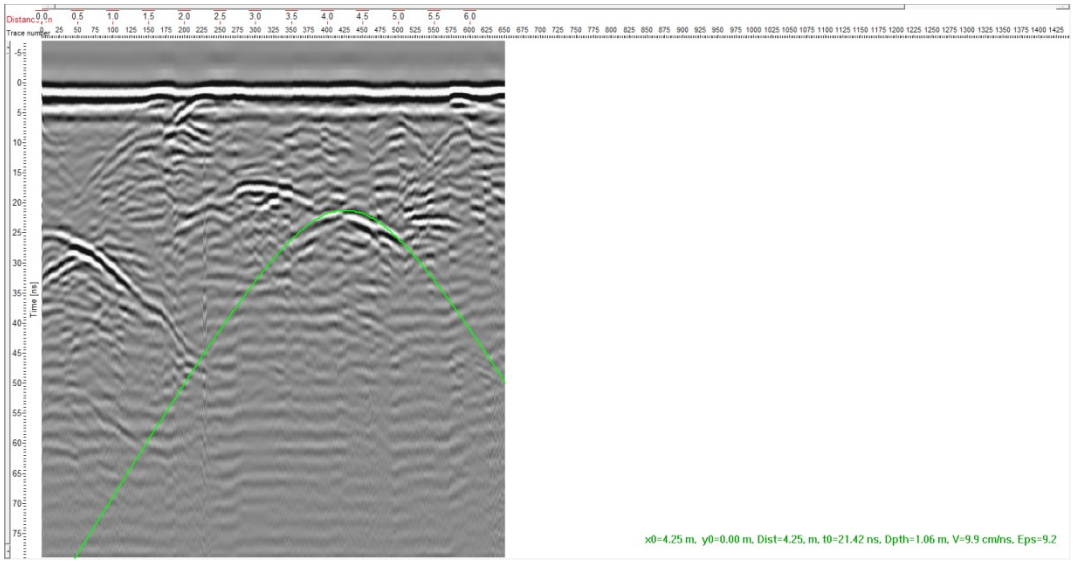

Figure 3: Velocity calculation. Typical hyperbola fitting gives V= 9.9 cm/ns.

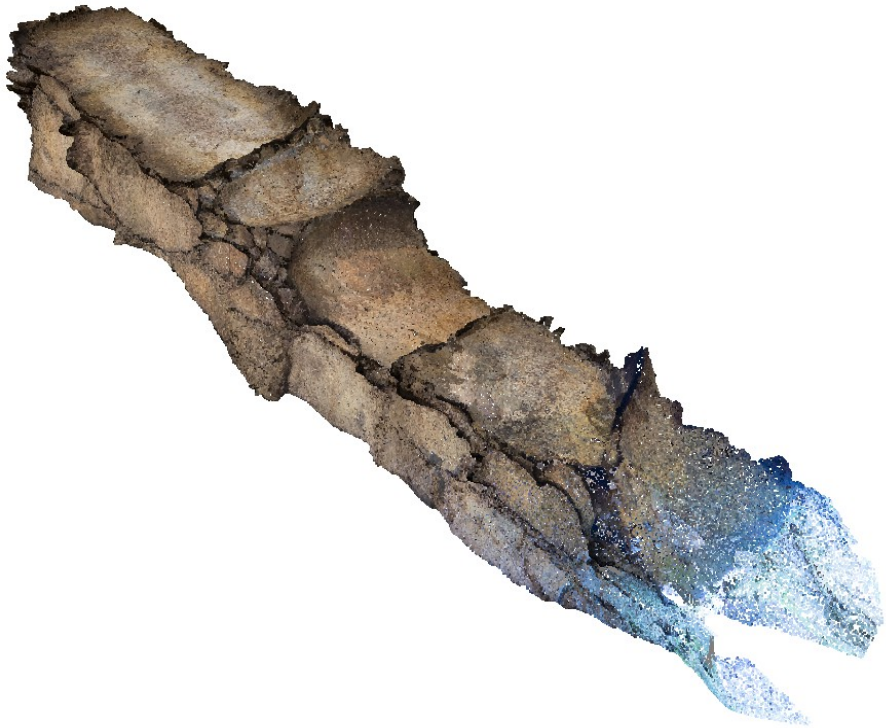

Figure 4: 3D Image of the chamber derived from the laser scanner point cloud *(PhD Dott.Arch. Nicolò Masturzo, Università di Torino - Dipartimento di Studi, Storici Laboratorio di Rilevamento e Documentazione.*

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Figure 5: Photo during site visit and grid design inside the chamber.

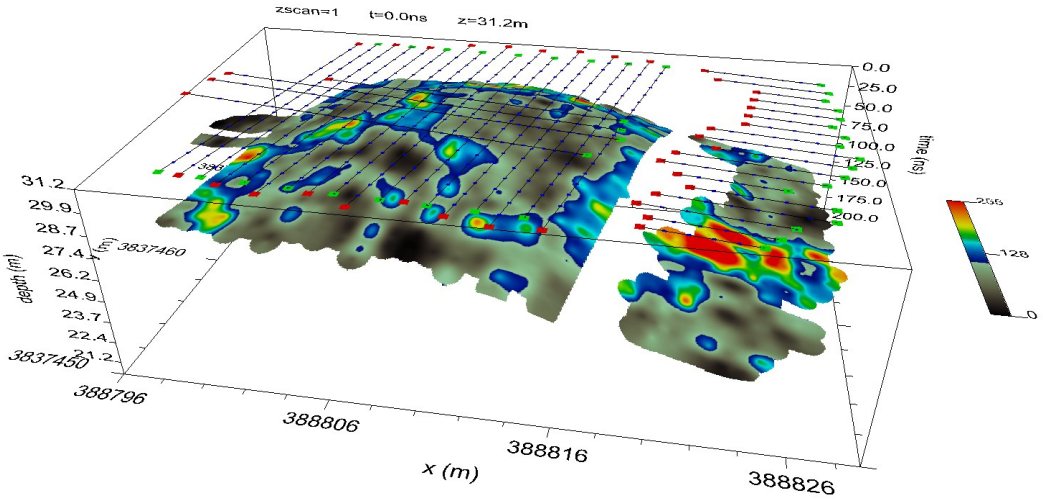

Figure 6: 3D image of the GPR amplitude map for the depth of 31.2 m with the GPR grid lines.

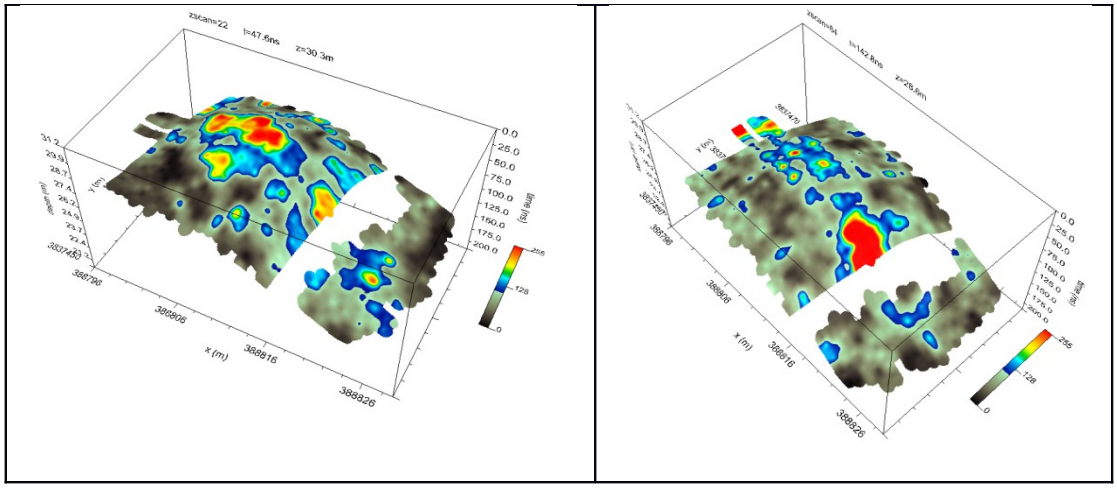

Figure 7: 3D image of the GPR amplitude map for the absolute elevation of 30.3 m (left image) and 28.6 m (right image).

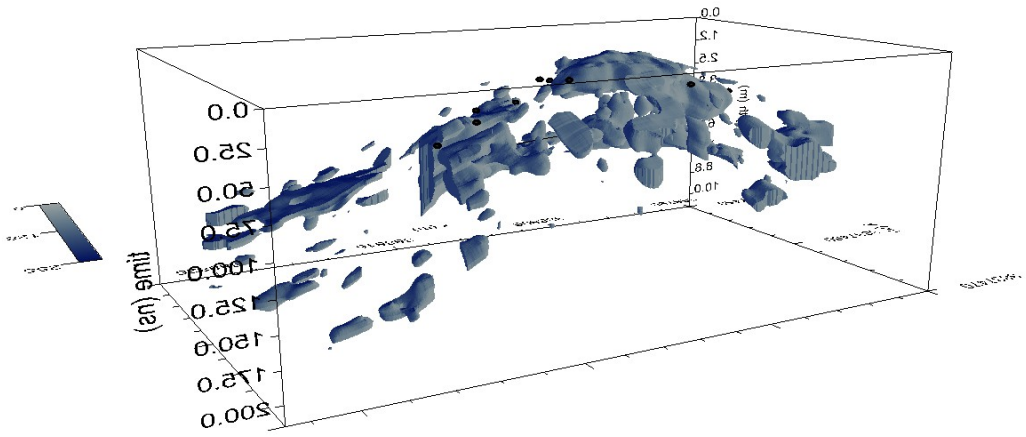

Figure 8: 3D image of the GPR isosurface at the outer part of the tomb. Isosurface renders displays of surfaces of equal amplitude in the 3D volume.