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POPULATION FROM THE KERMA EASTERN CEMETERY: BIOLOGICAL IDENTITY AND FUNERARY PRACTICES

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Introduction

The Kerma Eastern Cemetery (Upper Nubia, northern Sudan) is the main cemetery of the Kerma civilisation with approximately 40'000 burials spread over 70 acres. It is located south of the 3rd Nile cataract between the cultivated area and the desert, 4-5 km further east of the ancient city which is on the eastern riverbank. The necropolis was used during all the Kerma periods from 2500 to 1500 BC. The Swiss Archaeological Mission at Kerma has studied the funerary practices and its population since 1977. In 2008 a new research program was initiated by Prof. M. Honegger to increase our understanding of the early formative processes of the kingdom. To that end, new excavations on the oldest part of the cemetery (ca. 2500-2300 BC) have been on-going since the winter of 2008-2009. These extensive excavations have led to new data on the funerary practices, the cultural aspects and on the biology of the population.

Our research focuses on the biological aspects. The osteological collection contains almost 600 individuals studied by the author. Sex, age at death, metrical data and dental discrete traits have been collected according to current standards. This large volume of data allows for a targeted analysis of the population of Kerma. The aim of our paper is to present the first results of the most recent anthropological study. We will assess the funerary practices in the oldest sectors through the biological data. We will also discuss the issues relating to the composition of the population in the *Kerma Ancien* periods, as previous studies suggest that the Kerma population in that period was cosmopolitan.

Chronology

The oldest areas of the Eastern Cemetery are located to the north. The necropolis subsequently developed south - southeast. At the southern extremity are the most recent burials and the royal tumuli from the end of the Kerma civilisation. The chronology of the oldest sectors is based on the results of C14 dates and the study of the evolution of the pottery (Honegger 2013,

28-30). Through this preliminary study, he concludes that in cultural terms, the Eastern Cemetery begins with a first burials dating from the end of the Pre-Kerma, around 2500 BC which can be although considered as *Kerma Ancien 0*. Then between 2450 and 2300 BC the graves belong to the *Kerma Ancien* I and the Early C-Group Ia. The *Kerma Ancien* II, represented in our study by sector CE23, follows this period and ends around 2100 BC. This chrono-cultural distribution is used in this paper as the framework for the investigation of the evolution of the funerary practices in connection with the biological data, and to investigate the composition of the buried population.

Historical Review

The Swiss archaeological Mission began its work in the cemetery in 1977 under Charles Bonnet's direction. The aims of these first 23 years of excavations were to understand the chronology of the deposits and to gain more knowledge on the funerary practices and the funeral buildings.

The anthropologist in charge of the study was Dr. Christian Simon from Geneva University. He attended the excavations, determined the individual biological identities and studied the internal evolution of the population and its historical relationships in Africa.

The morphological study carried out by Christian Simon (Simon 1986; 1990) underlined two tendencies:

- First, a marked diversity during the *Kerma Ancien*, which progressively decreased to give rise to a more homogeneous population during the *Kerma Classique*;

- Second, the morphological affinities between the Kerma population and the Egyptian and Nubian populations chosen for comparison differ according to the period: the affinities are greater with the Egyptian populations for the *Kerma Ancien*, and for the *Kerma Classique* they are more pronounced with the Nubian population.

The new excavations in the oldest sectors began in 2008. With extensive and exhaustive excavations in three sectors, previously excavated by Charles Bonnet, dating between 2500 and 2100 BC, we gained information about the early formative processes of the kingdom. It appears that in cultural terms we are dealing with several groups when the cemetery was first established: *Kerma Ancien* 0 graves in sector CE28 with pottery similar to Late Pre-Kerma, *Kerma Ancien* I mixed with C-Group Ia in sector CE27 and finally *Kerma Ancien* II graves in sector CE23 with some C-Group pottery in lower proportion thant in CE27 (Honegger 2013, 28-30 and Honegger this volume).

Anthropological Issues

A critical review of previous anthropological studies has yet to be undertaken, but these initial observations combined with the study of the pottery (Honegger 2013) already raise the question regarding the composition and evolution of the population buried in the necropolis.

Indeed, even if there is great homogeneity in the practices, the groups identified on the basis of the chronology and the ceramic deposits can also be distinguished in certain aspects of their funerary practices: the size and shape of the grave can differ, as can the superstructure. The number of artefacts in any given grave become more numerous in the *Kerma Ancien* II period as compared to previous periods. The phenomenon of multiple burial, absent in Recent Pre-Kerma seems to appear in the *Kerma Ancien* I and C-Group Ia graves where it affects only double burials, uniting two adults. In the *Kerma Ancien* II sector, this phenomenon increases: multiple burials are more numerous and the number of interred individuals also increases (two and four). Such a grave can also contain men, women and children.

These preliminary observations on certain aspects of funerary practices also raise the question regarding the reasons for these distinctions, and the biological study has given more information regarding the question of the origins of the cemetery. The anthropological study of the buried population could reveal specific funerary practices linked to the biological identity of the deceased through sex ratio, age at death and spatial repartition, and could bring new knowledge regarding the composition of the population represented in the early tombs.

Corpus and Method

The individuals excavated from the ancient sectors since 2008 are stored at Kerma, near the cemetery in the house of the Swiss archaeological Mission, and were examined during the excavations. The skeletons previously studied by Ch. Simon are stored at Geneva University and were also re-examined for this study. For the ancient areas, the corpus is made up of 337 individuals. Buried in the *Kerma Ancien* 0 sector were 88 individuals, 128 in the *Kerma Ancien* I and C -Group Ia sectors and 121 for the *Kerma Ancien* II. The overall level of preservation is very good. For example, preservation of soft tissues such as hairs and skin is quite common due to the dry climate. However, preservation and representation of skeletal remains vary between sectors. While the state of preservation is excellent for sectors CE27 and CE23, it is on average less good, sometimes even very bad in sector CE28, especially at its western extremity. In fact, most of the tombs were looted in antiquity. The looting usually affected the head area, disturbing the burial only in a small area. The displaced bones, skull, first vertebrae and some pieces of the hands, are often found disturbed in the infill of the pit, in a secondary position. In the western part of sector CE28, the graves are shallow due to erosion phenomena. In this area, the looting was more violent and displaced bones were left exposed on the surface. Preservation and representation of skeletal remains are worse than in deeper graves where looting was only very partial.

Much data has nonetheless been obtained from the skeletons. The sexual diagnosis is based on the coxal bone according to the methods defined by Bruzek (2002) and Murail *et al.* (2005). We used the dental and bone maturation to assess the age of immature individuals. The determination of the age-at-death of the adults rely on the observation of the iliac sacro-pelvic surface (Schmitt 2001). A set of classical measurements has been made on both cranial and post-cranial skeletal remains. Pathological aspects and non-metrical dental traits were recorded for a well-preserved sample from each group.

Selection among the Deceased

To assess the potential presence or absence of a selection among the individuals buried in the necropolis, we refer to the data related to sexual diagnoses and the age at death.
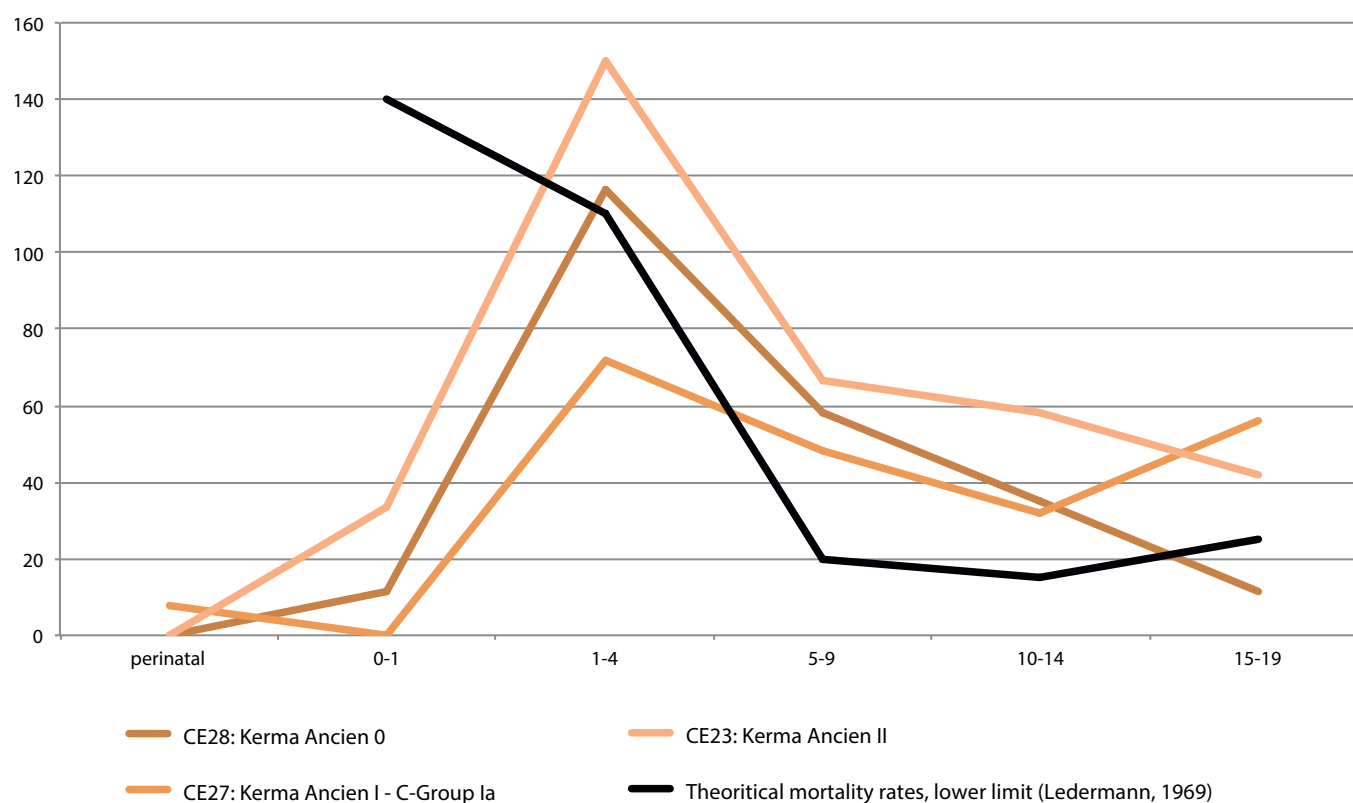
Figure 1. Mortality quotients for the Recent Pre-Kerma, *Kerma Ancien* I + C-Group Ia and *Kerma Ancien* II samples compared to the theoretical mortality rates of Ledermann (1969) for a population with a life expectancy at birth between 25 and 35 years.

The distribution of the individuals within the different age groups is compared to the theoretical mortality rates, illustrated in figure 1 with the lower limit in black, for populations with a life expectancy at birth between 25 and 35 years. It shows an identical general trend for all three sectors: very young children of less than 1 year are not represented, except for one individual buried in sector CE27: a foetus of about 7 lunar months buried with a young female individual aged between 20 and 29 years old. Indeed, the few infants between 0 and 1 year old fall within the upper limit of this age group. As for the children over 1 year old, the curves follow the anticipated trend: high mortality for the 1-4 year old group followed by a progressive decrease until 10-14 years old.

However a more detailed comparison of the three groups shows a few dissimilarities in the curve pattern: in sector CE27, the burials of children between the age of 1 and 4 are under-represented compared to the theoretical values, as well as compared to the *Kerma Ancien* 0 and *Kerma Ancien* II.

The hypothesis of a possible selection of the deceased is suggested for the perinatal individuals that are systematically under-represented in the sample, and if we exclude the impact of taphonomic processes, we could suggest a difference in treatment.

Regarding the data related to sexual diagnosis, we observe that male individuals are over-represented in the *Kerma Ancien* I - C-Group Ia sector and under-represented in the *Kerma Ancien* II sector. These observations seem to be confirmed by the sex-ratio which is higher than expected for *Kerma Ancien* I and C-Group Ia and lower for *Kerma Ancien* II. However, referring to the theoretical values of a chi-squared test (for P=0.05), the hypothesis of a selection based on sexual criteria is not significant.

Spatial Repartition

The spatial organisation of the burials regarding sex and age-at-death does not support a specific organisation through these criteria for any of the three sectors
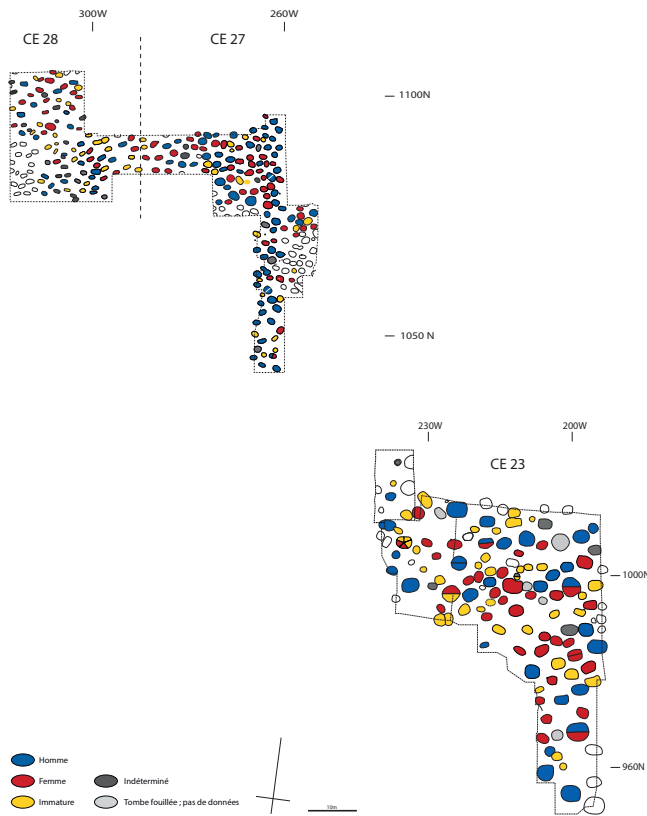
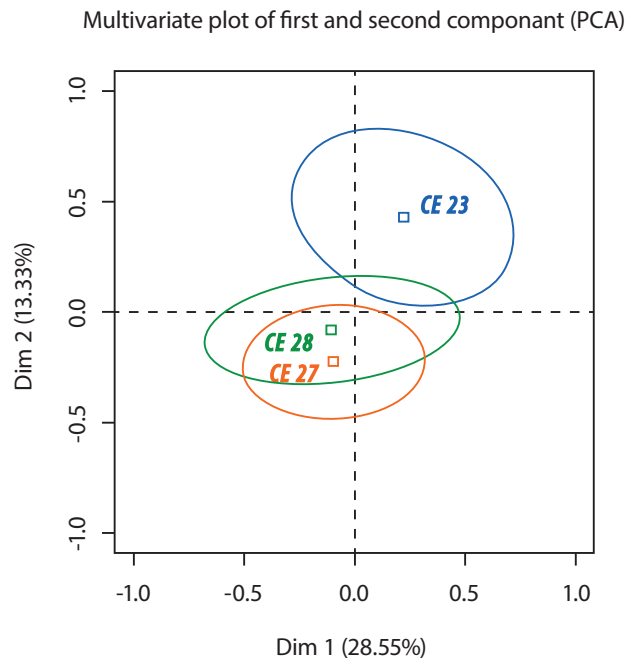Figure 2. Map of the oldest sectors with spatial organization in relation to the gender and the age-at-death.

Multivariate plot of first and second componant (PCA)

Figure 3. Multivariate plot of first and second components based on the morphology of the mandible. CE28 = *Kerma Ancien 0* ; CE27 = *Kerma ancien* I + C-Group Ia; CE23 = *Kerma ancien* II.

under study. No grouping can be distinguished, neither for the *Kerma Ancien* 0 phase, nor for the *Kerma Ancien* I-C-Group Ia, nor for the *Kerma Ancien* II (Figure 2).

Morphological Aspects

A preliminary test based on the morphometry of the mandible was undertaken. It took into consideration 10 measurements. The sample for this study includes 214 male and female adults: 34 individuals for the *Kerma Ancien* 0; 109 for the *Kerma Ancien* I and C-Group 1a and 71 individuals for *Kerma Ancien* II. The test is made using raw dimensions.

The multivariate plot shows the projection of the two first principal components from the PCA analysis on raw measurements. It represents about 40% of the total variance. (Figure 3) We can see that the individuals from *Kerma Ancien* II, represented by sector CE23 are separated from the *Kerma Ancien* 0 in sector CE28 and *Kerma Ancien* I and C-Group Ia individuals from sector CE27. The distinction is essentially made by the morphology of the mandibular symphysis. This first trend also shows similarities between the *Kerma Ancien* 0 sector (CE28) and the *Kerma Ancien* I-C-Group Ia sector (CE27).

These first observations need to be extended with additional studies on the cranial and infra-cranial morphology. Further, the intra- and inter-group diversity needs to be acknowledged.

Conclusion

In conclusion, the preliminary observations related to the evolution of funerary practices and the first insights into the morphological aspects of the population have shown more similarities between the two early stages of the cemetery represented by the *Kerma Ancien* 0 in sector 28 and the mixed *Kerma ancien* I and C-Group Ia in sector 27, than to the *Kerma ancien* II in sector 23. This initial study thus supports earlier investigations, and reinforces the trends indicated by previous studies of the pottery and certain funerary practices.

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