

Geophysical Investigations of an in situ Roman Mosaic floor in Volubilis, Morocco

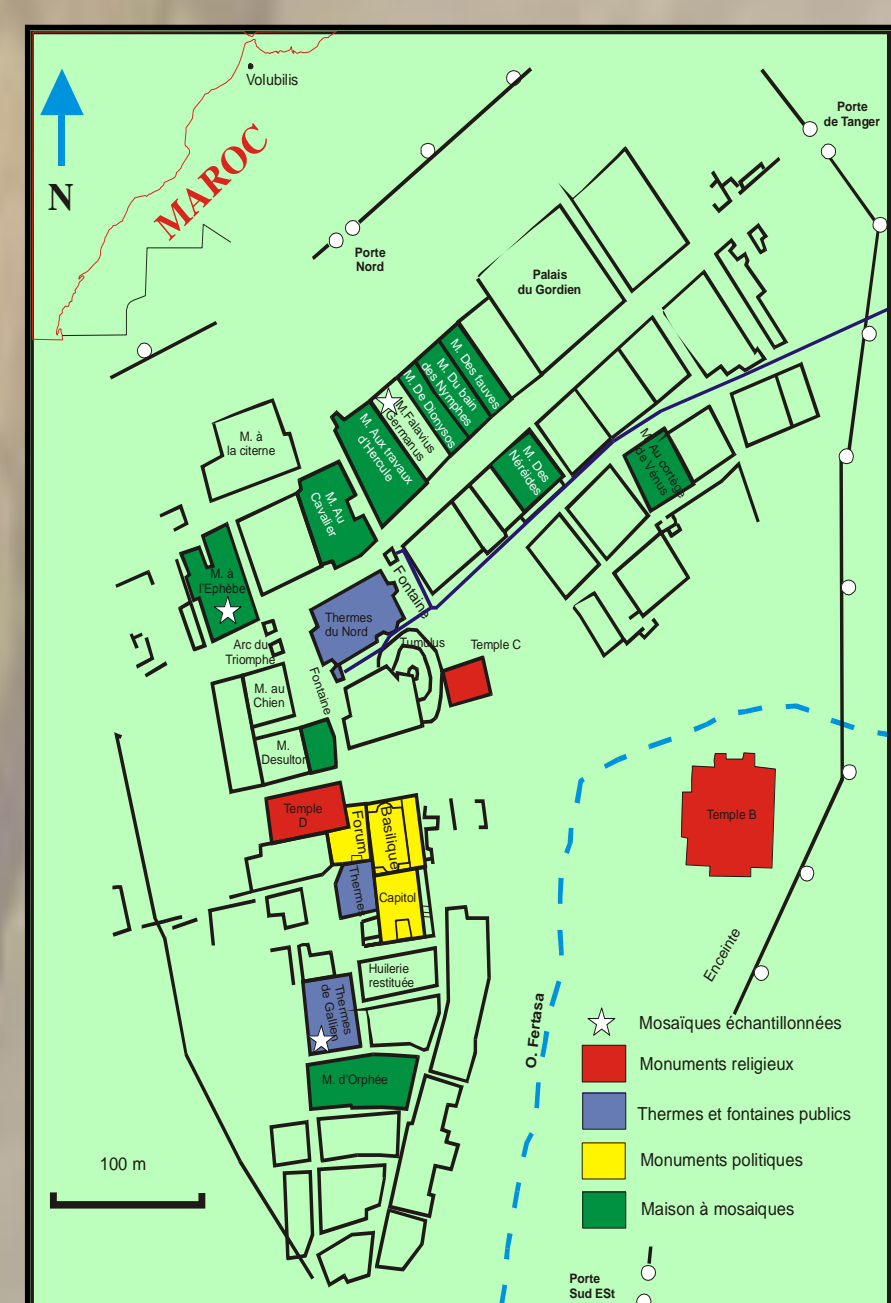
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OBJECTIVES



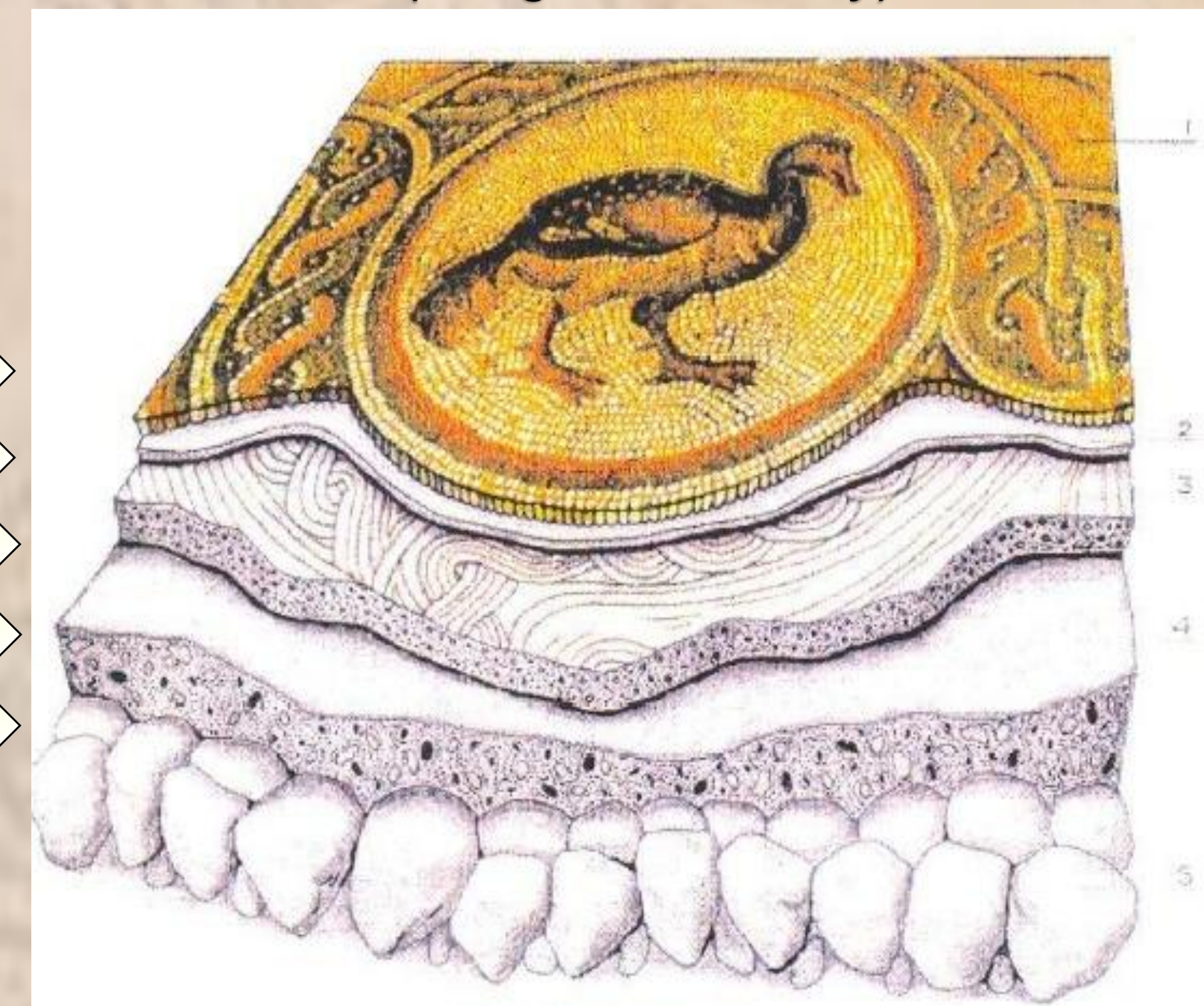
Volubilis located at the NE of Meknes, Morocco is an archaeological Roman site with many home, public baths, religious and official buildings decorated with remarkable mosaic floors. These floors have suffered from negligence and a lack of restoration. In order to mitigate these problem, there is a need of exploration of the best approach. The goal of this study is to implement electrical resistivity and ultrasonic technics to identify fractures and void space, which are the main cause of deterioration.

An example of Mosaic : Venus



Structure of Roman Mosaic (image from Getty)

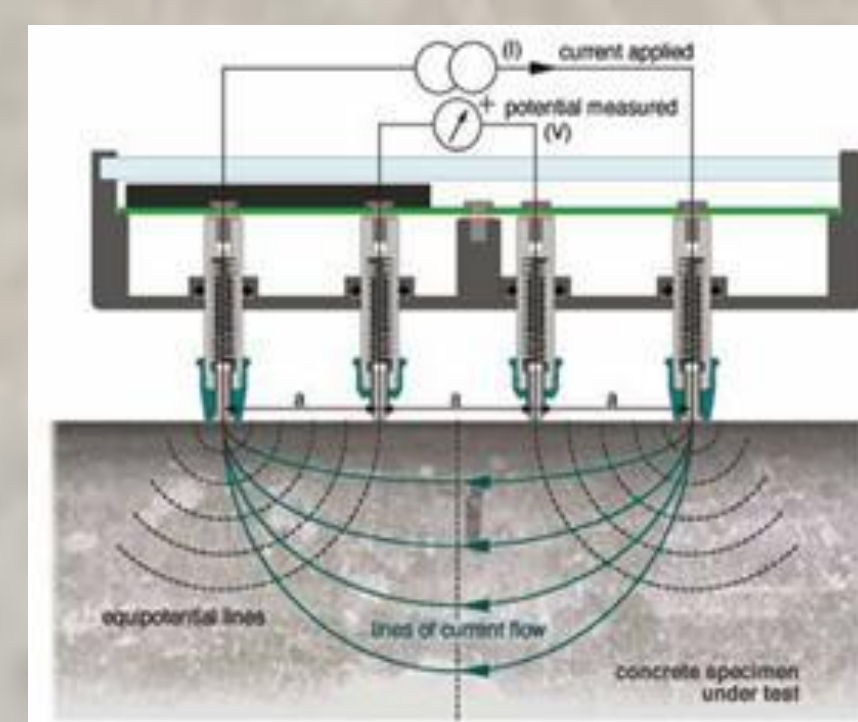
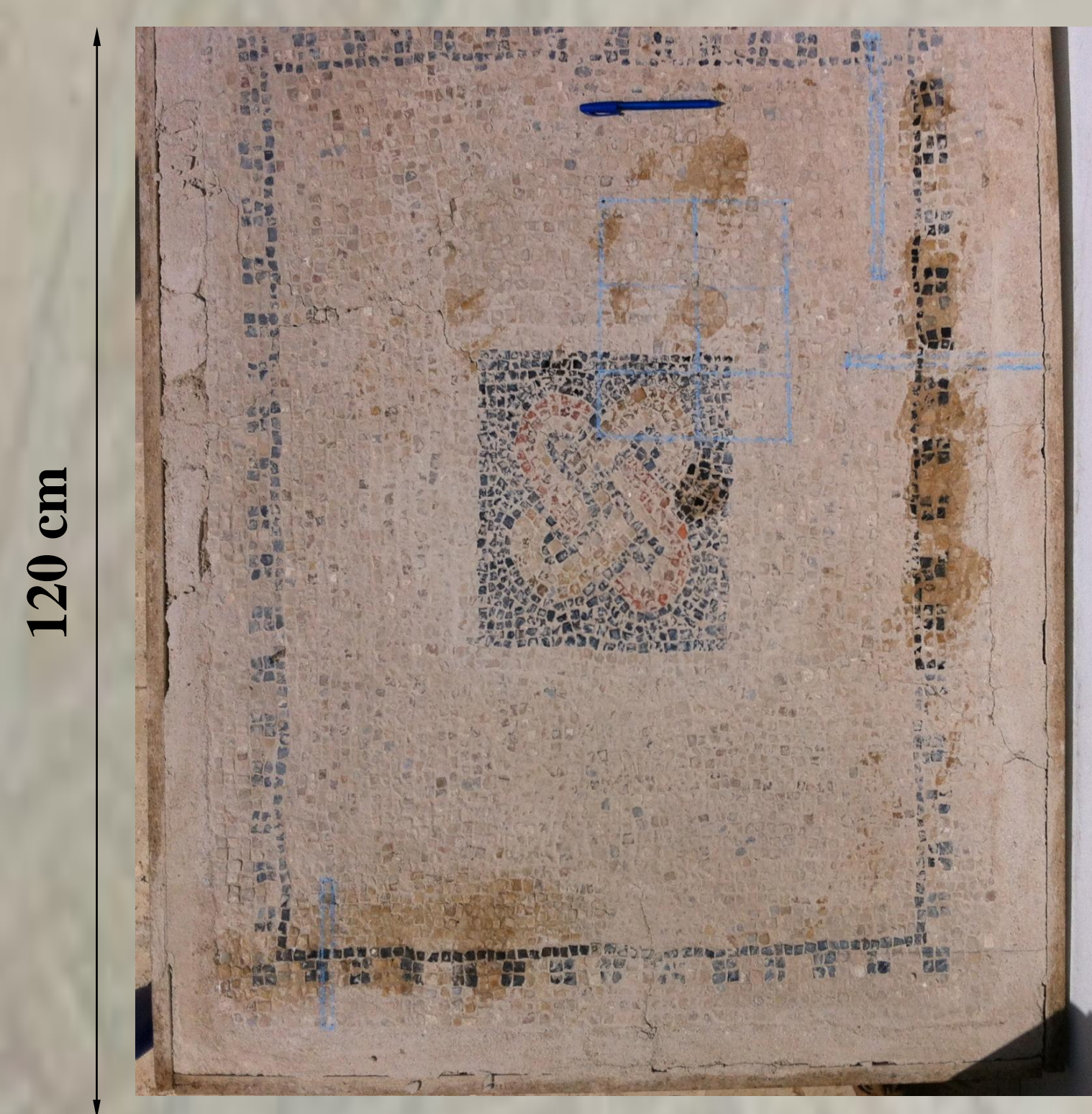
Tesselatum
Bedding layer
Nucléus
Rudus
Statumen



RESULTS

Model: Size and characteristics

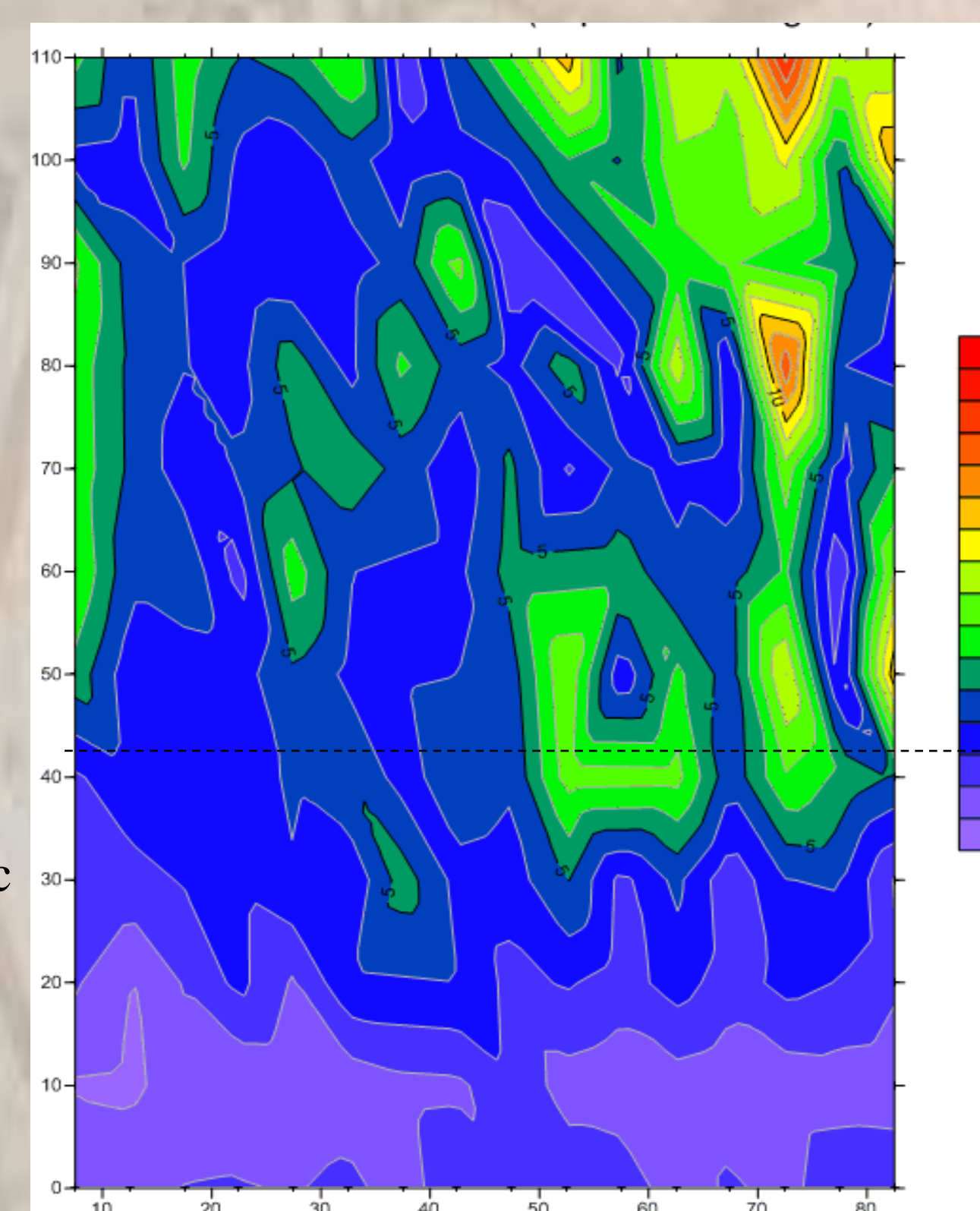
Equipment setup



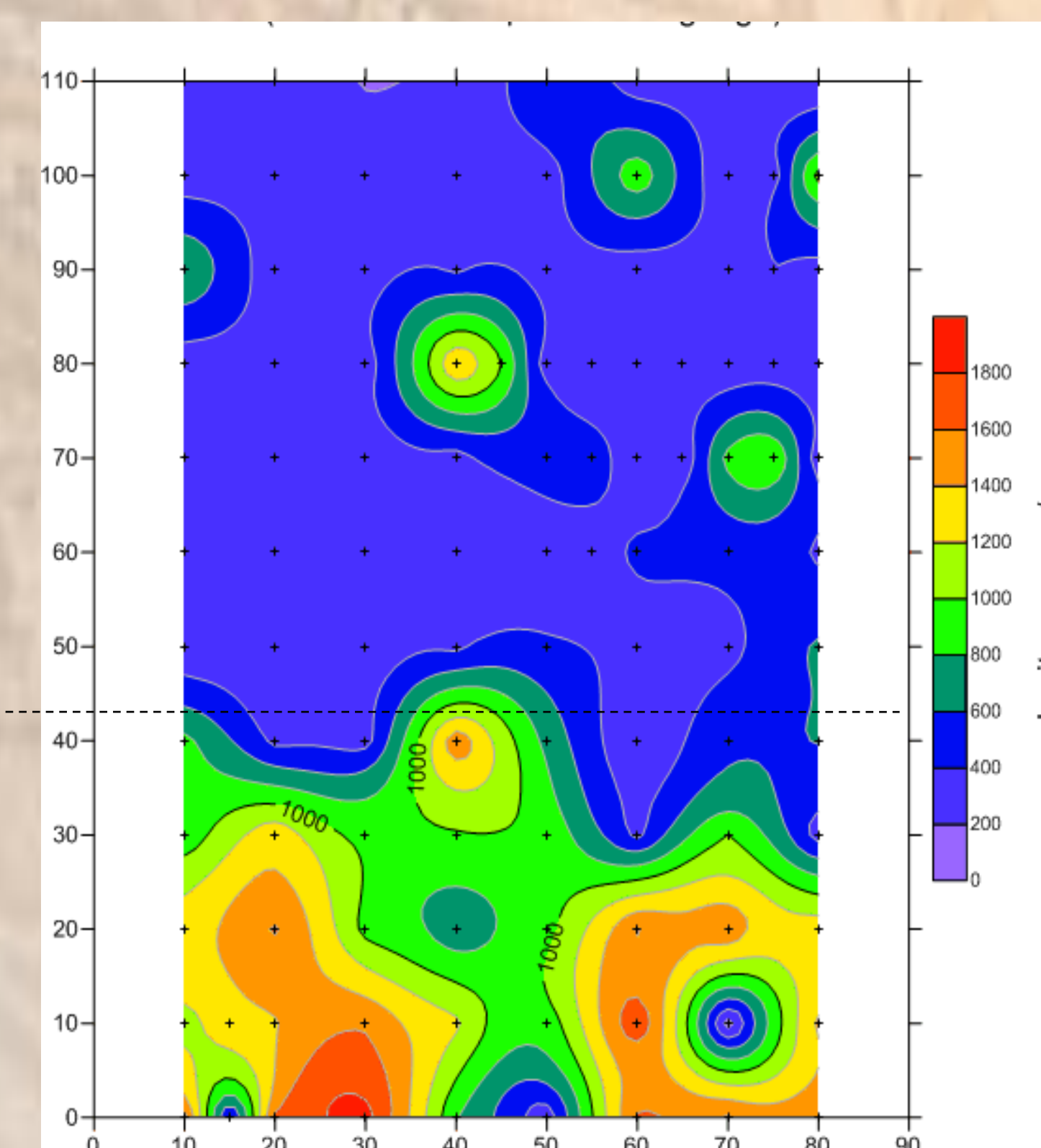
The geophysical Survey showed that:

1. Areas highly resistive (due to the presence of hallow spaces, existence of joints and fractures) and therefor have low ultrasonic velocity values.
2. The less resistive area with high elastic properties and characterized by strong ultrasound velocities

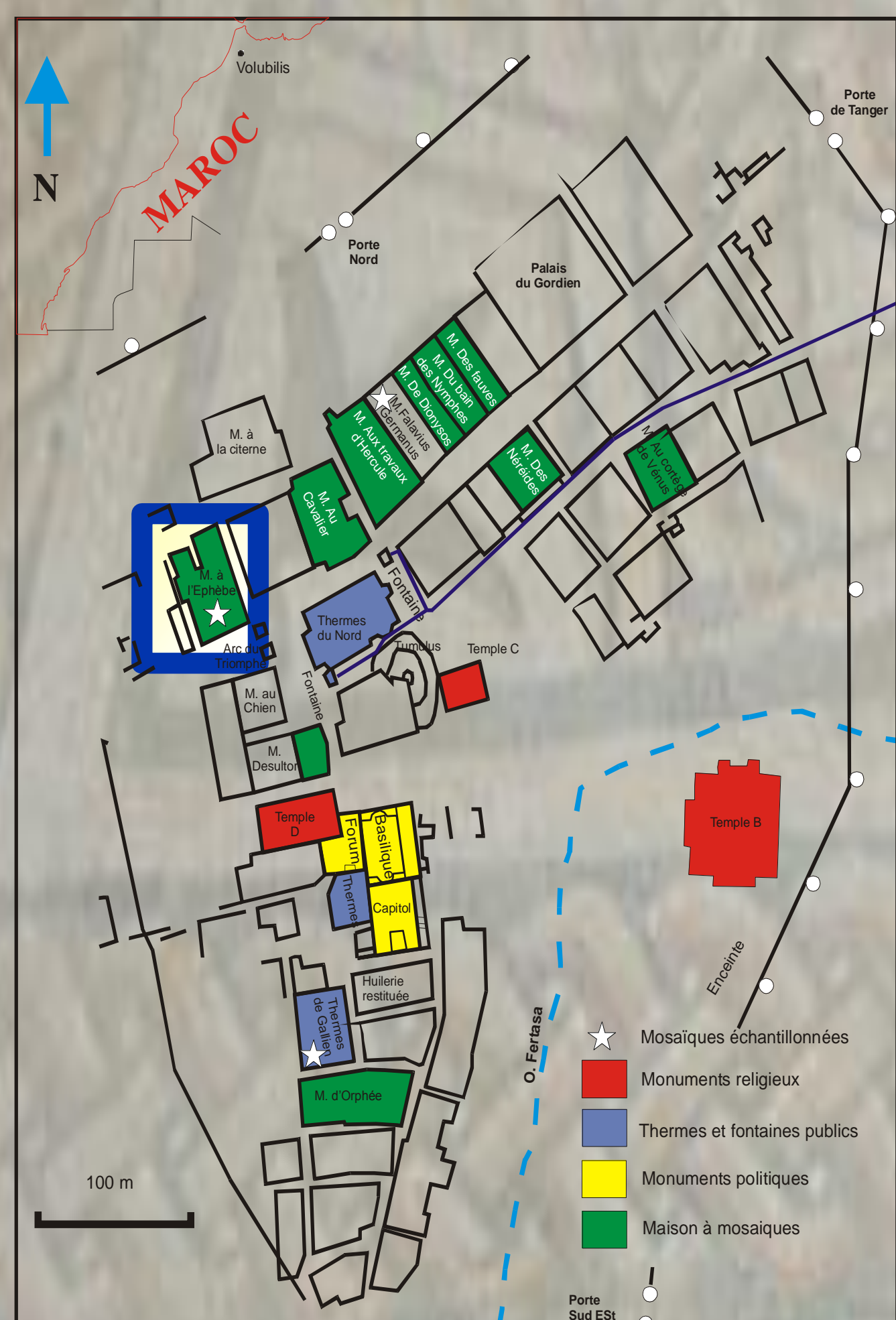
Electrical resistivity



Ultrasonic velocity



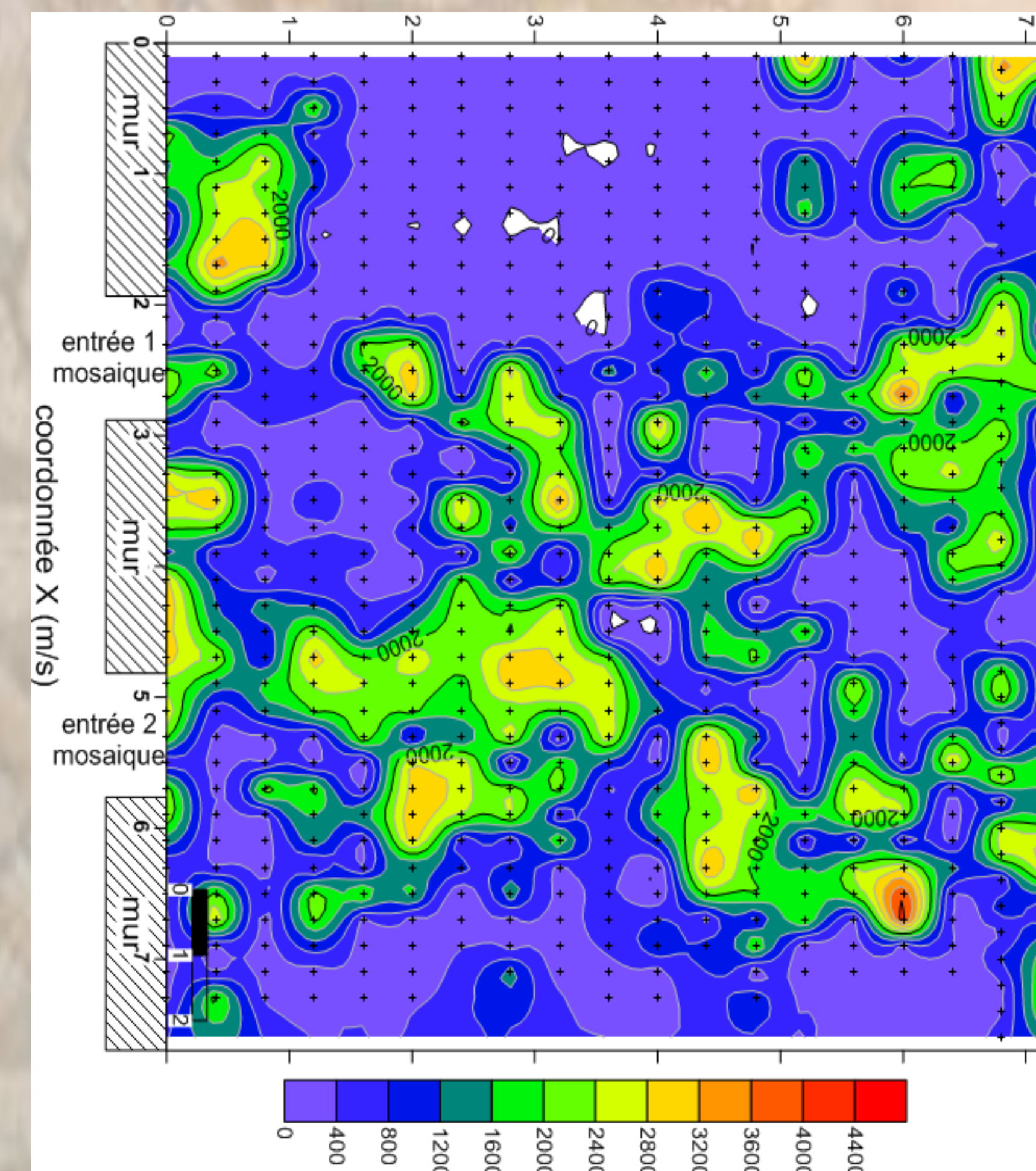
Case Study: Ephebe in-situ floor Mosaic



730 cm

The Mosaic floor found at the house of Ephebe which was placed over a concrete platform was found to witness significant degradation of tessellatum mainly due to the oxidation of steel rebars

Ultrasonic velocity



This Mosaic showed a substantial alteration especially near the surface. The small islands characterized by high velocity values match the highly compacted areas which represent lacunas repaired with cement based mortar

CONCLUSION

- The implementation of geophysical techniques on Roman Mosaic especially the acoustic method has shown to be effective in the identification of deteriorated areas and allow to map the entirety of the floor revealing areas of urgent needs of restoration.
- The electrical techniques, although destructive has proven to be equally able to identify but can be used on bench model for calibration and experimentation with noninvasive tools