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# Reconnaissance a new Palaeolithic site at Al-Huwaidy in Ha'il region, northwest Saudi Arabia

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## Abstract:

Ha'il region in northwest Saudi Arabia is characterized by the presence of oases, flat plains, Paleolakes, and lava fields, which are some of the main landscape characteristics in which Palaeolithic sites have been found in the region. It is located on one of the routes of early hominin dispersal across Arabia. The ongoing archaeological research made by the Paleodeserts and Disperse projects have recorded several Acheulean and Middle Palaeolithic sites in such localities as Jubbah basin in the Nefud desert (Groucutt *et al.* 2021; Petraglia *et al.* 2015; 2019), yet large parts of the region are still unexplored.

The ground archaeological survey conducted by the authors at Al-Huwaidy village, 70 km southwest of Ha'il town, has led to the discovery of a unique Palaeolithic site on the margin of a palaeo-oasis, close to a volcanic mountain. The archaeological site consists of an agglomeration spread of lithics covering an area of basaltic field and outcrops. Numerous handaxes have been documented on the surface and the profiles of current water canal shafts. The site setting and the quantity and quality of lithics from Large Cutting Tools (LCT), including typical handaxes, foliate handaxes, Acheulean cores and flakes, indicate that the site represents a new and interesting extension of Palaeolithic archaeology in the northwest of Arabia similar to Palaeolithic characteristics in the Jubbah basin. Thus, this discovery has a direct relevance in assessing the distribution of Palaeolithic sites in the Ha'il region, showing that they not only occur in the northern area (Nefud desert), but also in the different landscape (basaltic lava field) in the southern part of the region.

**Keywords:** Acheulean; lithics; Arabia; Ha'il; bifaces; basalt; Large Cutting Tools (LCT)

## 1. Introduction

Recent prehistoric archaeological research in Arabia revealed that hominin groups were present in the area by at least 400,000 years ago (Groucutt *et al.* 2021). They were widely dispersed and particularly occupied the margins of paleo-lakes and ancient rivers during the Middle Pleistocene period (Petraglia *et al.* 2019). Archaeological surveys and excavations conducted in various parts of Arabia recorded several Palaeolithic localities (Petraglia *et al.* 2010). And early human populations and pale-environment reconstruction have been discussed (Petraglia *et al.* 2015; Petraglia & Rose 2009). The main sites were discovered along the eastern coast of the Red Sea southwest of Saudi Arabia in Jazan and Asir regions, of which Harrat Al



Birk and Dhahaban Quarry are the main localities (Bailey *et al.* 2015; Inglis *et al.* 2014; Sinclair *et al.* 2019). Dozens of Lower and Middle Palaeolithic occupations were discovered along Wadi Fatima in Mecca region west of Saudi Arabia, Dawadmi localities in Central Saudi Arabia, Riyadh region and the Nefud desert in north and northwest of Saudi Arabia (regions of Ha'il, Tabuk and al-Jawf) (Petraglia 2003; Scerri *et al.* 2021; Shipton *et al.* 2014; 2018). Palaeolithic context were discovered associated with freshwater deposits in the Nefud desert (Breeze *et al.* 2017), as well as different Middle Palaeolithic landscape localities from Najed area in the regions of Ha'il, Medina and Riyadh (Groucutt *et al.* 2016). The Lower Palaeolithic sites discovered in western Nefud desert provided important information about middle to late Pleistocene population dynamic in Arabian Desert (Scerri *et al.* 2015). The major Palaeolithic occupations in northern Arabia were found along the Nefud desert in the areas of the Jubbah basin, the Al Maraat Basin and Khall Amaysham 4 (KAM4) in Tabuk region. They provided an impressive extension of Acheulean and Middle Palaeolithic archaeology including lithics, fossils and footprints (Groucutt *et al.* 2017; 2021; Robert *et al.* 2018; Scerri *et al.* 2021; Stewart *et al.* 2020).

Palaeolithic sites were studied from the surface and excavations revealed the general picture of the Palaeolithic landscape in Arabia, where three habitation patterns can be classified as follows: a) small occupation on the sediment mound close to a palaeo-depression, such as the sites of KAM4; b) occupation consisting of workshops of lithics remains in the basaltic fields (harrat) or close to the volcanic mountain (jebel), or sandstone extension as in the example of Al Maraat; c) workshop and lithic concentrations along exposed dykes such as the site of Saffaqah in the Dawadmi area (Groucutt *et al.* 2021; Shipton *et al.* 2018).

The principal Palaeolithic assemblages identified in Arabia are the Acheulean tradition, Mode 2 large cutting stone tools (LCTs) including handaxes, cleavers, foliate handaxes and lesser presence of Levallois cores and points, Mode 3, in late Acheulean and Middle Palaeolithic sites (Groucutt *et al.* 2017; Jennings *et al.* 2015; Petraglia *et al.* 2019; Scerri *et al.* 2018; 2021; Shipton *et al.* 2018; Stewart *et al.* 2020).

Although a number of Lower and Middle Palaeolithic sites have been studied in Saudi Arabia, many questions pose themselves and should be investigated owing to the lack of a comprehensive archaeological survey and of large-scale excavations, as well as the paucity of stratified and well-preserved Palaeolithic sites. Thus, some of these questions are related to the distribution of Palaeolithic sites in Saudi Arabia, because there are several unexplored regions. Furthermore, Lower and Middle Palaeolithic chronology and characteristics of Palaeolithic Acheulean and Middle Palaeolithic stone assemblages, reconstructions of the Pleistocene environment, and the dispersal of human groups within Arabia need to be further investigated.

In the case of Ha'il region, although several prehistoric research studies have been conducted in the southern margin of the Nefud desert (Almushawh 2018; Breeze *et al.* 2015; Jennings *et al.* 2013; Miller *et al.* 1989) and a number of Palaeolithic sites have been documented, there are still many unexplored areas. Some Palaeolithic sites have been recorded in the Jubbah basin, Al Maraat basin and Faid area (Groucutt *et al.* 2021; Jennings *et al.* 2016; Nassr & Elhassan 2020). This is why the authors carried out several archaeological surveys in the region, supported by desktop archaeology (Google Earth) and local community notifications incorporated with the Saudi Heritage Commission in an attempt to draw up a distribution map of Palaeolithic sites in the region and compare them with the wider Palaeolithic context in Arabia.

While the authors were teaching Arabian prehistoric archaeology courses at the University of Ha'il, Saudi Arabia, a student, Badr Dain Elshamri, notified them of his observation of a handaxe in the village of Al-Huwaidy. Based on this notification, the authors carried out an archaeological survey in November 2021 supported by Google Earth images to select targeted areas around the village. This paper aims to present the site landscape and lithics characteristics

along with their key characteristics which will be compared with the other relevant Palaeolithic sites in Arabia (Figure 1).

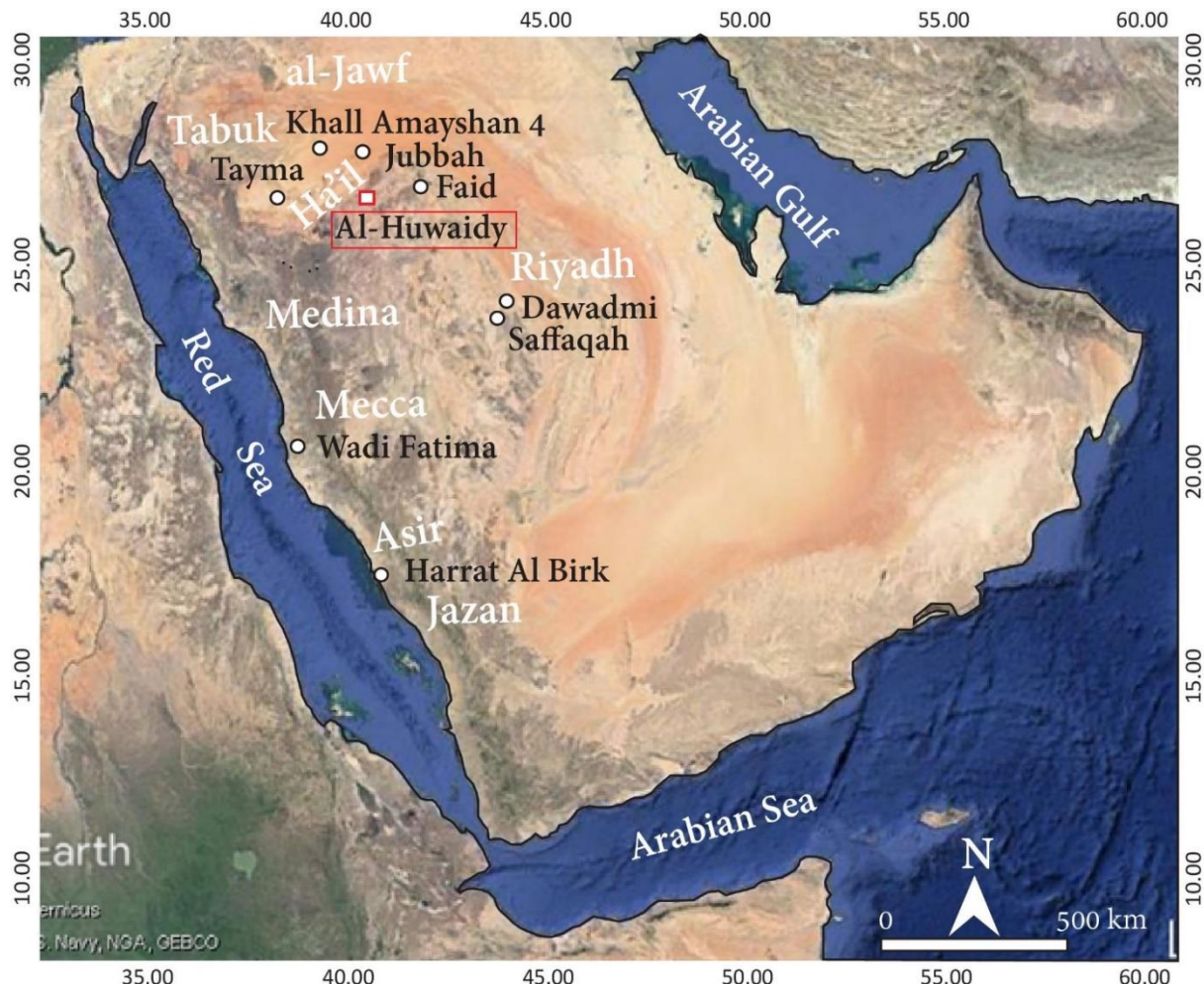


Figure 1: Location of Al-Huwaidy Palaeolithic site in northwest of Saudi Arabia and the main Palaeolithic localities and regions referred to in the text (names in black are Palaeolithic localities and names in white are regions).

## 2. Geographical setting of the archaeological site of Al-Huwaidy and its lithic distributions

Al-Huwaidy is located about 70 km southwest of the town of Ha'il in the area of Precambrian igneous and metamorphic rocks as well as Proterozoic Arabian shield and Phanerozoic sedimentary outcrops (Ali & Alshammari 2021; Hereher *et al.* 2012; Miller *et al.* 1989; Powers *et al.* 1966). Viewed from Google Earth, the landscape of the area explored is a large oasis surrounded by Alsamra mountain extension of composed volcanic rocks and connected by several small ancient water streams drained from the hilltop (jebel) into the oasis. The floor of the oasis is relatively flat, buried in sediment and sand. Our ground archaeological survey was carried out in the targeted areas between the margins of the oasis and the volcanic fields. The higher rocky mounds and outcrop extensions between the mountains and depression are chosen as targeted areas. The Palaeolithic site was discovered north of the village and close to the mountain (Figure 2). A large extension of Palaeolithic stone artefacts agglomerations covered an area of 400 m from west to east and 250 m from south to north (100.000 m<sup>2</sup>) of the basaltic field on the edge of the mountain and about 500 meters from the sandy area (oasis).

Lithics is after distribution estimated of around 20 pieces of tools, cores and flakes within each area of 100 m<sup>2</sup>.

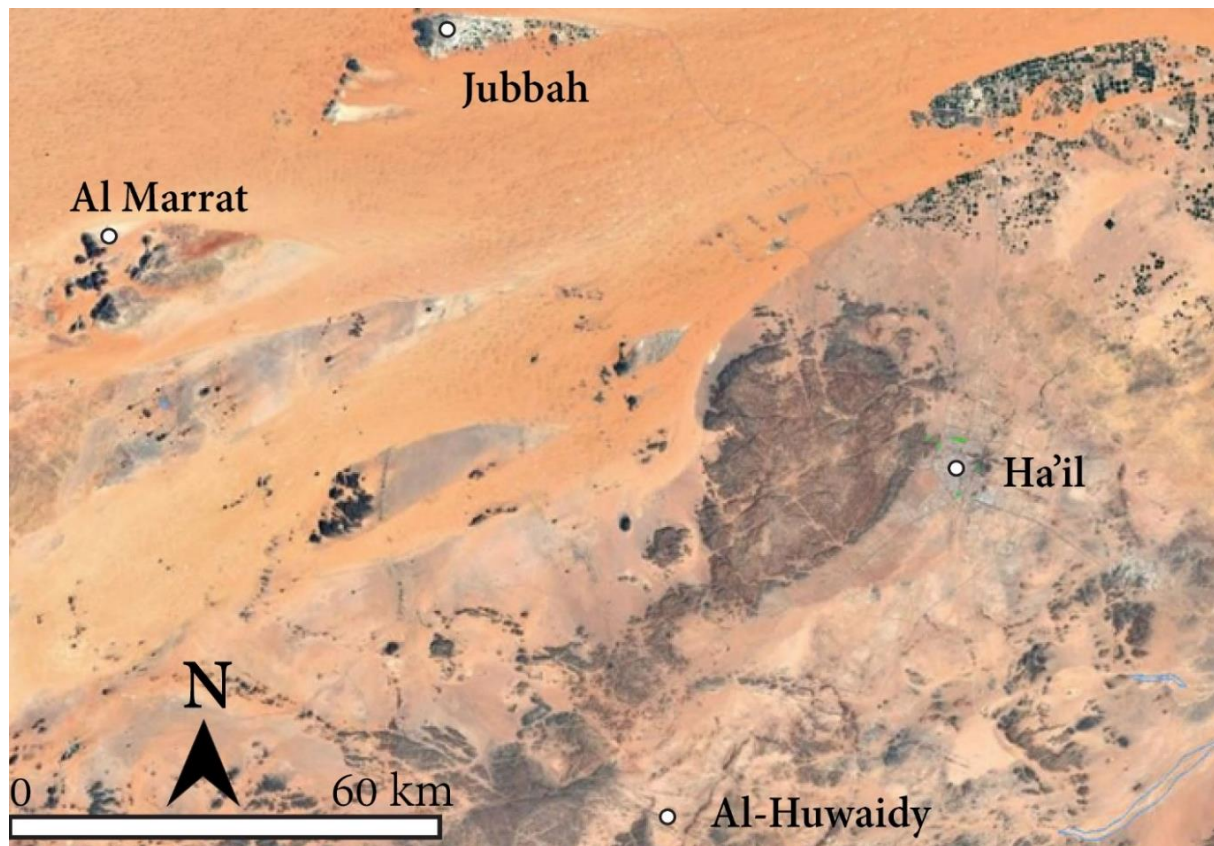


Figure 2: General view of Ha'il region landscape from Google Earth and the location of Al-Huwaidy site in the volcanic area and Jubbah and Al Marrat sites in sandstone, sand dunes areas.

The spread of lithics on the surface varies, some of the lithics were documented in concentrations close to outcrops, and others were recorded in scattered single finds (Figure 3). The margin of the site had been affected by erosion and lithics had moved and some of them had accumulated in simple concentrations around outcrops and water traces deposits. Some of the lithics found close to the oasis were highly weathered and many of them were buried by recent sand.

The site is an open-air Palaeolithic occupation, with lithics recorded from different locations, on the surface, and in the profiles of recent shafts dug by the local people for agricultural activities with a depth of around 1.5 meters. The lithics were documented in the field and not collected, samples from the surface were described randomly according technological variations (core, flake, debitage and tools). During the general survey, a total of 27 stone tool assemblages (Acheulean handaxes, scrapers, and Levallois productions) were collected for basic metric measurements.

GPS coordinates were used to collect the lithics for documentation and return them back to the same locations in the field. The main assemblages were found in the middle of the site, close to the basalt outcrops, and several flakes discovered including large flake blank production of LCT, small cores of different tool productions such as side scraper, end scraper, small retouched flakes, preferential Levallois cores and Levallois cores with faceted platform.

The site topography and distribution of lithics on the surface seem to be similar to the landscape criteria of Palaeolithic sites in northwest Arabia, where the main occupation is located within the rocky landscape such as mountains, dykes, or outcrops and on the margin of

the Palaeo-river system. Criterion such as the agglomerations of the lithics on the surface in different concentration with some of them spread within the outcrops, are found mainly similar to the landscape of Al Marrat and Jubbah basins Palaeolithic sites (Groucutt *et al.* 2021; Shipton *et al.* 2014).



Figure 3: A) General view of Al-Huwaidy Palaeolithic site facing south Amodan mountain and Alsamra mountain on the right, west of the site. B) Handaxe accumulated on the surface.

About 85% of lithics found on the surface were weathered and 15% presented preserved lithics. The lithic artefacts might be coming from the current digging shafts and the sediment layers eroded by seasonal rainwater. As well one handaxe, two Acheulean cores and five flakes were recorded along the profile of the current digging shaft buried by sediments as upper compact soil covered the bedrock of the mound (Figure 4).

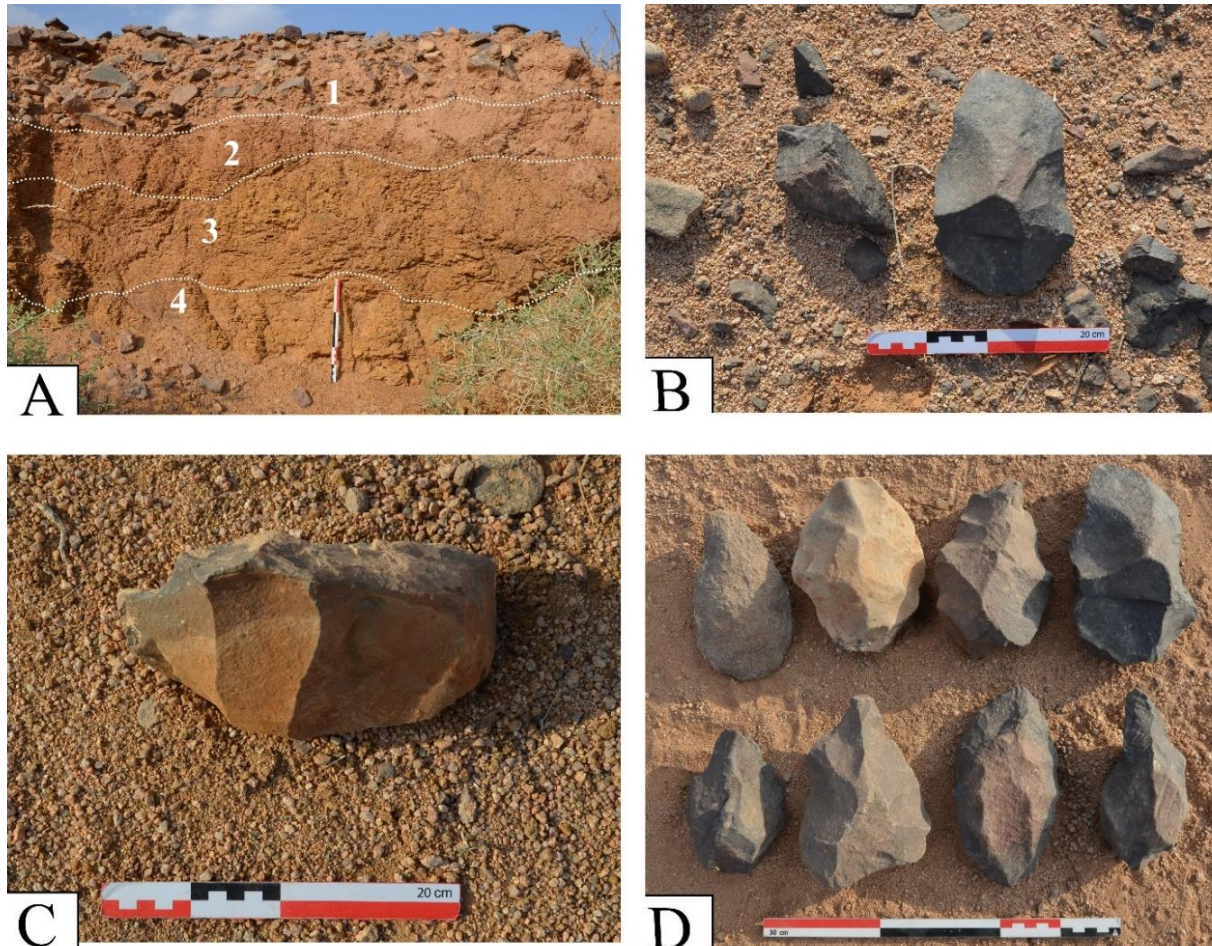


Figure 4: A) A recent water channel shaft profile, depth 1.5 m. 1: Weathered layer from loose fine clay and sand where Acheulean artefacts were buried. 2: Soft sediment with small amounts of Acheulean cores and flakes. 3: Reddish loam matrix of consolidated palaeosol, non-artefacts bearing. 4: Compact loam soil possibly above the bedrock, in depth 1.3 m, non-artefacts bearing. B) Large cutting handaxe made from fine basalt on the surface. C) Acheulean core showed several scars provided number of removals from multiple striking platforms. D) Different types and sizes of handaxes gathered from the surface for basic metric measurements.

### 3. Characteristics of lithics

Based on the discoveries of Palaeolithic archaeology in Arabia, the assemblage recorded at the Al-Huwaidy site consists of Acheulean-tradition LCTs (90%), that are Mode 2 forms which include handaxes, cores, scrapers and flakes as well as presence of Middle Palaeolithic tradition (10%), which are Mode 3 and include Levallois prepared cores and points. The general characteristics of lithics spread on the surface of the site revealed that each 20 lithics bearing about 18 Acheulean and 2 Levallois traditions.

The lithics were made from relatively fine-grained local basalt. The Acheulean core used to detach blanks for production of LCTs found in the digging shafts presented scars of several large flakes removed from multiple platforms (faceted and cortical). Besides that, a number of flakes observed on the surface presented different morphology and size from LCT flakes including large-flake blank, flake with percussion bulb and flake with striking platform, as well

as the small flakes indicated of secondary flakes, retouched flakes and debitage. In addition, handaxes showed long flakes struck from multiple platforms along the whole edge of the tool, whereas large flakes were removed from both sides. However, some handaxes presented continuous regular reduction of small thinning flaking along their edges to produce sharp edges, thin butt and end tip points.

In several cases of handaxes, the whole surface of the core was flaked away to form an oval implement with relatively straight edges and a pointed end. Small handaxes including foliate handaxes and some points presented typical late Acheulean technology from the concave form, worked butt, straight sharp edges and pointed end. Some of the typical handaxes were moderately sinuous edges with thick butt and relatively fine and invasive flaking along the edges. Most of the handaxes were made on core and their edges were removed by a reduction sequence of large and small flaking scars. Moreover, typical handaxes dorsal face is presented with scars of large and few flakes and less extensively retouched than the ventral face, where small scars indicated of more retouched working on the edges. The shape of the handaxes is mainly lanceolate with a semi-circular butt and pointed end (Figure 5).

Lithics typology including ovate handaxes, typical handaxes, foliate handaxes, points, hammer stone and scrapers presented an interesting Palaeolithic habitation and workshop of the Acheulean tradition. Some artefacts also presented Levallois production traditions, perhaps indicating a Middle Palaeolithic phase at the site.

Lithics measured in the field provided different sizes and shapes of Acheulean lithic productions with some elements of Middle Palaeolithic traditions (see Table 1). Acheulean handaxes are the dominant stone tools (Figure 6) and they show a variation in sizes and morphology that might indicate Acheulean stone tool productions development at the site similar to north-western Arabian Palaeolithic archaeology (Jennings *et al.* 2015; Nassr & Elhassan 2020; Scerri *et al.* 2021).

Table 1. Basic metric data of 27 Stone tools measured in the field from the surface of Al-Huwaidy Palaeolithic site and not collected, (L: Length, W: Width, T: Thickness). All dimensional units are in cm. For Levallois cores and scrapers Max. base dimension refer to max. dimensions.

| Lithic class     | Count | Max. base dimension (LxWxT) | Max. tip dimension (LxWxT) | Max. width | Max. scar Count (Face 1) | Max. scar count (Face 2) | Max. scar dimension (LxW) | Max. cortex cover |
|------------------|-------|-----------------------------|----------------------------|------------|--------------------------|--------------------------|---------------------------|-------------------|
| Ovate handaxes   | 4     | 7.7x9.7x4.3                 | 10.5x5.2x1.8               | 10.5       | 15                       | 18                       | 8x6                       | 20%               |
| Typical handaxes | 5     | 8.4x6.8x3.4                 | 11.8x3.8x0.8               | 9.7        | 22                       | 17                       | 9x4                       | 15%               |
| Foliate handaxes | 6     | 4.2x6.3x2.5                 | 9.4x4.6x0.7                | 8.5        | 12                       | 8                        | 5x3                       | 10%               |
| Other LCTs       | 5     | 8.5x9.5x5.7                 | 10.5x6.8x3.6               | 11.5       | 9                        | 7                        | 9x6                       | 30%               |
| Levallois cores  | 2     | 16.4x9.3                    | 10                         | 9          | 6x2                      | 10%                      | 6x2                       | 5%                |
| Levallois cores  | 2     | 16.4x9.3                    |                            |            | 10                       | 9                        | 6x2                       | 10%               |
| Scrapers         | 3     | 14.3x4.7                    |                            |            | 11                       | 6                        | 5x4                       | 20%               |

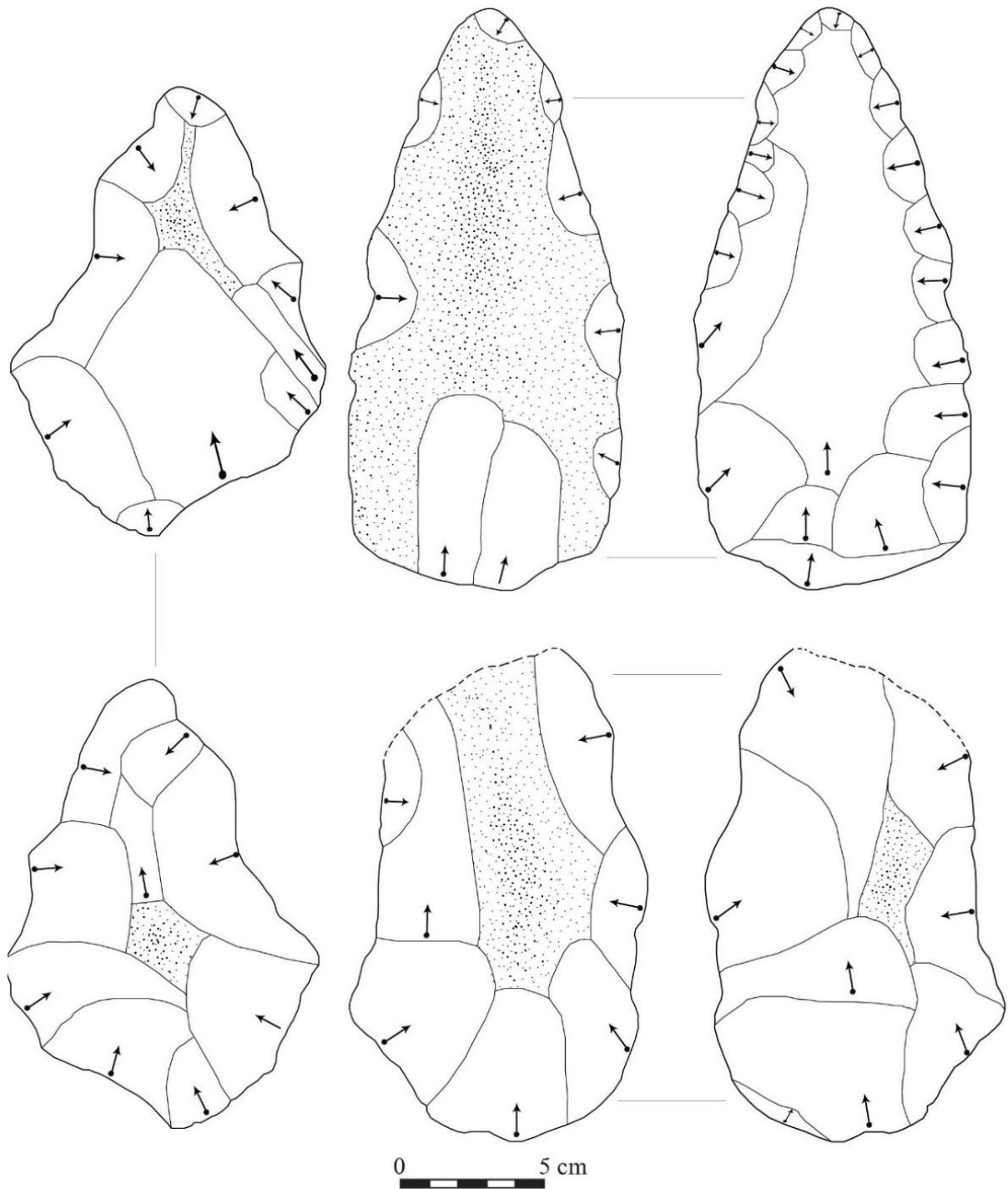


Figure 5: Knapping scars directions and sizes of different sizes of handaxes from the site, arrow show the flaking direction, dots indicate of cortex and dash shows broken part of the tool.





Figure 6: Different sizes and shapes of handaxes collected from the site surface.

#### 4. Conclusion

The Al-Huwaidy Palaeolithic site revealed a new extension of Pleistocene archaeology in Ha'il region in the southern part and in a landscape setting different from what was previously known in the area. The site topography and lithics accumulation on the surface are indicators of interesting Palaeolithic localities. As well as the presence of some artefacts buried by sediment in unit 2 from the current digging shaft profile prioritized possible discovery of stratified Palaeolithic materials for the future dating and excavations in the site. A further comprehensive survey and excavation might reveal more sites and stratified Acheulean finds in

the area. The lithics assemblage presented typical Acheulean tradition forms (LCTs), similar to Acheulean artefacts documented in the Jubbah and Al Mara'at sites, as well as being much larger (Groucutt *et al.* 2021; Shipton *et al.* 2014). Some of the large handaxes are more similar to Acheulean artefacts discovered at the Saffaqah site in central Arabia (Shipton *et al.* 2018).

The co-occurrence of Palaeolithic traditions Mode 2 and 3 (Acheulean and Middle Palaeolithic) in the site compared with the recent dating of the sediments in northern Saudi Arabia (Scerri *et al.* 2021; Stewart *et al.* 2020) indicate that the likely date of Al-Huwaidy Palaeolithic site is Middle-Late Acheulean and Early-Middle Palaeolithic 300 - 80 ka (MIS7 - MIS5). On the other hand, the geographical location of the site compared with the suggestion of multiple hominin migrations into Arabia (Groucutt *et al.* 2018; 2021) points to a new corridor of hominin dispersal across the volcanic area in the region of Ha'il northwest of Saudi Arabia.

The discovery of preserved surface and buried Acheulean handaxes indicates that the Lower Palaeolithic groups in northwest Arabia occupied the desert (Nefud) and the volcanic oases. An extensive and intensive archaeological survey and excavation with dating are necessary to study the role of this area in the Palaeolithic archaeology of Arabia.

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### Data accessibility statement

The authors confirm that the data collected for this article was carried out under consideration of agreement between The University of Ha'il and Heritage Commission, Ministry of Culture, Saudi Arabia. The lithics are studied in the field and not collected and the archaeological site was registered by the research centre of the Heritage Commission, Ministry of Culture, Saudi Arabia.

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## استكشاف موقع أثري جديد للعصر الحجري القديم في الهويدي بمنطقة حائل شمال غرب المملكة العربية السعودية

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### Abstract:

تتميز منطقة حائل في شمال غرب المملكة العربية السعودية بانتشار الواحات والسهول المنبسطة والبحيرات القديمة ومرتفعات الجيم البركانية، وهي من المميزات الطبوغرافية لمناطق انتشار مواقع آثار العصر الحجري القديم. وتقع منطقة حائل على أحد الطرق التي تتبعها المجموعات البشرية المبكرة خلال انتشارها في الجزيرة العربية. حيث سجلت الأبحاث الأثرية المستمرة لمشاريع (Paleodeserts and Disperse) العديد من المواقع الأثرية الأشولية وتلك التي تعود للعصر الحجري القديم الأوسط في مناطق مثل حوض جبة وصحراء النفود ومع ذلك فإن أجزاء كثيرة من المنطقة لا تزال غير مستكشفة (Groucutt et al. 2021; Petraglia et al. 2019; 2015).

قاد المسح الأثري الأرضي الذي أجراه المؤلفون في قرية الهويدي، التي تقع على بعد 70 كيلومتراً جنوب غرب مدينة حائل إلى اكتشاف موقع أثري نادر للعصر الحجري القديم على حافة واحة قديمة، وبالقرب من جبل بركاني. يتكون الموقع الأثري من انتشار واسع وتكدس للصناعات الحجرية على سطح مرتفعات صخور البازلت وما بين النتوءات الصخرية. تم توثيق العديد من الفؤوس اليدوية على سطح الموقع الأثري وفي طبقات قطاع حفريات حديثة لقنوات مياه في المنطقة. الموضع الجغرافي للموقع الأثري وكمية ونوعية الصناعات الحجرية التي تتميز بتقنية صناعة الأدوات الحجرية ذات الأطراف القاطعة بما في ذلك الفؤوس اليدوية النموذجية والفؤوس اليدوية ورقية الشكل والنوى والشطايا الحجرية الأشولية، تدل مجتمعة على أن هذا الموقع الأثري يمثل اكتشاف حديث مثير للإهتمام لانتشار آثار العصر الحجري القديم في شمال غرب المملكة العربية السعودية مثل بخصائص آثار العصر الحجري القديم في منطقة حوض جبة. وبالتالي، فإن هذا الاكتشاف يدعو إلى إعادة تقييم انتشار مواقع العصر الحجري القديم في منطقة حائل، ويوضح أنها لا توجد فقط في المنطقة الشمالية (صحراء النفود)، بل أيضاً في مناطق انتشار (الحمم البركانية) ذات المميزات الجغرافية المختلفة في الجزء الجنوبي من المنطقة.

**Keywords:** العصر الأشولي، الصناعات الحجرية، الجزيرة العربية، حائل، الأدوات الحجرية ذات الوجهين، البازلت، الأدوات الحجرية ذات الأطراف القاطعة