Review Article

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Datings in shelters in the middle holocene, upper Valley of the araçuaí.

Abstract

This report aims to present Mid Holocene dating from rock shelters of people who lived by hunting, gathering, and fishing (hunter-gatherers), thereby challenging the Archaic Gap hypothesis. This hypothesis predicted a depopulation of the Brazilian Central Plateau (in the center of South America) due to climatic changes in the period. We therefore present the obtained chronologies using AMS, ^{14}C, and OSL dating methods from Serra Negra, Central Brazilian Plateau, Brazil.

Keywords: chronologies, archaic gap, mid holocene, brazil

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Introduction

The aim of this report is to analyze the paleoenvironmental data and the archeological context in regard to the behavior of hunter-gatherer societies in relation to climate variations during the Holocene in an area of South America. The focus is the Mid-Holocene, in which there is a debate in Brazilian literature as to whether or not there were people throughout the Brazilian Central Plateau (BCP), the so-called Archaic Gap.[1–14]

As such, information is presented on the Serra do Espinhaço Meridional mountains (SdEM), especially the northeast face, which is known as the Serra Negra territory.[7,8]

In archeology, we seek to understand how societies were organized, appeared and disappeared, that is, we examine how relations between human people occurred (and non-human or more-than-human people[1]) through their materiality[2], be it ceramics (pots, ceramic pipes, or *Huacos*), rock instruments (rocks and/or minerals), or even their monumental architecture.[8]

This materiality provides the means, while the end is the different sociocultural behavior of the human and non-human people we study, whether from the past or from the present.[8]

For this to actually be valid, we should always bear in mind that knowledge is knowledge, and that there is no single truth but various (diversities / pluralities); at least it is as such in Human / Social Sciences. Therefore, in addition to joining ceramic or rock fragments together, we are studying and understanding iconography (seen on ceramics or murals), the rupestrian art that is so abundant in our valley,[8,17] the view of the landscape,[8] and the cosmographies and ontologies that are so different from that which we are (Arcuri, 2024), among other phenomena.

As such, this report intends to present the dates from four sites in shelters dating from the Mid-Holocene, which are unpublished in Brazilian Archeology, and thus negate the existence of the Archaic gap in occupations.

In other words, our execution of Archeology has sought to make and establish narratives on the past through material evidence (which could be yesterday). As such, we seek to understand and respect the behavior of the human people (and non-human people) and, subsequently, relate it in time-space (with a hyphen, in the sense that they are inseparable concepts), as only thus will this narrative make sense to us or to others in our contemporaneity.[8]

The Archaic gap – a reality?

The phenomenon known as the Archaic Gap was recommended based on analysis of archeological sites in Lagoa Santa, in Minas Gerais, at which the existence of two peaks of population increase were observed: (a) 10,000-8,000 years BP; and (b) 2.000-1.000 years BP. On the other hand, the period around 6,000 years BP, between these peaks, does not present data or traces of burials.[1–3]

When the geographical focus is expanded to other studies on the Central Brazilian Plateau (CBP), they also indicate the presence of this gap.[1–3.]

Among the main hypotheses is that with the climate changes happening from the end of the Early Holocene, there was a hydric deficit, which resulted in a drier climate and a lack of subsistence resources. From then on, the people that occupied the CBP migrated to areas with environments richer in resources.[1–3]

In a more recent article, the author and collaborators[4] comprehensively address the climatic instabilities in the Brazilian Central Plateau and their implications for human populations throughout the Middle Holocene. Thus, the research confirms that the so-called Archaic Hiatus turns out to be more extensive than previously thought, also reaching parts of the Amazon and the Pantanal (near the border with Bolivia), which exhibited patterns of depopulation or a significant reduction in human occupations during this period. Therefore, the authors argue that *Rapid Climate Changes* (RCCs) are more relevant for understanding the impact on human settlement than prolonged periods of drought or humidity.

The Serra Negra territory – paleoenvironmental and physiographic characteristics

The Serra Negra territory is located to the northeast of the city of Diamantina, encompassing the territory of the municipalities of

[1]For better understanding of what human people are, see Fagundes.[8]

[2]Regarding the debate on materiality see Fausto,[19] Latour,[20] Ingold,[21] and Descola.[22]

Felício dos Santos, Senador Modestino Gonçalves, Itamarandiba, Rio Vermelho, and São Gonçalo do Rio Preto of Minas Gerais (Figure 1)

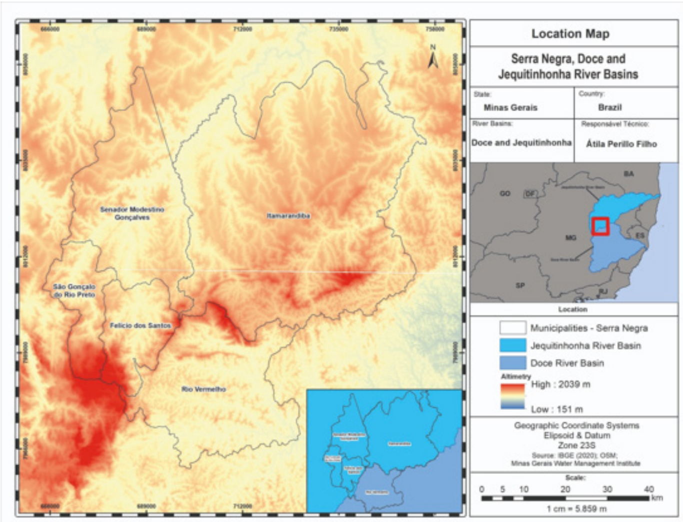

Figure 1 Location of the serra negra territory, brazil. Preparation; franca, 2024.

Recently, investigations have focused on the headwaters of the Araçuaí River, in an area with physiographic particularities in relation to other parts of the Serra do Espinhaço Meridional (SdEM). It is where the oldest archeological sites in the region have been found (shelters dating from the Middle Holocene, between 7 and 4.2 thousand years BP, without gaps for this period)

As such, we have focused on: (a) analysis of the current environment (geology, geomorphology, hydrography, and phytophysiognomy) and the paleoenvironment, particularly during the Mid-Holocene; (b) Excavations and archaeometry data (dating, technological analysis of the excavated material, sedimentary analysis, etc.); and (c) Archeological ethnography, which has the aim of understanding the multiple temporalities of the archeological record and the landscape.

Our main hypothesis, which is in common with that of other authors,[8,11–13] is linked to the fact that climate fluctuations cannot be solely responsible for alterations in the social dynamic and in the occupation of territories, especially in shelters on the CBP.

Thus, we are aware of the gradual lowering in the temperature, favored mainly by the difficulties of humid air mass displacements in the central area of South America. However, did these fluctuations, which resulted in a possible reduction in rainfall, directly impact the territories where these people were established, their lives and their experiences? Would a hydric deficit directly influence the consolidated territories, with established ontologies and ancestrality? How did these changes occur? Were they slow or sudden? How big was this hydric stress and the stress on annual temperatures in the Serra Negra during the Middle Holocene?

Of the known archeological sites, nine have been the target of systematic excavations, with the discovery of a diverse archeological record, above all, dating from the Mid Holocene, without significant occupational lapses. Thus, the chronologies are distributed into two clear periods of occupation: (a) The Middle Holocene (from 7,169 years BP, medium probability in Serra Negra) – hunter-gatherer occupations at three distinct times; and (b) Upper Holocene (from 4,200 years BP) – occupations carried out by groups which, in addition to hunting, fishing, and gathering, would also come to practice horticulture.

Paleoenvironment in Serra Negra

For Chueng et al. (2018), the samples collected in sequence in the profile situated at the Cabeças 4 site and in an Organosol profile close to the site indicated the predominance of phytolith types related to grass (Poaceae) and palm (Arecaceae) vegetation. When comparing the profiles it was possible to find the same types of phytoliths, indicating a similar vegetation to the present. However, the data suggest that in the chronological period of occupation of the archeological site, especially during the Mid Holocene, the region was predominantly covered by rupestrian grassland, with moderate hydric stress.[23] The same results were also demonstrated at the Matão 1 site.[15,24]

Similar results were obtained in the palynological analyses at the headwaters of the Araçuaí River. According to Costa et al,[25] it was possible to identify phases for the Araçuaí peat bog. In Phase 1 (8,900 to 6,600 years BP) there was a more humid period with higher temperatures, except for a one-off cooling at 8,200 years BP. Phase 2 (6,600 to 3,900 years BP) showed a trend of decreasing temperature. In Phase 3 (3,900 to 2,100 years BP), there was a reduction in humidity and an increase in temperature, while in Phase 4 (2,100 to 250 years BP), there was a decrease in temperature and an increase in humidity. Finally, in Phase 5 (the last 250 years), the environmental conditions have been similar to those of the present.

The chrononology of the mid holocene

In Serra Negra, chronologies associated with the Mid Holocene were obtained from four archeological sites: Cabeças 4, Três Fronteiras 7, Sampaio, and Água Quente 3. Dating was carried out using ^{14}C, AMS, and OSL (Tables 1 & 2).

Table 1 Serra Negra, MG: ^{14}C dating of the archeological sites[1]

Site	Lab	Method	Age (bp)	Calibrated age (cal yrs bp) shcall20	Mean probability (cal yrs bp)	Probability (2sigma)
Cabeças 4	BETA 379291	LSC	480±30	531-451	501	0.976
	BETA 379289	AMS	3,980±30	4,449-4,287	4,388	0.783
	BETA 370291	LSC	4,010±40	4,532-4,290	4,441	0.967
	BETA 370289	LSC	5,270±40	6,035-5,912	5,996	0.637
	BETA 379290	LSC	6,140±40	7,086-6,854	6,978	0.805
	BETA 379290	LSC	6,280± 30	7,259-7,154	7,169	0.599
Cabeças 1	BETA 379288	AMS	150±30	146-0	101	0.761
	BETA 379292		1,960±30	1,930-1,812	1,864	0.875

Table 1 Continued...

Cabeças 3	BETA 400565	AMS	920±30	817-724	776	0.817
Matão 1	BETA 506713	AMS	980±30	923-790	853	0.971
	BETA 506716		1,270±30	1,179-1,065	1,132	0.82
	BETA 506715	AMS	1,240±30	1,178-1,054	1,112	0.924
	BETA 506714		2,460±30	2,540-2,350	2,466	0.72
Itanguá 2	UG 10586	AMS	220±20	221-143	194	0.811
	CEN 1181		660±85	683-502	603	0.977
	CEN 1172	LSC	680±110	773-490	613	0.993
	CEN 1173		630±30	647-589	605	0.639
	BETA 310324	AMS	270±20	316-277	289	0,685
Sampaio	BETA 471280	LSC	4,280±30	4,870-4,797	4,823	0.581
Três Fronteiras 7	BETA 471281	LSC	4,100±30	4,648-4,422	4,553	0.862
	CENA/USP	14C	3,200±70	3,315-3,571	---	---
	CENA/USP	14C	2940±70	2919-3260	---	---
Água Quente 3	BETA 75226	AMS	4,520±30	5,280-4873	5082	0.65
	BETA 75225	AMS	4,470±30	5,301-4977	5011	0.731

Source: Fagundes et al.[15] Calibration: Utida, 2021; Rodrigo, 2025. Dates from the Mid Holocene are highlighted

The OSL/SAR15 and ^{14}C samples for the Hot water 1 site are currently being prepared.

Matão 01	OSL 5105	OSL/ SAR 06	400±50
Água Quente 3	OSL 6072	OSL/ SAR 15	5,540±600
Água Quente 3	OSL 6073	OSL/ SAR 15	4,615±485
Água Quente 3	OSL 6074	OSL/ SAR 15	3,065±505
Água Quente 3	OSL 607R	OSL/ SAR 15	2,105±445

Source: Fagundes et al.[15] Dates from the Mid Holocene are highlighted

Table 2 Serra Negra, MG: OSL dating of the archeological sites

Site	Laboratory	Method	Chronology (bp)
Três Fronteiras 7	DAT 5480	OSL/SAR 15	6,525±690
Três Fronteiras 7	DAT 5480	OSL/SAR 15	6,165±515
Matão 01	DAT 5479	OSL/ SAR 15	3,375±825
Matão 01	OSL 5140	OSL/SAR 15	3,300±520
Matão 01	DAT 5479	OSL/SAR 15	2,315±305
Matão 01	DAT 5479	OSL/SAR 15	1,930±385
Matão 01	DAT 5479	OSL/SAR 15	1,275±310
Matão 01	DAT 5479	OSL/SAR 15	1,095±210
Matão 01	OSL 5105	OSL/SAR 06	550±50

All are archeological sites at dates throughout the entire Mid Holocene. In other words, this proves that there was no Archaic Gap in Serra Negra, Brazil.

Final considerations

The aim of this report was to demonstrate that in the Upper Valley of the Araçuaí the same climate oscillations that occurred during the Holocene continue to be used. It has often been pondered how the dated archeological sites from the Serra Negra are related and differ from what has been shown in the literature, especially in regard to occupations in the Early Holocene.

The paleoenvironmental, archeological, and chronological data from Serra Negra corroborate the understanding that the shelters remained part of the gravitational center of hunter-gatherer territory in an area that can today be considered an ecotone.

Thus far, the data, which is pioneering for shelter occupations on the BCP, demonstrates that the northeast face of the SdEM remained occupied during the Mid Holocene, on a stable territory (in terms of population and environment).

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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