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Methodological development of archaeological survey in La Serena region (Spain): a GIS-based approach to a regional project

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Key words: Agrarian Landscapes, Survey methodology, Background noise, GIS application, La Serena region.

The paper presents progress in a regional-scale research project focused on the La Serena region (Badajoz Province, Spain) (Fig. 1). The main objective of this project is to analyze the historical evolution of a region situated in a key area in order to understand the interaction between the Atlantic and Mediterranean sides of the Iberian Peninsula (see, for example, Walid and Nuño, 2005). From the temporal point of view, the project claims to make a complementary interpretation between long-term processes of change and the characterization of each specific period. The main subject of this analysis is the dialectic process of human group interaction with a given environment, shaping the configuration of successive agrarian landscapes.

Methodologically, the strategy adopted for this task is highly committed to the application of non-destructive techniques. While being noninvasive, the procedures supply a reasonable volume of information concerning a broad area. Surface survey is the more developed of our tools, capable of generating a substantial and unique contribution to the archaeological analysis of a territory. The importance is to apply set formal procedures in order to be able to calibrate survey results from different regions and subsequently undertake a synthesis of settlement evolution on a suprare-

gional scale. GIS application plays a significant role in the achievement of these goals.

The recording and analysis of surface finds beyond the boundaries of sites was a challenge. As a long research tradition has already shown (Gallant, 1986; Wilkinson, 1989; Bintliff and Snodgrass, 1988), this kind of traces give valuable information about economical exploitation patterns and land use systems. The awareness of this potential has led in recent years to the development of highly intensive survey methods, which allow for exploring in detail surface distributions (Mayoral Herrera *et al.*, 2006). The huge amount of data that such an approach generates finds its best support in the development of spatial technologies. Its massive implementation in research projects at several levels has been undoubtedly one of the most remarkable changes in survey work in the last years.

In this contribution we present the implementation of a scalable solution which combines landscape and site scale recording within the framework of the given project. It benefits from our previous experiences developed in other regions of the Iberian Peninsula (Chapa Brunet *et al.*, 2004). We wish to stress how the improved capabilities of spatial technologies (mainly GPS and GIS) have speeded up the

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Figure 1: Location of the La Serena region in the Iberian Peninsula. Survey area framed.

Figure 2 (see color plate): Intensive survey, first stage. A – regular fieldwalking; B – distribution of finds across survey tracks

Figure 3 (see color plate): Intensive survey, second stage. A – recording sampling units on a site; B – estimates of different artifact distribution patterns derived from sample points

development of our survey project and have allowed the study of surface distributions to be approached with increasing reliability. Regarding fieldwork planning, the availability of cartographic sources has facilitated choice of study areas. In the field, workflow is structured in three main stages.

First, specific survey zones are selected in order to obtain a representative sample of archaeological finds in different landscape units. Then, traditional, 10 m-spaced field walking is carried out in selected landplots. They are easily identified thanks to available digital cartography, and then used as reference units for covering the ground. Every fieldwalker is equipped with a middle-range GPS device that allows to plot sherd distributions across their tracks. Its accuracy (around 2.5 m) has been considered acceptable for this purpose.

Secondly, the data are downloaded, integrated in a GIS environment and then used to obtain global estimates of surface finds in surveyed areas. Several density calculations are compared in order to define discrete areas of interest. This procedure, combined with careful ground reconnaissance, is the basis for delimiting polygonal entities (« sites ») and for planning a sampling strategy within them. A good integration between GIS and GPS allows this information to be uploaded.

Third, back to the field, sampling points are easily located with a GPS hand collector device with sub-metric accuracy. Then qualitative data on the surface materials is gathered (quantity, weight and erosion of sherds grouped by fabrics and shape). With the aid of a PDA this information can be directly linked to sampling points and sent back to its spatial analysis with GIS techniques. From a graphic, descriptive exploration of data recorded to the creation of surfaces through interpolation methods, the quantitative assessment of sherd distribution allows meaningful relationships between different kinds of surface finds to be identified. The result has in several cases clarified the chronology and

functional differentiation within sites. Finally, we are currently beginning to explore the dynamic nature of surface distribution, analyzing and modeling through GIS tools the interaction between sherds and soil erosion.

To sum up, our strategy is grounded in an approach focused on the problems of background noise and site definition. With the aid of spatial technologies, we are developing a workflow that overcomes discontinuity between the general regional landscape level and the thorough examination of small areas. Controlling these issues of scale can be a good way to understanding changing locational criteria over time and the underlying economic and social logic.

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