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New Palaeolithic Findspots at Jurf ed-Darawish, Southern Jordan: Preliminary Results and Implications for Bilateral Movements between the Southern Levant and Northern Arabia

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Abstract

Southern Jordan occupies a key position at the interface of the Levant and Northern Arabia, critical for understanding Paleolithic adaptation. Here we report two newly identified findspots in the Jurf ed-Darawish basin, where lithic artefacts document human presence from the Lower to Upper Paleolithic. The Acheulean component aligns with middle to late phases of the Levantine sequence, while the Middle Paleolithic assemblage shows both Levantine affinities and broader Saharo-Arabian adaptation. Upper Paleolithic blades parallel southern Jordanian assemblages, though the absence of UP sites in northern Arabia suggests a disruption of earlier bilateral connectivity. Recurrent occupation was likely facilitated by abundant knappable raw material suited to varied reduction systems, alongside evidence for surface water availability. The geographical continuity between the southern Levant and northern Arabia would have facilitated inter-regional movement without the dramatic climatic amelioration required for Out of Africa dispersals, making the region a priority for future Paleolithic investigation.

Introduction

Southwest Asia played a critical role in human evolutionary history, serving as a geographical crossroads between Africa and Eurasia during multiple dispersal events. Throughout the Pleistocene, several dispersal pulses of hominin groups have been documented through fossil, archaeological, and genetic evidence, both out of and back into Africa (Groucutt et al., 2015; Garcea, 2016; Tierney et al., 2017; Van de Loosdrecht et al., 2018; Templeton, 2002; Leplongeon, 2021). The fragmentary nature of the archaeological record including rare preservation of fossils, making lithic technology the primary proxy of tracking hominin presence and expansion across time and space. While convergent technological solutions cannot be ruled out (Abdolahzadeh et al., 2025), well-established techno-typological hallmarks remain a valuable tool for relative dating and for highlighting past human dynamics.

The Levant and Arabian Peninsula have emerged as the two most intensively researched regions in southwest Asia for Paleolithic archaeology, though their research histories differ considerably. Paleolithic investigation in the Levant began in the early twentieth century (Bar-Yosef, 1980), while sustained archaeological research in Arabia has only gained momentum in the last two decades (Mark, 2009). Both regions occupy positions along the two principal routes proposed for hominin dispersals out of Africa: a northern route via the Nile Valley into the Levant (Wurz & Van Peer, 2012; Van Peer, 1998), and a southern route across the Bab el-Mandeb into the Arabian Peninsula (Lahr and Foley, 1994; Armitage et al., 2011). Despite this extensive body of work, the nature and frequency of bilateral movements between the Levant and the Arabian Peninsula remain poorly understood, due in part to significant geographical gaps in the archaeological record of the transitional zones connecting the two regions.

Jordan occupies one such transitional zone (Fig. 1a), bridging the Mediterranean coastal from west and the Arabian interior from the east (Cordova, 2007). Decades of Paleolithic research have produced a substantial body of work concentrated in Wadi Hasa (Schuldenrein & Clark, 1994; al-Nahar & Olszewski,

2016), Wadi Qalkha (Henry et al., 1996), Jordan valley (Jagher et al., 2023; Shea et al., 2019), Azraq (Copeland, 1988; Byrd, 1988), Zaraqa (Perenti et al., 1997), and Al Jafr (Rech et al., 2007; Wilke et al., 2010). These studies laid the groundwork for understanding Jordan's Paleolithic sequence, though they were shaped by the interpretive frameworks available at the time. The rapid expansion of Paleolithic research across the Arabian Peninsula (Armitage et al., 2011; Petraglia et al., 2015; Rose & Petraglia, 2009; Jennings et al., 2016) and growing recognition of demographic connections between Africa and the Levant (Goder-Goldberger et al., 2016; Oron et al., 2024, 2025) have since transformed the regional picture (Fig. 1a). Building on recent calls to reassess Jordan's Paleolithic record in light of these developments (Beller et al., 2026), the identification of new localities beyond the traditionally investigated areas has become an increasingly pressing objective.

During fieldwork in the Tafilah Governorate, two findspots (JD1 and JD2) were identified in the Jurf ed-Darawish basin, yielding a surface assemblage spanning the Lower (LP), Middle (MP), and Upper Paleolithic (UP). Here we present the initial results of analysis from these sites. This paper aims to contribute new data from an understudied region of the southern Levant and demonstrate the area's archaeological potential for future investigation. Given its geographical proximity to northern Arabia and the shared drainage systems that connect the two areas, the findings are contextualized within both the southern Levantine and northern Arabian Paleolithic records, offering a perspective on the transitional zone between these two key regions.

Study Area

Jurf ed-Darawish (JD) is located in the Tafilah Governorate, approximately 100 km south of Amman (Fig. 1a). The basin is situated at the intersection of the Irano-Turanian and Saharo-Arabian biogeographical zones, characterised today by arid to semi-arid climatic conditions with grassland and shrubland biomes (Dinerstein et al., 2017). Raw material is abundant in the region, with flint nodules in tubular and clast forms available within Upper Cretaceous and Eocene limestone formations exposed in local wadis (Moumani, 1996).

Despite the current aridity, more favourable climatic conditions have been documented for the JD basin. Paleoenvironmental investigations by Moumani (1996) and Mischke et al. (2021) indicate that an aggradational setting dominated the region from at least MIS 5 through MIS 3. Mischke et al. (2021) document the formation of an in-stream wetland during MIS 5–4, characterised by slowly flowing streams, freshwater springs, and temporary ponds, which was subsequently replaced by a vegetated alluvial plain during MIS 3. These paleoenvironmental data indicate that lowered temperatures and reduced evaporation during glacial and stadial phases led to sustaining surface water resources that would have been attractive to Palaeolithic populations across multiple periods.

Previous archaeological work in JD has been limited to paleoclimatic investigations (Moumani, 1996; Mischke et al., 2021) and general surveys covering only the northern portion of the basin (MacDonald et al., 2000). To the best of our knowledge, no dedicated project has investigated Palaeolithic human

occupation in the area. The primary objective of this initial survey was to assess evidence of Palaeolithic occupation at JD and evaluate the archaeological potential for future systematic investigations.

Methods and Materials

Raw Materials

The availability and fracture properties of lithic raw materials play a central role in shaping the spatial organisation of past human settlements (Henry, 1989; Brantingham, 2003, 2006). Raw material availability in the JD basin was assessed through field observation during the initial survey. Flint sources were documented according to their depositional context, nodule morphology, colour, and knapping quality, the latter evaluated through experimental knapping. No petrographic or geochemical analyses were conducted.

Survey and Lithic analysis

This study presents lithic assemblages from Jurf ed-Darawish (JD), collected during field seasons in 2012 and 2023. The initial survey focused on two findspots located in the southern portion of the basin (Fig. 1b-d): JD1 and JD2. JD1 (30.630°N, 35.868°E) is situated within a wadi system at 960 m above sea level (asl). JD2 (30.687°N, 35.858°E) is located on a higher plateau at 1,020 m asl, approximately 5 km north of JD1. The collection followed a pilot strategy, targeting primarily diagnostic cores and lithic tools to establish a preliminary temporal framework of human occupation in the area.

Collected artefacts were analysed using standard techno-typological attributes to identify reduction strategies and assign materials to broad chronological periods. The lithic assemblage was classified into three main categories: debitage, tools, and cores. Debitage comprises all detached products removed from a core (e.g., flakes, blades, bladelets) during the reduction sequence. Tools were identified by intentional regular modification using only general typologies: scrapers, notches, truncations, burins, or simple retouch pieces.

Cores are volumes of raw material exhibiting at least two negatives of extraction. They were categorised based on the reduction system represented at the discarded stage: Levallois or laminar production. Levallois cores are a hallmark of the Middle Palaeolithic/Middle stone age across Africa and Eurasia (Adler et al., 2014). The core configuration comprises two hierarchically organised surfaces: a preparation surface and a flaking surface. Exploitation is directed onto the wider flaking surface, which may be configured for flake production using centripetal preparation, for point production using unidirectional, bidirectional (Boëda, 1995), or Nubian preparation (Usik et al., 2013), and less commonly for blade production. Laminar cores, in contrast, are oriented on the narrow surface of the volume, producing elongated blades and bladelets from a single flat platform unidirectionally or from opposed platforms bidirectionally (Bar-Yosef & Kuhn, 1999).

Results

Raw Material in Jurf ed-Darawish

The JD basin is rich in flint raw material of varied depositional context and quality. Three main sources were identified during the initial survey: desert pavement flint (DPF) and flint from primary and secondary outcrops.

DPF is scattered across the basin surface, visible from satellite imagery (Fig. 1b), and typically exhibits desert varnish, a dark manganese- and iron-rich crust characteristic of prolonged surface exposure in arid environments. These nodules likely derive from primary or secondary sources that became exposed through erosion and deflation, subsequently incorporated into the desert pavement over time. DPF occurs predominantly as small plicate and relatively large slabs, generally grey in colour with a coarse internal texture, likely resulting from thermal weathering and chemical alteration through extended exposure to extreme diurnal temperature fluctuations. As a result, DPF is of comparatively poor knapping quality and is unlikely to have been used for systematic reduction during Palaeolithic occupation.

In contrast, primary outcrops consist of flint nodules still embedded within their parent limestone formation (Fig. 2a), while secondary outcrops comprise nodules eroded and redeposited through fluvial processes or exposed on the surface as loose clasts (Fig. 2b). Both yield fine-grained Eocene flint of considerably higher quality, occurring in tubular and clast forms of varied sizes, generally exceeding 10 cm in diameter (Fig. 2b). These nodules display a range of colours including brown, grey, and light brown, and are better suited to controlled knapping, likely representing the principal raw material source exploited by Palaeolithic knappers at the basin.

Lithic Artifacts in Jurf ed-Darawish

A total of 123 stone artefacts were collected (Table 1). Given the small sample size and technological homogeneity observed at both findspots (JD1 and JD2), and their geographical proximity (Fig. 1b), the collection is presented as a single assemblage. Artefacts were assigned to three broad chronological periods: Lower Palaeolithic (LP), Middle Palaeolithic (MP), and Upper Palaeolithic (UP), supported in part by differential patination patterns (Fig. 3). LP artefacts exhibit heavily weathered surfaces with dark brown to black patination, consistent with prolonged surface exposure. MP artefacts generally display moderate patination, though some pieces retain only light surface alteration, suggesting that not all material has been equally exposed and that stratified deposits may survive in the vicinity. UP artefacts exhibit light white patination, consistent with comparatively recent surface exposure.

Table 1
Collected artefacts with chronological assessments.

Debitage	Lower Palaeolithic	Middle Palaeolithic	Upper Palaeolithic	Others	Grand Total
	1 (1%)	**14 (11%)**	**39 (32%)**	**35 (28%)**	**89 (72%)**
Blade	-	7	36	9	52
Flake	1	-	3	26	30
Levallois Flake	-	5	-	-	9
Levallois Point	-	2	-	-	2
Cores	**0 (0%)**	**8 (7%)**	**3 (2%)**	**1 (1%)**	**12 (10%)**
Laminar Core	-	2	3	-	5
Levallois Point	-	4	-	-	6
Levallois Flake	-	2	-	-	-
Tested	-	-	-	1	1
Tools	**12 (10%)**	**4 (3%)**	**3 (2%)**	**3 (2%)**	**22 (18%)**
Bifacial	12	-	-	1	13
Levallois Flake	-	1	-	-	-
Notch	-	-	1	1	2
Scraper	-	-	2	1	3
Grand Total	**13 (11%)**	**26 (21%)**	**45 (37%)**	**39 (32%)**	**123 (100%)**

The LP component is represented by Acheulean bifacial handaxes (Fig. 4), comprising 11.4% of the total assemblage. Handaxes dominate the LP sample (10% of total), exhibiting oval to cordiform morphologies with mean dimensions of 152 × 89 × 35 mm (Fig. 5). All handaxes display radial to centripetal flake scar patterns, and the majority are fully shaped, as indicated by low or absent cortical coverage (57%). Only 29% retain cortical surfaces on one or both faces, suggesting lower reduction intensity.

MP occupation comprises 21.1% of the total assemblage, identified through Levallois and laminar cores and their associated end-products (Fig. 4 & Fig. 6). Levallois cores account for 6.5% of the assemblage, oriented mostly toward point production with bidirectional or bilateral preparation, though centripetal preparations for flake production are also present. All Levallois cores retain cortical coverage on the preparation surface, indicating short production sequences, and were discarded at relatively large dimensions (Fig. 5) (mean: 103.3 × 93.0 × 35.4 mm). The laminar component of the MP (i.e., Tabun D) is poorly represented, with only two blade core tentatively attributed to this period based on dark patination comparable to that observed on the Levallois cores from the same assemblage (Fig. 6).

Levallois and blade end-products comprise 11.4% of the MP assemblage. Levallois flakes and points exhibit faceted platforms with no cortical coverage on dorsal surfaces and relatively large dimensions (Fig. 5) (mean: 91.3 × 68.0 × 14.1 mm). MP blades are few (6%), mostly representing core-trimming elements with hinge negatives on the dorsal surface or cortical ridges indicative of core preparation and maintenance activities. These blades are surprisingly large and thick (mean: 145.4 × 43.3 × 21.7 mm) with plain, flat platforms.

The UP occupation is also evident at JD, comprising 37% of the total assemblage (Figs. 4 & 6). Blades account for 30% and were assigned to the UP based on diagnostic attributes including plain striking platforms, unidirectional or bidirectional parallel dorsal scars, and triangular cross-sections. Of these, 16% represent determinate final products of laminar production, showing no cortex or core-trimming element features, while 15% exhibit hinge negatives on the dorsal surface or natural backed edges from shaping and maintenance stages of reduction; no crested blades were recovered. UP blades are comparable in size to MP blades but thinner (Fig. 5), with mean dimensions of 107 × 39 × 14 mm. Several retouched pieces, including notches, points, and endscrapers, represent characteristic UP tool forms. Only three laminar cores were recovered.

The remaining artefacts present 31% could not be securely assigned to specific chronological periods. Although the undiagnostic artefacts display patination patterns consistent with the diagnostic material from the LP and MP (Fig. 3), without secure context, it remains difficult to confidently assign them to specific reduction systems.

Discussion

The JD assemblage offers an opportunity to examine the southern Levant and northern Arabia from a single locality spanning the LP to UP. Arid southern Jordan and northern Arabia form a single, climatically continuous steppe-desert zone, linked by shared hydrological networks such as the Wadi Sirhan corridor (Petraglia et al., 2012; Ames & Cardova, 2014). JD therefore sits not at the edge of two regions but within one continuous arid landscape. Given the surface, palimpsest character of the assemblage, the following discussion situates JD through the presence and absence of diagnostic reduction strategies rather than quantitative comparison. On this basis, the JD record tracks a shifting relationship between the two regions: technological integration during the Lower and Middle Palaeolithic,

and an apparent disruption by the Upper Palaeolithic. These similarities need not imply continuous connection; even where they reflect contact rather than convergence, such links were likely episodic, and discontinuity may have occurred both between and within periods.

A dual-resource attraction In Jurf el-Darawish

Raw material distribution has been shown to fundamentally shape both the spatial organisation of past human settlements (Brantingham, 2003, 2006; Olszewski & Schurmans, 2007) and the technological strategies available to hunter-gatherers (Eren et al., 2024; Kadowaki et al., 2024). At JD, the availability of knappable raw material in varied shapes and sizes most likely served as a magnetic attraction to the basin from the LP to UP, as selecting nodules closer to the intended reduction aim (slabs for bifacial production, nodules for prepared cores) is more time-efficient than extensive modification. Yet raw material alone does not fully account for recurrent occupation; the palaeoenvironmental evidence outlined above indicates that sustained surface water resources coincided with periods of human presence, at least for the MP occupation (Mischke et al., 2021). These resources are best understood as a dual-resource attraction, with water and workable stone together facilitating the recurrent occupation of the basin. The significance of this combination is underscored by the central Rub' al Khali, where palaeolakes situated more than 200 km from any raw material outcrops yielded neither lithics nor traces of human presence despite abundant freshwater (Dellmour et al., 2026). The absence of occupation where only one resource was available reinforces the interpretation that it was the co-occurrence of water and raw material, rather than either in isolation, that drew and sustained populations at JD. This recurrent attraction is what makes JD a multi-period palimpsest, and therefore a vantage point from which the changing relationship between the southern Levant and northern Arabia can be read across successive periods.

The Lower Palaeolithic:

The LP technology is well represented in the southern Levant in both surface and stratified contexts, documenting the dispersal of hominin groups from Africa during the earliest Out of Africa events (Fleagle et al., 2010), against a backdrop of oscillating humid and arid phases through the Early and Middle Pleistocene (Bar-Yosef & Belmaker, 2011). Acheulean bifaces are broadly subdivided into early, middle, and late phases on the basis of morphometric variability (Shea, 2013): the early phase characterised by thick, irregular bifaces, best known from 'Ubeidiya in the Jordan Valley, now dated to at least 1.9 Ma (Matmon et al., 2026); the middle phase showing improved shape configuration and the adoption of bifacials on flakes, as at Gesher Benot Ya'aqov, dated to 0.78 Ma (Goren-Inbar et al., 2018); and the late phase, defined by thin, standardized morphologies, dated to 266 ± 40 kya at Shishan Marsh 1 in eastern Jordan (Bellera et al., 2020). The JD Acheulean assemblage most likely falls within the middle to late phase, given the relative shape regularity and thinness of the bifaces.

This Levantine framework, however, transfers only partially to northern Arabia, where the LP record is the most diverse on the peninsula but where no dated LP site is currently known (Petraglia, 2003). Raw

material variability there is considerably greater than in the predominantly flint-based industries of the southern Levant, with rhyolite and sandstone among the lithologies used, as at site 204 – 175 (Zarins et al., 1982). This diversity introduces additional variables into biface morphology, making shape regularity a less reliable criterion for relative dating and hindering direct techno-typological comparison; reduction strategies therefore offer a more productive basis for cross-regional comparison. On precisely this basis, possible cultural connections have been hypothesised: the Nahal Barak complex in the southern Negev shows technological similarities with Arabian LP sites in bifacial production on flake blanks and a preference for silicified limestone, a raw material not dominant in the Levant more broadly, with parallels at central and western Arabian sites such as Dawadmi (Shipton et al., 2018) and Wadi Fatima (Petraglia et al., 2009). Yet no evidence of raw material transport between the two regions has been documented, and these similarities may equally represent convergent technological solutions rather than direct contact; the presence of Acheulean industries in both regions is most plausibly the outcome of broader hominin dispersals from Africa. In either scenario, geographical proximity and hydrological corridors such as Wadi Sirhan in northeastern Jordan (Petraglia et al., 2012; Ames & Cardova, 2014) would have facilitated periodic contact between populations in the southern Levant and northern Arabia.

The Middle Palaeolithic:

While the LP connection remains ambiguous, the MP record provides firmer ground. The JD assemblage aligns techno-typologically with other MP sites in the southern Levant, with some notable differences. The laminar component may represent the earliest MP signal: blade production from unidirectional cores is commonly associated with the early MP in the southern Levant, as at Ain Difla (Mustafa & Clark, 2007) and Tabun Cave level C (Jelinek et al., 1973), though the JD blades are notably larger (mean: 145.4 × 43.3 × 21.7 mm), a distinction that may reflect the availability of large, elongated nodules at the site rather than a different reduction objective. Two of the Levallois cores feature Nubian-like exploitation strategies, a Nilotic reduction system employed during MIS 5 (Guichard & Guichard, 1965; Hallinan & Marks, 2023) that produces pointed end-products distinguished by an emphasis on distal and lateral convexities of the flaking surface (Usik et al., 2013; Van Peer, 1992). Although present in low numbers within a palimpsest context, their occurrence is not unexpected, given that the aridity and topographic setting of JD fall within the environmental distribution for Nubian Levallois cores and the raw material availability patterns observed across Africa and southwest Asia (Samawi & Hallinan, 2024). The remaining Levallois cores display unidirectional point production, generally affiliated with the late MP techno-package, as at Tor Faraj (Groucutt, 2014) and Far'ah II (Goder-Goldberger et al., 2025), alongside centripetal Levallois cores attested in the middle MP at Mediterranean sites such as Naame (Fleisch, 1970) and the recently discovered Nahal Aqev (Barzilai et al., 2022), the latter interpreted as evidence of a southward expansion of Mediterranean groups into the Saharo-Arabian region.

This same combination of methods is what links JD eastward. Several surface sites in the Al-Jawf region of northern Arabia have yielded MP assemblages characterised by centripetal and Nubian Levallois components (Hilbert et al., 2017). At the time of their discovery, and in the absence of documented Nubian Levallois technology in the southern Levant, these assemblages were affiliated

primarily with the northeast African and Arabian MP record (Hilbert et al., 2017). The growing evidence for Nubian Levallois in the Negev, and the co-occurrence there of both centripetal and Nubian production (Barzilai et al., 2022), now suggests that the southern Levant was more technologically integrated with northern Arabia during the MP than previously recognised. JD, combining both Levallois point and flake production strategies and situated geographically between the Negev and Al-Jawf, reinforces this pattern and adds a further data point in the space between the two regions.

The Upper Palaeolithic:

The connections traceable through the LP and MP appear to have been disrupted during the UP (Fig. 1a). At JD, the less weathered blades could in principle represent either the UP or younger blade-producing periods such as the Neolithic, particularly given the absence of diagnostic UP tool types such as El-Wad points. Neolithic attribution is unlikely, however, as Neolithic blade industries are typically highly standardized with more varied platform preparations. In surface contexts the UP is inherently more difficult to isolate when diagnostic tool types are absent; nonetheless, the technological characteristics of the blades are generally closer to UP assemblages from southern Jordan, such as Tor Hamar and Tor Fawaz (Kadowaki & Henry, 2019). At the regional scale, pollen data from the Dead Sea indicate an expanding Artemisia steppe from 60 to 20 ka (MIS 3–2), creating a south-to-north steppe corridor through the Levant that facilitated the expansion of Early Ahmarian populations from the Mediterranean biome into the Saharo-Arabian margins, including western Transjordan (Richter et al., 2020). This corridor operated within the Levant and does not appear to have extended east into northern Arabia. The UP record in Arabia is generally poorly documented (Groucutt & Petraglia, 2012; Maher, 2009), and to current knowledge northern Arabia lacks both stratified and surface sites with UP affiliations (Fig. 1a). It remains possible that UP populations were present but adopted distinct technological solutions shaped by natural and human parameters, difficult to recognise through a Levantine typological lens. Whether the current gap reflects genuine demographic contraction during the later Pleistocene or a recognition problem rooted in regional typological expectations remains an open question that further survey work may help resolve.

Conclusion

The JD assemblages, though modest in size, represent the first documented multi-period Paleolithic presence and contribute new data from a region that has seen minimal archaeological investigation. The technological parallels identified with both southern Levantine and northern Arabian assemblages during the LP and MP suggest that this part of southern Jordan participated in broader patterns of Paleolithic land use across the Saharo-Arabian belt. The Jurf ed-Darawish basin, situated at the interface between two of the most actively researched Paleolithic regions in southwest Asia, offers a rare opportunity to bridge the gap between the southern Levantine and northern Arabian records through future targeted fieldwork. Systematic survey of the wider basin, targeted excavation of intact deposits where, and chronometric dating are essential next steps. Such work would clarify whether the technological

signatures identified here reflect sustained occupation or episodic use of the landscape and would test the proposed connections between the southern Levant and northern Arabia on a firmer empirical basis.

Declarations

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Author Contributions

Maysoon Al Nahar: Investigation (fieldwork), Writing – review & editing. Geoffrey Clark: Investigation (fieldwork), Writing – review & editing. Osama Samawi: Conceptualization, Investigation (fieldwork), Formal analysis, Visualization, Writing – original draft.

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Figures

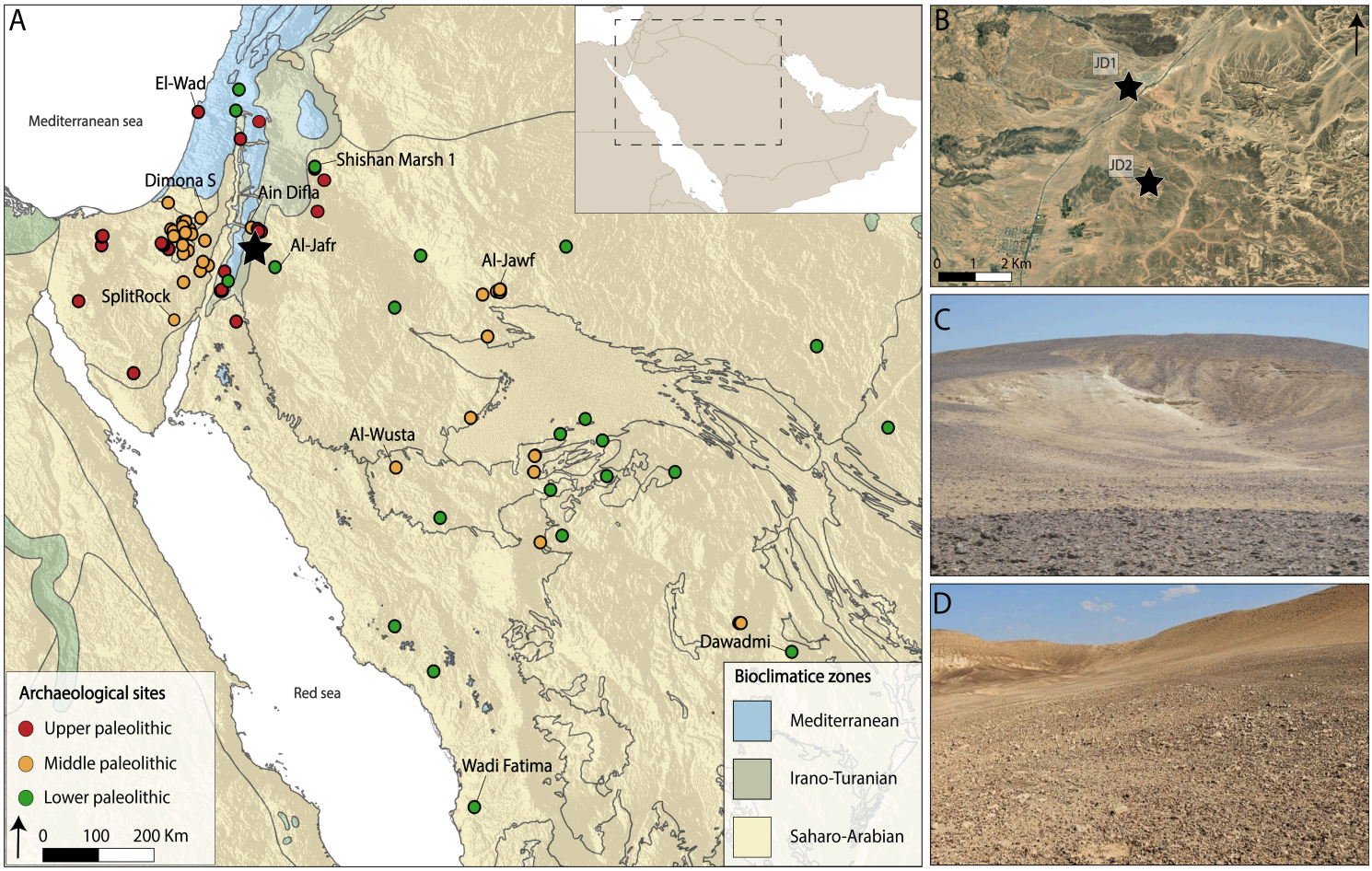


Figure 1

Distribution of palaeolithic sites and location of JD. **A**: Distribution of Paleolithic sites in Southern levant and Northern Arabia. **B**: Location of JD1 and JD2, **C**: Photograph of JD, **D**: Photograph of JD2. Bioclimatic data (Dinerstein et al., 2017; https://ecoregions.appspot.com/).

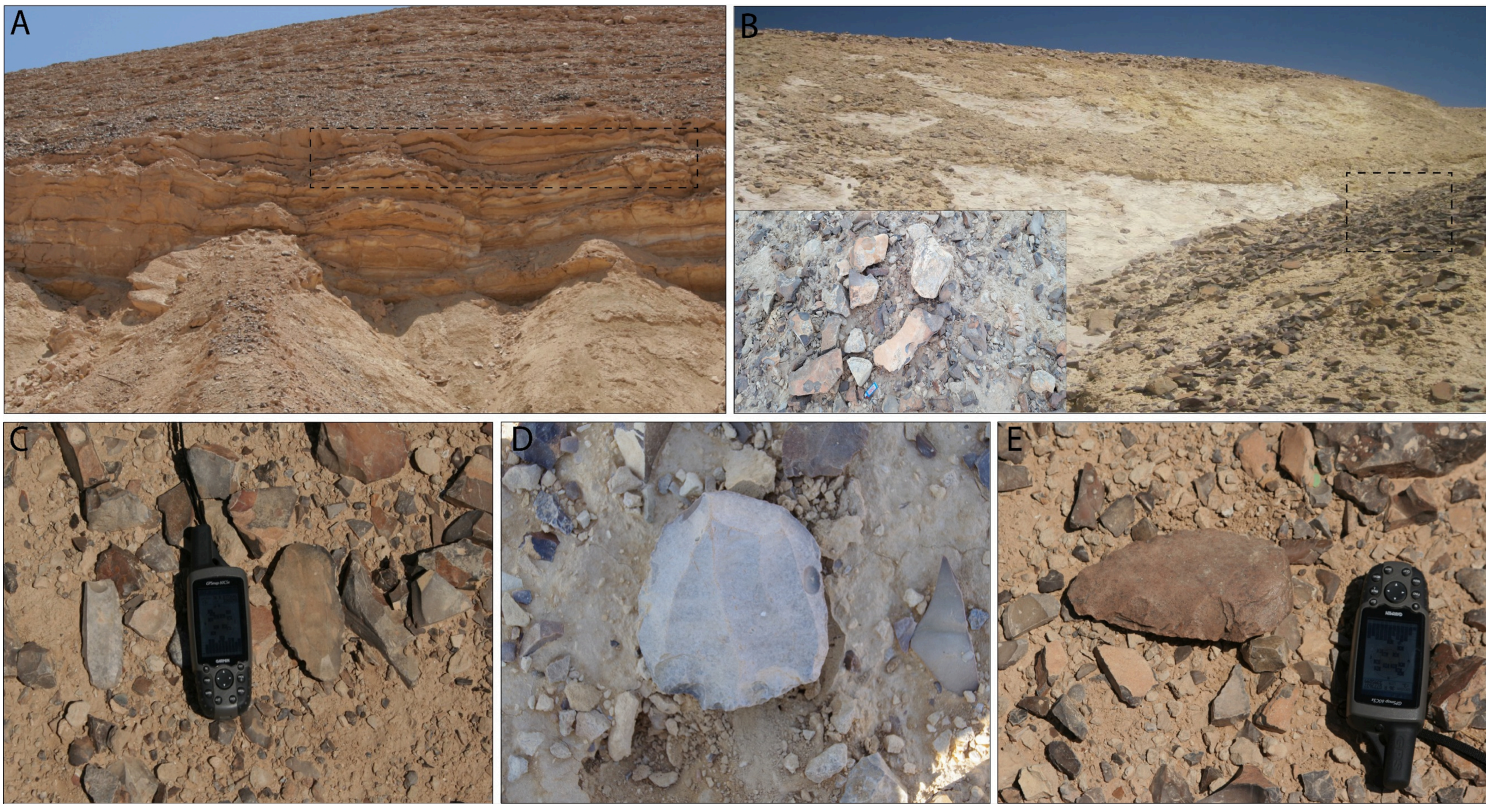


Figure 2

Raw materials outcrops and on-site artifacts. **A**: Primary outcrop, **B**: Secondary outcrop, **C**: Levallois point, **D**: Levallois point core, **E**: Lower palaeolithic handaxe.

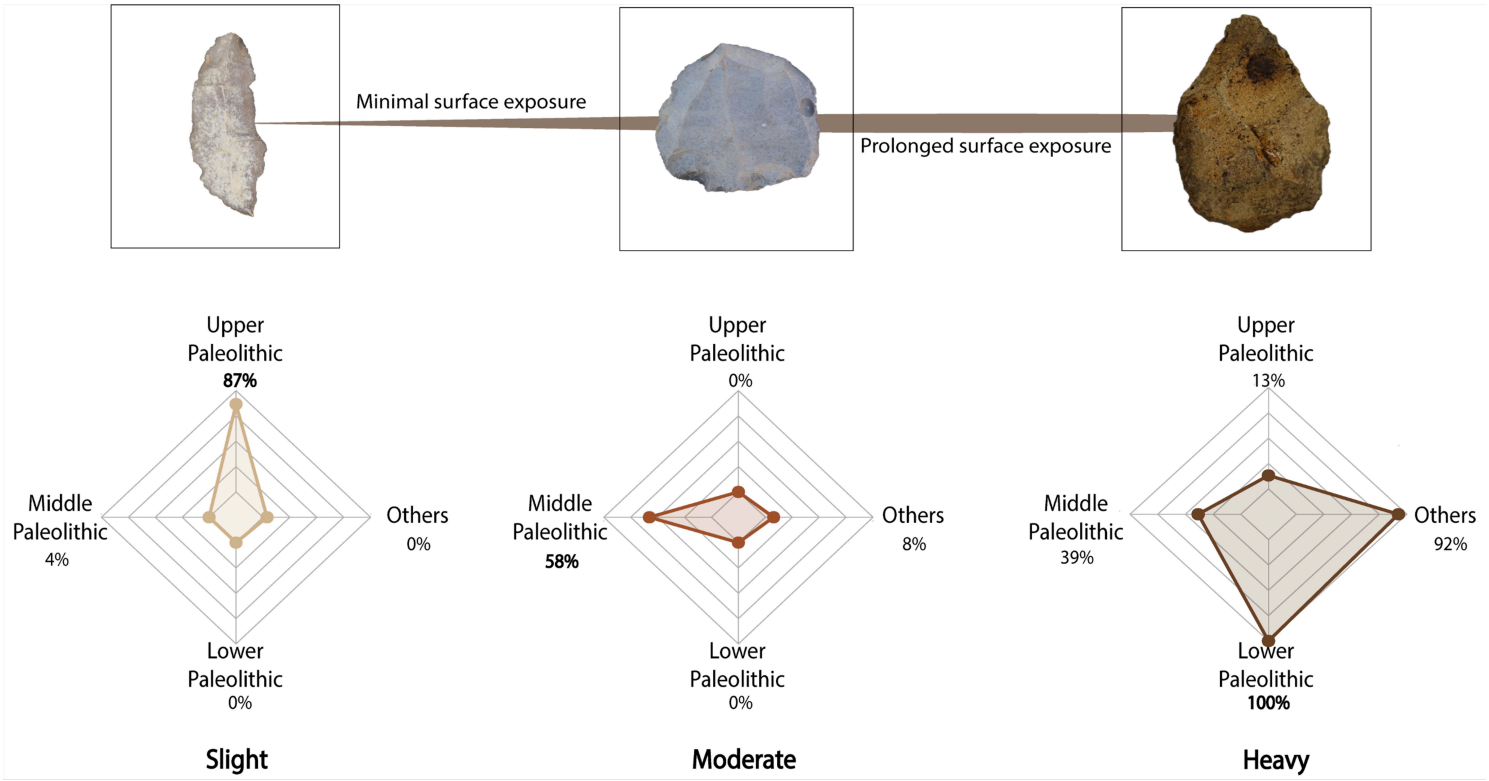


Figure 3

Patination pattern by the chronological period. Note the level of patination is corresponding with the period.

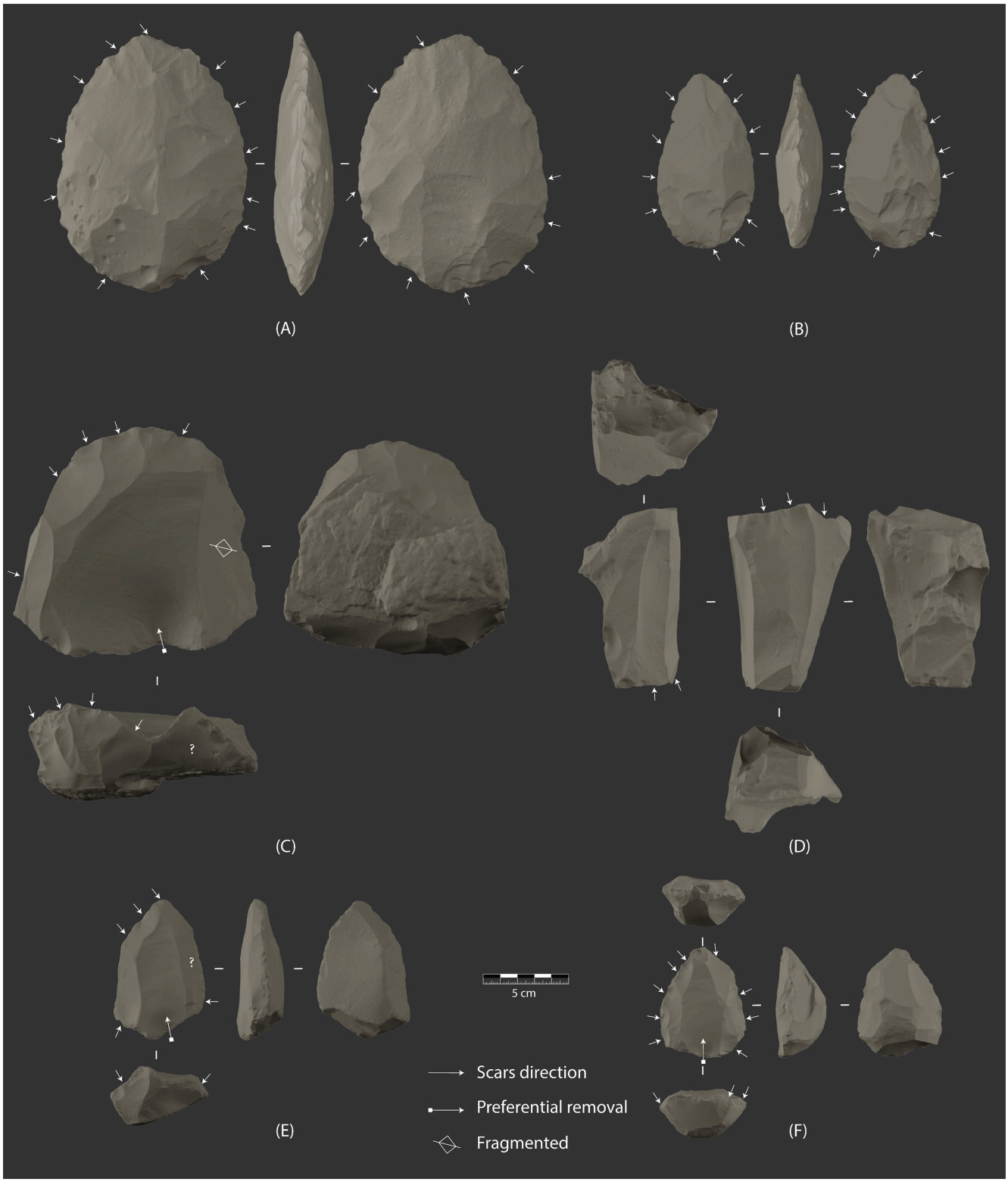


Figure 4

3D models of selected JD artefacts. **A**-**B**: Lower palaeolithic handaxes. **C**, **E**, **F**: Middle palaeolithic Levallois cores. **D**: Upper palaeolithic core. 3D models are available open access in OSF repository:

https://osf.io/upt9r/overview.

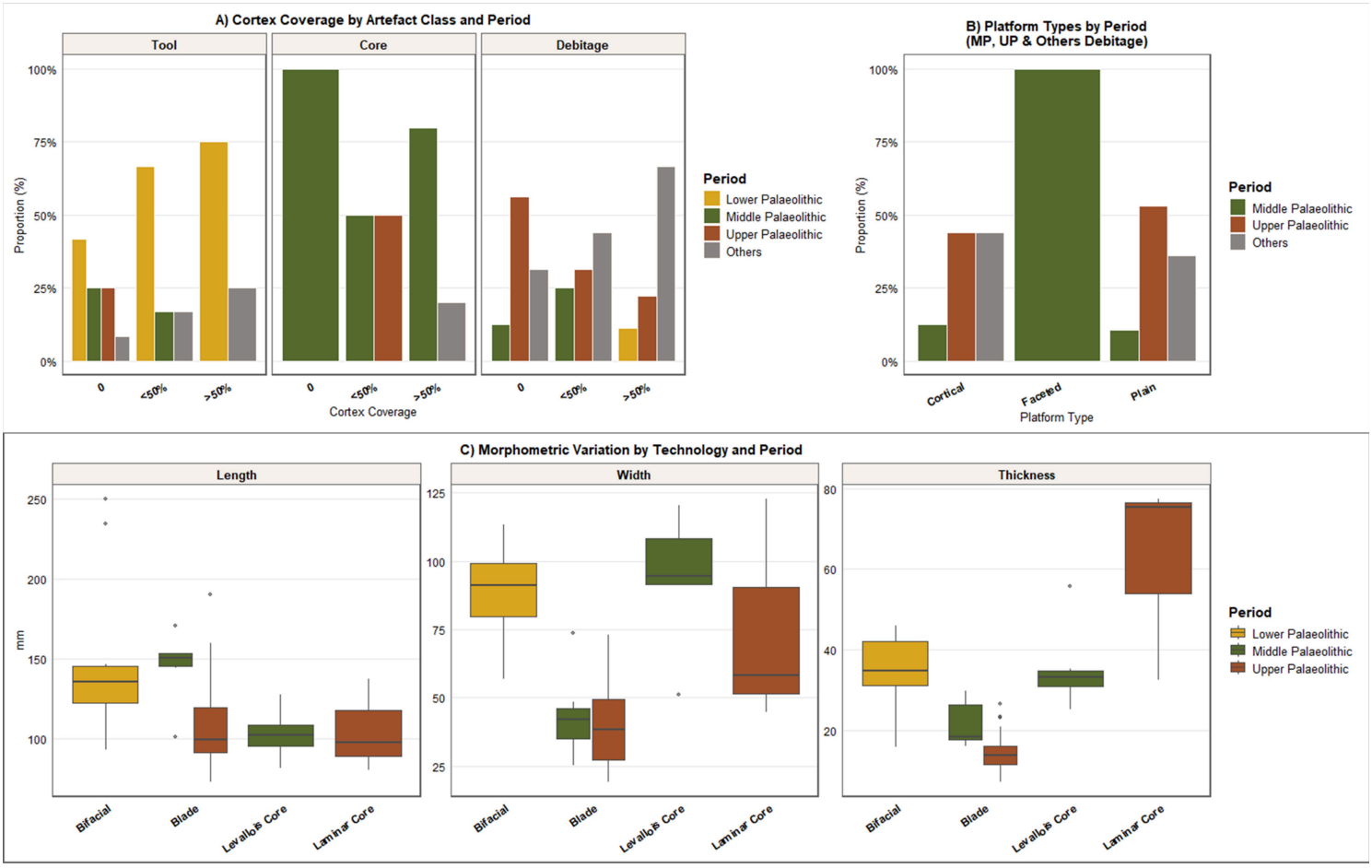


Figure 5

Techno-typological attributes for the collected artifacts from JD. **A**: Bar chart showing the cortical coverage by the chronological period. **B**: Bar chart showing the platform types for MP, UP, and other artefacts. **C**: Box plot for the artefact's dimensions by the period.



Figure 6

Selected artefacts from JD. (**A** & **B**) MP Levallois products, (**C**) MP side scraper, (**D**-**H**) UP blades, (**I**& **J**) MP blades. Note: artifacts are oriented platform-down.