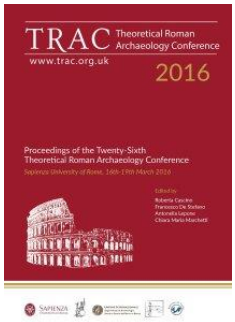

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Method Matters. Some Comments on the Influence on Theory and Methodologies in Survey Based Research in Italy

Jesús García Sánchez

This paper aims to reflect upon how relevant archaeological methodologies and data visualizations are for the production of archaeological knowledge and its eventual printed narrative form – still the most common form of communication within academia and outreach. The discussion will be built around well-known survey projects in the Mediterranean area, with some examples derived from our recent fieldwork project in Central-South Italy (NWO funded Landscapes of Early Roman Colonization project.).

Everyone is aware of the 'theory-ladenness' of archaeology as a discipline, especially after the energetic and critical debate abandoning an era of positivism. At present, the discipline of archaeology is still marked by the long-established processual versus post-processual debate, which nevertheless, has benefitted the development of methodologies aware of their own biases, and most importantly the rise of various schools of thought that combat positivism and objectivism fiercely. The concern of this paper is how Roman archaeology has barely addressed the debate about the 'theory-ladenness' of methodological decisions, and how this situation has been caused, perhaps, by the (ongoing) philological and artistic orientation of the discipline.

As in other social sciences, neither the methodological decisions made by scholars nor the methods themselves are surgical tools. Instead, we should consider them as embedded in broader theoretical scopes. Methodology is conceived as a tool to pursue or to validate the theoretical orientation of the research proposals; therefore, we should examine what the main theoretical programmes are that actually influence the implementation of archaeological methodologies. In that particular aspect, I will focus on survey methodologies.

Gardin (1980; 1999) proposes a comprehensive re-think of how one does archaeology (see also Dallas 2015), not only suggesting how one should perform archaeological research (doing fieldwork, excavation, and analysis), but also 'providing a new theory of how archaeological knowledge is produced'. A sort of process of deconstructing what archaeologists believe they do, in the words of Barceló (Barceló 2009: 100).

Three key elements can describe conceptually the most common workflow of research and can be used here to guide the argument of this paper – these are: performance, knowledge, and production. Such concepts can be translated or adapted to the particularities of archaeological research as method, interpretation, and narrative. These key concepts are rel-

evant to the exploration of how historical knowledge is dependent on theory-laden methodologies. Putting it simply, we will follow the '*chaine operatoire*', which first emerges from theory, secondly takes shape as a methodology, and thirdly produces an interpretation and knowledge, and finally is released to both the academic community and public as a narrative.

The element we discuss in depth is the methodology, as this is the point in the chain where datasets, as grounds to construct interpretations upon, are produced. This can be likened to an engine, when the fuel ignites and creates the movement that takes us to our destination somewhere. Let us say that this somewhere is the targeted knowledge about the past.

Mediterranean Surveys, Methods, and Theory

The well-known landscape and regional surveys in the Mediterranean area serve as an example of the premise of this paper. Both the Annales school surveys and the phenomenological approaches to how people dwelled in the landscape share almost identical fieldwork methodology, as well as the inventories and gazetteers produced, also known as the Compilation part of Gardin's (1980) *explanans* construct. Nevertheless the outcome in terms of interpretation is definitely divergent, the explanation, or *explanandum* side of the construct by Gardin. Thus, I will explore the theoretical and methodological foundations of various projects and contribute to the discussion with new intra-site survey data in the Republican colonial landscape as an example of an ongoing discussion about old and new interpretations of the colonization of Central-Southern Italy.

Regional Mediterranean survey can be understood as a research case in itself. Surveys in that geographical framework tend to be similar in aims and discussions, oriented towards the complexity of the surface record. However, there is room for larger theoretical analysis in Mediterranean survey, sometimes very evident, as for example when we compare Anglo-Saxon and southern European schools[1], like the well-known Italian '*topografia antica*'.

One of the most clear, because of its long-established tradition, is the impact of the Annales School in Mediterranean surveying. The key book by Bintliff (1991a) on the topic brings together various examples of research influenced by the structure of history proposed by Braudel. Two of the main important examples, paradoxically also the two first chapters of the book, are Bintliff's (1991b) Boeotia survey and Barker's (1991) Biferno valley survey. The former is directly linked to our research in the central Apennine region of Molise, referred to as area 1 in Fig. 1.

However, both survey projects bear different methods; the Boeotia survey is oriented towards the off-site record as a result of manuring activities coming from residential nuclei, whereas the Biferno survey is oriented towards the documentation of the long-term occupation of the valley from prehistory to mediaeval times. If we look at methodological decisions taken during the process of surveying regarding either the collection strategy or the scale of the study area, both are paradoxically different. So we can ask, what makes these two surveys different in terms of theory and methodology? Both projects follow Braudel's method

1 Master thesis of Rogier A.A. Kalkers using data from "A Mediterranean Valley"by G. Barker and "Forma Italia. Larinum" by Felice.

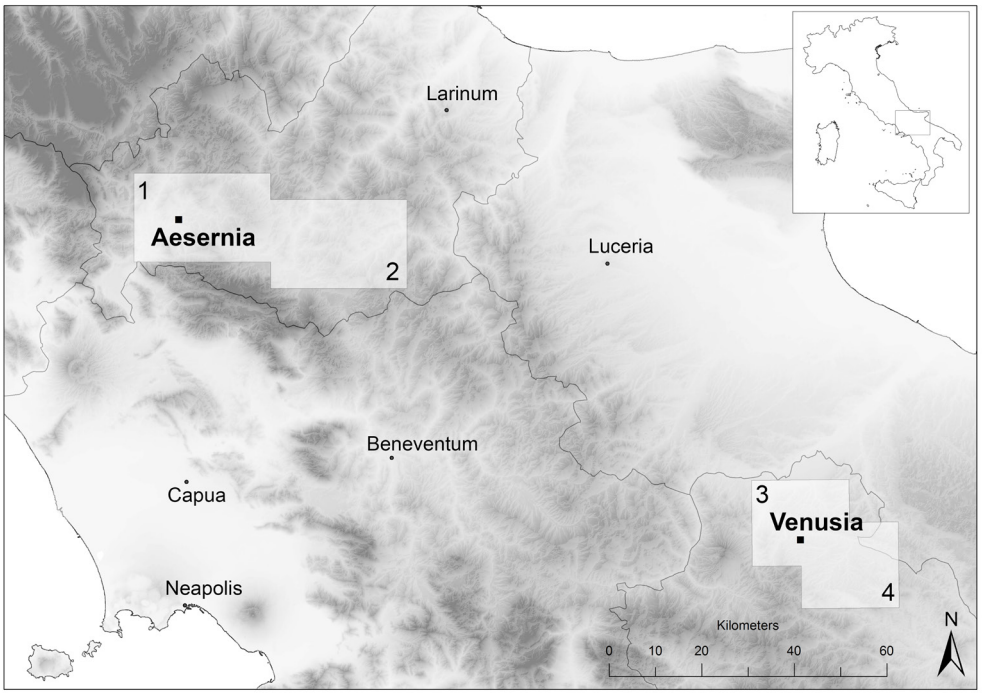

Figure 1: LERC research areas in 1, Aesernia; 2, Tappino valley and 3, Venusia.

of studying history and separate events and short-term processes. The selected method is therefore intended to gain new data which will eventually make it possible to overcome the 'history of big men' (according to the 19th century German tradition) and thus, focus on the conjectural aspects (demography, and agrarian and economic cycles). Demography and settlement densities in the long term, and affected by short-term (human) events, such as colonization, conquest, and war, are key subjects for understanding site-oriented research. In the case of the Boeotia project, the off-site research can be understood as a way to find those disappeared sites that are only traceable thanks to their material footprint, and to understand the settlement development through the millennia.

On the opposite side of the board of Mediterranean surveying we encounter those scholars aligned with a phenomenological interpretation of the landscape, like Given and Knapp's survey on Troodos (Knapp *et al*. 2003; Given *et al*. 2013) and the Sidney Cyprus Survey Project (SCSP). Given (2004) aims to understand past perceptions and experiences of the landscape, to do so he expresses his needs for a rigorous, intensive, multidisciplinary approach to both on-site and off-site contexts, since human 'activity-dwelling-experience' is not restricted only to sites. So, off-site collections are required for such a phenomenological approach to the rich surface pottery contexts of the Mediterranean. In his paper 'From density counts to ideational landscapes' we can see that perhaps the most striking difference between Barker's or Bintliff's surveys, apart from the theoretical scope of the research, is the sampling strategy oriented towards the reconnaissance of transects rather than of the whole

landscape. For example, Knapp and Given used transects of 50 m wide across the Troodos area, something that has also been criticized, such as in the similar example of the *Ager Tarraconensis* surveys (Carreté *et al.* 1995).

Given uses the SCSP survey datasets to interpret past experiences in the landscape, from Classical times to Ottoman and modern, but also at villages, in fields related to the manure activity and peasant dwellings on their work land, or the wilderness; though the latter is less present in Mediterranean survey discussions because no site data or demography can be inferred from these liminal areas. SCSP methodology matters for constructing a history of landscape experiences based on surface pottery collections. Equally, the hyper-intensive Boeotia strategy, geared towards off-site material also matters in order to reconstruct the demographical trends of the entire region, the role of the cities and their expansion or decline. Barker's ground-breaking work in the Biferno Valley has brilliantly applied the principles of Annales School in archaeology, raising the standards for the telling of history using survey data. His emphasis on detecting sites helps him to understand the long-term process undertaken by the valley from prehistory to the recent construction of the Bifernina highway. His sampling of the valley, and complementary sampling in some areas of the high plateaus, is crucial to his method. This is a case for reconsidering the importance of the method on the creation of narrative histories.

We have seen how the well-known landscape and regional surveys in the Mediterranean area serve as an example of this premise – the Annales School surveys and the phenomenological interpretation of the landscape and how people dwelled on it share methods, but the outcome is definitely divergent. Therefore, I will analyse the theoretical and methodological foundations of different projects and, moreover, I will contribute to the discussion with new intra-site survey data in the Republican colonial landscape as an example of an ongoing discussion about old and new interpretations of the colonization of Central-Southern Italy.

To represent that theoretical introduction, I would first like to stress the importance of site-oriented intra-site research, focusing on a particular colonial landscape, and second, to reflect on possibilities of visualization in the production of archaeological knowledge; these are the means or vehicles of narration, also sometimes called inscriptions of knowledge (Latour 1986; Mlekuž 2013: 114–115). These products could be purely graphic, or take the form of a graph and its accompanying text.

My belief is that visualization, combining GIS-based management of datasets, multivariate statistical analysis (Tukey 1977) and cartographic representation of space is the most powerful instrument to create knowledge and interpretation, which cannot be done by pure statistical output alone (Tufte 2001). The case of geospatial statistics is rather different, considering that they deal with the spatial location of variables; therefore, the output is cartographic.

Despite criticism to the obvious Western conception of cartography (Thomas 2001), it is still the most suitable and understandable tool to solve problems with any degree of spatial complexity. As Tukey (1977) states for his Exploratory Data Analysis, graphic output is an extraordinary element to foster interpretations and to generate new working hypotheses. That makes the map a mechanism for generating data, a tool to interpret the data and the way of

communicating that knowledge, the former an area explored by Gardin (1999) decades ago when computing methods in archaeology began to show their potential, but which unfortunately still has not created a proper space for academic communication.

Landscapes of Early Roman Colonization

The aim of the Landscapes of Early Roman Colonization (LERC) project is to question the traditional assumptions which understand colonies as vehicles of Romanization that helped the spread of the city-estate model, in which colonist farmers inhabited a landscape characterized by evenly distributed plots of land. This assumption arises from classical sources of the second century B.C., which depict colonies that do not have very much to do with the ones we are studying (e.g. *Aesernia*, in area 1 in Fig. 1 and *Venusia*, in area 3 in Fig. 1). Therefore, methodological decisions are crucial in order to change the traditional, unquestioned narrative.

Our study case focuses on the impact of Early Roman colonization on the Italic world in the third century B.C. An impact that could be understood not as a mere war-like event, i.e. 'confrontation-destruction-implantation', but as a long dialectic process (e.g. Rome-Samnites) of external force versus indigenous resistance that endures until the Social War in 90 B.C. Our survey's aim is to study such an impact of a powerful external force in Samnite society, in the area of the upper Volturno valley, a natural pass on the Apennine ridge, where the Latin colony of *Aesernia* was established in 263 B.C. Another complementary area for our project is the re-study of the *Ager Venusinus*. The hinterland of *Venusia*, founded in 291 B.C., was surveyed for years by a team led by Maria Luisa Marchi (Marchi *et al.* 1996; Sabbatini 2001; Marchi 2010), covering a total of 70 thousand hectares and discovering more than 2000 new sites.

The first three years (2011-2013) of research in the territory of *Aesernia* by the LERC project aimed to gain knowledge about the general settlement pattern in the region, something we had to construct from scratch due to the absence of regional gazetteers or systematic surveys of the area. Therefore the method was oriented towards the detection of new sites from any period, despite the original interest in the early colonial scenario. This part of the research has already had its own conclusions published (Stek *et al.* 2015), so I will pursue the second, intra-site phase of the project.

Post-colonial theory presented by P. van Dommelen for the Mediterranean aims to reject the dualistic conception of colonialism and, therefore, to 'shed light on murky dimensions of colonial situations' (van Dommelen 2011). One possible way is to look at internal differentiation of colonial society, and a methodological approach is to study materiality 'in the everyday sphere of rural housing'. In that sense S. Kent remarked that 'the organization of a built environment and use of space is a metaphor for the organization of a culture: tangible expressions of invisible reality' (Kent 1991).

Our methodological approach to colonial sites, selected from the CLP site catalogue, consists of a sampling strategy called Point Sampling. It serves either for extremely rich surface contexts or for low visibility areas where the surface cannot be seen. The methodology

derives from previous surveys in Riu Mannu (Van de Velde 2001), and has parallels in the old San Vincenzo al Volturno test pits in the early 1980s.

In both cases, a systematic approach is needed, thus, the point samples were set up following a regular grid measuring 10 metres on each side. Surveyors equipped with tools scraped an area of 1 metres in radius from the point sample until exposing soil layers, where, if lucky, the surveyor would retrieve archaeological material. It is important to keep control of the procedure, since in contrast to regular field surveying the work of sampling and collecting is an individual task. It is crucial to check whether each point sample has been cleaned according to the standards, neither leaving a very superficially scraped point sample, nor digging crater-like samples, as these two scenarios will bias the pottery collections and the representativeness of the method.

We can agree with Bintliff (2013) on his lament regarding missing information in sampling methods. However, we have incorporated sampling of the blocks in between point samples in order to retrieve all the diagnostic material that could reinforce chronological and functional interpretations of sites. These block collections, despite being analysed as rigorously as the point samples collections, are not included in further intra-site statistical analysis because of their non-systematic nature.

Moreover, A. Hamel had surveyed some sites with electric resistivity in order to find out more about the preservation of intra-site structure, adding this data to the use of domestic or productive space in Hellenistic sites. Sites hidden by the increasing forest coverage in Molise, like hillforts inhabited at the time of the Roman conquest and theoretically abandoned thereafter, were studied via LiDAR datasets.

A crucial point for the research is to consider the spatiality of the point samples, otherwise the systematic planning of the surface pottery collection will be useless, and we could have the same bag of pottery just walking randomly across the site, and in the case of non-visible areas, digging holes randomly across sites. Thus, in parallel, and complementary to the material culture studies of the collections carried out by M. Termeer, my aim is to stress the importance of understanding the assemblages in space, while always bearing in mind the danger of straight forward interpretations of sub-surface assemblages, ignoring the importance of post-depositional effects, ploughing being the most obvious. So, are survey collections totally stochastic? (see Fentress 2000). I reject the idea as a working hypothesis, so I will continue the effort of extracting spatial results from our complex datasets.

The site contexts we are studying are mostly domestic with industrial activities as we can infer from the presence of distinctive pottery types as dolium, amphorae, slag, kiln refuse, etc. The pottery collections were classified according to a well-established LERC system, where each potsherd was described using a list of 71 ware types, from ABP (Amphorae Byzantine Type) to WAS (Western kiln refuse). This long list does not seem very operative if we consider that sometimes the collections are rather meagre, and the ware list is then reduced to a few categories.

A solution to overcome the complexity of this ware list is to translate our working list into a functional-category list, which helps to reduce data complexity and to extract meaningful output.

Winther-Jacobsen (2008; 2010) has proposed functional interpretations of wares, and has applied it to the analysis of the Sidney-Cyprus Survey Project. Her functional list is composed of Table Wares, Cooking Wares, Light Utility Wares (with walls thinner than 8 mm), Heavy Utility Wares, Transport materials and Architectural material. The LERC wares can then be easily translated into the Winther-Jacobsen functional classifications. Both classifications are useful to characterize the different use of space. The LERC one is definitely superior for the study of assemblage composition, while the Winther-Jacobsen one is useful for grasping functional interpretation of the data, or for visualization that requires a lower level of complexity.

Some Examples of Data Visualization

The Colle Palumbo site is located 4 km east of Isernia, on the southern slopes of Colle dei Cerri. The site is located on a flat terrace controlling a gentle slope towards the east, where we can find flat lands adjoining the River Carpino.

The site is interesting due to its size and because a Hellenistic phase has been identified due to the presence of black gloss pottery. The size of the site and the richness of the assemblages led us to interpret it as a large and internally structured rural settlement. Electric resistivity allowed us to appreciate that internal differentiation and some structures connected to the site that appear in the surroundings, which are now completely buried. Some parallels of this type of architecture strip buildings or raw-type town houses were found in the *Ager Cosanus*, Etruria, Potenza, and the Tiber valley.

Nevertheless, a later mid–Roman phase was also indicated by several African red slip (ARS) sherd fragments, so for the moment we cannot correlate the assemblages with particular architectural phases. The geoprospection shows us the later phase, but our parallels also point towards an earlier period; perhaps the building was reused without strong modifications of the original layout. The methods we are using to study this and many other Hellenistic settlements are nevertheless insufficient to resolve these kinds of stratigraphic problems.

Our most recent intra-site approach is to study the relationships among neighbouring assemblages in an attempt to assess variability in collection composition across space. A normal procedure in archaeology is to group individuals, collections in this case, with statistical procedures like cluster analysis. The problem we encounter using cluster or hierarchical groupings is that it works well with individuals, say, compositions of mud bricks, but has nothing to do with the spatial positions of these individuals. In our particular case, we can say space matters. If we translate the dendrogram to the map we can already see how cluster groups work in space. The method also makes the groups considering the collection composition, variables, but not the spatial dimensions. In that particular case we can be happy because we can already see some spatial consistency in the output and some isolated point samples grouped together.

In order to closely explore space variability we have to look in depth at the cluster method. Groups are made using statistical distances among individuals. The closest individuals in this metric are grouped together; this is the information we can see displayed in a dendrogram.

I choose to represent these distances on a map, but only in between point samples. Without entering into the practicalities of creating this graph, I can say that it is possible to choose any kind of metric, including those that are more familiar to archaeologists, like the Pearson correlation (Drennan 2009) that can also be mapped combining strength of relationship using line thickness and direction using colour (thus difficult to plot in black and white plates). The example displayed in Fig. 2 corresponds to a similar analysis implemented in a third century A.D. Roman villa in Granjería (Sandoval de la Reina, Burgos, Spain). An example of another distance or dissimilarity index is the Euclidean distance. An easy interpretable index as an 'ordinary' straight-line distance in a metric space. Fig 3 shows an example of site 119 using that analytical and visualization method. Fig. 4 shows another example from the *Aesernia* survey, site A203 was also studied with a Euclidean distance matrix. We visualize orthogonal vectors. Colours indicate the distance between samples.

As we can observe, reddish colours indicate close distances, which happen among samples with very meagre collections from outside the site core. Green and blue lines indicate the biggest distances, so the collections are more complex in composition in total counts and different wares also termed richness. In the case of the Late Roman villa of Granjería, the visualization plots three different groups, one in the upper corner, another one in the eastern and central part of the grid, and a very small one in the southern part of the grid. Especially around the later one, the data is homogenous and points towards a smooth distribution that can be understood as an off-site scatter and debris from the main core of the site. In A119,

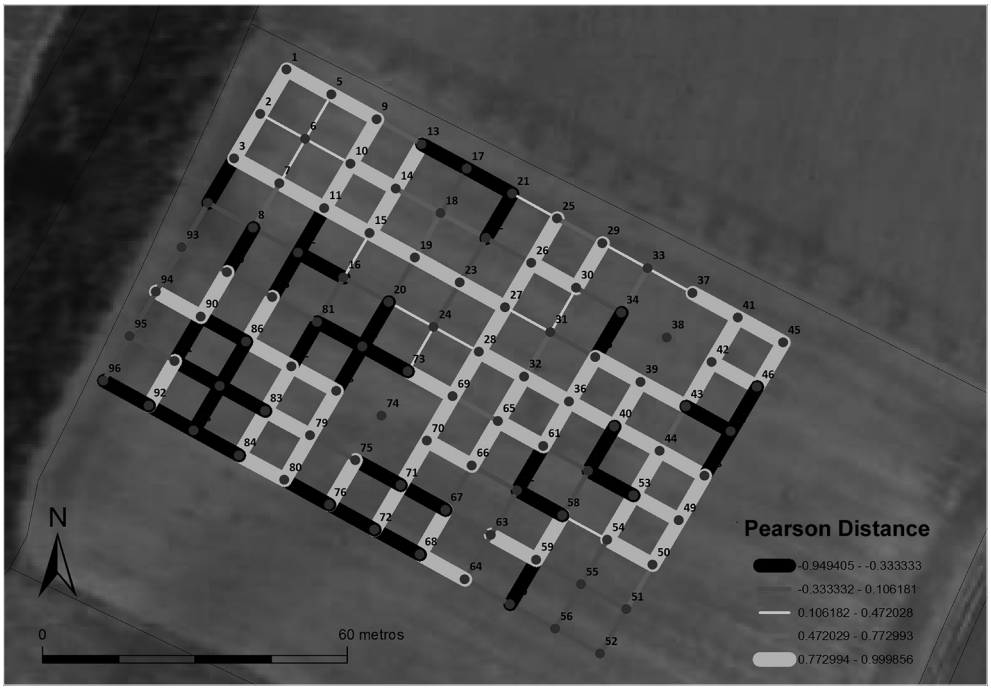

Figure 2: Pearson correlation expressed as distance in a cartogram to express assemblage variability in Granjería (Burgos).

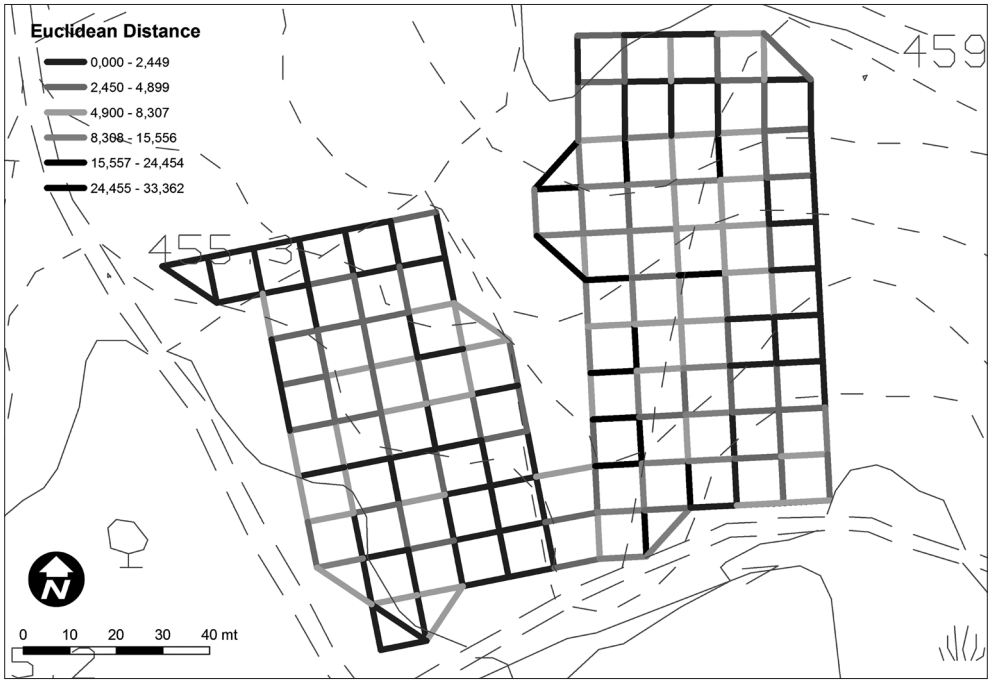

Figure 3: Euclidean distance expressed as a cartogram to represent assemblage variability in A119 (Isernia).

the plot clearly shows the concentration of pottery at the left side of the Eastern grid. The dissimilarity points towards a great variability in the composition of assemblages and the plausible low destruction of the site, surrounded by an extended halo with almost no material.

A203 shows the same information as A119, as one part of the side presents high variability in the assemblage composition. In that case, the feasible site core is rather small, no more than 20 x 20 m. It is surrounded by a halo, low variability or smoothened densities and eventually the off-site scatter that surrounds the previous examples. In that case it has been possible to suggest the size of the site core. The reduced site size summed to the material assemblage could be understood to play a particular role in the landscape, e.g. a cultic, or ritual space rather than a production or habitation centre.

The last approach is to explore how functional categories are spatially related, something that can be particularly interesting for the site core area. The statistically transformed data is originally displayed in a 2-dimensional graph, or an array of them, thus we can grasp an idea of the process occurring on the site as a whole. However, as occurs in the cluster analysis, as we lose spatial rich information we are obliged to translate this information to the map.

Nevertheless, the representation of the standardized values of the Principal Component Analysis (PCA) or Correspondence Analysis (COA) (Greenacre *et al.* 1987; Greenacre *et al.* 1994) does not allow a multivariate representation, thus, several maps are required, exchanging the graph array for a map array. There are possibilities of performing the same analysis and display it in a multivariate-fashion. However, for the moment, we have not yet advanced that far.

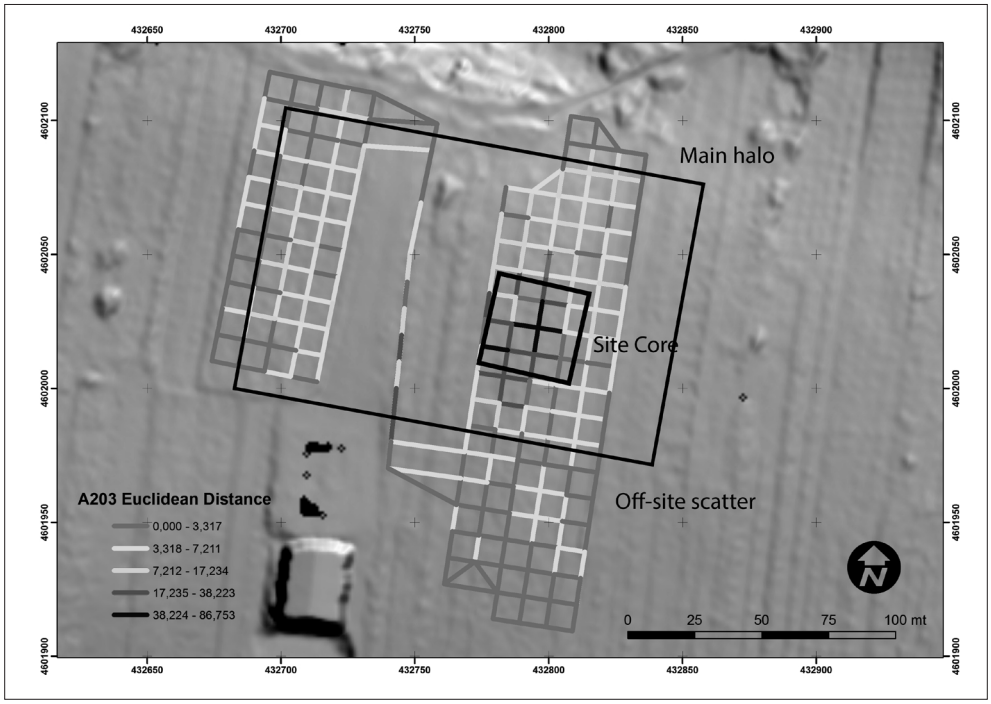

Figure 4: Euclidean distance analysis and interpretation in A203 (Isernia).

The standardized PCA scores visualized in a matrix (Fig. 5) analyse the samples from site A205, also known as Colle Pallumbo, where further geophysical research was also carried out to compare the surface assemblages with sub-surface structures. Each matrix plots the PCA scores for each functional ware in a point sample. The symbol's size can be interpreted as the strength of the ware to explain that particular sample. It is especially interesting to see the strong correlation of Table Ware and Light Utility Ware. Heavy Utility Wares, in that case big containers like *dolium* fragments, indicate diverse assemblage composition, and perhaps productive areas. We can then translate this into a map, to have a better idea of the meaning of the group association in the space (Fig. 6).

Table Ware appears distributed throughout the site, but it is rather more significant in the upper area, maybe the slope can be considered off-site debris, as happens with Architectural material. Light Utility Ware also appears in a small area, slightly elevated over the slope, so maybe another differential use zone. Heavy Utility Ware appears in the eastern area of the site and downslope. In that case the stochastic nature of Architectural materials is undoubtedly obvious.

Conclusions

Our research is clearly oriented towards the understanding of settlement patterns in a colonial context, and to carry it out we can examine regional patterns following the methods in regional survey in the Mediterranean areas. These methods have been used extensively for different research purposes and within agendas aligned with several schools of thought.

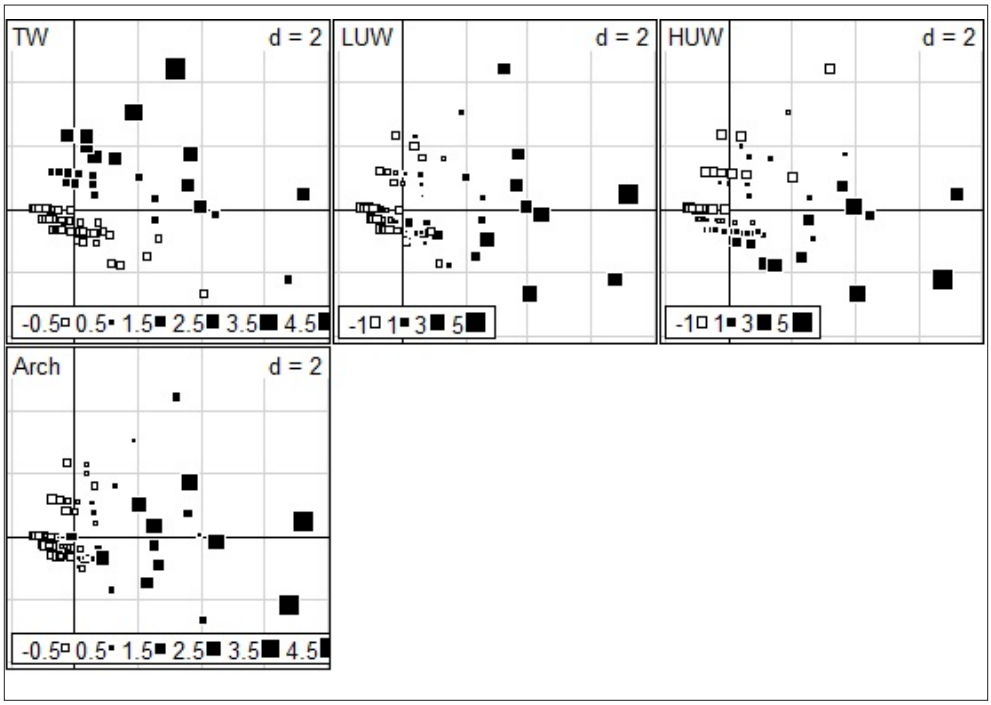

Figure 5: PCA-standardized matrix of functional wares in A205 (Isernia).

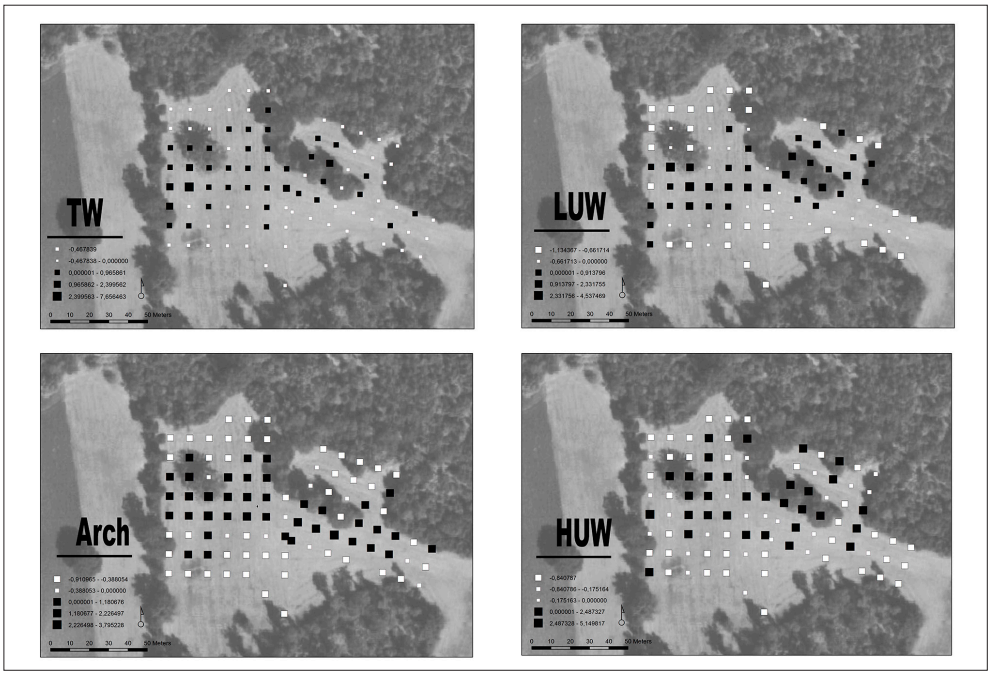

Figure 6: PCA-standardized values of site A205 in a map-matrix.

Moreover, for the sake of a proper understanding of the landscape dynamics, together with the evolution of the population dwelling in such landscapes, I consider it relevant to look at the spatial complexity of different forms of habitation using intra-survey data and multivariate statistical visualization.

Visualizing our results in an understandable way is also important for the correct dissemination of information using alternative publication methods, as foreseen by Gardin (1999), to deal with new and forthcoming data complexity. Visualization is also a dialectical tool to create the discourse on colonization. With a deep knowledge of intra-site contexts we can redefine the traditional narrative based on standard farms. With our analysis we can see complexity in surface assemblages and intra-site spatial structure, and, eventually, a classification of Republican sites.

So, what does all this add to the narrative concerning Roman colonization? It is important to look into the assemblages and their spatial meaning in order to create a discourse that portrays the great variability of the settlement pattern, somehow humanizing what have always been considered 'dots on a map' (Witcher 2006). The various types of settlement on the colonial landscape, especially productive areas or clustered villages, then show a non-traditional model of Roman colonization.

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