



Geochemical identity of pre-Dogon and Dogon populations at Bandiagara (Mali, 11th–20th cent. AD)



A.-F. Maurer^{a,b,*}, A. Person^a, A. Zazzo^c, M. Sebilo^d, V. Balter^e, F. Le Cornec^f, V. Zeitoun^g, E. Dufour^c, A. Schmidt^h, M. de Rafélisⁱ, L. Ségalen^a, R. Bedaux^h

^a Laboratoire Biominéralisations et Environnements Sédimentaires, Sorbonne Universités, UPMC-Paris 06, UMR CNRS 7193, IStEP, F-75005 Paris, France

^b Laboratório HERCULES, Universidade de Evora, Palácio do Vimioso, Largo Marques de Marialva, 8, 7000-809 Evora, Portugal

^c Unité Mixte de Recherche 7209 “Archéozoologie, Archéobotanique: Sociétés, Pratiques et Environnements”, Centre National de la Recherche Scientifique, Muséum National d’Histoire Naturelle, Sorbonne Universités, CP 56, 55 rue Buffon, F-75005 Paris, France

^d Sorbonne Universités, UPMC Univ Paris 06, CNRS, Institute of Ecology and Environmental Sciences (IEES), 4 Place Jussieu, 75005 Paris, France.

^e Laboratoire de Géologie de Lyon, UMR 5276, CNRS/Ecole Normale Supérieure de Lyon/Université Lyon 1, 46 Allée d’Italie, 69364 Lyon Cedex 7, France

^f IRD LOCEAN (UMR 7159), IPSL/IRD/UPMC/CNRS/MNHN IRD France Nord, 32 avenue Henri Varagnat, 93143 Bondy Cedex, France

^g UMR 7207-CR2P-Cnrs-Mnhn-Université Paris 6, Sorbonne Universités, Université Pierre et Marie Curie, T. 46-56, 5ème Étage, Case 104, 4, Place Jussieu, 75 252 Paris Cedex 05, France

^h National Museum of Ethnology, Steenstraat 1, Leiden, The Netherlands

ⁱ Géosciences Environnement Toulouse (GET), Univ. Paul Sabatier, UMR CNRS 5563, 31400 Toulouse, France

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ABSTRACT

Bone geochemistry of pre-Dogon (11th–16th cent. AD) and Dogon (17th–20th cent. AD) populations buried in two caves of the Bandiagara Cliff (Mali) was examined for the purpose of exploring their diet and mobility. While the Dogon were the subject of extensive ethnographic studies, the lifestyle of the pre-Dogon, so-called “Tellem” is not known. We therefore compared the geochemical composition of Dogon bones with the results obtained from modern dietary surveys in Mali, to establish the parameters of a dietary model that was further applied to the pre-Dogon in order to expand our knowledge concerning their way of life.

The exceptional preservation of the bones of both populations was confirmed not only at the macroscopic scale, but also at the mineralogical, histological and geochemical levels, which resemble those of fresh bones, and therefore offered ideal conditions for testing this approach.

The application of the Bayesian mixing model FRUITS, based on bone $\delta^{13}\text{C}$ (apatite and collagen) and bone $\delta^{15}\text{N}$ values, suggested a dietary continuity through time, from the 11th century to today. Bone barium (Ba) content revealed very restricted mobility within the Cliff while bone $\delta^{18}\text{O}$ values indicated that Pre-Dogon and Dogon most likely occupied the Bandiagara Plateau and the Cliff, respectively.

1. Introduction

Almost a century has passed since the Dakar-Djibouti mission led by Marcel Griaule (1932), who shed light on the inhabitants of the Bandiagara Cliff, the Dogon population. Encountered by Louis Desplagnes in 1905 and first called the Habé, the Dogon are particularly known for the complexity and richness of their culture, expressed through their architecture, masks, rituals and beliefs (Bedaux and Van der Waals, 2004). Many other expeditions have been conducted, but the Dakar-Djibouti mission was the first to conduct intensive ethnological, anthropological, zoological and entomological surveys and collection in West and Equatorial Africa. Although this work has long been a reference for French Africanist anthropology, the overemphasized

spiritual dimension of the Dogon society conveyed by Griaule and colleagues has been since criticized (Doquet, 2005; van Beek, 1991).

Based on the work conducted by Desplagnes, Griaule and later Dieterlen (Desplagnes, 1907; Dieterlen, 1941; Griaule, 1932, 1938; Griaule and Dieterlen, 1965), a Dutch architect, Haan, followed by an inter-disciplinary team led by Huizinga, who involved human biologists, archaeologists, anthropologists and geneticists, led expeditions from 1964 to 1971 to visit the Bandiagara Cliff, and more specifically the region of Sanga. They discovered and excavated several caves whose material culture and remains were attributed to three populations, namely the Toloy, Tellem and Dogon (Bedaux, 1972, 1988). Besides providing the first radiocarbon dates on human bones and charcoal in that area, the research showed a genetic discontinuity

* Corresponding author at: Laboratoire Biominéralisations et Environnements Sédimentaires, Sorbonne Universités, UPMC-Paris 06, UMR CNRS 7193, IStEP, F-75005 Paris, France.
E-mail addresses: annefrance.maurer@gmail.com, amaurer@uevora.pt (A.-F. Maurer).

between the Tellem and the Dogon, as well as changes in material culture around the 15th cent. AD (Bedaux, 1972).

More recently, a Swiss team led by Huysecom and conducting interdisciplinary studies (archaeology, ethnology, archaeobotany, geomorphology) since 1997 in the Dogon Country, has argued for a continuous occupation of the region for the past 4000 years (Mayor et al., 2005, 2014; Ozainne, 2013). They also made the assumption that coiled-clay structures in cave A, dated from the 5th cent. BC to the 2nd cent. AD, and identified as granaries 40 years ago (Bedaux, 1972) were constructed as burial places. Similar structures at Douro-Boro were dated from the 5th to 6th cent. AD (Mayor et al., 2014), and yielded skeletons from the 7th to 9th cent. AD, hence they were slightly older than the collective sepulchral caves used by the Tellem (11th–16th cent. AD, Bedaux, 1972). These new data led Mayor et al. (2014) to prefer the term “pre-Dogon population” over the classic division Toloy-Tellem, to better characterise a chrono-cultural continuity. In addition, they also stress the fact that these pre-Dogon populations should not be seen as isolated but rather interacted with a wide social network, according to the presence of glass beads whose geochemical composition indicated a provenance from Asia (Mayor et al., 2014).

In this paper, we investigate pre-Dogon and Dogon diets using bone geochemistry to see whether cultural continuity in terms of dietary practices can be observed through time from the 11th cent. AD to today, and to decipher potential interactions with populations from the adjacent West African empires explored via the degree of mobility of these populations.

Archaeological bone geochemistry has been increasingly used for approximately the last 30 years to study dietary habits and movements of past populations. Dietary behavior and mobility patterns are archived in the skeleton during an individuals' life, through the ingestion of dietary components whose specific chemical composition depends on their nature and location. For example, the consumption of C_3/C_4 plants, whose isotopic composition varies with different photosynthetic pathways (Ehleringer, 1989; O'Leary, 1981), is inferred from bone

carbon isotopic values recorded in bone apatite and/or bone collagen (DeNiro and Epstein, 1978). The investigation of water supply, the isotopic composition of which depends on environmental factors (latitude, altitude, distance to the coast, Dansgaard, 1964) is deduced from oxygen isotope ratios recorded in bone apatite (Longinelli, 1984). Additionally, the trophic level position is provided by Sr/Ca and Ba/Ca ratios registered in bone apatite (Balter et al., 2001, 2002, 2012; Burton et al., 1999; Elias et al., 1982), as well as, nitrogen isotope ratios of bone collagen (DeNiro and Epstein, 1981). Together, these common proxies, based on the fact that “we are what we eat and drink”, offer insight into the structure and organisation of past societies (Loftus et al., 2016; White, 2005).

Pre-Dogon and Dogon individuals constitute an extraordinary population for using this approach. Indeed, protected from humidity and temperature variation in sepulchral caves, the macroscopic preservation of these individuals is exceptional and clearly contrasts with that of archaeological bones from arid contexts. Additionally, archaeologists and ethnologists extensively studied the system of thought and way of life of the Dogon people for > 100 years (Bedaux, 1972, 1986; Desplagnes, 1907; Dieterlen, 1941; Gallay et al., 1995; Griaule, 1932, 1938; Griaule and Dieterlen, 1965; Huysecom, 2002), while in contrast little is known about the pre-Dogon (Bedaux, 1972). They were occupying the Bandiagara Cliff before the arrival of the Dogon but their provenance, genetic affiliation, way of life, as well as settlement location continue to be investigated (Bedaux, 1972). Finally this work will also expand the anthropobiogeochemical database of West Africa that may constitute a robust baseline for further dietary reconstructions (Balter, 2001; Maurer et al., 2014; Person et al., 2012; Zeitoun et al., 2005).

2. The Dogon country: setting

The Dogon country is located to the east of the inner Niger Delta, near to Bandiagara in the center of the Republic of Mali, in the Sudano-Sahelian zone (Fig. 1). The vegetation cover consists of bushes and

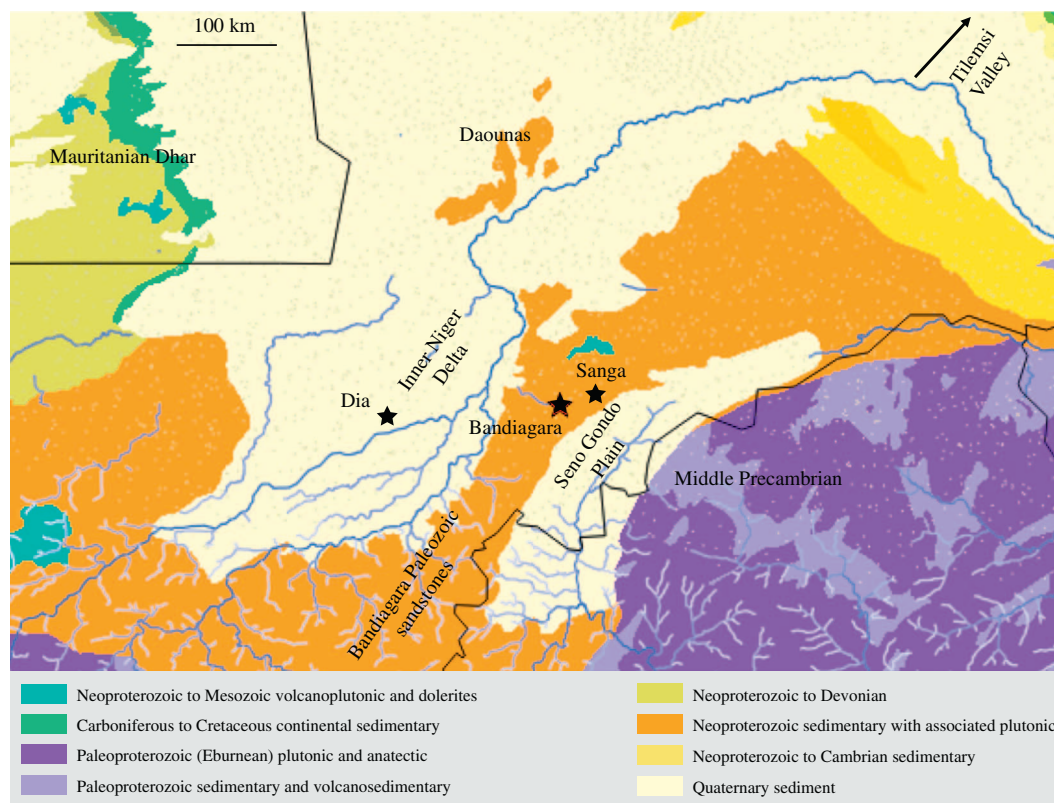


Fig. 1. Location of the study area. The WFS layer from server “http://mapsref.brgm.fr/wxs/1GG/SIGAfrique_BRGM_Africa_Geology” was used for the geological map.

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