

The Project.

Puig Ciutat is an archaeological site of ca. 5Ha, located 80km north from Barcelona (Catalonia). After an accidental finding of roman amphorae in 1983, the site remained unexplored until a first magnetic survey in 2005. In 2010 a interdisciplinary research team was created, gathering a group of young archaeologists and the team of SOT Archaeological Prospection. The Puig Ciutat Project aims to test new techniques and methodologies in parallel to the archaeological investigation of the site. The poster exposes how the systematic use of geophysics guided the research team to place the excavations areas to obtain significant information, which helped at the same time refining the interpretation of geophysical survey results.

Site exploration and evaluation

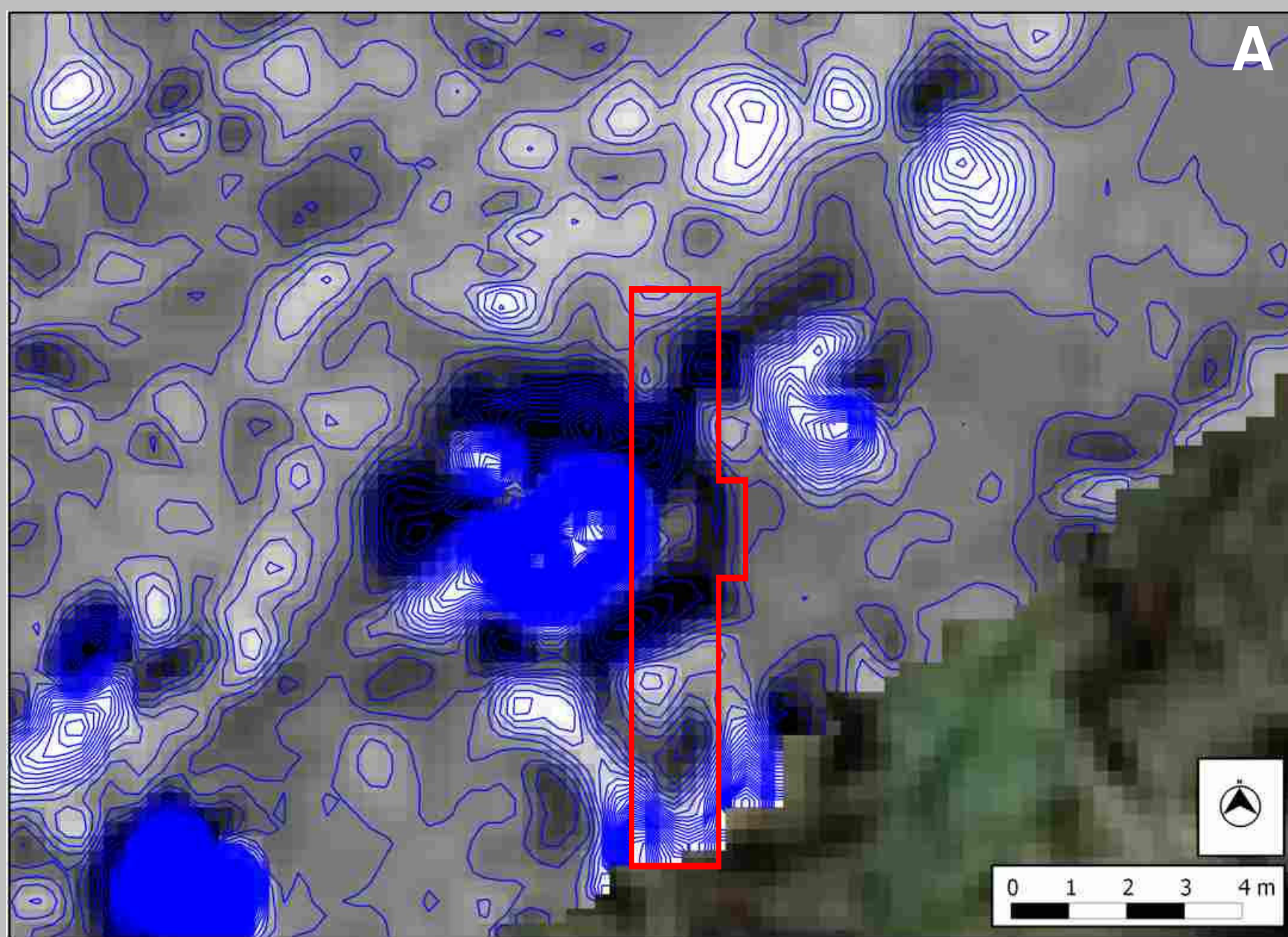
The local geologic media consists of a succession of sandstone, claystone and marls, affected by erosion.

The 2010 and 2011 seasons were dedicated to survey the two largest fields (zone 1 and 2) applying a fluxgate gradiometer (Bartington G-601) and GPR (IDSHi-Mod 200-600MHz).

The magnetic map showed a low contrast for building features and areas of disturbance produced by deep plough works both affecting the archaeological record. In specific zones, groups of remains contained north-oriented dipoles suggesting fire-related features. The first excavations in 2010 revealed evidences of destruction and firings in building 1, trench 4, sector 4 and sector 7.

Excavations

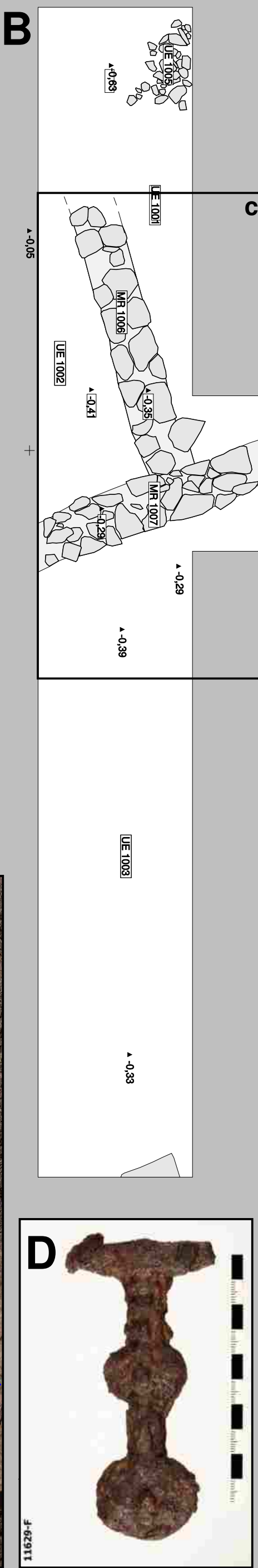
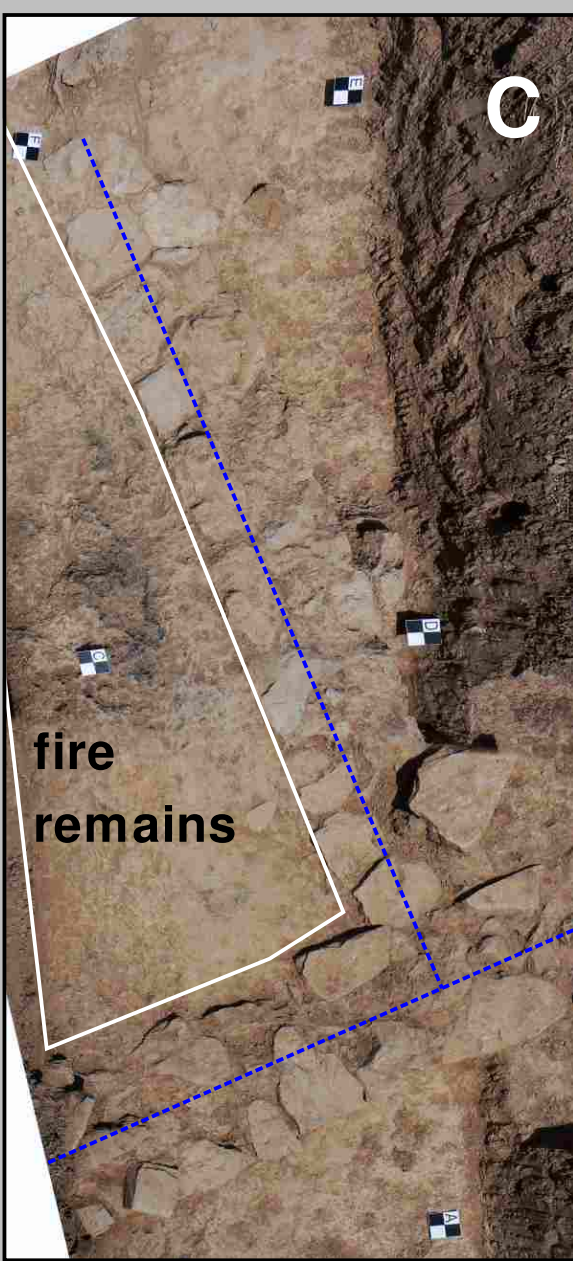
Zone 1. Trench 4.



A kiln or a fired building?

One of the first excavations was placed in the south of Zone 1 after observing a group of high-contrast magnetic anomalies (A) and coal pieces on the surface moved by plough works. The north-oriented dipole gave values of -8.1 to 25.5 nT/m, too high compared to the local mean contrast, but too low to expect a pottery kiln.

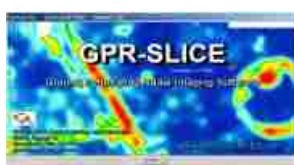
The excavations (B and C) revealed a group of shallow walls (19cm depth) that matched with the negative perimeter of the anomaly. The upper layers of the room showed evidences of firing remains. Out of the room, the stratigraphical unit UE1003 contained metal items, such as a part of scissors or a bidiscoidal Puglio (D), and multiple fragments of Campanienses types B and C pottery, mainly produced in Italy and Sicily. The archaeological evidences pointed towards a fired room of the 1st century B.C., possibly related with a military settlement.



Metal detector survey

The GPR surveys were carried out over a rough terrain and also showed a low contrast due to the weak composition differences between the sediments, the bedrock and local building material.

After evidences of a destruction and weaponry (C) were found in the excavations, a first campaign of georeferenced metal detector survey was organized in 2011 (A). Its aim was to locate possible remains of a siege or a battle in the surroundings of the site. Multiple metal objects such as lead glandes (B) or caligae nails (D) were mapped suggesting a roman military presence at least.



THE PUIG CIUTAT PROJECT

MULTI-METHOD GEOPHYSICS AND ARCHAEOLOGICAL FEEDBACK TO MAP A DESTRUCTION

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GPR Survey 600M Hz

Zone 1

Zone 2

IDSHi-Mod 600M Hz
40cm spacing profiles
Time-slice 7.7-14.1ns
0.32-0.64m (0.084m/ns)

IDSHi-Mod 600M Hz
20cm spacing profiles
Time-slice 13.5-19.4ns
0.57-0.82m (0.084m/ns)

0 10 20 30 40 50 m

Magnetic gradient Survey

Zone 1

Zone 2

Sector 7

Sector 4

Trench 4

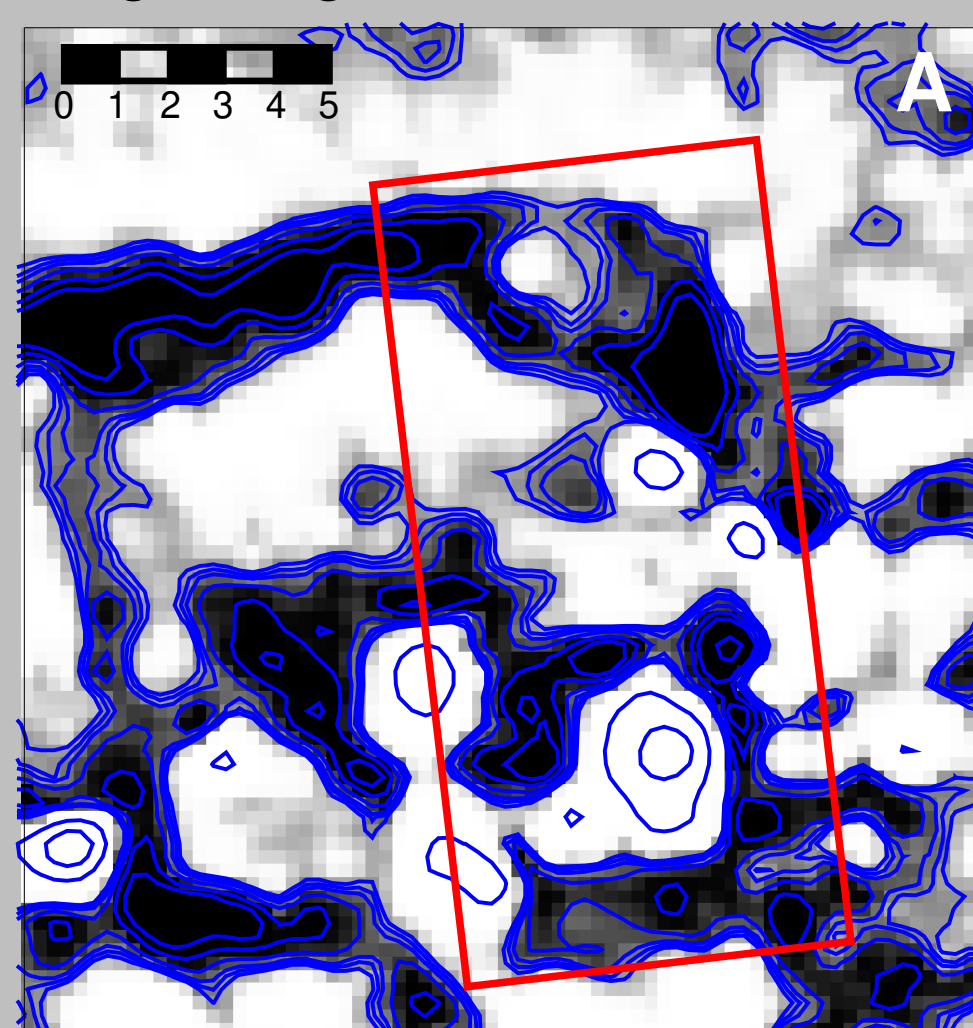
Building 1

Fluxgate gradiometer survey. Bartington G-601 dual.
Reading resolution 0.5X0.25m. Gaussina low-pass filtered data

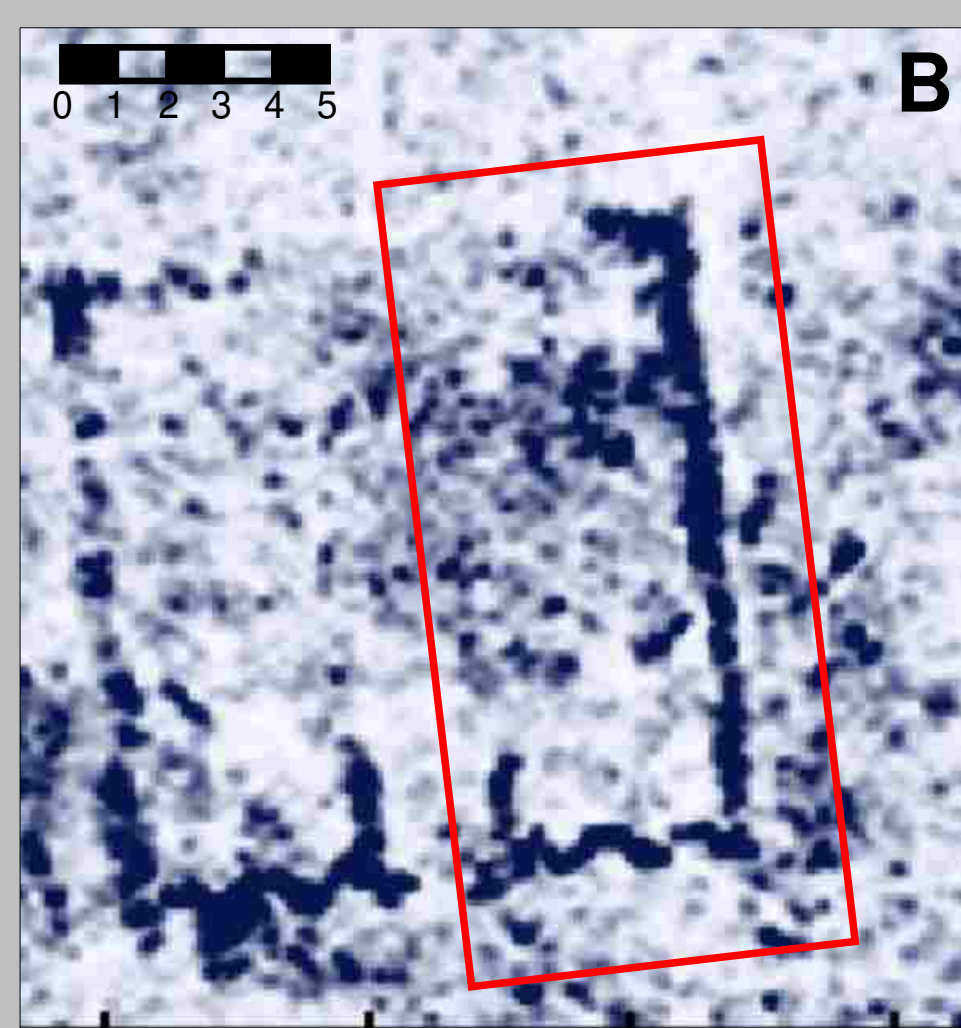
0 10 20 30 40 50 m

Zone 1. Building 1

Magnetic gradient

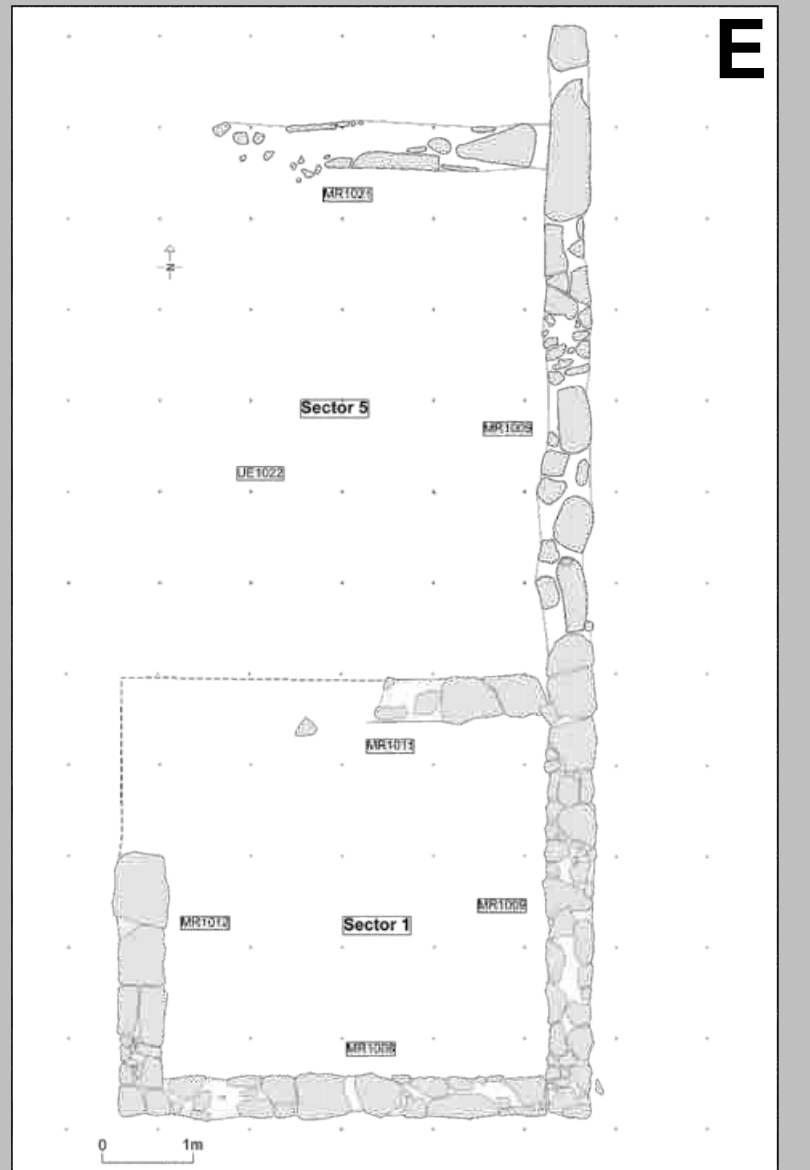
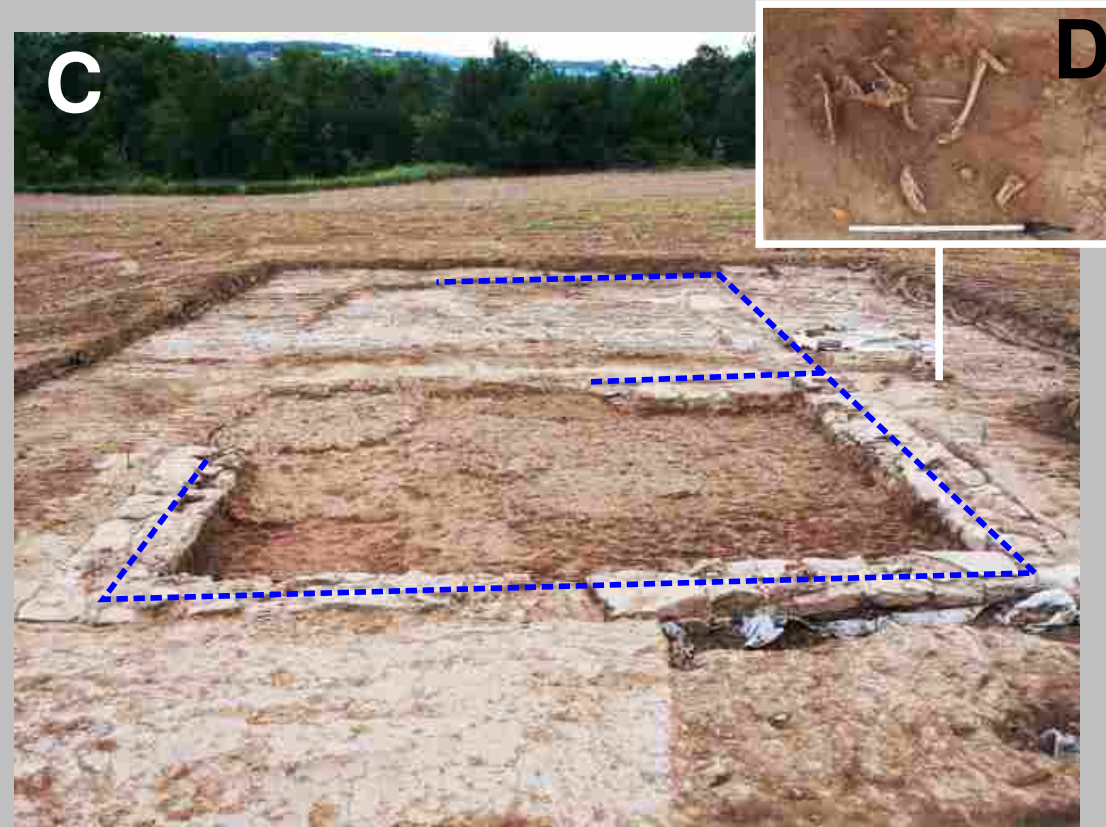


GPR 600M Hz time-slice 0.41-0.54m



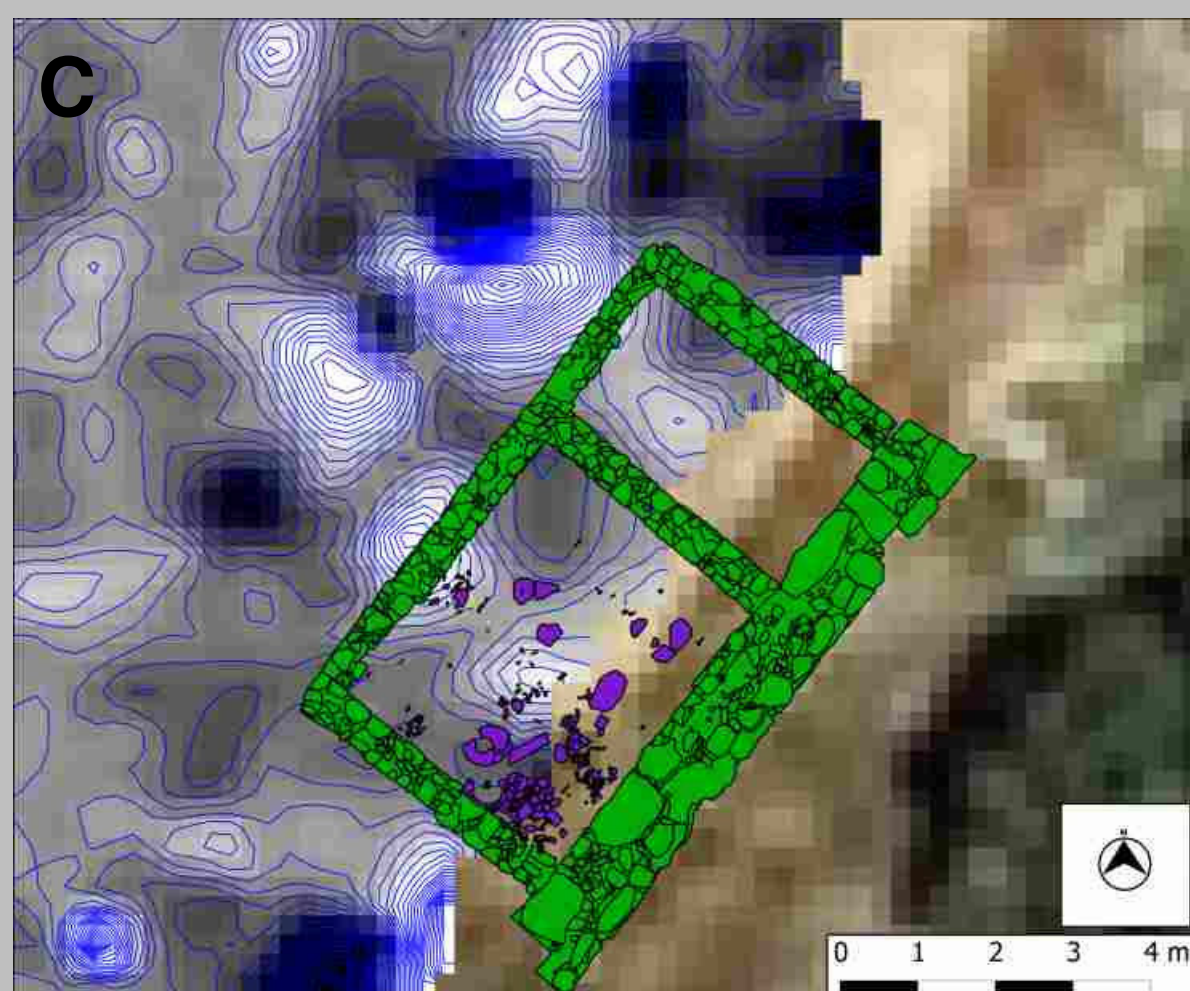
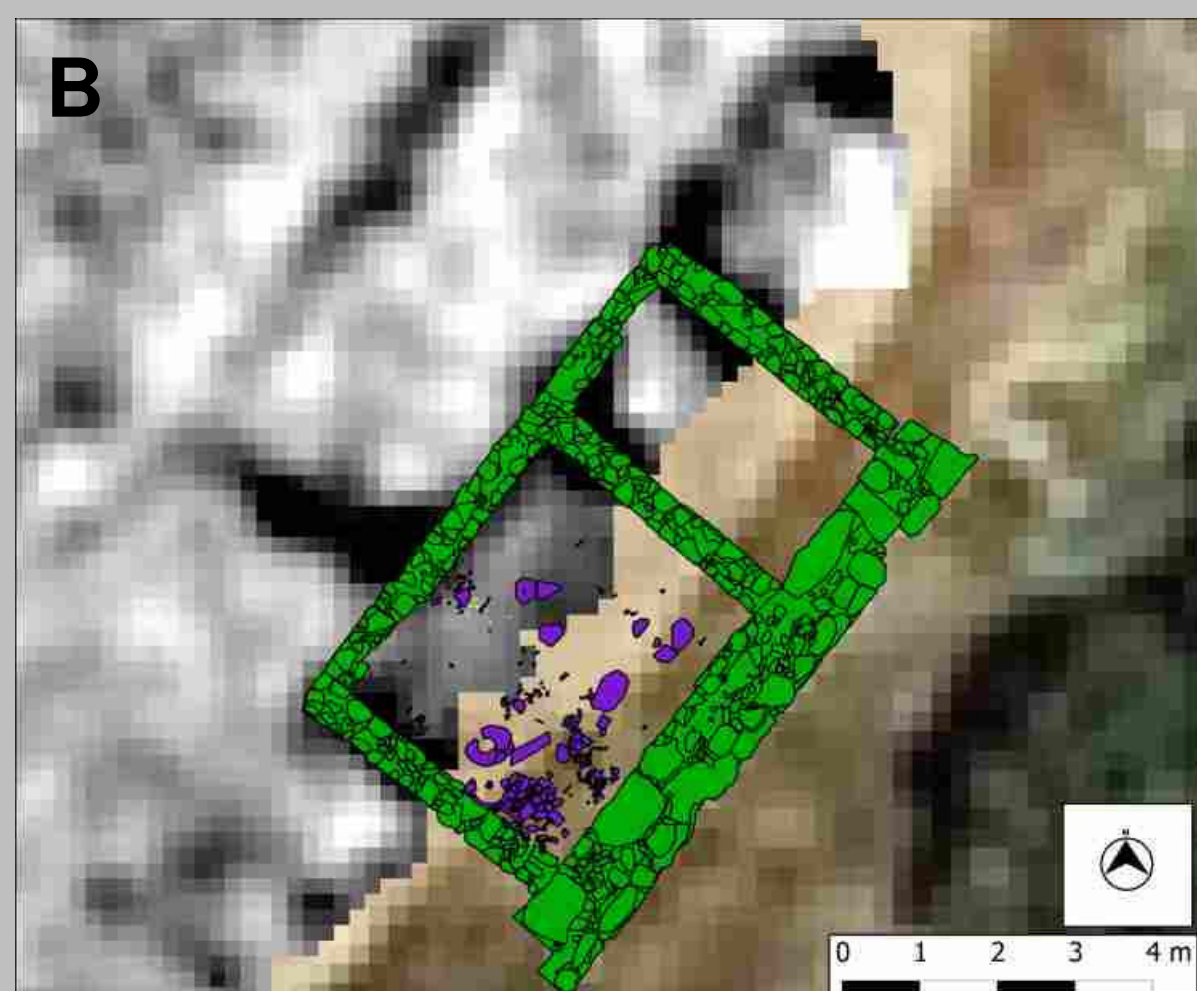
A singular building.

The contour line plot of the magnetic survey (A) shows that the central building in Zone1 presents a higher contrast than other features located in the same area. A specific GPR survey (B) was placed in the same area using IDSHi-Mod with 600-200MHz dual antenna. The results were processed to generate a time slice sequence, showing the square shaped symmetric building (11.5X11.5m). The excavation (2010-2011) of the eastern half of the building (C and E) revealed again evidences of a destruction. A group of broken common italic pottery laying over a burnt wooden structure were described. The 2011 excavation also revealed the remains of a canid (dog) lying with an iron and bronze chain in the outer face of eastern wall (D).



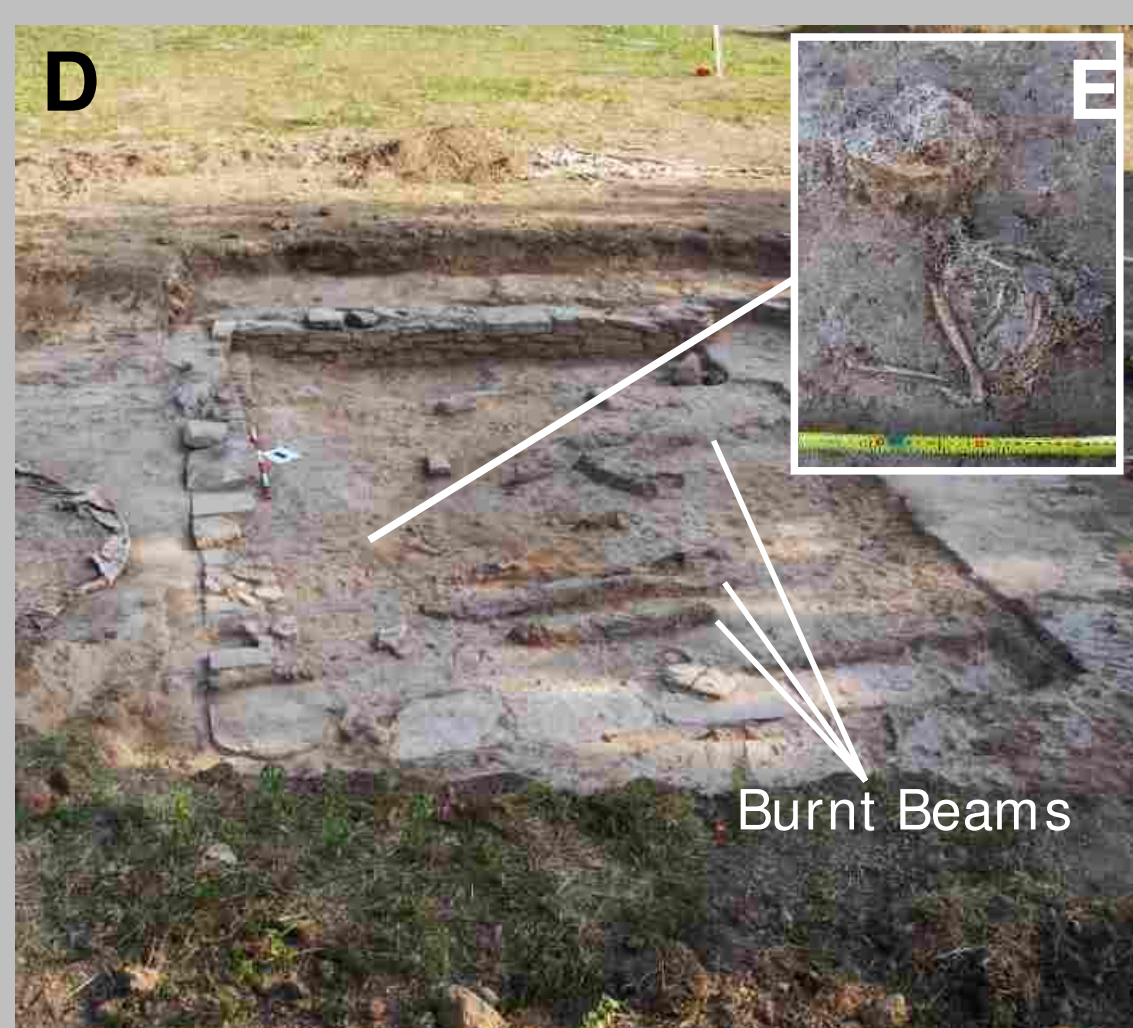
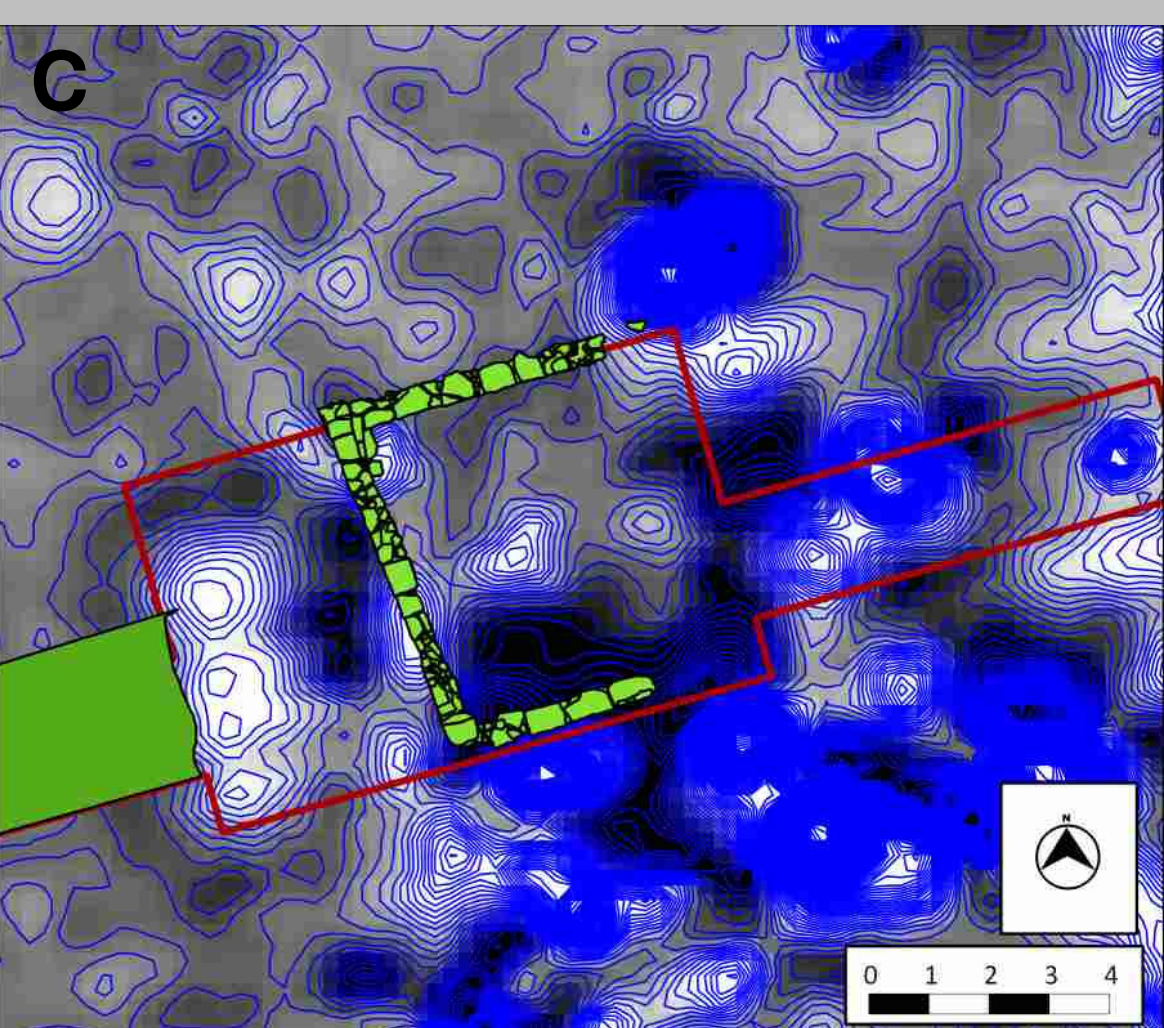
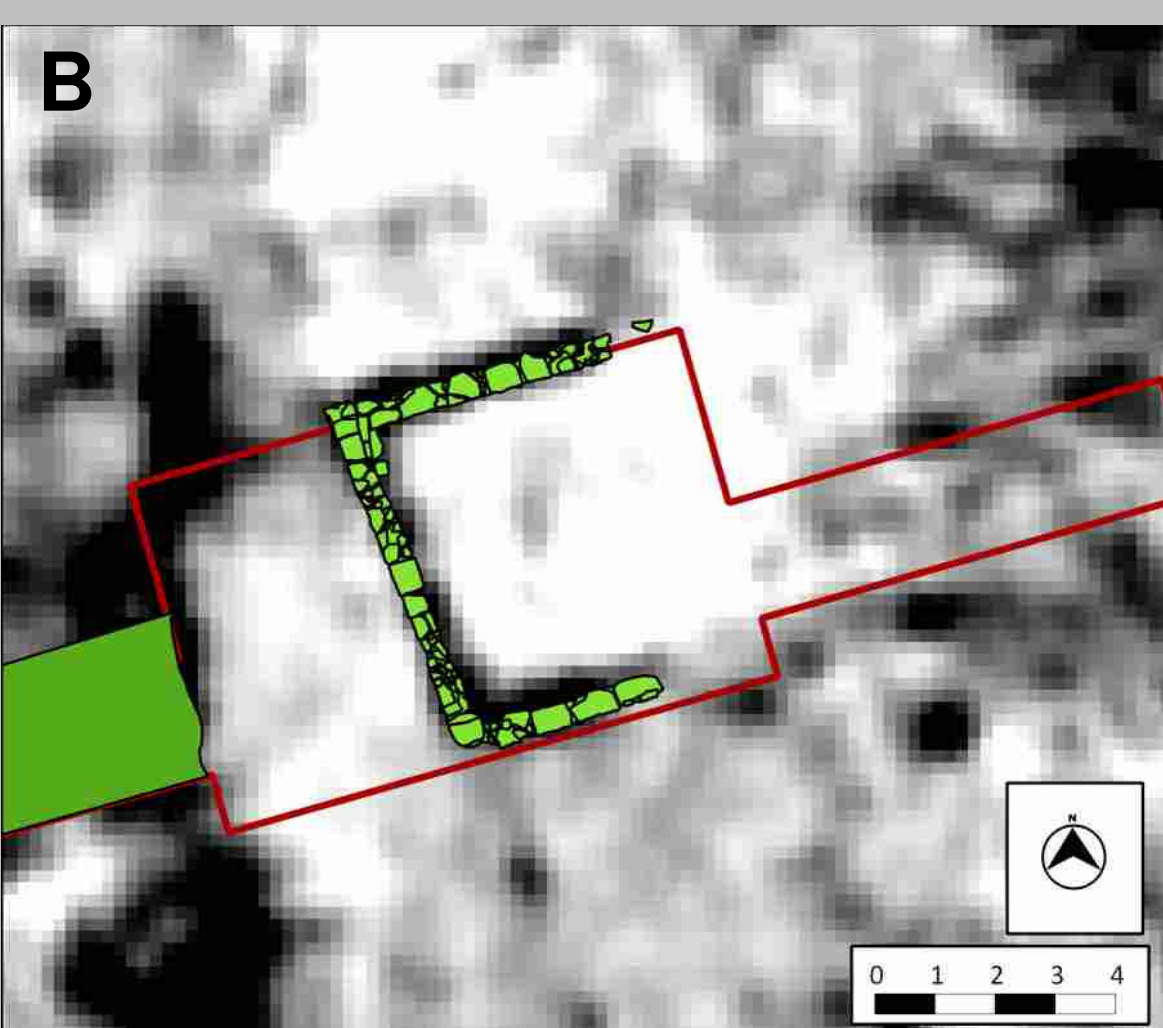
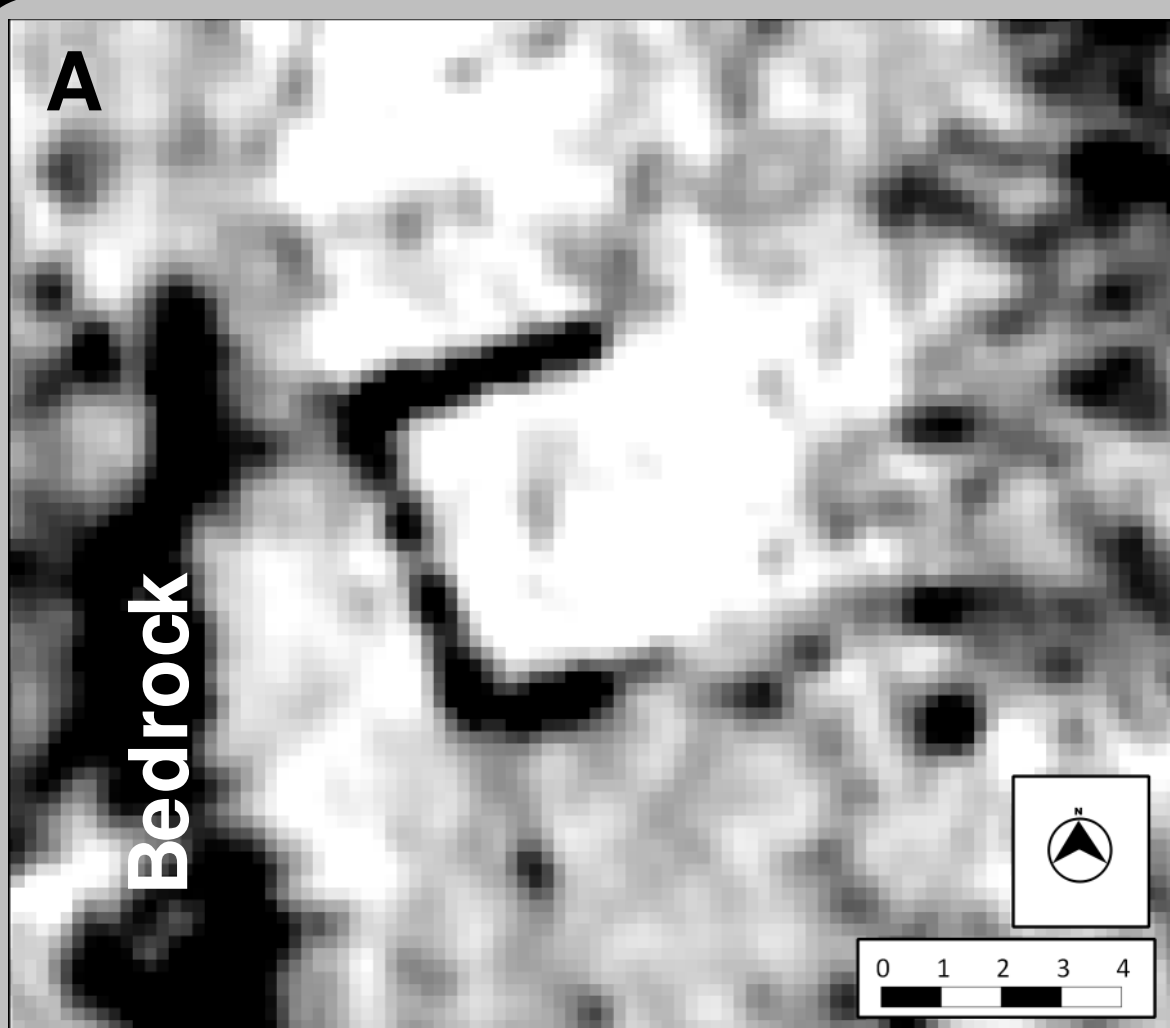
Zone 2. Sector 7

In the NE limit of Zone 2, the GPR survey showed several linear features interpreted as walls. The excavation results (B and D) revealed a group of rooms aligned with the settlement walling and containing a rich destruction layer, including B and C types of campanienses pottery, amphorae, dolia and weaponry (catapult and bow arrow heads, lead glandes). The magnetic survey results (C) show very altered data with low contrast anomalies for the walls, which could be explained by the presence of pottery and iron material and by a higher depth of the structures.



Photogrammetry by J.E. Garcia Blesch

Bedrock



Burnt Beams

Zone 2. Sector 4

The results of the GPR survey revealed a "C" shaped feature interpreted as a building remain, close to an area with changes in the bedrock depth. The magnetic survey results showed a highly disturbed area, with multiple peaks interpreted as iron items and thermo-alterations. The excavation showed a good matching with the geometry described by the GPR survey. The remains of burnt wooden beams, pottery and a small-sized canid (dog) confirmed again a scenario of destruction.

Conclusions

The combination of the morphological information of building remains given by GPR extensive surveys and the qualitative information given by magnetic surveys have been useful to identify fired areas and to document the possible destruction of the settlement.

After only 3 seasons of investigation, the archaeological evidences collected suggest that Puig Ciutat was a roman republican settlement destroyed during the Roman Civil Wars between Julius Caesar and Pompeius Magnus (49-45 B.C.). This is an example of how the full integration of geophysicists in archaeological research teams can optimize the excavation works. The geophysical results produced relevant information that was used for the excavation planning and that will be continuously reinterpreted with selective excavations in order to extrapolate the conclusions to other areas of the site.