Mobility, Visibility and the Distribution of Schematic Rock Art in Central-Mediterranean Iberia

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Abstract. The distribution of Schematic rock art sites in the central-Mediterranean area of the Iberian Peninsula is closely related to the mobility of Neolithic groups, and to their visibility, perception and structuring of landscape. With the application of some well-known GIS techniques, such as computing least-cost paths or cumulative viewsheds, we can study the visual relationships established between paths and rock art shelters. These analyses give us a sounder background to understand the distribution of the sites, which is closely related with their social context of use.
Keywords: Neolithic rock art, mobility, visibility, perception of landscape

1. Introduction

In the last decades it is becoming more and more frequent the formulation, in the archaeological literature, of the doubts and possible criticism raised by the use of the word "art" for designating the prehistoric graphic expressions. This seems to be related with the connotations often suggested by the concept of Art – based in the Romantic idea that its creation belongs to an aesthetic self-expression, the artist's (but see Bradley 2002). In accord to this concept, for many years prehistoric rock art studies have been outside the evolution of interpretive trends in Archaeology; these studies have focussed mainly in the analysis and interpretation of the motives depicted, not paying attention to their social and historical context of use.

However, instead of this normativistic point of view, prehistoric art might be considered as a cultural product, intimately related with their author's ideology and social structure. Thus, its creation and use would depend on various factors: from possible technical or material constraints, to the social and cultural conventionalisms that affect its form, content, functionality, and the place where it must be depicted. From this point of view, rock art appears as a part of the archaeological record that could be studied with the same analytic tools than settlement or burial sites. Going beyond a simple stylistic or chronological analysis, the application of some common GIS techniques to study the location and distribution of rock art sites shows us a high degree of internal variability; this variability also affects the motives depicted in every shelter, which could have had different functionalities.

The analysis of Schematic rock art in many parts of the Iberian Peninsula, such as the North-western or South-eastern areas (Bradley et al 1995; Martínez García 1998), has revealed a patterned distribution of the motives depicted, marking the optimal corridors used by human individuals and cattle, and also some areas of resource abundance. In the central Mediterranean area, in spite of its internal variability, the distribution of many of the Schematic rock art shelters also seems to be closely related to the mobility of Neolithic groups, and their visibility, perception and structuring of landscape. These relationships can be studied through GIS techniques, such as computing least-cost paths – in which the shelters may be included as attracting points; or computing cumulative viewsheds along these paths – to explore the visual relationships established between paths and shelters. At the same time, on the basis of these analysis this paper focuses on some of the critical points of applying GIS techniques to study human movement and visibility, i.e., the importance of cultural features over environmental restraints in the election and use of paths, and the importance of distance and movement when considering visibility.

2. Analysis and Discussion

The analysis of the spatial dimension of rock art has been common since its inclusion in landscape studies in the last decades. Special attention has been given to its participation in processes of information exchange, considering motives as symbols that mark given places in the landscape (Bradley 1997; Taçon 1994). Always attending the distribution of the shelters, GIS techniques allow us to make analysis at two different scales.

2.1 Location of the Shelters

GIS allows us to systematically quantify and compare different aspects of the location of rock art sites. Some of the most important would be topographic measures such as slope or prominence, but also their distance-based viewsheds: addressed in the short or restricted distance (<1 Km), medium or intermediate distance (1–5 Km) and large distance (>10 Km). These measures show the existence of different kinds of shelters, among which the motives depicted will also change, as well as the stylistic complexity of the panels.

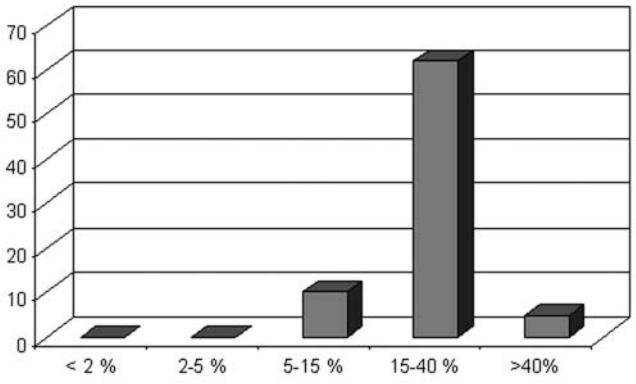

Fig. 1. Classification of the shelters attending to the slope values.

Thus, such a preliminary analysis is already enough to appreciate the existence of some general tendencies in the depiction of Schematic rock art in this area of the Iberian Peninsula: 1) The smallest shelters, located in the steepest slopes or in the highest mountain ridges (thus, the most inaccessible and with the greatest viewsheds), seem to have had a more restricted or specialised context of use; accordingly, the panels would be always more simple, with a small number of motives. 2) The biggest shelters, accessible and located close to points of passage in the valleys used as optimal corridors, always have complex panels; these could be dedicated to a wider or more heterogeneous audience that would be easily accommodated in front of the shelters; at the same time, the location of these sites does not seem to give importance to maximising visibility. And finally, 3) there are also medium-sized shelters, distributed along the valleys and mountain passes, whose visibility seems to be addressed to the control of movement and resources (see also Fairén 2004).

2.2 Distribution and Structuring of Landscape

Although we can use several GIS techniques to do this simple analysis quickly and efficiently, different authors have highlighted the capabilities of the spatial technologies to perform new kinds of analyses and develop new approaches to the archaeological record (Kvamme 1999). In a higher scale of observation, we can apply GIS to explore the distribution of rock art in landscape, and its role in its appropriation and structuring – considering landscape not only as a static scene for the development of human action, but a network of relationships between people and places that provide the context for everyday activities (Thomas 2001). Archaeologically, we can reconstruct these social practices by analysing the relationships created between the different components of landscape, attending to two main variables: their intervisibility, and the mobility patterns established between them.

Cumulative viewsheds may be defined as the result of summing several individual viewshed themes, representing the visible locations from a given number of sites (Wheatley 1995). This analysis has two main implications: first, it allows us to distinguish groups of sites, attending to the visual relationships established among them and with the settlement and burial sites located close to them. Second, the result of computing cumulative viewsheds show us different schemes in the appropriation of the space: 1) Shelters distributed along an axis (mainly river basins); in this case, the different sites could only be seen while an individual moves along this axis, and we can also observe a clear spatial segregation between rock art sites on the one hand, and settlement and burial sites in the other – which are not frequent along these valleys.

And 2) Shelters distributed in the mountainous margins of a wide river basin; in this case their cumulative viewshed may be concentrated either in the lower lands of this basin, where we can find clusters of open-air settlement sites; or in the peripheral mountain ridges, where rock art and burial sites are located.

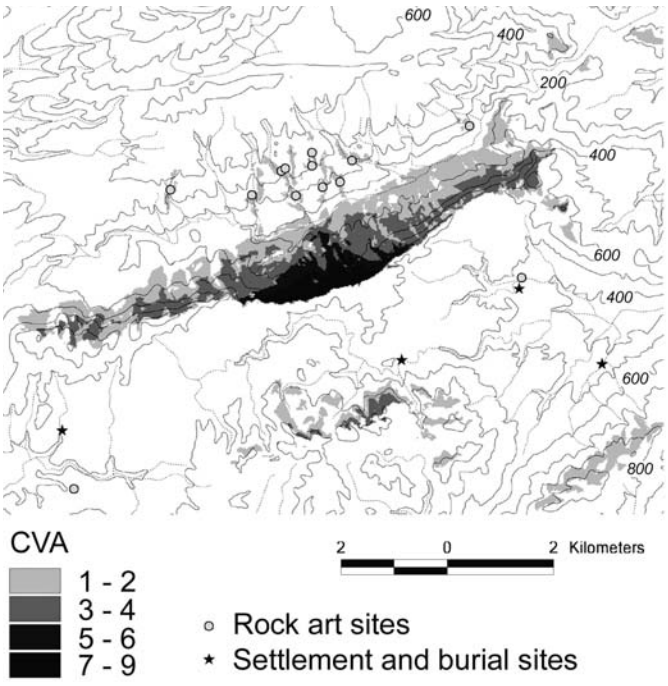

Fig. 2. Cumulative viewshed of a group of shelters distributed along an axis. The example of the Vall de Gallinera.

Regarding mobility, cost-surface techniques are useful to model the dynamics of movement across a cultural landscape, defining a theoretical walking network of a given area through computing least-cost paths (optimal corridors). This kind of analysis has been successfully applied in different case-studies, to investigate the social relations that linked different types of settlement sites (Lock and Harris 1996); or, in combination with cumulative viewsheds, to explore the relationships between the location of settlement sites and the course of the possible optimal paths (Madry and Rakos 1996; Bell and Lock 2000). However, in these studies the computerised models were only validated after their comparison with the remains of historical trails previously known. Therefore, as T. Harris has remarked (2000), testing the success of these analyses is still a problem when such an evidence is not available, i.e. with hunter-gatherers or earliest Neolithic societies – especially if landform in the study area is not well defined, providing different possibilities for modelling the course of optimal paths. Following this idea, Harris recalls Llobera's proposal for the analysis of the sociology of movement (Llobera 2000), focussing in the identification of general patterns of movement rather than

specific paths; these patterns would not be restricted to landform, but to the social and cultural factors included in their creation and use – where some natural or cultural features could act as attracting or repelling points.

To test this idea, I have computed optimal paths between several settlement sites in this area, using a 20 m DEM to create a simple anisotropic cost-surface based on slope and watercourses; this has been used to calculate optimal corridors attending only to the natural landform. In a second stage, I have added to this cost surface the location of Schematic rock art sites giving to the area that surrounds them a high accessibility value, in order to compensate difficulties in accessing imposed by the landform; in this case, least-cost paths would have a cultural value, because they would be only used with the willingness of arriving to (or passing close to) several rock art sites. The results in the first cost-surface avoided the movement in north-south direction, using the peripheral corridors that surround the study area; and, in SE-NW direction, using only two valleys where we can find some rock art sites. Therefore, in this case there were many sites whose location was not related at all with the computerised paths. However in the second cost-surface, the determination of passing close to Schematic shelters obliges to use different valleys; and attending to the concentration of rock art and settlement sites along those valleys, we can say that in fact they were used. Thus, we might say that only a specific type of shelters are located in the valleys identified as natural corridors; accordingly with the complexity of the motives depicted, these seem to be aggregation sites, maybe addressed to socially controlling movement. But many other shelters are not located in points of passage, and thus they can only be considered destination shelters, whose use obliges to the creation of new routes of communication even when this might increase the cost of movement.

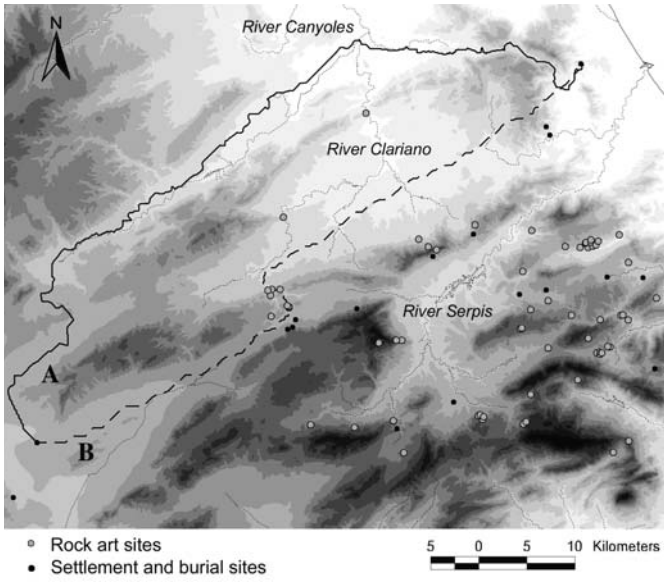

Fig. 3. Different possibilities in the course of optimal paths. A) Attending to natural landform; B) Attending to the distribution of rock art sites.

In a final stage, we can also calculate distance-based cumulative viewsheds along these cultural paths, in the same way as that proposed by Bell and Lock (2000), to explore the visual relations established between paths and shelters; moreover, this may be also considered a simple way for overcoming the static character of visibility analysis (see Wheatley and Gillings, 2000). As a result of this analysis, I have observed that most of rock art shelters are not located in the most visible areas while walking along these paths; contrariwise, they show a preference for locations with a reduced visibility index or not visible at all. Therefore, except in the case of these shelters that we consider aggregation sites (always located in visible and accessible points), they would not be visible when moving through the landscape that surrounds them. Thus we cannot maintain the idea that in this area rock art was used for marking paths, resources or ethnical boundaries – some of the most common functionalities hitherto proposed in rock art studies: all of them imply that they should be easily seen in a medium or distant media, but clearly this is not the case.

3. Conclusions

In the last decades the development of GIS applications pointed out new ways of studying the archaeological record; with the case study of central-Mediterranean Iberia, I would extend these new approaches also to rock art record, following the interpretive trends that raised after its recent incorporation to landscape studies. With these analyses we can surpass earliest approaches only focussed in the stylistic or chronological aspects of the rock art motives. This gives us a sounder background to explore its social and historical context of use: for example, comparing the differences between least-cost paths depending on environmental features and least-cost paths including rock art shelters as attracting points we can understand the distribution of Schematic rock art, and the circumstances for the creation and use of the different pathways. Moreover, the visual relationships established between paths and shelters allow us to interpret the social context of use of rock art in its landscape. Finally with all these analyses we can also test the validity of the most common hypotheses thus far proposed for understanding the functionality of prehistoric rock art, advancing new questions and hypotheses.

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