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The Roman settlement at Auritz (Navarre): preliminary results of a multi-system approach to assess the functionality of a singular area

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INTRODUCTION

The Aranzadi Society of Science has been engaged in an ongoing project to trace Roman roads in northern Navarre since 2011. This research has been focused on the route through the Pyrenees at Orreaga/Roncesvalles and has produced new evidence that suggests some variations from the route known so far. During this research a roadside settlement was detected; archaeological trenches have revealed substantial Roman masonry building foundations (Agirre-Mauleon *et al*. 2012). In order to delimit and characterize the archaeological site, geophysical prospection was undertaken over an area of 18 ha using a fluxgate gradiometer. The results show a densely occupied area of about 5 ha and they have allowed the main characteristics of the settlement to be described, revealing urban occupation organized along the road (Garcia-Garcia *et al*. 2013).

In that context, Aranzadi approached MOLA (Museum of London Archaeology) in order to develop cooperative approaches to the investigation and further research of the site (Agirre-Mauleon and Hill 2013). In September 2014, MOLA led a non-invasive archaeological intervention through core sampling, designed to complement and refine the existing geophysical survey. In the same campaign, a drone survey was performed, providing orthorectified aerial photography and a topographical model with 6 cm pixel size (MOLA/Aranzadi 2014).

OBJECTIVES

Despite the amount of information obtained through the magnetic survey, some areas of the settlement could not be well described. In particular, an area with a singular disposition of anomalies has been detected and flagged as one of the areas of interest for

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further research. Indeed, whilst the orientation of the buildings is in general aligned with the main road through the settlement, in that particular location magnetic data show different groups of anomalies, referred to as P5, observing a coherent orientation and disposed around a rectangle of about 78 m by 32 m (Garcia-Garcia 2013). Furthermore, the area occupied by P5 is slightly elevated above the road level and provides a strategic position from which to control it. The south-eastern side of this rectangle is delimited by parallel linear anomalies showing negative magnetic contrast and interpreted provisionlly as walls. However, their full length cannot be traced because of weak magnetic contrast. Thus, magnetic survey results give some, but not enough evidence to interpret that area as a unique archaeological unit.

This location was targeted during the core sampling campaign performed in September 2014 (MOLA/Aranzadi 2014). To analyze the continuity of the stratigraphic sequence three sediment cores were drilled in the inner part of the rectangle. Given the contrasting results from the three cores and the lack of data from the northern part, the core survey could not corroborate the interpretation of P5 as a single delineated area and further investigation was required.

A new geophysical campaign was thus designed in order to complement the data from the area.

DATA ACQUISITION METHODOLOGY

Based on the previous geophysical survey, the area of interest was divided into several grids. As a first step, a small area was prospected with both GPR and electrical resistance meter in order to get complementary information and to assess the best survey strategy. Despite the high moisture level, the GPR results showed good contrast and penetration; consequently, it was applied in preference because of the higher resolution obtained in lower acquisition time.

The GPR prospection was conducted using the IDS Hi-Mod instrument with two multi-frequency antennae (200 MHz and 600 MHz). Measurements were taken every 2.5 cm along parallel traverses, separated by 0.2 m and in zigzag mode. The time window was fixed on 90 ns for the 200 MHz antenna and on 70 ns for the 600 MHz antenna. Data was processed using GPR-SLICE software, then imported to a GIS environment for combined interpretation. As many molehills were present in the targeted areas, the field had to be cleared in advance in order to ensure satisfactory contact between the antenna and the ground. Therefore, the survey was confined to those areas that could be cleared within the available time. Work will continue in spring.

RESULTS AND DISCUSSION

The preliminary results over approximately 4400 m^2 show complementary information to that obtained in the magnetic survey. The south-eastern limit of the P5 rectangle appears clearly on the time-slice sequence, allowing a more detailed description than the one obtained from magnetic data. Furthermore, the buildings in this area show great contrast and their inner divisions can be properly described, improving notably the architectural information obtained from the magnetic survey. However, the topographical variations of this area, probably related to the collapse of archaeological structures, affect the time-slices and make necessary further processing to adjust the GPR profiles into real vertical position (Goodman *et al*. 2006). The topographical model created from the drone survey has been shown to be a useful tool, given its high spatial resolution, compared to the 5 x 5 m LiDAR data available until now.

CONCLUSION

The combination of both geophysical and topographical information was essential to analyze and interpret rectangle P5. The first magnetic survey provided some evidence to suggest that this area could be a distinct archaeological zone, but complementary geophysical surveying was essential to obtain a more detailed architectural characteristics that would allow a more accurate interpretation. However, the geophysical and archaeological information could not be contextualized without the topographical model obtained from a drone survey. Therefore, this combined methodology has proved useful in improving the interpretation in a complex topographical context.

REFERENCES

Agirre-Mauleon, J. and Hill, J. 2013. *Archaeology Research Project on Luzaide-Valcarlos, Orreaga-Roncesvalles, Auritz-Burguete, Erroibar-Valley of Erro, Artzibar-Valley of Arce and Baztango Bailara-Valley of Baztan.* Unpublished report

Garcia-Garcia, E., Sala, R. and Tamba, R. 2013. *Prospección Geofisica Multisistema en los municipios de Auritz-Burguete y Auritzberri-Espinal para la determination de zonas de expectiativa arqueológicas.* Unpublished fieldwork report.

Goodman, D., Nishimura, Y., Hongo, H. and Higashi, N. 2006. Correcting for topography and the tilt of ground-penetrating radar antennae. *Archaeological Prospection* 13(2): 157-161.

MOLA/Aranzadi, 2014. *The Roman Town of Auritz (Navarre). Geoarchaeological Evaluation Report.* MOLA/Aranzadi unpublished report.