The Cederberg Rock Art Survey Project: A Co-ordinated Field Record and Database Structure

Abstract

The Cederberg Rock Art Database is the first fully digital database introduced into Southern African rock art research. This paper deals with rock art methodology for recording, storing, manipulating, exploring and preparing collected information for subsequent analyses. The Cederberg Rock Art Database was designed to store the entirety of not only the rock art, but also the topographic and archaeological records.
To demonstrate the potential of this tool Asmus (2003) examined the issue of the existence of different site types. He furthermore analysed the sites based on the evidence of the painted images, the topographical position, and the archaeological surface material. The recorded features were portrayed by descriptive statistics and compared with similar studies throughout southern Africa. Paintings, topography and archaeological surface remains provide the respective foundations for a classification of similar sites into groups. The groups of classifications were compared in order to identify the possible parameters responsible for site choice. The results of the analyses did not demonstrate the existence of sets of characteristics, which seemed responsible for site choice. In fact the outcome was quite the opposite: apart from the fact that shelters and overhangs in closer proximity to constantly flowing water were preferred, the sites seemed to have been chosen rather indiscriminately.
The nature of the database enabled Asmus (2003) to conduct detailed analyses. It also assisted him in critically assessing the capacity of the recorded information in order to answer the previously posed questions. These included: Do different types of sites exist in terms of the nature of painted imagery; how is site choice influenced by topography and accessibility; how does geomorphology influence site location; what is the association between painted sites and other archaeological remains? The database, in conjunction with a novel model of energy expenditure to characterise site accessibility, addressed these questions successfully.

Bastian Asmus
University of Cape Town
bastian@science.uct.ac.za

Conny Meister
University of Cape Town
meicon@web.de

Aims

The Cederberg Rock Art Database is a result of several research interests and activities in the Cederberg. Initially we commenced with three years extensive design and development. Moreover, we advanced our personal research experience during three rock art recording field seasons, to finally conclude with a careful evaluation and comparison of traditional recording methods in Southern African rock art studies (Asmus and Meister 2001, Asmus 2003).

The goals for the development of the Cederberg Rock Art Database were to combine the traditional methods of recording rock art with up-to-date digital technology resulting in a valuable system for recording rock art in the Cederberg. The database is multi-functional; fulfilling the needs of our research interests, and furthermore acting as an archive facility for rock art sites of the Cederberg and beyond. Elsewhere Asmus (2003) proposed a methodology to provide the minimum requirement for recording rock art sites in the Western Cape as a broad and powerful base for comparison.

Our interests included the development of an appropriate rock art recording tool, of which the database is but one part, thus complementing the coordinated survey methods described later on. The realisation of this work encountered numerous challenges, including the creation of a user-friendly interface of the database, the coordination of field observations, the co-ordination of the digitising process of the collected data, and accessibility to this information to a large group of people. Overcoming these obstacles proved as an opportunity to introduce this database method to southern African archaeology.

Concept and Structure behind the Cederberg Rock Art Database

The database consists of eight data files, which were developed during the course of the several field seasons, each providing the framework for data entry. In addition several parts of the database deal with visualizing and displaying issues. These files are programmed to return and display general descriptive statistics of the recorded information, e.g. the display of the frequencies of depicted animals per site in a systematic tree diagram. The eight main files cover the following aspects:

(1) general site information; (2) topographical information; (3) paintings of human beings; (4) paintings of animals; (5) paintings of inanimate objects; (6) occurrence of handprints; (7) digital images of rock paintings; (8) archaeological remains.

The power of the database facility particularly lies in the possibility of generating related files at any necessary moment without changing the information in the master files. The definitions of the relationships between the discrete files are: the value for the site name relates all eight main files to each other. The image cross-reference uses additionally the site unique painting ID number. Files dealing with images of humans and animals have one-to-many relationships. The relationship between the general site information file relates one entry per site to a unlimited number of entries that deal with the description of individual rock art images.

Negative Effects on Databases

Since queries and subsequent data analyses are dependent on the comparison of search strings with the contents of the database, data consistency is a key element to the scientific value of the application. The following aspects have been very important during the design of the database.

(1) All entries carrying the same meaning have to have exactly the same string/value
(2) Cells with freely formulated narrative or descriptive contents cannot be queried meaningfully
(3) Multiple values entries per variable have to be avoided.

The less complicated the strings or values in cells are, the higher the likelihood of consistent data. Instead of leaving the user free to formulate strings freely to describe a feature, he has to choose from defined values for each variable in pull-down menus. More detailed descriptions are broken down into multiple variables, rather than to record these with multiple value entries per variable Table 1 presents three alternate ways to describe the same rock art image.

Narrative description	There is a painted red human figure with breasts and with a bag with tassles. The head is missing. faces left.
Description as an outline	Red female without head; with a tasslebag; oriented to the left.
Description broken down into single descriptive variables	sex: female - head: missing - attribute: tasslebag orientation: left - colour: red

Table 1 Three different examples to describe the same rock art image

The first two options are prone to a variety of interpretations because they are descriptions of an image in ones own words and, therefore, do not allow meaningful queries of the collected information. It is quite clear that the third option maximizes the potential for later analytical work. It is imperative that the values for every variable are clearly defined and comply with the database and recording guidelines. We wish to reiterate that these value definitions are open to modification. New definitions can be introduced during any stage of recording, given that they are included in the pool of value definitions. In some cases, though, it is indeed desirable to create variables that store freely formulated descriptions, such as to explain the directions to a site.

Recording of Rock Art Images

The idea behind descriptive variables is to define and standardize the vocabulary for the description of rock art images, resulting in a very clear, structured way of recording and was first successfully applied to rock art recording in Southern Africa by Vinnicombe (1967) and Pager (1971a, 1971b). A very good introduction to this matter can also be obtained from Evans (1971), who proposed a universal scheme for recording rock art of South Africa, which prepared for a subsequent analysis with computers. All four researchers worked on the basis of separating single images into smaller units, which are described by standardized variables. The idea of describing distinctive sections of a specimen is widely used in the archaeological science, because the level of precision can be adjusted easily depending on the research interest. The main problem is to account for the almost infinite variability of rock art images, as basically every image is unique. It is necessary to reduce the infinite amount of data to a manageable extent of information. To group painted images with each individual sets of characteristics into separate groups of similar paintings the development of categories is mandatory. These are themselves abstractions, and thus are inevitably biased by the research interest. Apart from this, they reflect the researchers way of thinking, rather than prehistoric realities. The study is comparative and thus constrains individual manifestations of the creative human mind to categories consisting of sets of predetermined variables, which can be analysed archaeologically.

To keep pace with the changing needs of recording, this set of variables is open to modification. New variables, or values thereof, can be defined at any time, as long as they are documented and their definitions are added to recording system and database. Data credibility and lucidity are very important issues in this study and each single description is cross-referenced with a digital image.

These descriptive variables are a result of earlier fieldwork conducted with a different recording system, which did not prove feasible for our needs. The flexibility and ease with which the variables can keep pace are an advantage above recording systems, where static categories of "painting types" were defined beforehand. The use of a digital audio recording device replaced the majority of the hand-written paper record. This most recent refinement of the recording system allowed us to collect and digitise a large quantity of information in a short period of time. The time consumption was reduced both, in the field during recording and in the lab during digitising the information. The use of headphones and the co-ordinated structure of the database contributed to data consistency because it minimized mistakes during the digitising process of deciphering hand-written field notes.

Every human figure, animal, handprint or inanimate object is treated as an individual painting, which requires a description. Basic units, which in synthesis yield the description of

Human figure	Animal
biological sex	animal (field observation)
head	
torso	
motion	
arm motion	
attributes	
clothes	therianthrope
context	completeness
orientation	orientation
colour	colour
visibility	visibility
state of painting	state of painting

Table 2 Overview of descriptive variables, as they describe an image of human being

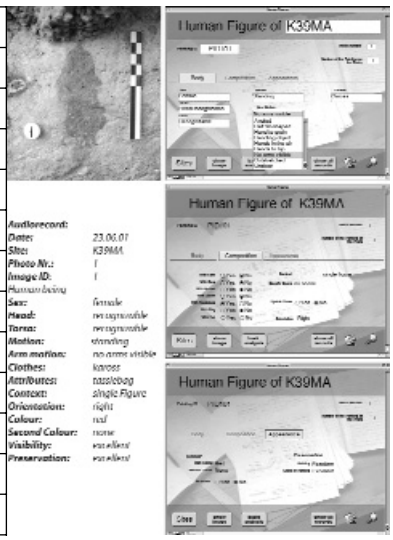

Figure 1 The field record is carefully co-ordinated with the database. Every value of every descriptive variable is available in pull-down menus of the Cederberg Rock Art Database

the image, are related to the research question. We emphasize that an objective basic unit does not exist, and therefore the archaeologist is required to classify the images in an archaeological meaningful way. Our study (Asmus and Meister 2001, Asmus 2003) primarily concentrates on paintings of humans and animals, therefore we dealt with these two classes in more detail than with handprints or inanimate objects. In fact the inanimate objects form such a heterogeneous group, that they were only counted. Handprints were documented photographically and counted. Table 2 lists all descriptive values of the image classes of human beings and animals. The values of these variables are available in pull down menus in the Cederberg Rock Art Database.

The recording archaeologist describes the painting by choosing the appropriate value for each variable (see Fig.1). It describes a particular variable best and records this characterization with a digital audio device. If no satisfactory match could be found, a new value was defined and added to the recording system. The data set for one image was complemented with a site unique painting ID number, the number of the digital photo, date and site name.

Conclusions

The use of low cost up-to-date digital equipment in conjunction with a relational database for the task of recording rock art is a success. Several questions concerning the existence and distribution of rock art sites in the study area could be successfully addressed with assistance of the Cederberg Rock art Database: A relationship between relativ e proximity in distance and altitude could be found. The total amount of 967 paintings of humans and 346 of animals could be analysed. A relation between unusual imagery, such as the paintings of spread-legged females, the so-called ´Mythic Women´ (Goodall 1962, Solomon 1994), or images of elephants, or both, and topographically more isolated sites could be discovered (Asmus 2003).

The time effective way of recording and digitising captured information requires a minimum of personnel. This relatively low cost approach could contribute to the task of protecting the fragile heritage of rock art in Southern Africa.

Acknowledgements

The project was financially supported by the Herbert-Quandt Stiftung der Varta AG, the Bund der Freunde der Universität Tübingen and the University of Cape Town. We are endeared to John Parkington, and the Clanwilliam Living Landscape, who gave us the opportunity to realize the Multimedia application of the Clanwilliam Rock Art Trail (Parkington, Asmus and Meister 2003). Furthermore we would like to acknowledge the tremendous work of Tobias Tonner and Tony Manhire in surveying and recording, and especially Tobias Tonner for making invaluable comments and contributing ideas towards the projects aims. We also acknowledge Joellyn Palomaki for proof-reading this paper.

References

ASMUS, B., 2003, unpubl. Painted images, landscape position and site characteristics in the Rondegatvalley, Western Cape, South Africa. MSc. thesis, Department of Archaeology, University of Cape Town, Cape Town.

ASMUS, B. and MEISTER, C., 2001. Projekt zur Aufnahme von Felskunst in den Cederbergen, Südafrika. Archäologische Informationen 24, 1:93-96.

EVANS, R.J., 1971. A draft scheme for computer processing of rock art data. In Schoonrad, M. (ed.), Rock Paintings of Southern Africa, Supplement to the South African Journal of Science, Special Publication Number 2, South African Association for the Advancement of Science, Johannesburg:73-79.

GOODALL, E., 1962. A Distinctive Mythical Figure appearing in the Rock Paintings of Southern Rhodesia. In Nenquin, J. and Mortelsmann, G. (eds.), Actes du IV congrès panafrican de préhistoire, Musée Royale, Tervuren:399-405.

PAGER, H., 1971a. Ndedema. Akademische Druck- und Verlagsgesellschaft, Graz.

PAGER, H., 1971b. The Rock Art of the Ndedema Gorge and neighbouring valleys, Natal Drakensberg. In Schoonrad, M. (ed.), Rock Paintings of Southern Africa, Supplement to the South African Journal of Science, Special Publication Number 2, South African Association for the Advancement of Science, Johannesburg:27-33.

PARKINGTON, ASMUS and MEISTER, 2003. The Mantis, the Eland and the Hunter - A virtual journey through rock art sites in the Warmhoek valley. CD-Rom.

VINNICOMBE, P., 1967. Rock Painting Analysis. South African Archaeological Bulletin 22:129-141.

SOLOMON, A., 1994. 'Mythic Women'- A Study in Variability in San Rock Art and Narrative. In Lewis-Williams, J.D. and Dowson, T.A. (eds.), Contested Images - Diversity in Southern African Rock Art, Witwatersrand University Press, Johannesburg:331-372.