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Geoarchaeological Context of the Motilla de la Vega Site (Spain) Based on Electrical Resistivity Tomography

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ABSTRACT During the Bronze Age, the region of La Mancha Occidental (Spain) was occupied by prehistoric settlements in which the protection of basic resources was a primary concern. The structure of these settlements comprised several concentric walls that surrounded conical mounds around 4–10 m high. The Motilla de la Vega is an unexcavated site next to the Azuer River, and is only 4 km from another Bronze Age village, called Motilla del Azuer, which has been subject to systematic archaeological excavations and is the paradigmatic reference for these settlements. As Motilla del Azuer had a well inside its walls and this fort is located in a similar geological setting, it is logical to ask whether Motilla de la Vega also had a well inside its walls, and to determine whether it is possible to extend similar architectonic and social patterns to other settlements that occupied the river valleys of this region. In this study, we used the electrical resistivity tomography (ERT) method to detect the possible location of a well in Motilla de la Vega. In order to plan appropriate data acquisition, and to evaluate the optimal parameters for processing the field data, we performed a numerical modelling exercise to simulate the likely ERT responses based on the geological information and on the constructive scheme of the excavated well in Motilla del Azuer. Afterwards, we carried out five ERT profiles over the levelled Motilla de la Vega site and some of them have resistive anomalies similar to those that synthetic models predict for a well. Consequently, we propose the existence of a well placed in the eastern side of Motilla de la Vega, with the same relative position as the well of Motilla del Azuer. This has implications for the understanding of other sites in the region. Copyright © 2013 John Wiley & Sons, Ltd.

Key words: Electrical resistivity tomography; ERT; geoarchaeology; Bronze Age; Motilla de la Vega

Introduction

Electrical resistivity tomography (ERT) is a geophysical exploration method used widely in archaeology. For example, Teixidó and Peña (2006) describe the application of ERT to investigate buried Roman tombs in the archaeological ensemble of Carmona (Seville, Spain), Rey *et al*. (2010) detected walls in the Castulo Roman village (Jaén, Spain), Berge and Drahor (2011) test the capability of the ERT method using simulations of multilayered archaeological settlements, and Tsourlos and Tsokas (2011) studied the condition of the Acropolis in Athens to develop a better understanding of its development and future conservation needs. In this context, this paper aims to use the ERT method to confirm the possible existence and location of a well at the unexcavated archaeological site of Motilla de la Vega (Daimiel, Spain).

The Motilla de la Vega site (Figure 1) is located next to the River Azuer (Daimiel-Ciudad Real, Spain). It is a prehistoric settlement, which, along with others, occupied the region of La Mancha Occidental during the Bronze Age, between 2200 and 1350 BC. The basic structure of these fortified settlements comprised several concentric walls that surrounded conical mounds around 4–10 m high. They were distributed along the river valleys and in small depressions where, until recent times, there were lakes and marshy areas (Nájera and Molina, 2004b). Such archaeological sites are called ‘motillas’ (little plateaus) because of their appearance relative to the surrounding environment, due to the effects of erosion and agricultural.

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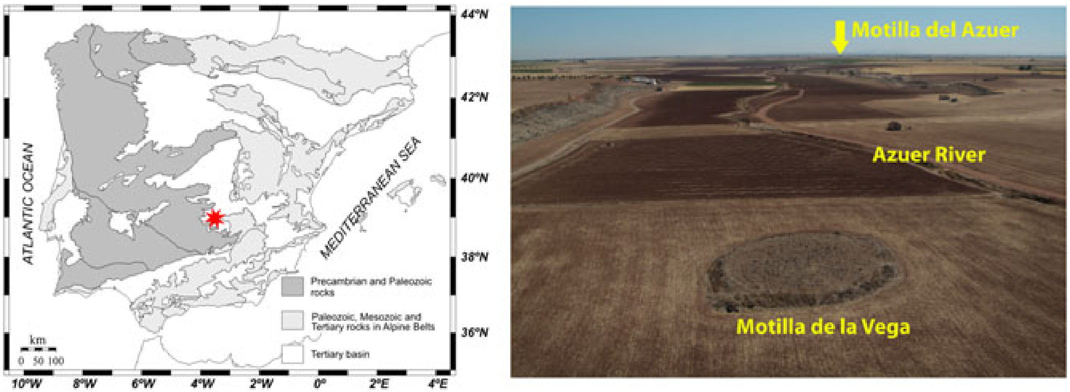

(a) Location map (b) Aerial photograph

Figure 1. (a) Location map showing the prehistoric settlements of Motilla de la Vega and Motilla del Azuer in the basin of the Azuer River, near Daimiel-Ciudad Real, Spain. (b) Oblique aerial photograph of the study site at Motilla de la Vega. The yellow arrow marks the location of the Motilla del Azuer archaeological site, located about 4.6 km to the southeast. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

The Motilla de la Vega remains an unexcavated site; consequently, its archaeological reference point must be taken from the nearby Motilla del Azuer site. This prehistoric settlement is located in the same valley of the Azuer River and is about 4 km, downstream and almost within sight of Motilla del Azuer (Figure 1).

The Motilla del Azuer site has been subject to systematic archaeological excavations by the Department of Prehistory and Archaeology at Granada University (Nájera and Molina, 2004a), so that this site is the paradigmatic reference for these fortified villages, both in terms of its architecture and archaeological record. The fortification (Figure 2) was arranged with separate, clearly defined spaces: a central tower with points of access located in narrow corridors, a large courtyard in the eastern section that contained an impressive well about 16 m deep, and two concentric enclosures separated by another wall. The circular outer wall enclosed the fortified area.

A series of ^{14}C dates from anthropological remains (seeds and wood) showed that the site was established by around 2200 BC, during the Old Bronze Age, and was abandoned during the Late Bronze Age around 1350 BC. Thus, the settlement was occupied continuously for 800–900 yr (Nájera *et al.*, 2010). This complex settlement played an important role in protecting basic resources such as water, collected from the water table, and controlling the storage and processing of grains,

(a) Aerial view of the fort (b) Schematic plan of the fort

Figure 2. (a) Aerial view of fortified structure of the Motilla del Azuer site. The Bronze Age well location is marked with a yellow arrow. (b) Schematic plan of the fort. The well is marked with a black arrow. It is located at the northeast corner, relative to the E–W axis. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

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which were preserved in various storage systems (Nájera, 1984; Nájera and Molina, 2004b).

During the Bronze Age, the climate in this part of Spain was semi-arid (Dorado Valiño *et al*., 1999), with seasonal floods and a scarcity of fresh water (Potenciado de las Heras, 2004). These extreme weather conditions caused the population to be concentrated around reliable watercourses or near seasonal lakes, which are typical of northwestern La Mancha (Nájera and Molina, 2004a).

These features make Motilla del Azuer a site of great archaeological interest because it indicates how the population settled and survived in the area during a period of difficult climatic conditions. Therefore, if Motilla de la Vega also contains a well, it is reasonable to suggest a similar architectural and social structure for other settlements that occupied the river valleys in this region.

Geoarchaeological context

Hydrogeology information

The western region of La Mancha is a morphostructural depression that forms an extensive plain with an E–W orientation (Pérez-González, 1996), and whose basement consists of Palaeozoic and Mesozoic rocks. The overlying unconsolidated materials are typically terrestrial Quaternary sediments (López-Geta *et al*., 1989), which range in grain size from gravels to sands, silts, and clays, and pass gradually down into a Miocene evaporite facies and then Pliocene limestones and marls.

The Azuer River is a semi-permanent watercourse that flows SE–NW through the study area. It is a tributary of the Guadiana River, whose waters form part of a hydrogeological unit that covers 5000 km^2 (IGME, 1994). There are three different units within this hydrogeological system. The upper aquifer comprises Quaternary detrial materials and calcareous levels and the lower aquifer is a Jurassic and Cretaceous dolomitic limestone. Miocene sediments (clays and marls) act as a semi-permeable aquitard between the two aquifers (García Hidalgo *et al*., 1995).

Given the depth of the Motilla del Azuer well, this settlement exploited the upper aquifer. The recharge of the upper aquifer occurs by direct infiltration of rain water on the outcropping strata (permeable and horizontal) that allow practically all of the rain to percolate down to the deeper sediments that are poorly permeable, or impermeable. Additional recharge comes from the River Azuer, where the water infiltrates, fully or partially, via the permeable layers. In the past there was no overexploitation of water, and when this shallow aquifer was saturated, seasonal lakes appeared in the landscape.

Geotechnical study of Motilla del Azuer

During the excavations of 2007 at Motilla del Azuer, a detailed study of the Bronze Age well and also two geotechnical boreholes were undertaken to determine the lithology of the site (EGM–GEA, 2007). Figure 3

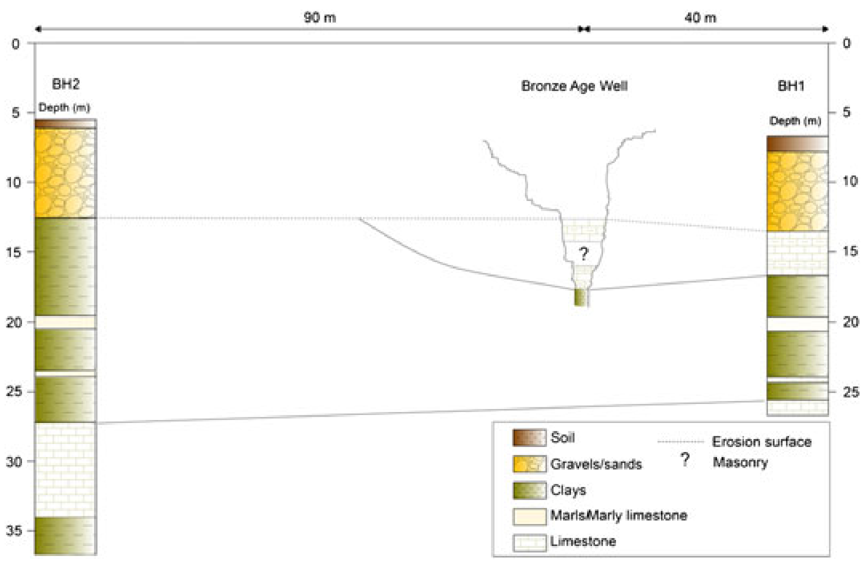

Figure 3. Lithostratigraphic correlation between the two geotechnical boreholes and the Bronze Age well (modified from EGM-GEA, 2007). Note that the horizontal scale is broken. BH1 is 40 m east, and BH2 90 m west, of the Bronze Age well. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

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shows the lithostratigraphic correlation between the two boreholes in relation to the Bronze Age well. Note that the well was constructed in a series of steps to a depth of 13–14 m; beginning with a width of 13 m at the surface and narrowing to only 1.5 m wide at the bottom of the well. This suggests that construction was carried out in several phases, especially the later steps, which may have coincided with an increasing demand for water or a water shortage. Consequently, the Bronze Age inhabitants excavated through the near-surface Pleistocene–Holocene fluvial deposits until they encountered the phreatic waters of the uppermost limestone.

Both, the shape and the dimensions of this Bronze Age well have been incorporated into the ERT synthetic models (see next section).

The ERT test profile at Motilla del Azuer

An ERT field profile was recorded across geotechnical borehole BH2 (Figure 4) to determine the relationship between lithology and resistivity for this geological unit. These data were acquired using a Wenner–Schlumberger electrode configuration with an array of 80 electrodes spaced at intervals of 1.5 m. The two-dimensional apparent resistivity data were inverted using the same parameters as those that were used to invert the five ERT profiles from Motilla de la Vega (described below). The correlation between resistivity and lithology allowed us to differentiate the following three geoelectrical units (Figure 4).

(i) A surface layer with resistivities between 10 and 100 Ωm. This heterogeneous layer was 2 m thick (on average), and consisted of vegetation, atrophic soil (farming activities) and fine-grained sediments (clays and silts).
(ii) Underlying this, a layer with higher resistivity values of 300–1000 Ωm was recorded. This layer was approximately 6–7 m thick, and comprised coarser material (sands and gravels) in a silty matrix. In hydrogeological terms, this level corresponds to the unconfined upper aquifer.
(iii) Finally, at 9–10 m depth, a conductive layer was detected, with resistivities <50 Ωm. It contained clays and marls interbedded with karstified limestone, and correspond to the aquitard formation below the upper aquifer.

Curiously, in Figure 4 we see a vertical anomaly produced by the geotechnical borehole, consisting of a vertical band surrounding the borehole where the resistivity increases by about 15 Ωm. We will show below how this effect is also evident in the numerical simulations.

Synthetic ERT models of the Motilla de la Vega site

Based on previous geoarchaeological information from Motilla del Azuer and assuming that the geological context is the same for the Motilla de la Vega settlement,

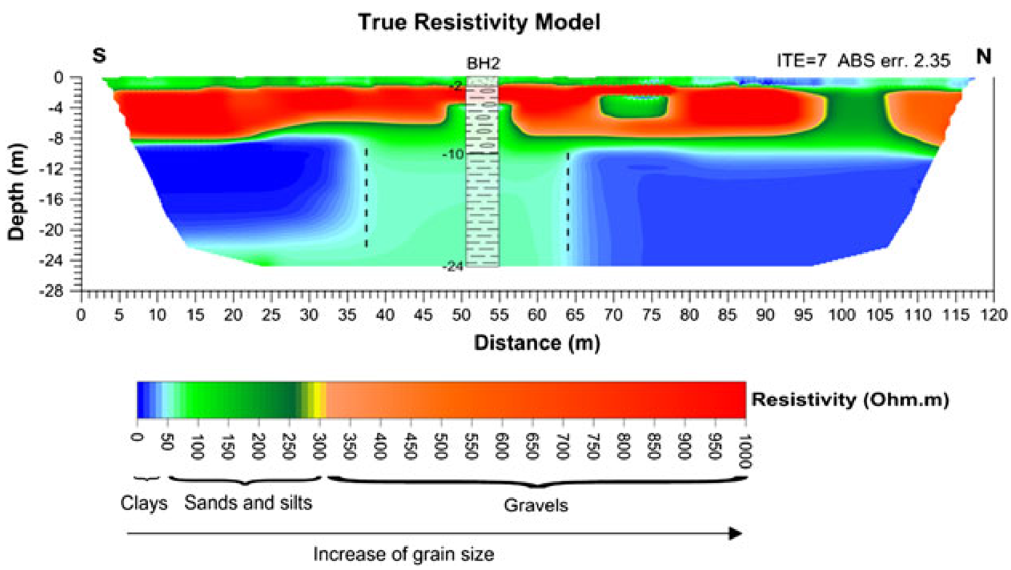

Figure 4. The ERT test profile and its geophysical interpretation. This profile runs S–N and crosses BH2 after 50 m. The legend shows the relationship between the two-dimensional resistivity model and the borehole lithological column. Note the vertical effect of the borehole, in the electrical image (dotted lines); see text for details. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

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a representative two-dimensional subsurface geology model was developed to predict the resistivity response of a Bronze Age well (Figure 5). We defined the model using horizontal subsurface layers. The first layer was 3 m thick, and consisted of clays and silts with a representative resistivity of 35 Ωm. Below that we defined a bed of gravel, 9 m thick, with a resistivity of 300 Ωm. The basal layer of the model was composed of marls and clays, with an average resistivity of 40 Ωm. We inserted a well at the centre of this model with the same dimensions as the Bronze Age well of Motilla del Azuer, and assumed that it was filled with a mixture of coarse and fine materials that had an average resistivity of 150 Ωm.

Bearing in mind that the vertical resolution and investigation depth depend on the maximum spread of the electrode array, and considering that in the fieldwork we used a total of 80 electrodes, we selected an electrode spacing of 1.5 m as the best compromise between horizontal resolution, related to the well diameter, and the desired measurement depth. We have constructed a two-dimensional resistivity model 118.5 m long and 30 m depth (approximately). Note that the dimensions of the grid model are irregular according to the loss of resolution as depth increased (Figure 5b).

We used this two-dimensional resistivity model as input for the forward modelling program RES2DMOD (Version 3.01; Loke, 1995–2010) to obtain the apparent resistivity pseudosections. We used Wenner–Schlumberger and dipole–dipole configurations (Figure 6a and b, respectively) to test the two different array responses related to the well detection. Having obtained these two apparent resistivity pseudosections, we used them to generate the corresponding true resistivity models using the RES2DINV program (Version 3.58, Geotomo Software; Loke, 1995–2010).

Additionally we then analysed the influence of different factors on the inversion procedure. In particular, we wished to determine the influence of the finite mesh grid size and the effect of the damping inversion factor. The damping factor leads to a stabilization of the solution, but produces a smoothed resistivity model (Godio and Naldi, 2003). In our case, a smoothed section was not desirable because we were attempting to emphasize the electrical anomaly produced by the well. The effects of the inversion algorithms on the final results were also analysed. When the subsurface bodies have vertical forms, such as a well, the conventional least-squares smoothness-constrained method tends to smear the boundaries. Consequently, we selected the robust constrained inversion method, which is less sensitive to resistivity contrasts and gives a high apparent resistivity absolute error (ABS), but emphasizes resistivity variations in the vertical direction (Loke, 2009). Thus, we opted for the following inversion parameters: a refinement cell

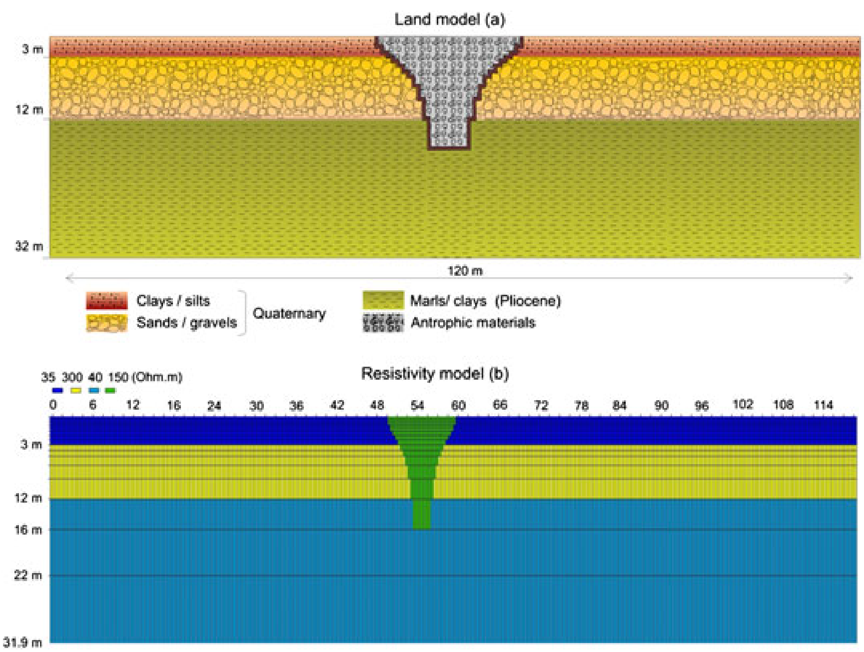

Figure 5. (a) Model of subsurface structure at the Motilla de la Vega settlement based on lithological data from the geotechnical boreholes at Motilla del Azuer and a geological survey of the study area. (b) Subsurface structure based on resistivity values derived from the ERT test profile carried out at Motilla del Azuer. To calculate the theoretical responses we used the same number of electrodes that were used in the fieldwork; that is, 80 electrodes spaced at intervals of 1.5 m that produced a profile 118.5 m in length. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

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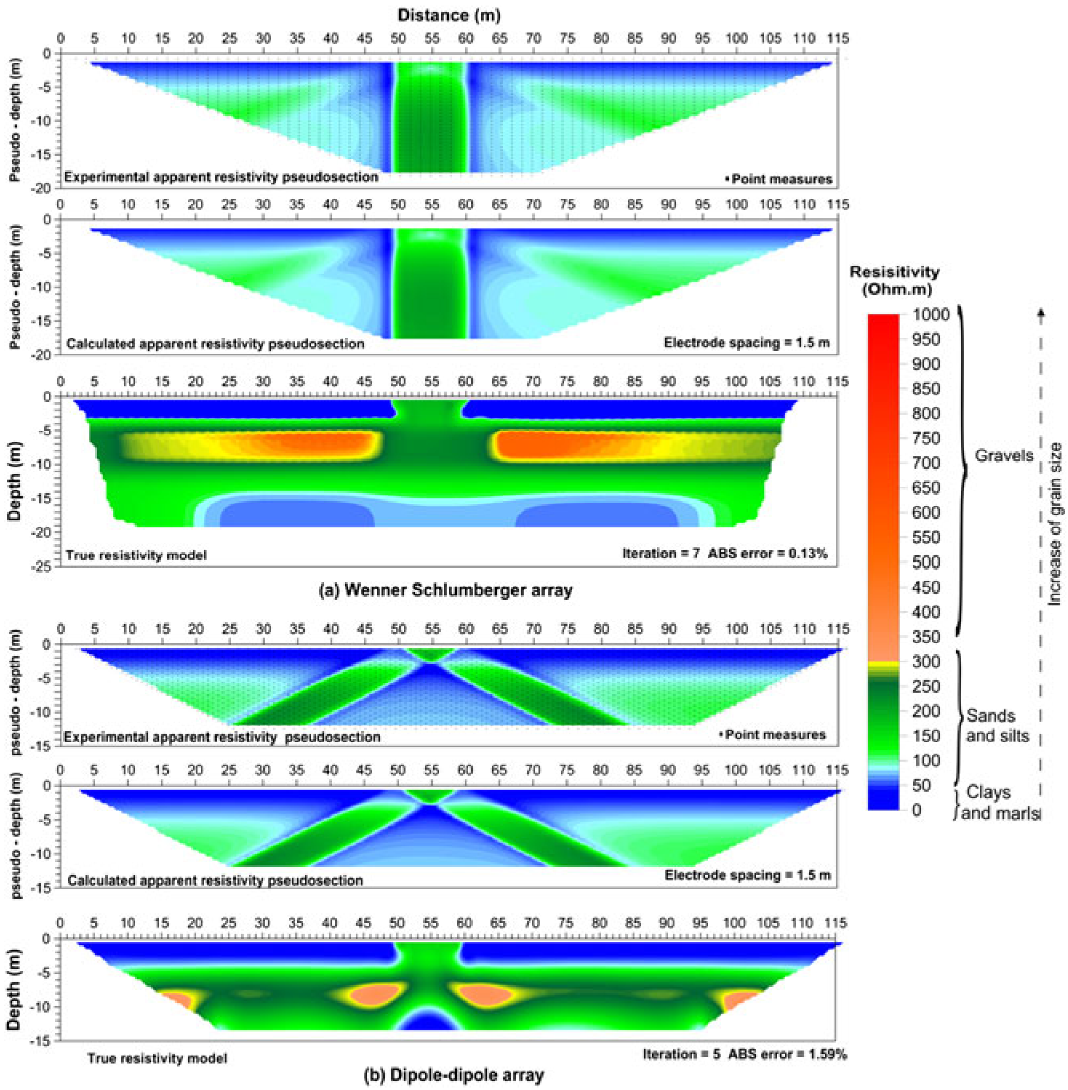

Figure 6. (a) Results of the inversion for a pseudosection obtained with a Wenner–Schlumberger configuration. (b) Results of the inversion for a pseudosection obtained with a dipole–dipole configuration. The inversion parameters were the same for both solutions; see text for details. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

model defined by four nodes for electrode spacing, a low inversion damping factor (0.1) and a robust constrained method to emphasize vertical changes.

The results can be drawn from Figure 6 and suggest that:

(i) For equal electrode spacing, the dipole–dipole configuration reached a depth of only 14 m compared with the 20 m achieved by the Wenner–Schlumberger configuration. This is because, in these arrays, the signal–noise relationship is defined through the geometric constant, and it is higher in the Wenner–Schlumberger configuration (Edwards, 1977; Reynolds, 1997).

(ii) The dipole–dipole solution shows the contact between the Quaternary gravels (resistive bed) and finer Miocene sediments (conductive layer) less clearly.

(iii) The well produces a resistive vertical anomaly. At the top, this anomaly is detected equally clearly by the two solutions, but at depth the Wenner–Schlumberger array extended the anomaly to the bottom of conductive layer, while the dipole–dipole array stops at the top of conductive layer.

(iv) All models indicate that the electrical anomaly may be small, so the capacity to detect the well is controlled by the nature of the infill materials; that is, the resistivity contrast with the

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surrounding geological strata, and the degree to which the electrical profiles cross the well. Our findings suggest that better results are likely to be achieved with the Wenner–Schlumberger configuration; that is, if a well is present, the electrical anomaly will be more extensive and the likelihood of detection will be greater.

These results are in agreement with the ERT test profile carried out over the geotechnical well (Figure 4). Recall that this electrical profile was obtained with a Wenner–Schlumberger array and shows a similar resistive anomaly. In this case, however, despite the small diameter of the borehole, the clear resistive anomaly is produced because the well is void and the electric contrast is greater.

Data collection and processing aspects

The fieldwork at Motilla de la Vega was carried out in September 2011. The two-dimensional resistivity profiles were obtained using the ABEM Terrameter LUND imaging system (SAS1000) together with a set of 80 electrodes spaced at intervals of 1.5 m. The five profiles (Figure 7) were planned with reference to the location of the well at Motilla del Azuer, which is slightly displaced to the east side. All electrode coordinates were acquired using a dual-frequency global positioning system (GPS) operating in RTK (real-time kinematic) mode in order to provide their accurate position in the study zone. It was also used to perform a topographic survey of the plateau.

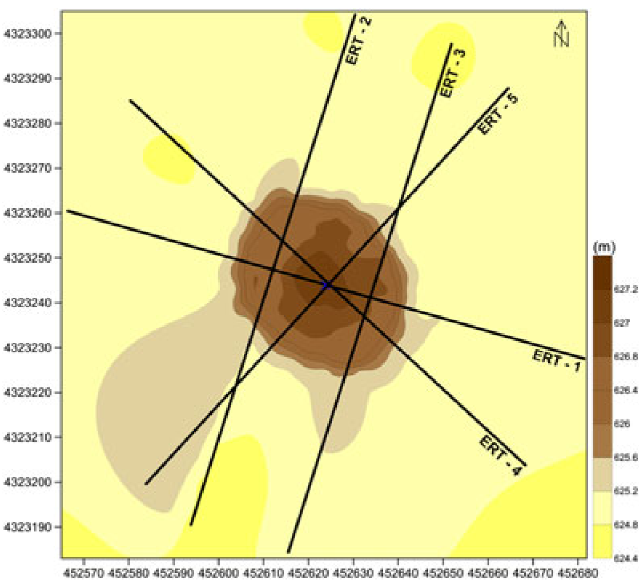

Figure 7. Elevation map of the Motilla de la Vega site and locations of the five ERT electrical profiles. All electrode coordinates were measured using a differential GPS operating in real-time kinematic mode (UTM coordinates, datum ED-50, H-30). This figure is available in colour online at wileyonlinelibrary.com/journal/arp

In the previous section it was seen that the theoretical results suggest that the best electrode array for obtaining clearer images of the electrical anomaly of a well is the Wenner–Schlumberger configuration. Consequently, all ERT profiles were acquired using this Wenner–Schlumberger configuration. However, it was also considered appropriate to carry out one ERT profile using a dipole–dipole configuration coincident with the ERT-5 profile (Figure 8). Unfortunately, these two ERT profiles do not cross any well, and therefore we cannot compare the electric anomaly that would be produced by a well when using these two types of electrode configurations. Figure 8 nevertheless verifies that the dipole–dipole array provides a less clear ERT model of fluvial Quaternary deposits than the Wenner–Schlumberger model; this latter model is more consistent with the geometry of the sedimentary facies of the study zone.

The field data were inverted using the same criteria and parameters of the synthetic models: a refinement cell model defined by four nodes for electrode spacing, a 0.1 inversion damping factor and a robust constrained method to emphasize vertical changes. Additionally, in this case, we also used a finite elements method to include the effects of topography. Figure 9 shows the resulting calculations for profiles ERT-2 and ERT-3. Note that profile ERT-3 indicates an electrical vertical anomaly that extends into the deepest conductive layer. This increase in resistivity is similar to that obtained in the synthetic model (Figure 6) and in the ERT test profile of Motilla del Azuer (Figure 4); it is plausible to infer that the well has been traversed by the ERT-3 profile. Another observation is that the ERT-2 model has a better fit (smaller ABS error) than the ERT-3 model; probably because it is easier to adjust an inversion model which has only horizontal layers than to adjust a model (ERT-3) with a vertical discontinuity. The interpretation of these two-dimensional electric models is discussed in the next section.

Resulting models

Figure 10 shows the five resulting field models from the Motilla de la Vega site. The relationship between lithology and resistivity for interpreting these five electrical models was based on an ERT test profile from Motilla del Azuer. The justification for this correlation

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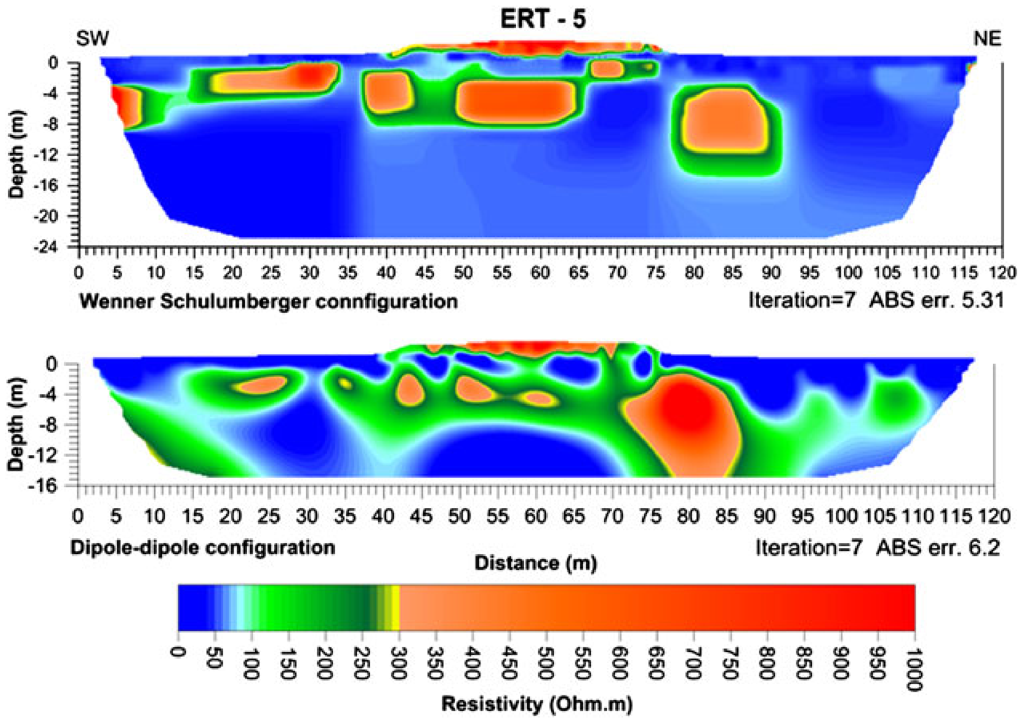

Figure 8. True models obtained for ERT-5 profile with a Wenner–Schlumberger configuration (top) and dipole–dipole configuration (bottom). These images were obtained with a field device consisting of 80 electrodes spaced 1.5 m. The calculations to obtain these models are explained in the text. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

is that the two archaeological sites belong to the same geological unit.

At the surface, all ERT profiles detected a highly resistive level (> 500 Ωm) corresponding to the central plateau formed by the accumulation of the remains of the limestone masonry from the settlement (see Figure 10). The thickness of this level is around 2 m. Below this level, a thin layer was detected with resistivities between 20 and 100 Ωm, indicating fine-grained materials (clays, silts, and sands). The electrical models suggest that the bottom of this layer coincides with the level of the current agricultural land, and can be taken as the level on which the ancient structures were built. The interpretation of this thin layer (2–3 m) between the plateau and the next resistive layer indicate that the Motilla de la Vega is a fortification that has no foundations; this is in accordance with the evidence from the site at Motilla del Azuer.

Between 3 and 9 m depth, one resistive stratum (200 to 900 Ωm) was detected. Based on the geological information, this layer is composed mainly of coarse-grained Quaternary deposits (gravels), forming the unconfined upper aquifer. The basal layer has low resistivity (< 40 Ωm) and consisted of impermeable, fine-grained sediments (Pliocene marls and clays) that constitute the impermeable bottom (aquitard) of the upper unconfined aquifer.

As already indicated, an electrical anomaly was detected in profile ERT-3 with the same appearance as the synthetic model and the ERT test profile at the Motilla del Azuer site (Figure 4). This anomaly has resistivities between 150 and 200 Ωm, and expands toward the underlying conductive unit (clays and marls). In Figure10 we can see that ERT-4 profile also exhibits an increased resistivity that extends as a vertical band below the gravel layer (dotted lines). In this case the resistivity is around 60 Ωm, which indicates an increase of 20 Ωm with respect to the basal layer (40 Ωm). If we consider the presence of a well, this slight increase in resistivity would suggest that this profile (ERT-4) passed very close to the well but did not cross it; because the resistivity increase is lower and less extensive that in the ERT-3 profile.

Figure 11 is a three-dimensional view of the five ERT profiles carried out at the Motilla de la Vega site. The dotted circle marks the limits of the central plateau where the surface archaeological remains, characterized by higher shallow resistivities, are located. Detailed inspection of this image reveals that this fort was erected where the gravel layer (higher resistivities) is wider and more coarse than the surrounding sediments.

If we focus on where the ERT-3 and ERT-4 profiles intersect, we can see how the two vertical anomalies intercept and we can deduce the well location because

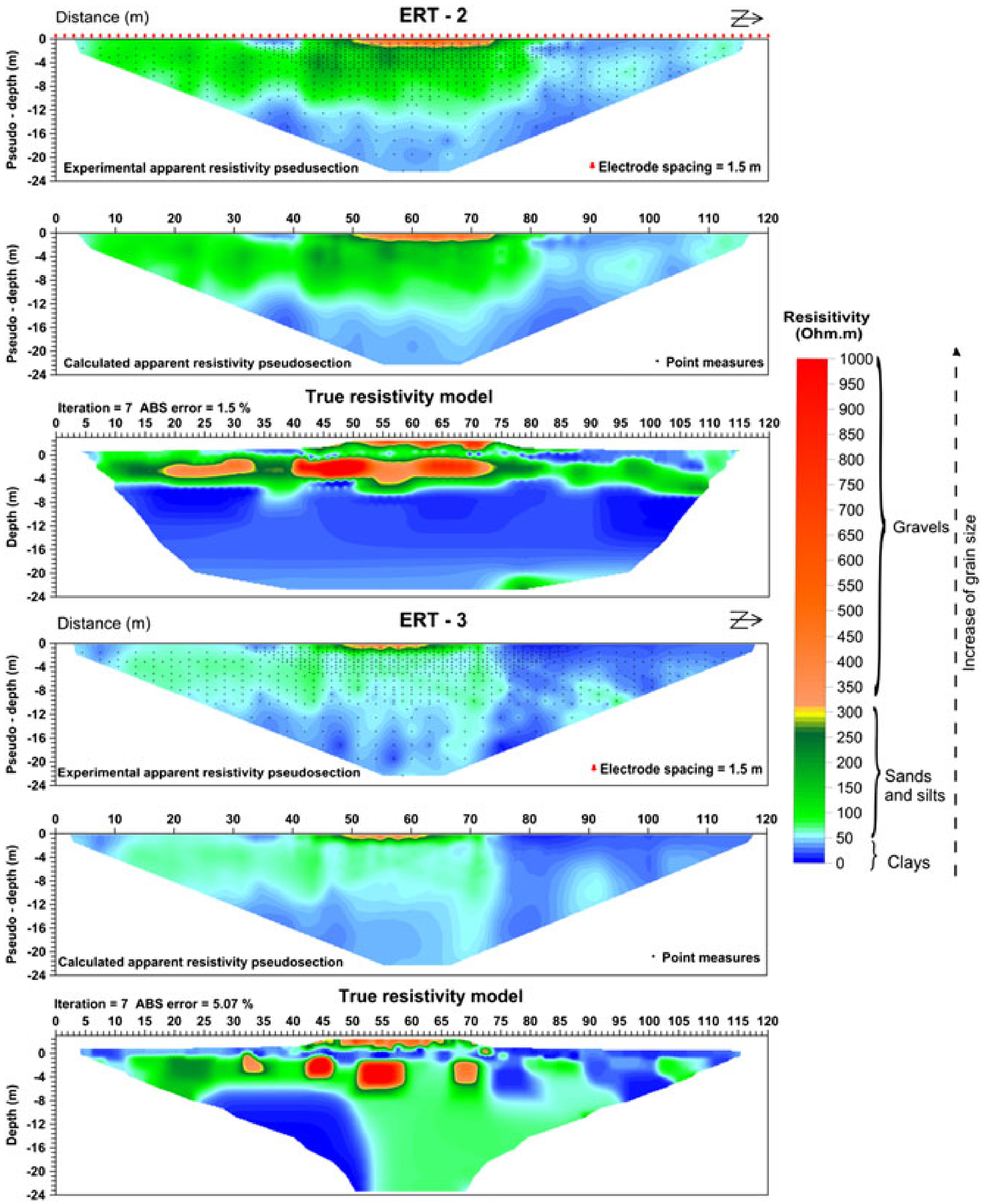

Figure 9. Calculations for ERT-2 and ERT-3 electrical profiles. The experimental apparent resistivity pseudosection (top), the calculated apparent resistivity (middle) and the calculated true resistivity model (bottom). The final models show the number of iterations and the ABS error. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

it must be crossed by the ERT-3 profile, skimmed by the ERT-4 profile and missed by the ERT-1 profile. So we deduce that a possible Bronze Age well is placed on the same eastern side as found in Motilla del Azuer. Both wells are located in the upstream direction, but in this case, as suggested by Figure 11, the Motilla de la Vega well is located at the southeast side, while the Motilla del Azuer well is placed at the northeast side (Figure 2). However, the lateral and vertical resolution of the models is too low to determine the diameter and depth of this well.

This constructive similarity suggests that the inhabitants of the 'motillas' sites followed the same pattern to place a well, because in both settlements they are located on the upstream side, perhaps ensuring a better quality of water. In addition, we have seen these

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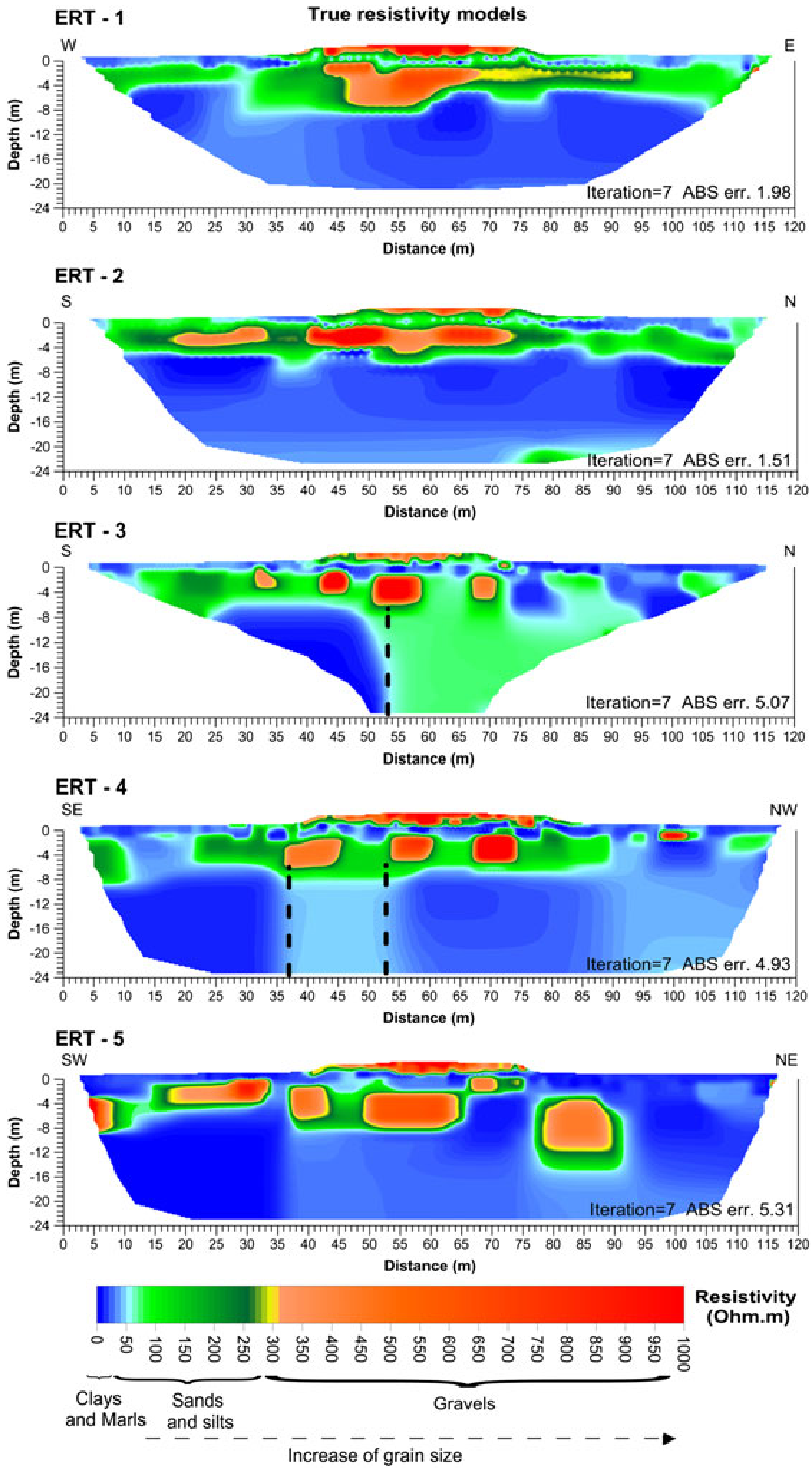

Figure 10. Electrical images of the five ERT profiles carried out at the Motilla de la Vega site. Note the vertical electrical anomaly in profiles ERT-3 and ETR-4. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

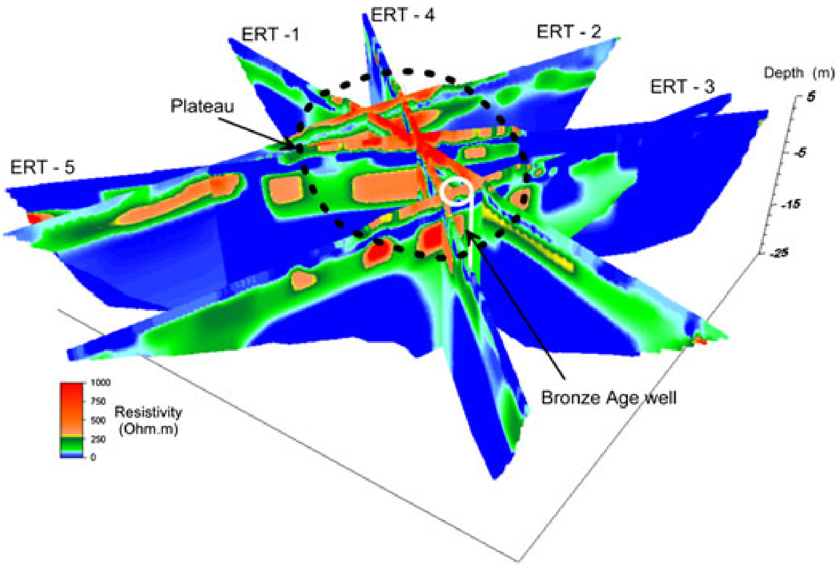

Figure 11. Three-dimensional views of the five ERT profiles carried out at the Motilla de la Vega site. This image indicates that the well is located to the east of the central of plateau and in a comparable location (relative to the river) to the well at Motilla del Azuer. This figure is available in colour online at wileyonlinelibrary.com/journal/arp

forts were erected where the gravel layer is at its thickest; in that way the water was temporarily stored and easily exploitable. The different well locations relative to the E–W axis of the respective plateaus could indicate that both wells were constructed on the side closest to the old Azuer River course at the time; that is, during the Bronze Age.

Conclusions

At the unexcavated Bronze Age settlement of Motilla de la Vega, non-destructive ERT profiles were performed to determine the geoarchaeological context and to detect the possible location of a well. This study has demonstrated the usefulness and limitations of the electrical resistivity tomography method to obtain subsurface information at archaeological sites.

We have shown that in situations where structures may be difficult to detect, it is advisable to use supporting strategies. In our case, we relied on two lines of supplementary information. First, we collated all available archaeological information from the nearby Motilla del Azuer site, which is an excavated Bronze Age settlement that can be used as reference. We used a geotechnical borehole to calibrate an ERT test profile. The resulting two-dimensional ERT image showed the relationship between lithology and resistivity in this study area, and also provided a real indication of the electrical anomaly produced by a well; although this effect was only indicative, because the geotechnical borehole and the Bronze Age well differed in shape and fill. Second, we used this geological information and the shape of the Motilla del Azuer well to create a theoretical geological model and to generate numerical simulations with which to obtain the electrical esponse (theoretical) of a well with the same characteristics. Through these inversion procedures, we were able to test the inversion parameters to be used when processing the field data. We also determined that, in this context, the optimal electrode experimental configuration setup is a Wenner–Schlumberger array.

The electrical images obtained for Motilla de la Vega show the same geological structures that are present at Motilla del Azuer: a plateau of about 2 m in height with high resistivity remains of limestone masonry; a thin conductive layer beneath, which coincides with the level of the farmland soil (indicating that the Motilla de la Vega is a fortification that has no foundations, as observed at the Motilla del Azuer site); below this layer is a gravel bed with medium to high resistivities continues to 10–13 m depth and is the upper unconfined aquifer; finally, a conductive layer (clays and marls of Pliocene) that acts as an aquitard was recorded. The well was placed mainly on the gravel layer. Interestingly, the settlement was located where this gravel bed is thickest, indicating that the prehistoric inhabitants had a detailed understanding of their surroundings and of how best to exploit them; that is, where the thickness of gravel is greater, the water reservoir is larger.

Detailed analysis of the three-dimensional ERT view indicates that this settlement contains a well similar to that present at the Motilla del Azuer site. Both wells are located on the eastern side and the upstream edge of the settlements; perhaps in order to obtain the best water quality. Each well is placed differently with reference to the E–W axis of thier respective plateaus: Motilla del Azuer is displaced to the northeast and Motilla de la Vega is displaced to the southeast. These positions could indicate that these wells were constructed on the side closest to the Bronze Age course of the river.

The results derived from the ERT prospection are a significant archaeological finding because we can established that the Motilla de la Vega site follows the same architectonic pattern of the Motilla del Azuer site. It is suggested that the inhabitants of Motilla de la Vega had an empirical knowledge of the territory similar to that of the Motilla del Azuer inhabitants. In that way, we can extend the social aspects of the Motilla del Azuer site, which is widely studied, to other settlements that occupied the river valleys of this region.

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