A Note on Excavations at Khududih-Chauniya, Purulia, West Bengal

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Abstract

The Ayodhya Hill complex and the surrounding region in Purulia District, West Bengal, India, have been extensively studied in the context of prehistoric archaeology during the previous two decades. In this report, based on two excavations undertaken at the site of Khududih-Chauniya in 2020 and 2022, we expand on our understanding of the artefact-bearing context and the geomorphic surface occupied by past hominin populations. Interestingly, no artefacts were found *in-situ*. Detailed field studies show that the original artefact-bearing context is exposed due to continuous erosion of the bedrock, thus representing a typical bedrock site in a piedmont region. Unlike the other sites in the Hill complex that only have microlithic technology, Chauniya also shows a small amount of Lower Palaeolithic and Middle Palaeolithic technologies, in addition to the main microlithic technology. The raw material resource zone has been reconstructed from existing geological maps, which show that it existed within 2 km from the site. The hominin groups made extensive use of felsic tuff derived from this zone, although quartz was available in plenty closer to the sites, which has wider implications for the cognition levels of the hominin groups.

Introduction

The Precambrian residual Ayodhya Hills and surrounding regions in Purulia District, West Bengal, India, have been extensively studied in the context of prehistoric archaeology during the previous two decades (Basak *et al*. 2014; Basak and Srivastava 2017; Basak *et al*. 2021). In this note, we expand on our understanding of the artefact-bearing context of Khududih-Chauniya (23.11° N; 86.13° E) and the geomorphic surface occupied by past hominin populations. Two excavations were undertaken at the site in 2020 and 2022. The site is located within 1 km north of the Baghmundi-Purulia road in the deep recesses of the Ayodhya Hill and forest reserve area (Fig. 1). Our discussion will focus on the site formation processes and assemblages represented at the site, which display a small percentage of Lower Palaeolithic and Middle Palaeolithic technologies along with the dominant microlithic technology.

Excavations at Khududih-Chauniya

Three distinct broad geomorphic landscapes can be recognised from the Ayodhya Hill region where the sites are located; these are (1) Denudational or Residual Hill, (2) Pediment Surface, and (3) Pediplain with incipient floodplain. The pediment surface fringing the residual hill is characterised by the extensive badlands topography developed over the residual mantle of weathered and ferruginised granite-pegmatite bedrock, and transient colluvium deposits. Lithic artefacts are strewn over the seasonally dissected badlands surface and, under favourable conditions as clasts within the colluvial apron. Khududih-Chauniya is marked by the development of hardpan over ferruginous latosol with the intricate badlands topography. Contrary to the hill-front Mahadebbera site (23.19° N; 86.20° E) that is located at a higher elevation (310 m AMSL), where considerable artefacts were recovered from the colluvial deposit; the Chauniya site (elevation 240 m AMSL) is characterised by extensively scattered and strewn artefacts over the regolith surface capping the bedrock, along with a very thin transient seasonal colluvial apron (Fig. 1). As the site is close to the pediment-pediplain transition, annual precipitation and flash floods facilitate easier transportation of the transient colluvium apron. This explains the occurrence of a colluvial lag deposit left after each monsoon, and sufficient lithic artefacts are found strewn over the badlands surface due to the active erosional processes acting on the colluvium.

Recent excavations were undertaken at the site (February 2020 and September 2022) along a 2-3 m scarp of highly weathered bedrock-regolith to ascertain the stratigraphy of the artefacts. The top of the escarpment, at an elevation of 240 m AMSL, was taken as the benchmark. CHN 2 was laid out on top of the escarpment. CHN2 (3/3 m) was excavated to 1.54 m, in which Unit 1 consisted of 47 cm of a loose, sandy, fine-grained, yellowish-brown

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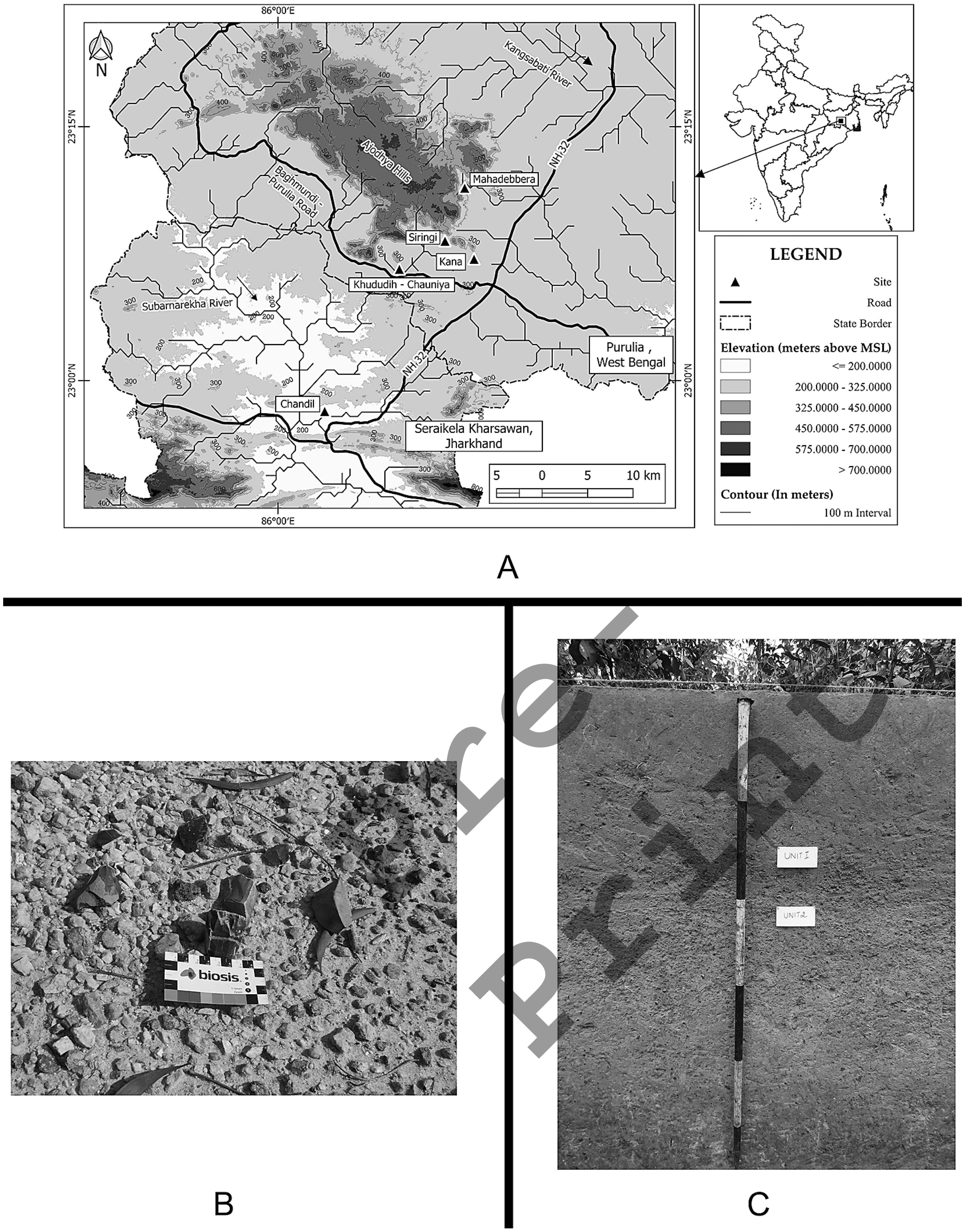

Fig. 1: A: Location of Khududih-Chauniya and other sites, B: Artefacts scattered on a hardpan surface at Chauniya, C: Section- CHN2

material that graded down to coarser, gritty, ferruginised material. Unit 2 (47 cm-1.54 m) comprised bedrock, regolith, and colluvial patches. The excavation of CHN2 (Fig. 1) revealed that the nature of the profile was different from the colluvial context exposed and dated at the other two sites in the region, which have been subject to detailed investigation. Unlike the other sites, artefacts were not found *in-situ* in the section. A second excavation was planned in 2022 for a more thorough in-depth study of the upper portion of the badlands to understand the nature of the profile and to check if artefacts remain absent *in-situ*. CHN 3 (3/3 m) was laid out 8 m west of CHN2. The trench was excavated to 1.20 m in parity with the excavations done in 2020 (Fig. 2).

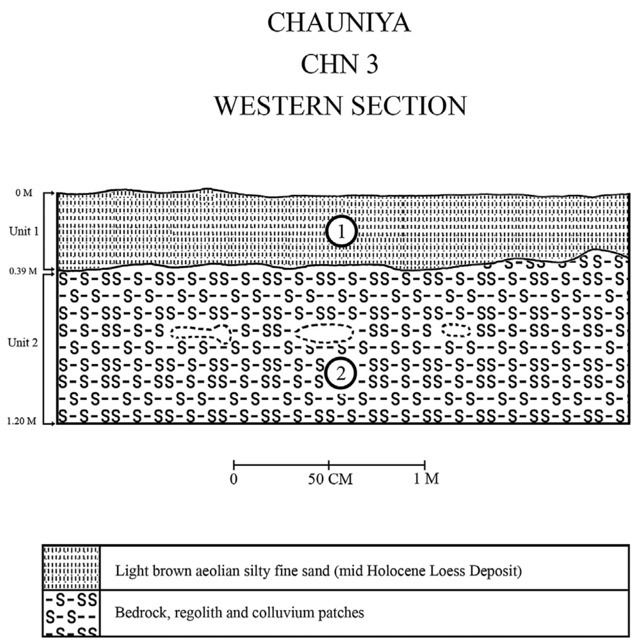

Fig. 2: Stratigraphy – CHN 3

Although no artefacts were found *in-situ*, the excavation was important to ascertain the nature of the context of the artefacts, and also understand the geoarchaeological implications. Units 1 and 2 continue in this trench (similar to CHN 2), showing a clear disjuncture between the two depositional cycles. Unit 1 indicates the presence of a 0.5-0.7 m thick, buff-coloured, silty fine sand above and covering the weathered bedrock. This buff-coloured, featureless, fine silt blanket deposit is likely to be a loess deposit (~ 5k) that still blankets various parts of the Ajodhya Hills and is reportedly used widely by the locals for colouring their mud-wall houses. Arguably, such a blanket loess deposit also covered different segments of the bedrock-regolith badlands along with artefacts, that get daylighted seasonally following erosion and transportation through spells of torrential rainfall.

Although samples were collected for OSL dating from Unit 2 in both seasons, it was unsuccessful. The reason cited was oversaturation of quartz due to incomplete bleaching. This only happens in a situation when there is no/less transportation of quartz. This would support our observation that Unit 2 was formed due to *in-situ* weathering of bedrock, so there was no significant degree

Table 1: Lithic assemblage from the season 2016-17 (n = 54)

Category	Numbers, Percentage	Max length (cm)	Min length (cm)
Microlithic *chaine*	**39**		
Cores			
Blade Core	4,7.40%	5.81	3.08
Core fragments	3,5.55%	__	__
Unretouched artefacts			
Flakes	25,46.29%	4.14	2.36
Bladelet	1,1.85%	2.2	
Broken flakes	3,5.55%	3.33	2.7
Retouched artefacts			
Point	1,1.85%	3.81	
Notched	1,1.85%	5.05	
Flake	1,1.85%	5.23	
Middle Palaeolithic *chaine*	**7**		
Core			
Levallois Core	3, 5.55%	10.78	8.19
Unretouched artefacts			
Flake	2, 3.70%	4.52	4.49
Retouched artefacts			
Point	1, 1.85%	7.1	__
Scraper	1,1.85%	6.38	
Flaked pieces	6, 11.11%	5.9	5.1
Lower Palaeolithic	2		
Large Flake Acheulian	1,1.85%	14.37	__
Lower Palaeolithic Artefact	1, 1.85%	16.13	__

of transport of material, especially quartz. The authors conclude from two consecutive seasons of excavation at Chauniya that the original context of the occupational surface was exposed due to continuous erosion of the bedrock. The sections do not form a part of the colluvial fill, unlike the other two sites, Mahadebbera and Kana (23.12° N; 86.21° E), in which *in-situ* artefacts found in the colluvial deposits were also securely dated.

In the absence of chronometric dating from the site, the stone tool technologies act as determining factors to establish the site's antiquity.

The Lithic Assemblage

A random collection of artefacts was undertaken in 2016-2017 when the site was surveyed, and again in 2020. A total of 54 artefacts were collected from the naturally exposed profile (Table 1) in 2016-2017. Technologically, we may isolate two *chaine de repertoire* here. The microlithic *chaine* (Basak and Srivastava 2017; Basak 2018) is the most prominent feature at the site, followed by a second *chaine* that is classified as Middle Palaeolithic (Behera and Barik 2022; Devara *et al* 2022; Devara *et al* 2024). An isolated Large Flake Acheulian, and an Acheulian core were the only artefacts found that do not fit into either of the microlithic and Middle Palaeolithic *chaines.*

A total of 243 stone artefacts were collected from the naturally exposed profile at Chauniya during the 2020 season. Levallois elements continued to occur, including cores, unretouched flakes, and retouched artefacts made on Levallois flakes. Microlithic technology represents almost similar elements as those documented in 2016-17 (Table 2).

Table 2: Lithic assemblage from the season 2020 17 (n = 54)

Category		**Numbers, Percentage**	**Max length (cm)**	**Min length (cm)**
Microlithic *chaine*		**190**		
Core				
	Blade Core	49, 20.16%	5.42	1.5
	Core fragments	7, 2.88%	—	—
Unretouched artefacts				
	Flakes	75, 30.86%	6.3	1.4
	Blades	3, 1.23%	2.5	1.92
	Bladelets	3, 1.23%	3.81	1.7
	Broken Flakes	23, 9.46%	3.43	1.93
	Raw Material Nodules	2, 0.82%	—	—
	Nodule	1, 0.41%	—	—
Retouched artefacts				
	Flakes	7, 2.88%	4.7	1.3
	Scraper	6, 2.46%	4.1	2.3
	Tanged point	2, 0.82%	3.5	2.7
	Tanged tool	3, 1.23%	3.9	3.3
	Notches	3, 1.23%	3.9	2.8
Microlithic tools		6, 2.46%	—	—
	Backed blade	1	2.4	—
	Triangle	2	2.3	2.0
	Point	2	2.8	2.5
	Lunate	1	2.38	—
Middle Paleolithic *chaine*		**41**		
Cores				
	Levallois core	6, 2.46%	10.81	4.1
Unretouched artefacts				
	Flakes	32, 13.16%	10	2.7
Retouched artefacts				
	Knife	1, 0.41%	6.32	—
	Flakes	2, 0.82%	4.88	—
Flaked pieces		**12,** 4.93	6.3	2

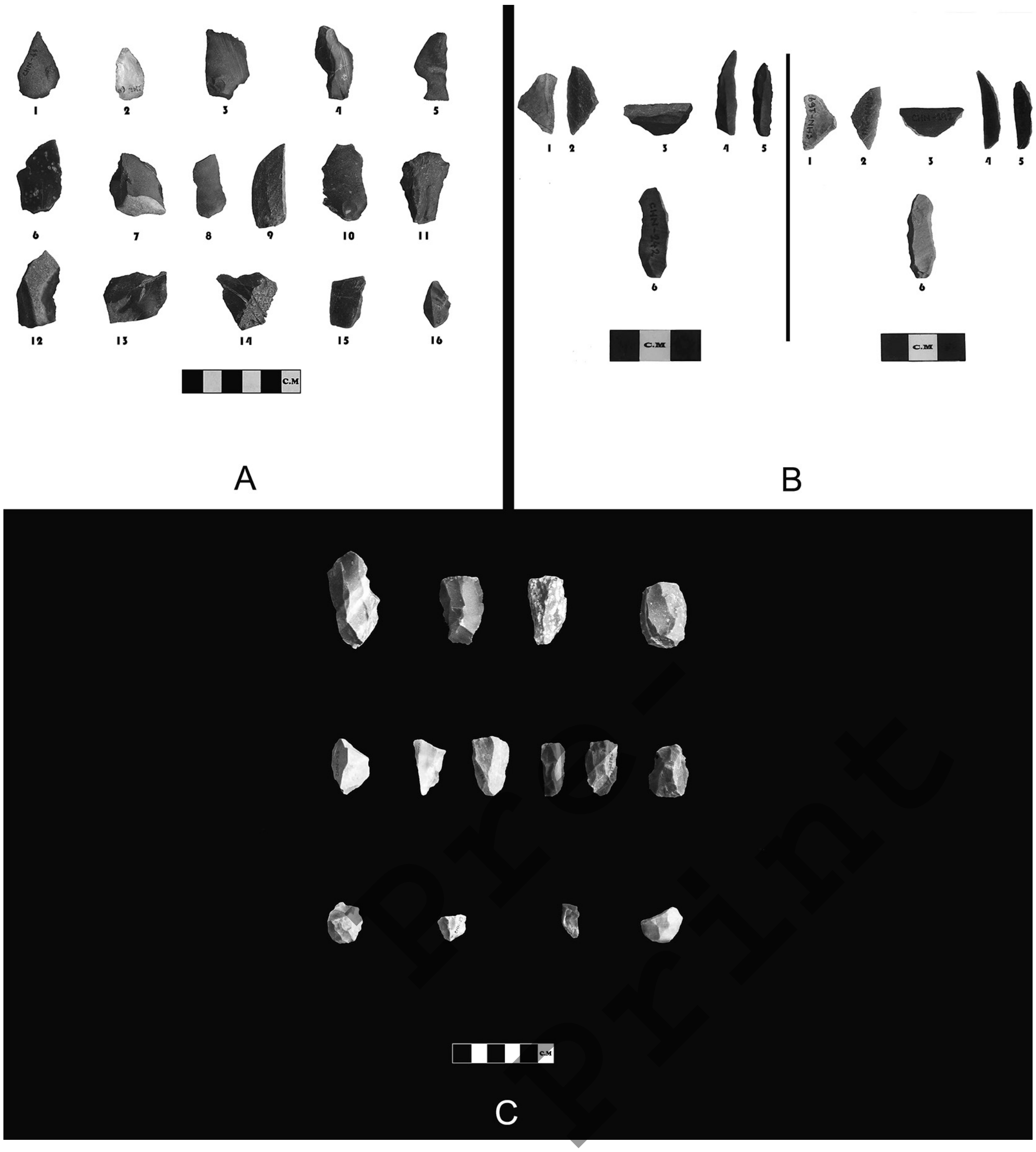

Fig. 3: A: Retouched artefacts found from Chauniya during the 2020 season: (1,2) tanged points, (3-5) tanged tools, (6-11) scrapers, (12-14) notched tools, (15,16) retouched flakes; B: Microlithic tools (Dordal and Ventral) found from Chauniya during the 2020 season: (1,2) triangles, (3) lunate, (4,5) points, (6) backed blade; C: Chauniya-Blade cores from both seasons

The Microlithic Chaine (Fig. 3)

The most characteristic feature of both seasons is the absence of primary manufacturing debitage, ascertained by the absence of raw material nodules and primary debitage consisting of primary decortication flakes and rough-outs. Only a low number of raw material blocks (n = 2) and a single nodule are present, and cores also have minimal cortex. The later stages of working were confirmed with blade cores and secondary flakes. The flakes with no cortex cover are maximum (78.94%), followed by flakes with <50% cortex cover (21.05%). The blade cores are indicators of reduction patterns typical of a microlithic assemblage, and care was taken to see the nature of their exploitation/reduction. They were mostly abandoned in a well-exploited state and represent later stages of reduction (Table 3). The inferred primary manufacturing might have taken place elsewhere, closer to the raw material sources. Felsic tuff is the dominant raw material used in the manufacture of the lithic assemblages. A considerable number of retouched tools and microliths constitute the assemblage from both seasons. (Tables 1 and 2).

The maximum number of blade cores fall in the 2-3 cm category (Table 3), which tallies well with the maximum length of the microlithic tools. Therefore, it

Table 3: Blade cores from both the seasons

Category	Number, Percentage
Blade cores	53, 17.84%
Multiple platform	24, 45.28%
Double platform	18, 33.96%
Single platform	11, 20.75%
Minimally Used Cores	10
Well-Exploited Cores	34
Exhausted Cores	9
Size of the cores (Maximum length) in cm	
4-6	8
3-4	19
2-3	26

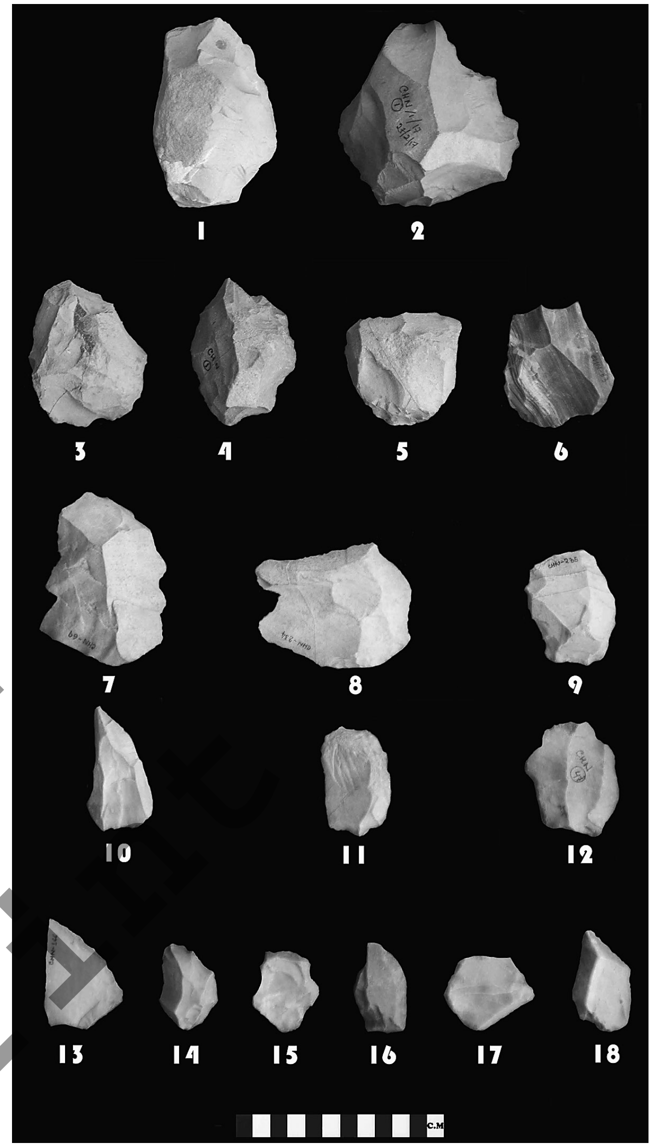

Fig. 4: Middle Palaeolithic assemblage from both seasons: (1-6) cores; (7-8) large unretouched flakes (10 cm and 9.18 cm, corresponding to the size of the cores); (10) point; (11) knife; (12) scraper; (9, 13, 14, 15, 16, 17, 18) unretouched Levallois flakes

is clear that the blade cores were principally reduced for manufacturing the microliths. Even the cores in other size categories represent features of blade reduction, and so it may be concluded that they were meant for the same purpose. The retouching on flakes indicates a differential use of tools.

The microlithic assemblage bears a close resemblance to that of the Mahadebbera and Kana microlithic sites (Basak and Srivastava 2017). The ratio of cores to flakes is 53:100, or approximately 1:2, and the well-explored cores are maximum in number. Overall, this indicates the extent of flaking activity at the site: on average, two flakes were removed from each core, which may indicate that a substantial number of cores were discarded at the site. As artefacts are mostly found as lag deposits in the exposed bedrock surface, they display a mixed assemblage, combining elements from different technological traditions. The presence of tanged tools and tanged points strongly suggests that these retouched tools were likely adapted for hafting. Tanged artefacts, scrapers, are up to 4 cm in length and are categorised as part of the microlithic assemblage.

The Levallois/Middle Palaeolithic Chaine

The Middle Palaeolithic *chaine* (Fig. 4) from both seasons represents a total of 9 Levallois cores showing a wide variety of morphological features, retouched artefacts, and flaking debitage. Two types of formal reduction were noticed among the Levallois cores: preferential removal (n = 3) (the maximum length varied between 6.63 and 10.81 cm) and recurrent removal strategies (n = 4) (the maximum length varied between 4.8 and 6.25 cm). A retouched Levallois point core (7.2 x 5.5 x 1.84 cm) and a triangular core (6.32 x 4.63 x 1.73 cm) were also documented. The retouched tools show a few distinctive types (Tables 1 and 2). Two flakes are large, 9.18 cm and 10 cm, corresponding to the size of the cores. Additionally, there are a few unclassified flaked pieces (n = 12) with lengths ranging from 2 cm to 6.3 cm found from both seasons. Overall, these pieces lack proper diagnostic attributes – only a few display prominent bulbs and dorsal scars – making it difficult to determine which technological *chaine* they belonged.

The analysis of Levallois and prepared core attributes provides valuable insight into the reduction sequence at this site. The methodology employed in this study has been effective in highlighting the diagnostic typo-technological traits of cores and retouched artefacts. In particular, the diversity of Levallois cores and the types of retouched tools observed across all assemblages align with the characteristics of Middle Palaeolithic assemblages found

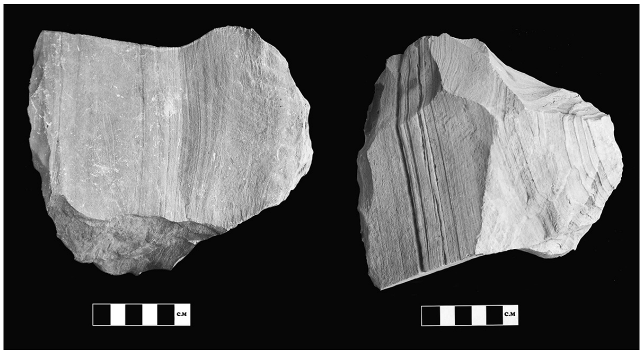

Fig. 5: Chauniya-large cutting tool

Table 4: Representation of raw material exploitation at the site Chauniya in 2016-17 and 2020 (n = 297)

Raw Material	Number	Percentage
Felsic Tuff	251	84.5
Cherty quartz	22	7.40
Grey Chert	6	2.02
Greenish Chert	5	0.16
Creamishchert	5	0.16
Black Chert	2	0.67
Quartz opaque	4	1.34
Transparent quartz	1	0.33
Reddish chert	1	0.33

throughout South Asia (selected references: Ghosh 1970; Haslam *et al*. 2012; Blinkhorn *et al*. 2013; Clarkson *et al*. 2020; Devara *et al*. 2022; Behera and Barik 2022; Devara *et al.* 2024).

The Large Flake Acheulian (Sharon cited in Mishra *et al*. 2010: 271) has a maximum length of 14.37 cm (Fig. 5). It could be a primary flake blank detached from a giant core to be transformed into a large cutting tool. It retains an unfaceted striking platform and 4 large flake scars on the dorsal surface. However, the core with a maximum length of 16.13 cm is classified as Acheulian artefact.

Raw Material

The principal raw material used was felsic tuff. Others represent a substantially lesser percentage, including quartz and cherts of different varieties (Table 4). As the primary manufacturing stage is absent for all technologies represented, it is imperative to understand the probable sources of the stones used for manufacturing the artefacts.

The Khududih-Chauniya site is located near the southern margin of the Chhotanagpur Gneissic Complex (CGC), consisting of different varieties of rocks like granite, gneisses, granulite, migmatite, amphibolite, and phyllite, among others. These rocks, being coarse-grained and soft in nature, were not used for chipping. The careful selection of the fine-grained, hard rocks from within the South Purulia (also known as Tamar-Porapahar) Shear Zone, located within 2 km south of the CGC, reflects the level of cognition and intelligence of these Anatomically

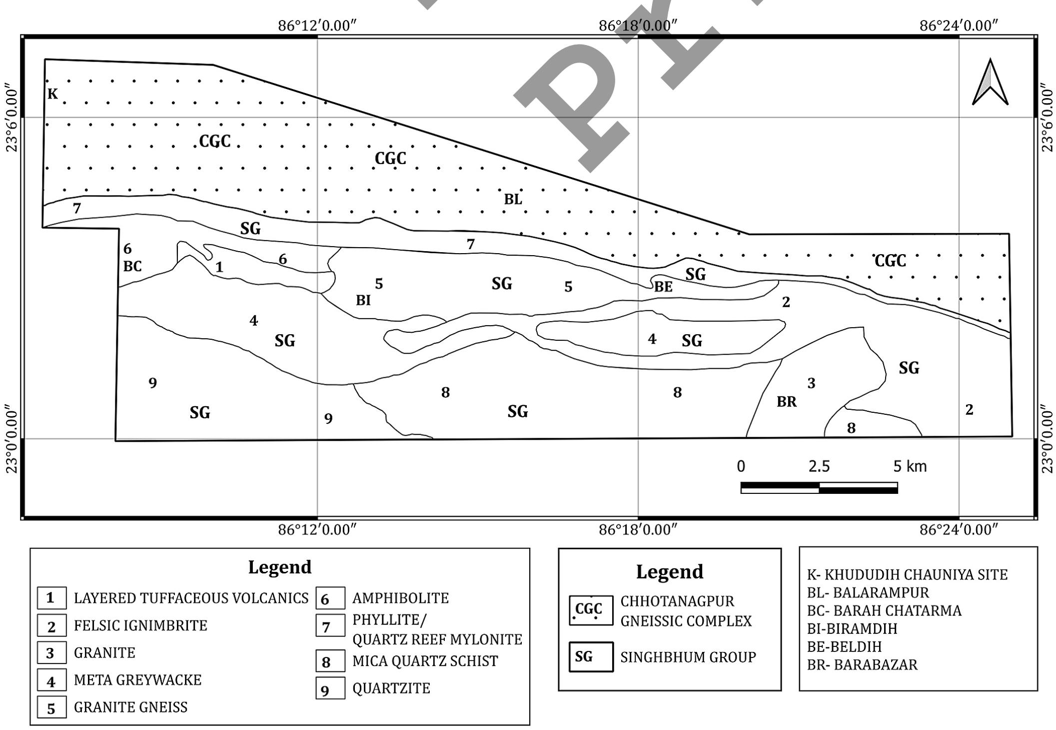

Fig. 6: Geological map showing the raw material source region based on Acharyya *et al*. (2006)

Modern Human population groups. Different types of felsic volcanic rock are abundant in this Shear (fault) Zone (Acharyya *et al*. 2006) that constitutes the bulk of the raw material used to manufacture the lithic artefacts (Fig. 6), like the layered tuffaceous volcanoclastic rocks that were used in making the core and the LFA (Large Flake Acheulian). Another possible source for fine-grained hard rocks is the Dalma volcanics that are located 15-20 km south of the site, along the Subarnarekha River near Chandil in the Jharkhand State. A few samples extracted from the outcrop and three artefact samples from Chauniya, Siringi, and Kana were subjected to a detailed petrographic analysis by the Geological Survey of India, which showed that all the samples, with minor differences between them, represent the same type of rock (Basak 2008). Our present study, based on geological maps, provides supportive evidence to the earlier laboratory analysis.

Conclusions

The present study highlights the importance of understanding site formation processes of pediment sites, which show a complex stratigraphy. As OSL dates were difficult to obtain for reasons discussed, the presence of different technologies at the site proves to be the most important indicator of the age of the site and shows its preferential importance among the hominin populations. Given that the chronology of the other sites – Kana and Mahadebbera – has a range of 42-25 ka, it is not unlikely that the microlithic technology of Chauniya falls in that chronological period. As Middle Palaeolithic technology so far dated in South Asia has a varied chronology now (Kumar *et al*. 2018; Devara *et al*. 2022), and LFA (Large Flake Acheulian) has a wider connotation, the possibility of Chauniya having a deeper antiquity than the other sites is not ruled out. The raw material provenance survey, though limited in scope, aids in a wider understanding of the technological organization of Chauniya and other sites in the Ayodhya Hill complex. Overall, the results of the present study and those undertaken earlier at the other sites in the region over more than a decade establish a methodology of understanding hominin land use patterns. This reiterates the urgency of an intensive field survey and in-depth study of select sites that aid in the reconstruction.

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