Surveying Ashmounds – Integrated Data Collection for the Establishment of Site Life Cycles in Southern Deccan (India)

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Abstract. The paper discusses the aims of The Herders' Monuments: Ashmounds of Southern Deccan Neolithic project and its computing strategy. The project tries to explore the formation and meaning of ashmounds, formed by reoccurring burning of dung, by integrating data from archaeological fieldwork and environmental and landscape analyses. The computing strategy concentrates on systematic data collection and combines low-tech field methods with post-fieldwork data processing. A selected example of preliminary results demonstrates the advantages of the approach.
Keywords: Ashmounds, India, Neolithic, data collection, GIS, life cycles

1. Introduction

The Herders' Monuments: Ashmounds of Southern Deccan Neolithic is an archaeological project concerned with the study of the ashmounds formed by the characteristic accumulation of burned dung in the pastoral settlements of the Neolithic of Southern Deccan in India (Fig. 1).

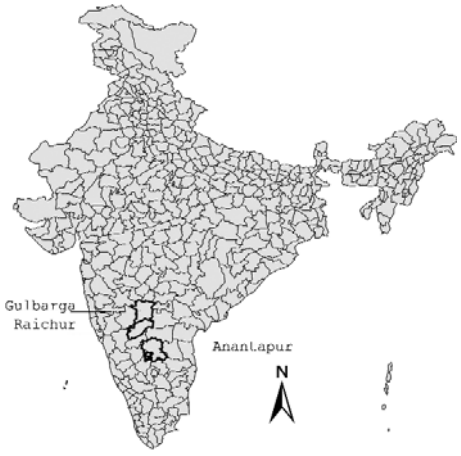

Fig. 1. The research areas of the project.

The ashmounds (Fig. 2) have been recognised as a great archaeological interest already in the 18th century by Foote (1887) and Newbold (1842–43). Since then, a number of archaeologists have tackled the issue of their formation and the nature of the human habitation associated with them (Korisettar et al. 2001; Rami Reddy 1990; Sundrara 1987; Paddaya 1991–2). The formation of these sites is clearly related to the accumulation of ash from dung burning (Zeuner 1959; Allchin 1963), although their detailed life-cycle remains unclear. The available field evidence supports the idea that the ashmounds represent some form of seasonal encampment by a pastoral segment of the society (Allchin 1963; Korisettar et al 2001). Some authors interpret the sites as being the result of seasonal transhumance of the cattle herders, moving between permanent and seasonal settlements (Allchin 1963; Fuller et al 2001).

Furthermore, the type of human occupation at the ashmounds is still ambiguous. There are clearly a number of different types of ashmound sites: some consists only of the heaped deposits of dung and stand alone in the open, others are at the base of hills with villages on the top of the hill and some ashmounds are set next to permanent occupations. Recently it was suggested that all ashmounds had human habitation around the mound (Paddaya 1993). Unfortunately, this hypothesis is based on the excavation of only a single site. Besides, our own observations during last year survey confirmed a high variability in the type of human occupation. The Herder's Monuments project covers two geographical areas of the Deccan Plateau: the Anantapur district of Andhra Pradesh and the Raichur and Gulbarga districts of Karnataka (Fig. 1). In these areas there are numerous Neolithic sites, a number of which have been surveyed during the 2004 field season.

2. Aims of the Project

The project aims to address the following issues:

- Little or nothing is known about the formation of the ashmounds. The ashy sediments undoubtedly show a cyclic deposition but it is unclear if these represent short annual cycles or a series of longer cycles with regular burnings and periods of abandonment. A combination of geoarchaeological and phytolith analyses it is used to address this question.

- A move to regional scale is needed to recognize the context of the ashmounds in respect to the Neolithic settlement pattern of the Southern Deccan. This is also essential to understanding the ashmounds' practical use and possible ritualistic and/or symbolic meaning.
- The extent and nature of the human occupation of the Neolithic sites associated with ashmounds is not fully understood. There are obviously many different combinations of ashmounds – settlements to investigate further. Most previous excavations have concentrated on the area of the ash accumulation, which is normally poor in occupation deposits and which may therefore lead to a false conclusion that the site was only intermittently occupied.
- Finally, this project will provide an important opportunity to record critical information about the ashmounds. This is especially important because today many ashmounds are threatened with destruction. Some of these sites have been already destroyed and others are under serious threat. Agricultural expansion, deep ploughing and extensive irrigation, together with the recycling of the old ash as architectonical material for modern villages, seriously threatens the preservation of this rich archaeological heritage of the Indian peninsula.

GIS is a central aspect of our project for the integration and analysis of the different types of data collected (cf. e.g. Gillings and Sbonias 1999), and especially important is the creation of an ashmound database. The ultimate aim for the GIS is to recreate the ashmound/site formation processes as a 3D model and/or animation and to produce a distribution map of the ashmound tradition that takes into consideration geographical and topographical characteristics as well as environmental and cultural data.

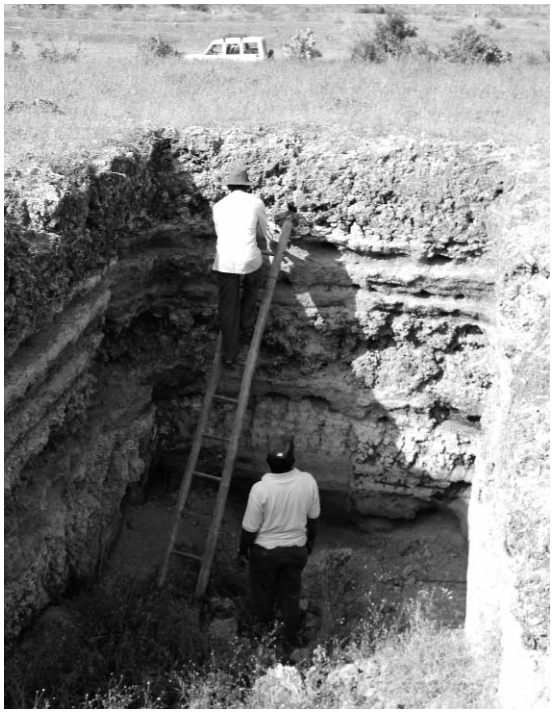

Fig. 2. The northern ashmound at Palavoy during the sampling for phytolith and geoarchaeological analyses. Note the alternate layers of white/grey ash and darker vitrified material.

3. Fieldwork

The focus of the first field season was on the collection of topographical data and environmental samples, and gridded find collection at selected sites. The first season lasted for three weeks and the work was carried out in the Bellary, Raichur and Gulbarga districts in Karnataka and Anantapur district in Andhra Pradesh.

At most sites, a suitable section was cleaned and drawn and a selection of environmental samples was taken (Fig. 2). The plans were made on graph paper on a scale 1:10 with all samples marked. In addition to phytolith samples, soil was sampled for geochemical and micromorphological analyses and charcoal for radiocarbon dating.

A deeper analysis of the ashmound phenomenon requires systematic data on site locations. Therefore, prior to the field season a form was designed to collect topographic data. One form was filled for every ashmound. Where sites consisted of several ashmounds a form was filled in for each of them. Besides, all sites were documented using both digital and traditional photography.

At two sites gridded survey (cf. e.g. Mattingly 2000) was performed. Transects were used to sample a destroyed ashmound at Tadbidi and a preserved ashmound at Palavoy. Both transects consisted of a single line of squares; surface finds were collected inside a predefined time limit. As the squares were of different size the time limit was 5 minutes in Tadbidi and 2.5 minutes in Palavoy. All surface finds were classified and catalogued. In addition, a general map was drawn at Palavoy.

4. Computing Strategy

The computing strategy of the project includes five major elements. Firstly, available cartographical resources have been assessed. Free digital maps and satellite imagery has been collected together with traditional paper maps. Secondly, an ashmound database has been created to store topographic data. Thirdly, new digital cartography is created through fieldwork. Fourthly, a digital photographic archive has been established. Finally, GIS is used for landscape analysis and visualisation.

The low-tech character of the data collection in the field was a deliberate pragmatic decision. This strategy has many advantages in the context of our project. It allows travelling light and the equipment used requires minimum amount of electricity for recharging or easily accessible batteries. The use of a laptop was relegated at the end of the day in the hotel where power cuts are a lesser problem. In this way, expenses are kept low and for sharing data photocopies are easy to make and readily available even in the smaller villages. In addition, the use of a handheld GPS in parallel with traditional measurements, hand drawings and sketches proved a quick mode of working.

However, the strategy requires a considerable amount of editing in the computer laboratory. All data have to be inserted into the database. Paper maps have to be scanned: sections have to be scaled and digitised in AutoCAD and general maps

have to be georeferenced in ArcGIS workstation (Arc/Info PC version) and digitised in AutoCAD. Furthermore all traditional photographs have to be scanned in a digital format.

5. Data Collection and Analysis

5.1 Database

A simple relational database was designed in Microsoft Access. The ashmound database consists of seven relational tables with information on

1. place (name, co-ordinates, map sheet)
2. ashmound (size, form, preservation)
3. location (topography, vegetation, land use)
4. archaeological context
5. conditions during the visit
6. documentation and
7. bibliography.

Most variables have attribute lists that standardised data input. Find catalogues and information on other features are stored in separate data tables. Data tables can be easily linked with shapefiles in ArcGIS for visualisation purposes.

5.2 Cartography

Free GIS layers in both vector and raster formats can be found from the Internet. The Global Land Cover Facility (GLCF) provided free satellite imagery. The most detailed paper maps were produced by the British colonial government during the 1910s, 1920s and 1930s. The photographic department of the Cambridge University Library has digitised these maps.

During the general mapping at Palavoy the co-ordinates of different features were measure with the handheld GPS; detail was added by taking traditional measurements with measuring tapes and prismatic compass. The mapping was done on graph paper using WGS84 projection. The accuracy of single GPS measurements ranged between 7 and 12 metres. The work progressed swiftly and the results can n ow be used in basic visualisation.

5.3 GIS Applications

The project tries to answer specific archaeological questions using both scientific and computerised methods. Environmental sampling will aid in defining cycles of deposition and time scales whereas computerised methods help in data collection, analysis and visualisation. At the moment, visualisations are mainly two-dimensional but in the future 3D maps will be produced.

Two-dimensional GIS maps are mainly used to present survey results. Different distribution are visualised together with survey conditions. We are now in the process of producing a full landscape analysis for the first year data on the basis of the digitised British maps. The main questions are the visual relationships between the ashmounds and their imminent surroundings and the access to different resources. The analysis of different visual interrelationships may help to understand possible ritual meanings of the ashmounds whereas the analysis of the geographic background allows considering different site locations from a functional point of view (e.g raw material, grazing areas, water availability, etc.).

6. The Importance of Systematic Integrated Data Collection

The systematic study of the ashmounds gathers urgency since the sites are disappearing at an alarming rate (Fig. 3).

All sites visited in 2003 were at least partly destroyed – mainly by agricultural practices profiting the fertilising qualities of ash. Other land uses, such as quarrying and residential expansion, add to the destruction. Without systematic data collection the site locations cannot be properly analysed and the current state of the sites is impossible to assess.

Although only a small selection of sites could be visited in 2003, important preliminary conclusions can be made. Standardised classification allowed comparing different site locations and geographic settings. Simple Excel charts show the high degree of variation between locations (Figs. 4–6). Local diversity seems to be one of the keys in understanding ashmounds. The phenomenon is highly localised. In spite of this, a closer look shows differences in topographical location (the place), geographic context (microenvironment) and overall landscape context (macro formation). Many ashmounds do have a “typical” location on a slope by a rocky outcrop but some lie in the valley bottoms or passages be-

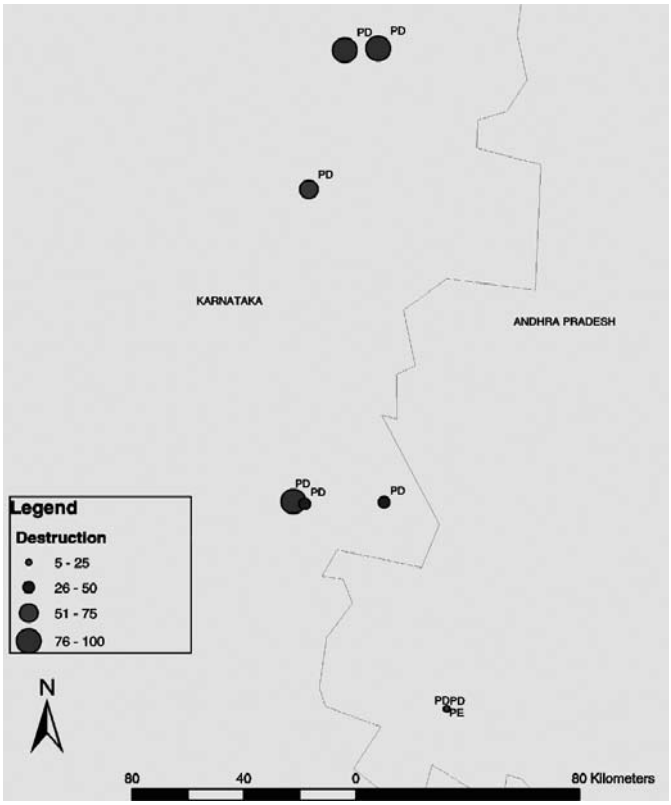

Fig. 3. Visualisation of the degree of destruction of the visited ashmounds.

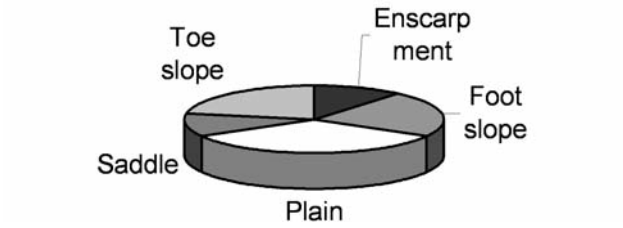

Fig. 4. The topographical location of the visited ashmounds.

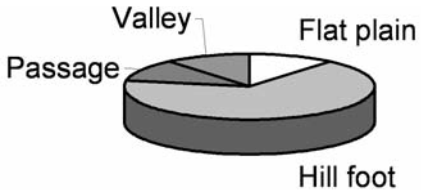

Fig. 5. The geographic context of the visited ashmounds.

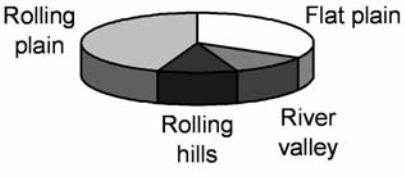

Fig. 6. The landscape context of the visited ashmounds.

tween hills. It is clear that places are important but their meaning can be understood only by juxtaposing generalisations and specific detail on qualities and resources.

7. Conclusions

So far The Herders' Monuments project has achieved in integrating data from different sources. The results of a low-tech survey have been converted into a digital format and some preliminary analyses have been performed. The approach has proved successful and the first results are very encouraging. The analyses highlight the significance of local diversity and underline the importance of the intrinsic worth of a place. It is obvious that an integrated research strategy is the way forward. Although much has been achieved, a lot remains to be done. The environmental analyses have just started. The chronological and spatial relationships between settlements and ashmounds can only be further understood through intense survey and radiocarbon dating of as many as sites as possible. At the same time, Palavoy has to be properly surveyed with a total station. This will also provide a means to assess the accuracy of the earlier mapping.

As it became apparent from our work, landscape analysis cannot rely only on one method or one aspect of the archaeological research. One has to combine archaeological theory, traditional fieldwork, and scientific and computerised methodologies in order to create a successful research design to achieve a better understanding of prehistoric societies.

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