

## THE PLEISTOCENE HUMAN SETTLEMENT IN GILAN, SOUTHWEST CASPIAN SEA: RECENT RESEARCH

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### Abstract

This paper reviews recent developments in the Paleolithic archaeology in the Gilan region of southwestern Caspian Sea utilizing information accumulated over the last decade. The documented sites fall within the Early to the Late Paleolithic periods and include both sheltered (caves and rock shelters) and open-air sites. The Lower Paleolithic sites of Ganj Par and Darband produced archaeological record dating back at least to Middle Pleistocene. For the later Middle Paleolithic period, the only known site is Yarshalman, while late Paleolithic remains are known from at least four caves and rock shelters and two open-air sites. Gilan currently furnishes the most convincing evidence for the Acheulian industry in Iran and the earliest radiometric date for the presence of hominins in the Iranian Plateau.

**Key words:** Alborz, Paleolithic, Acheulian.

### INTRODUCTION

Gilan's geographical position on the way between the Caucasus region and central Iran and its great ecological diversity make it a key region for understanding human population movements and their cultures during Plio-Pleistocene and Pleistocene. The Caspian coastal plain and the Sefidrud River with its tributaries combined with general marked environmental variations in this region supported a diverse fauna and flora during the Pleistocene which in turn provided rich ground for hominin exploitation (Figs 1, 2).

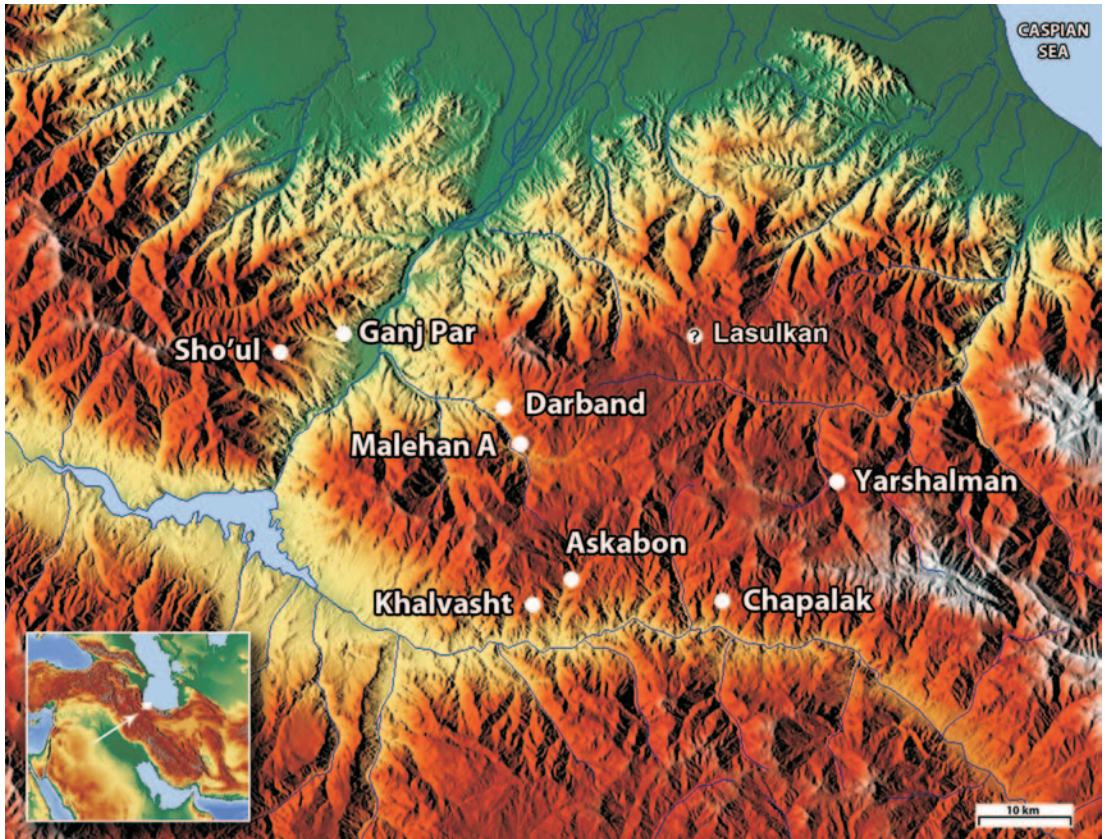
Despite its rich potential for Paleolithic archaeology, the region was unknown until the turn of twenty-first century. Discovery of at least nine Paleolithic sites in various parts of the region during the recent decade demonstrates its potential for Paleolithic studies. Although few in number, these recently discovered sites shed new light on human Pleistocene occupation in the western part

of the Alborz Mountains in the southwest of the Caspian Sea.

### PHYSIOGRAPHIC SETTING

The extensive east-west trending Alborz Mountains is the most prominent topographical feature to the south of the Caspian Sea. It runs nearly parallel along the southern coast of the Caspian Sea and separates humid zone of the Caspian lowlands from the arid uplands of Central Iran, forming a barrier between these two regions. The deep transversal gorge of the Sefidrud (lit., 'White River') separates the Alborz from the western highlands of the Talesh Mountains. The Sefidrud is the main river of the region and the largest one reaching the southern shore of the Caspian Sea (Figs 1, 2).

The Alborz and the Talesh Mountains occupy most of the Gilan province in southwest of the Caspian Sea. To its north lie the Caspian coastal



**Fig. 1.** Location map of the known Paleolithic and Epipaleolithic sites in the Gilan province of northwestern Iran. Inset bottom left: Location of Gilan in Southwestern Asia

plain with the Sefidrud Delta in the east and the Fumanat plain in the west. A number of minor rivers originating in the northern foothills of the Alborz and the Talesh cross the narrow coastal plains.

The climate of Gilan is temperate in the north and becomes semi-arid in the south toward uplands of Central Iran. The rain-fed northern slopes of the Alborz and northeastern part of Talesh are covered with dense forests subdivided into two distinct subtypes: the so-called Hyrcanian forest, and the humid montane forest. The Hyrcanian forest proper has been replaced from 800–1000 m above sea level (a.s.l.) by the humid montane forests (Ehlers, 1999). Hyrcanian forest is rich in relict species and its diversity of edible plants and associated fauna could have been an attractive habitat for the Paleolithic and Epipaleolithic hunter-gatherers.

Regional climate change during Pleistocene is detectable in the loess deposits along the Sefidrud gorge. Two loess-soil sequences at Rostamabad and Saravan have been studied (Kehl *et al.*, 2008). These sequences show an alternation of (i) comparatively dry and cool climate phases with increased dust accumulation including loess formation, and (ii) moist and warm phases with soil formation, respectively (Fig. 3). Several paleosols were recognized in the profiles developed under forest vegetation (Kehl, 2009). Recent datings of Luminescence samples taken from section of Rostamabad yielded two age estimates of  $63.7 \pm 5.8$  ka BP and  $130 \pm 12$  ka BP (Fig. 3). The older date comes from a sample taken from below of the first buried paleosol, which indicate the first paleosol is probably correlates with the last or older interglacial soil (Kehl, 2010). The samples obtained



**Fig. 2.** An overview of the Gilan province southwest of the Caspian Sea; looking to the east. 1. Lasulkan; 2. Yarshalman; 3. Chaplak; 4. Darband; 5. Malehan A; 6. Askabon sites; 7. Khalvasht; 8. Ganj Par; 9. Sho'ul (courtesy of Christoph Hormann with some modifications: <http://earth.imagico.de/view.php?site=elbrus3> [Accessed 21 December 2010])

from the section of Saravan yielded age estimates ranging from  $22.7 \pm 2.5$  to  $47.9 \pm 4.8$  ka BP indicating loess deposition at Saravan occurred during OIS 3 and 2 (Kehl, 2010).

Climate change is also reflected in old terraces of the Sefidrud which have been studied by a number of researchers (Ehlers, 1971; Paluska and Degens, 1980; Busche *et al.*, 1990; Maeomoku, 2003). However, the significance of these terraces as mere evidence for climatic change is questionable since tectonic uplift has also been involved in their formations (Kehl, 2009). Evidence for Pleistocene uplift in the Alborz Mountains could be found in the form of incised river terraces and coastal marine terraces (Berberian, 1983). The area is seismically active (Berberian, 1983; Jackson *et al.*, 2002) and during the 1990.06.20  $M_w$  7.3 Rudbar earthquake the whole area was completely devastated (Berberian *et al.*, 1992; Berberian and Walker, 2010).

Paleolithic and Epipaleolithic hunter-gatherers and faunal and floral resources of the region have been affected by the Pleistocene climate and the Caspian Sea level changes. But at present,

lack of archaeological excavations in known stratified sites, makes it difficult to have any speculations about the ranges and effects of such environmental changes on local human populations.

## RESEARCH BACKGROUND

Apart from a handful of the Late Paleolithic sites recorded in the eastern and central parts of the Alborz and the southern Caspian basin, the Early Paleolithic period of the region was unknown until the beginning of the twenty-first century. The known sites in the eastern and central Alborz include the Hotu and the Belt Caves (Coon, 1951, 1952, 1957), and the Ali Tappeh Cave (McBurney, 1964, 1968). In the past two decades, a number of new sites were discovered in the eastern and central Alborz: (i) the Komishan Cave located near the city of Behshahr (Heydari, 2003; Naderi, 2003; Shidrang, 2003; Mashkour, 2010); (ii) the Qaleh Asgar, Moghanak and Otchounak open-air sites located near the city of Damavand (Amirlou, 1991; Berillon *et al.*, 2007); and (iii) the Garm Roud 2 site located to the south of the city of Amol (Beril-



**Table 1**

Summary of known Paleolithic and Epipaleolithic sites (and a possible site) in Gilan

No.	Site	Coordination	Archaeological period	Elevation (m)	Setting	Exposure direction	Archaeological remains	Researcher (s)	Sources
1	Ganj Par	36°53'34"N, 49°28'56"E	Lower Paleolithic	235	open	-	Lithic artifacts	Biglari, Heydari, Shidrang	Biglari <i>et al.</i> 2004; Biglari and Shidrang 2006
2	Darband	36°50'10"N, 49°39'29"E		800	cave	south	Lithic artifacts, bone, potsherds	Biglari, Jahani, Shidrang	Biglari <i>et al.</i> 2006; Biglari and Shidrang 2006
3	Yarshalman	36°45'51"N, 50° 4'41"E	Middle Paleolithic	1948				Bae and Bagherian	<a href="http://hyicp.or.kr">http://hyicp.or.kr</a>
4	Malehan A	36°48'06"N, 49°40'32"E	Upper Paleolithic ?	810		north	Lithic artifacts, potsherds	Jahani, Bae and Bagherian	Jahani (2006); <a href="http://hyicp.or.kr">http://hyicp.or.kr</a>
5	Chapalak	36°38'13"N, 50° 3'46"E	Upper Paleolithic ?	1230	south	Falahian, Bae and Bagherian		Falahian 2006a,b; Jahani 2010; <a href="http://hyicp.or.kr">http://hyicp.or.kr</a>	
6	Sho'ul	36°52'57"N, 49°24'27"E	Epipaleolithic	960	open	-	Ohtsu and Nokandeh	Adachi 2004	
7	Khalvasht	36°39'04"N, 49°41'19"E	Upper Paleolithic/ Epipaleolithic	1110	rock-shelter	south		Biglari and Abdi	Biglari and Abdi. 2001; Biglari and Abdi. 2003
8	Askabon A	36°40'26"N, 49°45'06"E	Epipaleolithic ?	1045	open	west-south west	Lithic, bone potsherds	Biglari and Abdi	Biglari and Abdi. 2003
9	Askabon B	36°40'26"N, 49°45'04"E	Epipaleolithic	1040		-	Lithic artifacts		
10	Lasulkan	36° 54? N , 49° 55? E	?	1650	open	-	Lithic ?	Egami and colleagues	Egami 1963

lon *et al.*, 2007, 2009). These sites fall within the Middle Paleolithic to Epipaleolithic and Neolithic time period.

Until recently the western part of the Alborz, especially the Gilan Province was virtually unknown. This lack of information was particularly due to the fact that archaeology in Gilan has been focused on the Bronze Age and the Iron Age cemeteries as well as the historical period sites; while sites of earlier periods were virtually ignored.

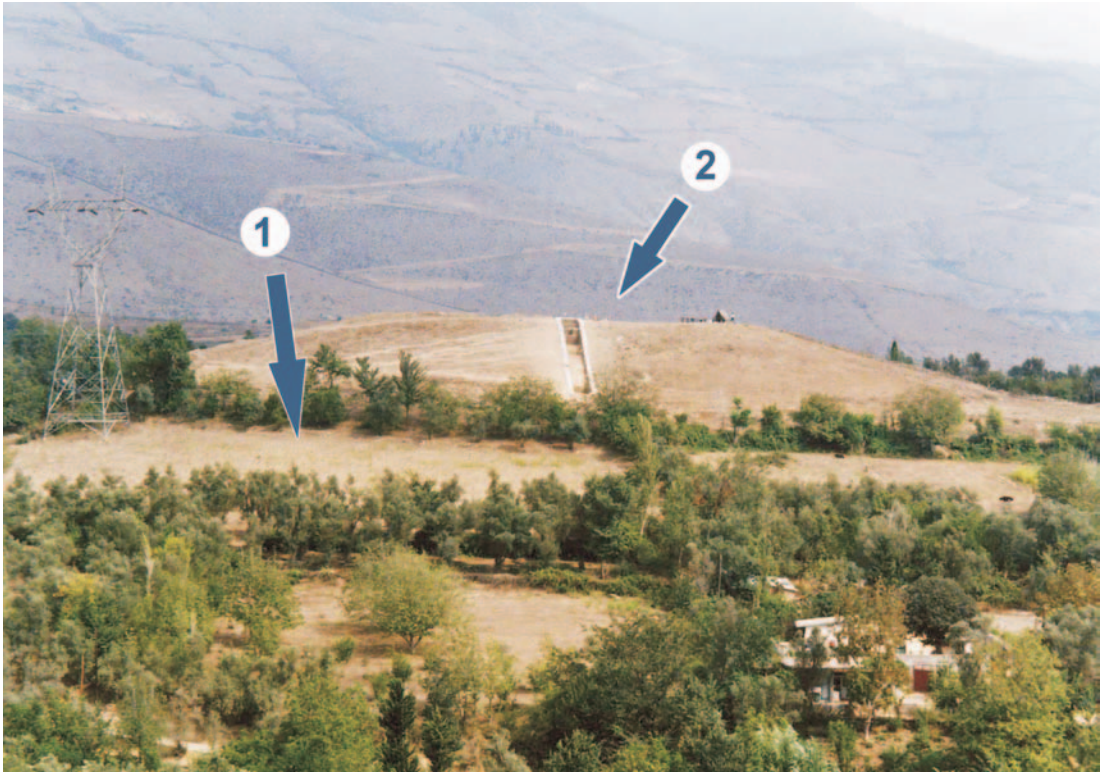
## THE LOWER PALEOLITHIC

Early hominins were apparently present in the Gilan region at least since the Middle Pleistocene period. The evidence comes from the Ganj Par site with a definite Acheulian techno-typology associated with one of the terraces of the Sefidrud River. Another known Lower Paleolithic site, the Darband cave (Figs 1, 2 and 8; Ta-

ble 1), produced a small assemblage of flake industry and faunal remains dominated by cave bear dating back to the Late Middle Pleistocene.

### Ganj Par

This site lies at an elevation of about 230 m a.s.l. (Figs 1 and 2), on a terrace of the Sefidrud in the Rostamabad plain (Biglari *et al.*, 2004; Biglari, 2005; Biglari and Shidrang, 2006). The site of Kaluraz with Iron Age and historic occupational remains lies at northern edge of the Ganj Par (Hakemi, 1973; Ohtsu *et al.*, 2006) The geomorphology of the Rostamabad region has been described by Ehlers (1971), Maeomoku (2003) and recently Amini (Sarem Amini, personal communication 2010). Ehlers distinguished five fluvial terraces between elevations of 1 to 70 m above the valley floor. According to Maeomoku there are five terraces at the western part of the plain, at elevations 15 to 665 m above the plain.



**Fig. 4.** A general view of the Ganj Par site (1) and the nearby site of Kaluraz with the Iron Age and historic remains (2). View looking to the north

The Ganj Par lithic scatter is located at elevations of 90 to 100 m above the Sefidrud valley (altitudes 225–235 m a.s.l.), higher than terrace IV, and may have been reworked from deposits of the older/higher terraces (Figs 4 and 5).

During three visits to the site about 140 artifacts in an area of about half a hectare were collected. Although plowing in the sampled area has relocated artifacts horizontally and vertically. But all pieces were plotted on topographic map to record all potential information (Fig. 5). Almost half of the assemblage is made of fine-grained limestone that comes from the local bedrocks. A large proportion of the other artifacts are made of sedimentary (red sandstone, quartzite), volcanic (andesite, basalt), and volcano-sedimentary (tuff) rocks which primarily come in form of water worn pebbles and cobbles from secondary gravel sources along the Sefidrud and its left bank tributary of Kaluraz. The presence of some small flakes in the assemblage and the low degrees of

abrasion on the artifacts may indicate there was no significant post-depositional disturbance, although there is a possibility that some lighter artifacts were washed away.

The assemblage is composed of high frequencies of core-choppers and cores, along with core-scrapers, bifaces, large flakes, and hammers. The bifacial assemblage is composed of hand axes, cleavers, a partial hand axe and a pick (Figs 6 and 7). Bifaces are made by *façonnage* and *debitage* on limestone and volcanic rocks. There is a tendency to use flakes as blank for production of hand axes and cleavers. The cleavers and core-scrapers found are the first-known examples of these types in a Lower Paleolithic archaeological context in Iran (Fig. 6).

Cores have a wide range of size and they were modified almost entirely of limestone. Cores are categorized as unipolar, multiple, discoid, and indeterminate. There is also some anvil or bipolar cores that made of river pebbles and cobbles.



**Fig. 5.** A view of the Ganj Par surface lithic scatter; looking to the east. A core on flake from the site is shown in the inset

A single sub-spheroid is also present in the assemblage. An interesting aspect of the industry is selective use of limestone for the production of cores and core-scrapers, and a tendency to use quartzite pebbles and cobbles for core-chopper production.

### **Darband Cave**

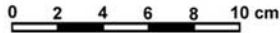
Not far from Ganj Par, the recently discovered site of Darband has yielded the first known evidence of the Lower Paleolithic occupation in a cave site in Iran (Fig. 8). The Darband cave is located on the northern side of a deep canyon at southern forested slopes of Mount Dorfak to east of the Sefidrud gorge. The site lies at an altitude of 800 m a.s.l. During two surveys a sizeable number of faunal remains and 25 stone artifacts were collected from back dirt of a pit dug by looters along the western wall of the main gallery

(Biglari and Shidrang, 2006; Biglari *et al.*, 2007, 2008). Some large fragments of calcite flowstone were found around the pit. A primary examination of the pit indicated the presence of two main natural layers separated by a 3–5 cm thick calcite flowstone layer. The lithic and faunal remains most probably came from the lower layer that composed of light reddish sediments. The extent of the speleothem floor is not known. But it is probable; the Middle Pleistocene sediments were sealed and protected from later erosions by this cap of calcite layer.

The faunal assemblage from the cave is dominated by cave bears, with a few ungulate remains. The assemblage is composed of mostly skeletal parts, the most diagnostic ones being the tooth remains. The remains of two adult cave bears could be identified on the basis of cranial and post cranial bones (Fig. 9). On the basis of detailed analy-



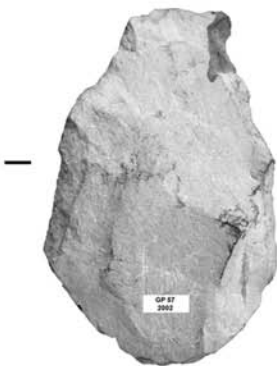
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1



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3

Fig. 6. Lower Paleolithic artifacts from Ganj Par: 1. cleaver; 2. heavy duty scraper; 3. handaxe



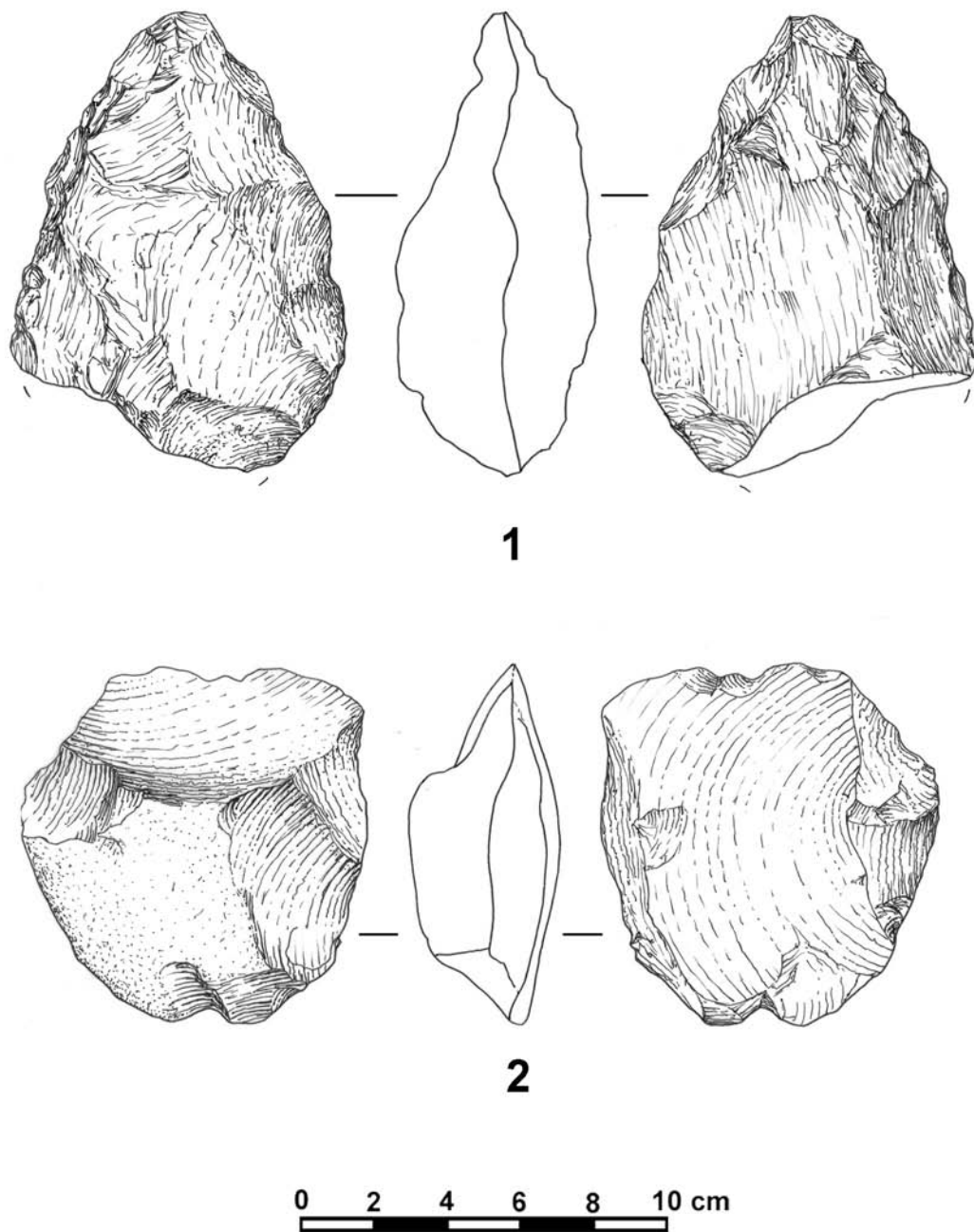
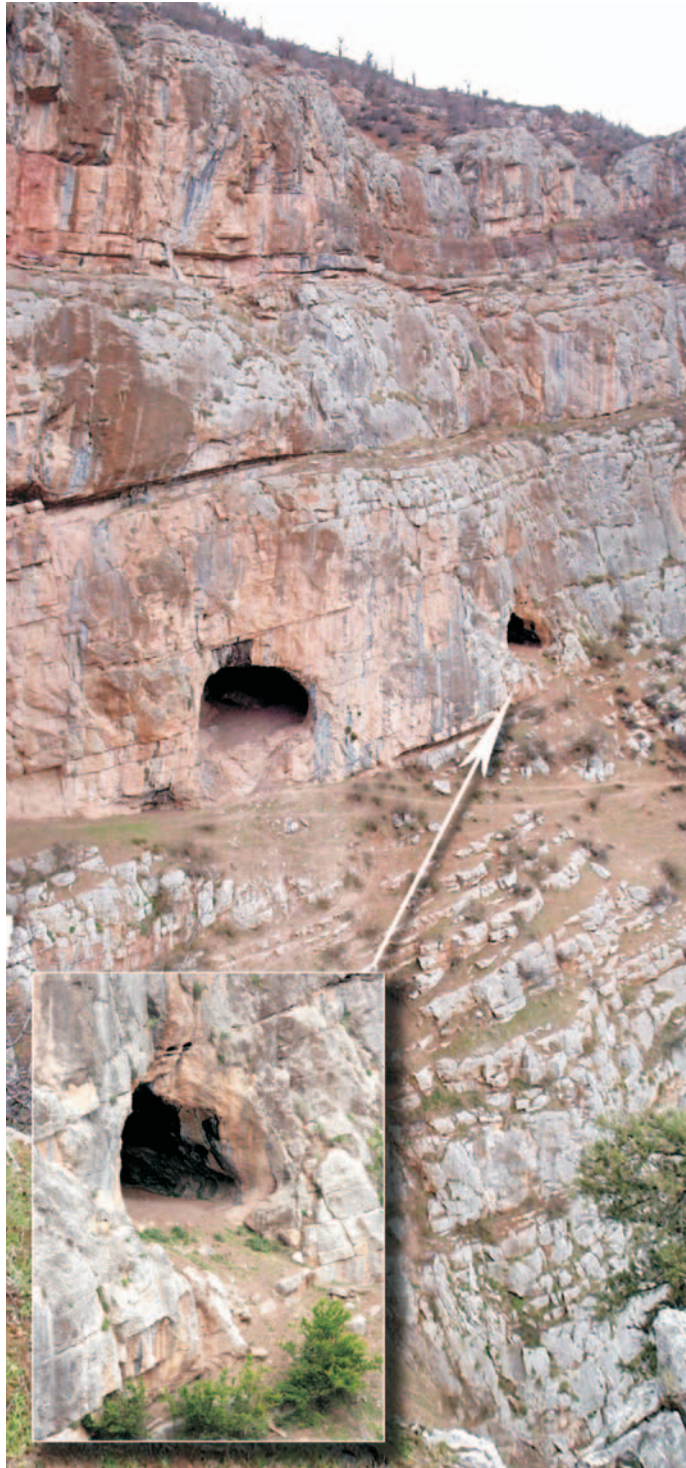


Fig. 7. Large cutting tools from Ganj Par: 1. handaxe; 2. cleaver



**Fig. 8.** A view of the Darband Cave and a larger cave adjacent to it overlooking a deep canyon; a close view of its entrance is shown in the inset



**Fig. 9.** A broken mandible of cave bear from Darband Cave (Biglari *et al.*, 2007)

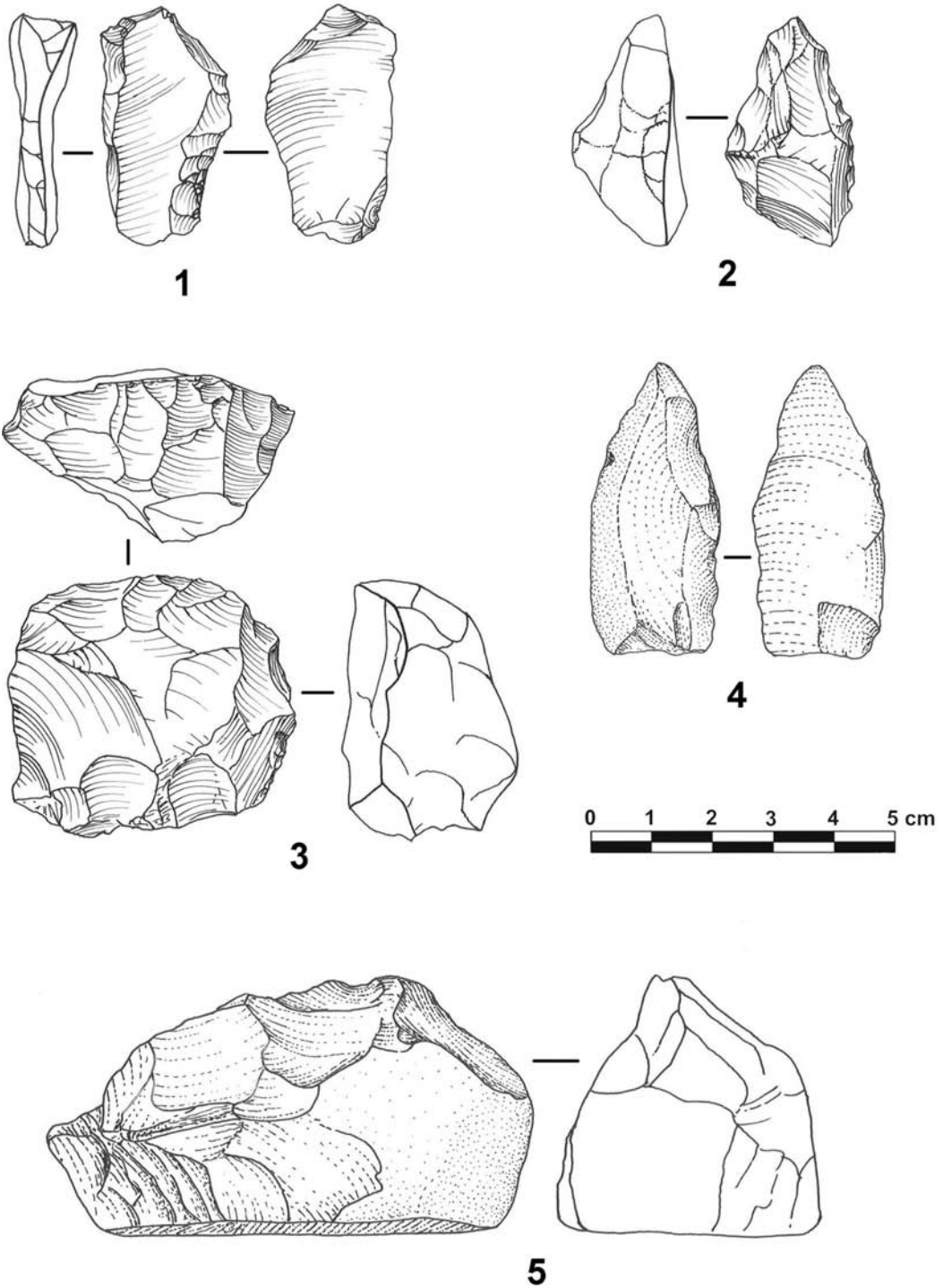
sis of the bones, it is possible to allocate these remains to *Ursus deningeri paleokudarensis* (Biglari *et al.*, 2007).

The lithic artifacts are mainly made of chert, followed by tuff and other volcanic rocks. Flakes make up the majority of the artifacts, with their platform left plain or retaining cortex. The majority of flakes have a high flaking angle exceeding 90 degrees. Most of these flakes show some re-touch. The collection also includes one core-chopper (Fig. 10). A thick flake with a convex profile and sub-radial dorsal scar pattern may have been struck from a biface which in turn could be evidence for the presence of an Acheulian industry at the site. However, it is necessary to have larger lithic samples to attribute this assemblage to a certain Lower Paleolithic industry (Biglari *et al.*, 2007). The preliminary observation based on both lithic and faunal assemblages indicated a probable late Middle Pleistocene age for the site (Biglari *et al.*, 2007). This primary relative dating was confirmed by U-series dating of

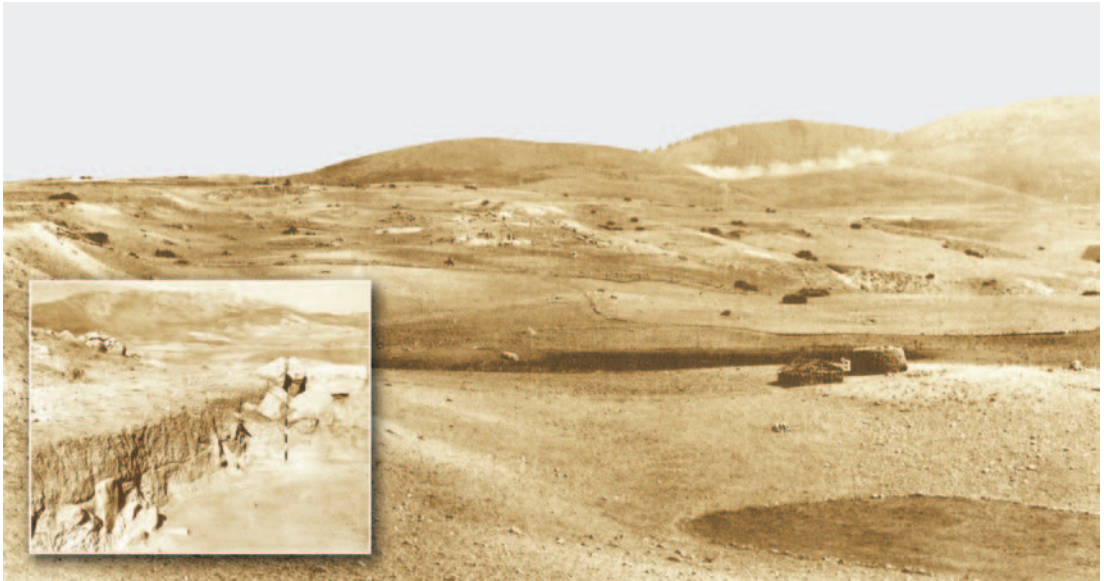
two bear teeth that were found in association with the lithic artifacts.

### Lasulkan

The Lasulkan hills are located to the east-northeast of Dailaman, at an altitude of about 1650 m a.s.l. (Figs 1, 2 and 11). Looters activities in some stone chambered tombs in this area attracted a Japanese team to the region who undertook excavations that revealed a number of the Iron Age tombs yielding human skeletons and pottery (Egami, 1963). Two layers of volcanic ash containing pumice rock were exposed under the upper archaeological layer. The second layer contains some flint pieces (Fig. 12) reported by Egami (1963) as cores and flakes: “*The flake implements of flint material are not in particular forms characteristic of stone implements and it is not clear which part of the stone age they belong to ... some of cores are clear cut on the surface and others are worn out to a certain extent by the movement of heaped earth.*” (Egami, 1963:



**Fig. 10.** Selected Lower Paleolithic lithic artifacts from the Darband Cave: 1. single side-scraper; 2. pointed tool with retouched lateral edges; 3. core-thick end scraper; 4. single side-scraper made on naturally backed flake; 5. chopper-like core



**Fig. 11.** A general view of Lasulkan. Egami's excavation is shown in the bottom left inset (Egami, 1963)

22–23). Similar layers with flint pieces are reported from the nearby Parthian [250 B.C.–224 AD] site of Ghalekuti. The real nature of these claimed artifacts and their ash layer context is not clear. However, judging on the published drawings, they look to be geofacts<sup>1</sup>. In spite of the ambiguities, it is worth examining the area to clarify the nature of the reported ash layers and their environmental impacts on Pleistocene hunter-gatherers.

## THE MIDDLE PALEOLITHIC

### Yarshalman

The Middle Paleolithic occupation of Gilan is poorly known and there is only one known site, the Yarshalman rock shelter (Fig. 13; Table 1), that was discovered in 2006 (Jahani and Mousavi, 2005) and tested by a joint Korean-Iranian team directed by K. Bae and M. Bagherian in 2007–2008. The report has not yet been published and there is a short note in an exhibition catalogue published by Daegu National Museum (2009: 312–313) as well as some information available on the website of the Hanyang University (Bae, 2009). The rock shelter is located in the Siah-Kal Region, to the east of the Gilan province, at an altitude of about 1900 m a.s.l. (Fig. 2). Surface sur-

vey and test excavations in the site yielded a small number of Middle Paleolithic lithic artifacts (three pieces), faunal remains (herbivore tooth) and Iron Age potsherds (Daegu National Museum, 2009).

## THE UPPER PALEOLITHIC AND EPI-PALEOLITHIC

### Khalvasht Rockshelter

The Khalvasht Rock shelter is located in the Amarlou Region, along the Loshan-Jirandeh road, and at an altitude about 1100 m a.s.l. (Figs 1, 14; Table 1). The site was discovered by Hossein Abdi, who initially found some Parthian potsherds and a flint artifact on its talus slope. This discovery was followed by a more extensive survey of the site by Biglari and Abdi in late August 2000 (Biglari and Abdi, 2001). The shelter faces south and is located at the base of a series of conglomerate outcrops that are about 160 m long. A spring emerges about 300 m to the southwest of the site. This spring supplies drinking water to the Khalvasht village located between the spring and the rock shelter. At the eastern end of the rock shelter, there is a cavity of about 5 m deep and 10 m wide. The small cave contains no sediments and the bedrock is exposed. The talus slope at the

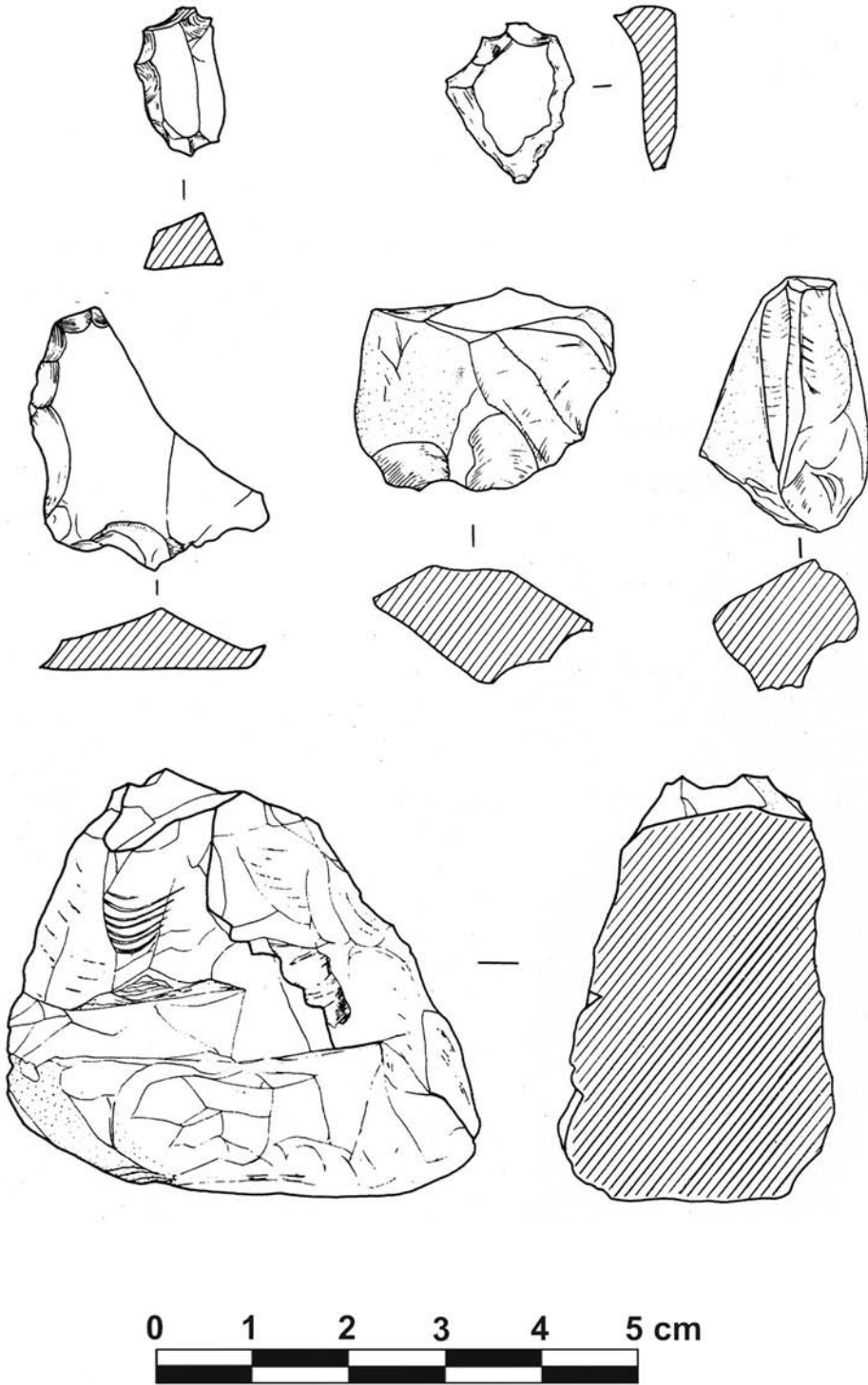
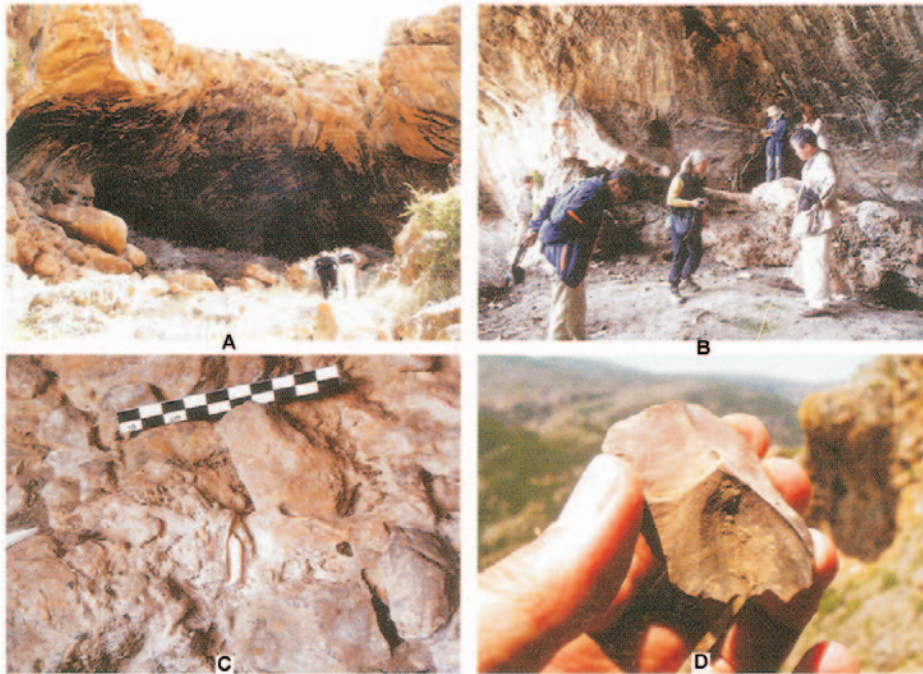


Fig. 12. Claimed Paleolithic artifacts from Lasulkan (Egami, 1963)



**Fig. 13.** Yarshalman Cave. A and B: Two views of the site. C and D: Brecciated deposit and a Middle Paleolithic artifact (Daegu National Museum, 2009)

front of the cave extends to a seasonal stream, which has slightly washed away its lower slope (Fig. 15).

During the first visit nine flint artifacts were collected from the washed area (Fig. 16). Later 18 artifacts were collected during a second visit to the site in 2002 at the same point of down slope (Fig. 16). Artifacts did not form a continuous distribution across the talus slope and were concentrated in the eroded part, adjacent to the stream (Fig. 14). These artifacts may have eroded out from occupational deposits originally accumulated in the rockshelter and washed down to the lower part of the slope.

The artifacts are made of gray and black chert, red variant of fine red-green chert, fine dark brown chert, and one example of white chert. These rock types are found in pebble and cobble size (50 to 200 mm) in the area. The sample includes 18 flakes, one flake fragment, five blades and bladelets, one small flake core, one core tablet, and one shatter. The core tablet is from a bladelet core with scars of previous bladelets removals (Fig. 16: 8). The collection is too small

and difficult to evaluate. In the absence of re-touched tools, the presence of blade/bladelets and the bladelet core tablet in the sample may indicate an Upper/Epipaleolithic age for the site.

#### Askabon Sites

Askabon consist of an open-air site and a rock shelter that were discovered in 2001 by H. Abdi in northwest of the Askabon village, some 6 km to the northeast of Khalvasht (Figs 1 and 2; Table 1). The open-air site is located at an altitude of 1040 m a.s.l., about 4 km to the southwest of Jirandeh. The site is a flint scatter along western edge of a relatively deep ravine, which runs in the north-south direction (Figs 17 and 18). This ravine locally called Noh-joob Dareh leading to the Sarom River.

Abdi collected 23 flint artifacts and an additional five pieces were found while Biglari and Abdi revisited the site (Biglari and Abdi, 2003). Used raw material is almost similar to those of Khalvasht and dominated by black and gray cherts, some fine red chert, one piece of chalcedony and small numbers of poor quality rocks. The assem-



**Fig. 14.** The Khalvasht rock shelter looking to the north. Arrow showing the location of the flint scatters



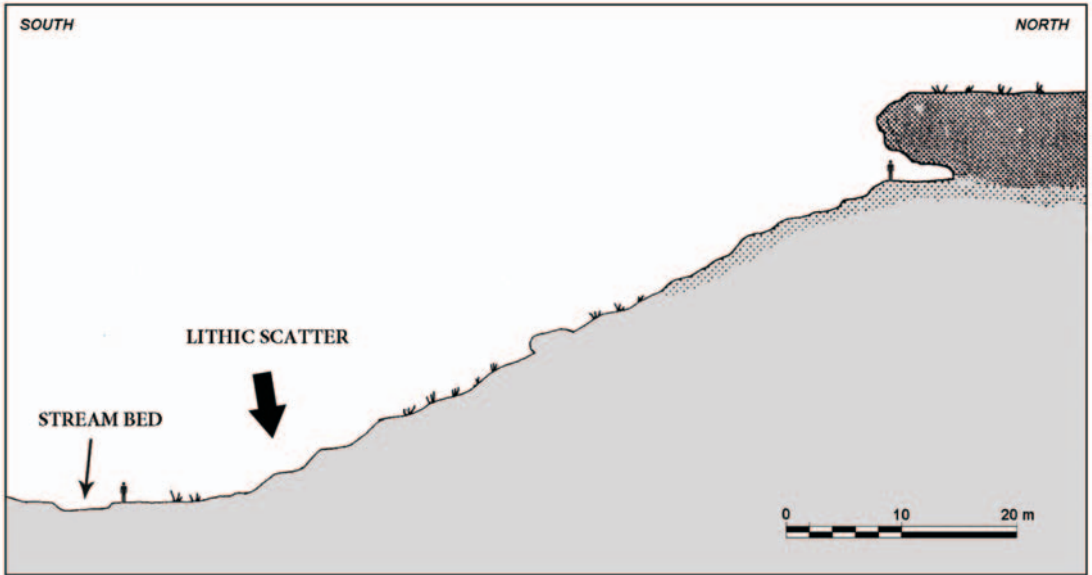


Fig. 15. Profile of the Khalvasht rock shelter and its talus slope (the scale bar defines the horizontal distance)

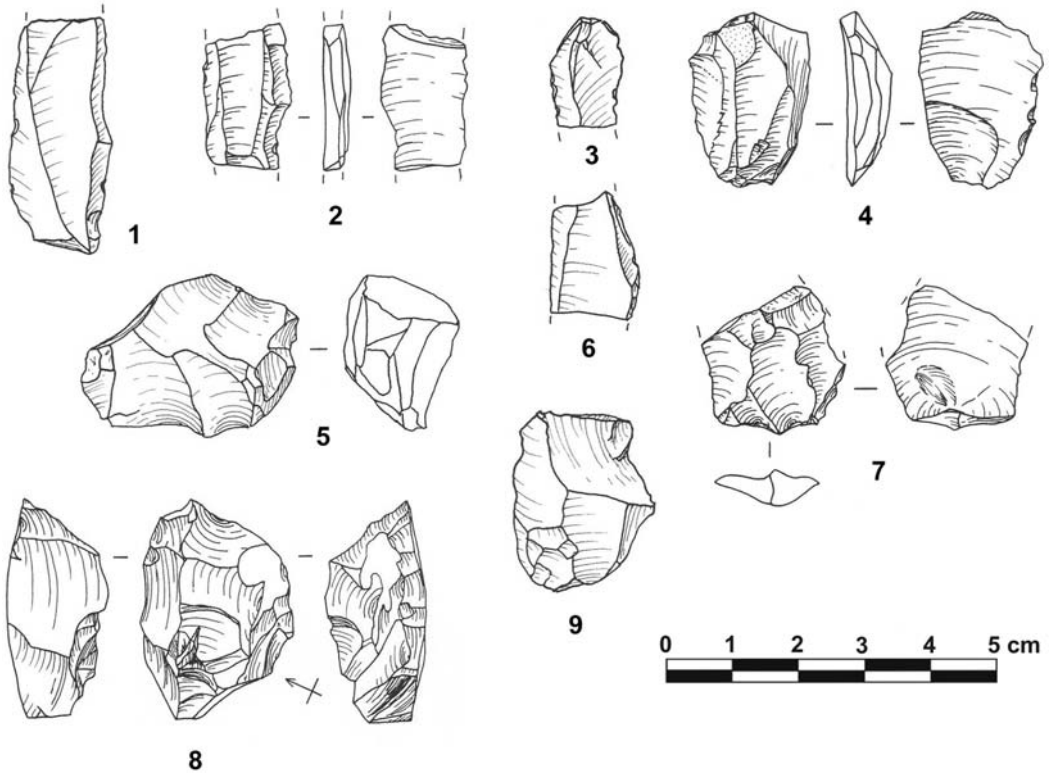


Fig. 16. Late Paleolithic artifacts from the Khalvasht rockshelter: 1. broken blade; 2. blade fragment; 3. bladelet; 4. flake; 5. flake core; 6. bladelet fragment; 7 and 9. flakes; 8. bladelet core tablet.



**Fig. 17.** General view of the Askabon sites near the Askabon village; looking to the south (courtesy of Hossein Abdi). The village of Askabon was completely destroyed during the 1990.06.20  $M_w$  7.3 Rudbar earthquake (Berberian *et al.*, 1992; Berberian and Walker, 2010)



**Fig. 18.** Aerial photo of Askabon showing location of the rockshelter and the open-air site at northwest of the village (Google Earth)

blage includes 14 flakes, four flake fragments, one core face-cleaning flake, one chunk, and six retouched tools (Fig. 19). Tools include an end-scraper on flake, a bec on a core fragment, an atypical burin, an obliquely truncated flake, a scraper on flake, and a truncated blade (Fig. 20). The industry is flake dominated with only one example of a blade.

The rock shelter is located at the eastern side of the ravine, opposite to and on the same level as the lithic scatter (Figs 17 and 18). It is located at the base of a series of rock outcrops along the eastern side of the ravine. The shelter is measuring 27 m long by 4 m deep, and faces to the west-southwest, overlooking the ravine. About 11 m of its floor, along the back-wall, is protected under the overhang. Some large rockfalls are visible on the floor and on its talus slope. The site is estimated to contain at least two meter of archaeological deposits, as a pit dug by looters close to the backwall penetrating 150 cm deep into the deposit. Several pieces of potsherds of possible Iron Age and some mammalian and human skeletal remains were scattered in the backdirt of this pit. Not far from the pit a blade with oblique truncation and a small shatter was found (Fig. 19). The presence of an end-scraper, a truncated blade and some unretouched blades/bladelets in the Askabon assemblages may indicate an Epipaleolithic date for these two related sites.

In addition to the above-mentioned sites, a number of rock shelters were also spotted by Biglari and Abdi along the Loshan-Jirandeh road that may contain more evidence of probable Late Paleolithic occupations (Biglari and Abdi, 2003).

### Sho'ul

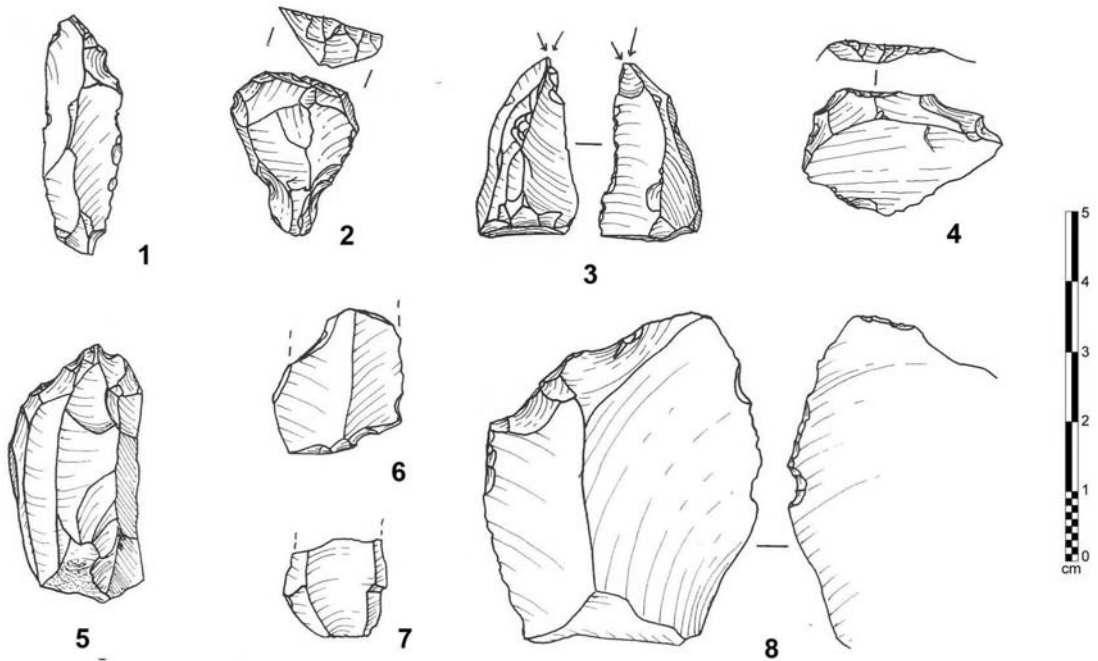
During a general survey of the Sefidrud gorge conducted by a joint Japanese-Iranian team directed by T. Ohtsu and J. Nokandeh in 2002–2003, two surface finds were collected at Sho'ul in the Ganj valley, some eight km to the north of Rudbar (Fig. 1; Table 1). The lithic artifacts were found on a steep slope that leads to a flat area along the valley (Fig. 21). The finds consist of a truncated blade made on shale and a small cortical flake made of chert (Fig. 22). These finds are attributed tentatively to the Epipaleolithic period based on the presence of the truncated blades (Adachi, 2004). These artifacts may have been eroded from an open-air site buried under more recent slope colluviums.



**Fig. 19.** A blade with oblique truncation from Askabon rockshelter

### Malehan-A Cave

The Malehan-A cave and its adjacent Malehan-B cave are located at an altitude of about 800 m a.s.l., in the Rudbar region (Figs 1 and 23; Table 1). This north-facing cave site was discovered by Vali Jahani in 2006 while excavating the Iron Age cemetery of Vatel in the vicinity of the cave. He registered this cave site and its neighboring cave on the National Register of Historic Places in the same year. A joint Korean-Iranian team directed by Kidong Bae and Mohammad Reza Bagherian revisited the Malehan-A Cave and conducted test excavations in the site in 2007. Test excavations revealed an archaeological sequence



**Fig. 20.** Lithic artifacts from the Askabon rock shelter (A) and Askabon open-air site (B): 1. blade with oblique truncation (Askabon A); 2. end-scraper on flake; 3. atypical burin; 4. end-scraper; 5. bec; 6. truncated blade; 7. broken bladelet; 8. obliquely truncated flake



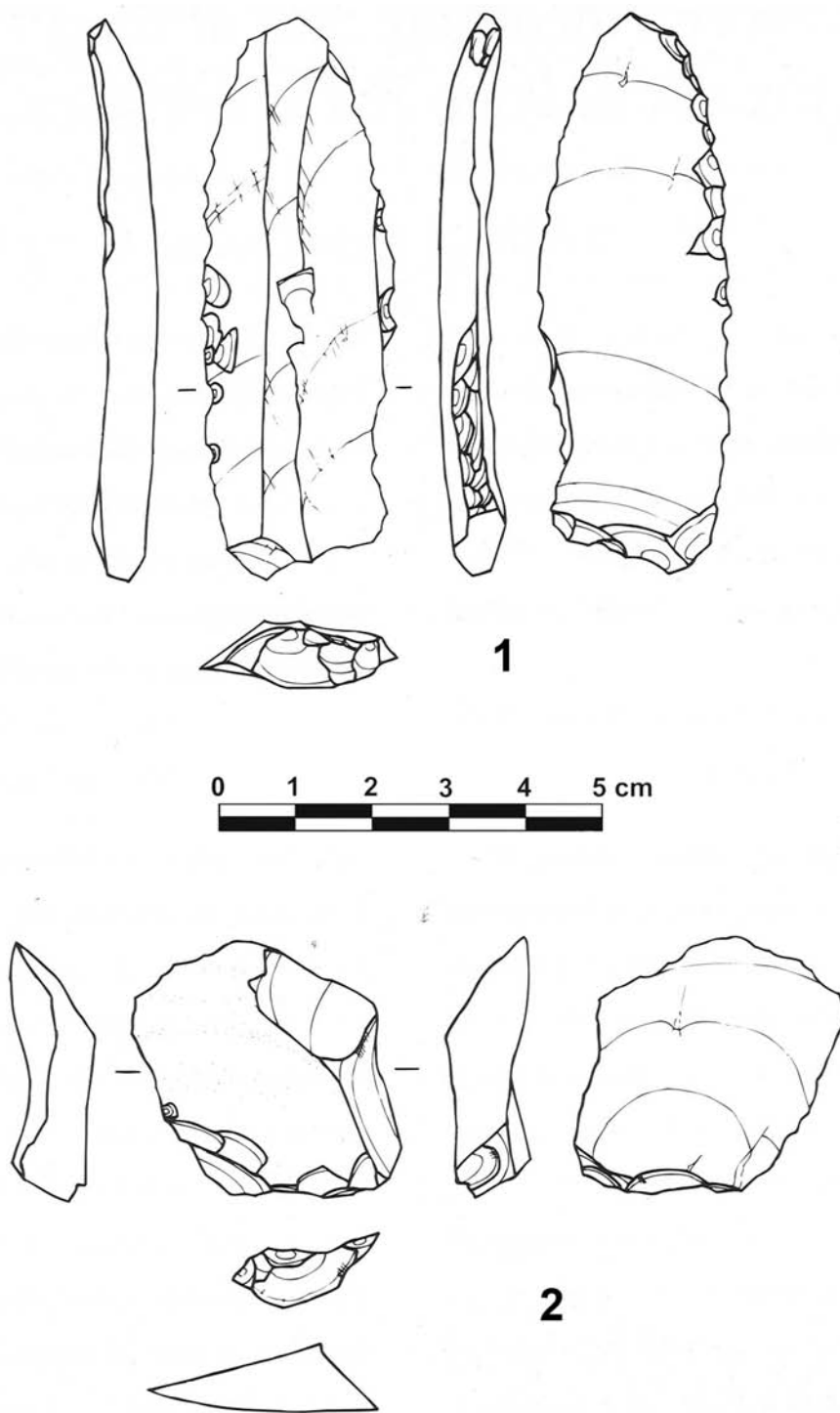
**Fig. 21.** Two views of Sho'ul, the Ganj Valley (Adachi, 2004)

that yielded a microlithic industry in its upper layer. The lithic collection (34 pieces) includes blades, bladelets and flakes attributed to the Upper Paleolithic period (Bae, 2009).

#### Chapalak Cave

The cave site of Chapalak is located about altitude of 1230 m a.s.l., some 1800 m to the south-

east of Naudeh village, in the Amarlou region (Fig. 1; Table 1). This south-facing cave is about 45 m deep and consists of a main chamber in front and two smaller chambers at rear of the cave. A stream flows in the rear chamber. It was discovered by Yousef Falahian in 2003 (Falahian, 2006a, 2006b; Jahani, 2010). He found a number of potsherds and animal and human bones that



**Fig. 22.** Two late Paleolithic artifacts from Sho'ul: 1. truncated-retouched blade; 2. unretouched flake (Adachi, 2004)



**Fig. 23.** The entrance of Malehan Cave from inside

were assigned to the Neolithic and the Iron Age times (Falahian, 2006a, 2006b). The site was tested by a team directed by Kidong Bae and Mohammad Reza Bagherian in 2008. They found lithic artifacts (14 pieces: cores and blades/bladelets) in the upper most layer of the test pit that based on their techno-typological characteristics attributed to the Upper Paleolithic period (Bae, 2009).

#### **Other cave sites**

A large number of cave sites have been reported by Vali Jahani, and Yousef Falahian that yielded surface finds of potsherds, human and faunal remains, mainly dating back to the Bronze Age and the Iron Age periods (Falahian, 2006b; Jahani, 2010). Among these sites one can mention Espahbodan (Khorgam region), Div Rash, and Vali Gord Caves (in the Rudbar region); Talabon Gorj near Gorj village (Siah Kal region), Varbon (Rudsar region), and Talabon Diarjan Caves (in the Amlash region); Tanian Cave (Some'h Sara

region); Tavelas, and Boz Khaneh Caves (Fau-man region); Liaroo Cave (Langerud region); and Oishu Cave (Masal region). It is necessary to emphasize that at least some of these sheltered sites have the potential for preserving Pleistocene records of human occupation that have been buried under later thick Holocene deposits.

#### **FINAL REMARKS**

This short review indicates the high potential of the Gilan province for research into the archaeology of the Pleistocene, especially for the Lower and Middle Pleistocene (Table 1). The Gilan province currently furnishes the clearest evidence for the Acheulian industry in Iran and the earliest radiometric date for the presence of hominins in the Iranian Plateau.

Ganj Par is one of the few Iranian Lower Paleolithic sites that could be assigned with certainty to the Acheulian Industrial Complex. The assemblage shares technological similarities with

the Early and Middle Acheulian assemblages of western Asia, including the use of volcanic rocks as raw material from gravel sources, the presence of large cutting tools, the use of large flakes as blanks, the high frequency of core-choppers, the presence of discoïd and anvil flaking along other methods, and the specific use of raw material for production of certain cores and core-tools (Biglari and Shidrang, 2006).

Given the geographic location of the Ganj Par site close to the Caucasus, its assemblage bears closer resemblance to the Caucasus Acheulian than to the Western Zagros assemblages (Biglari and Shidrang, 2006). The narrow Sefidrud gorge, where Ganj Par is located, provides easy passage in two directions, south toward the Central Iran and the north Zagros, north to the southern shores of the Caspian Sea, and northwest to the Caucasus, a region with a rich Acheulian record (Lioubine, 2002).

For the first time the Darband Cave allowed us to have insight into the lithic industry, fauna, and their implication for paleoenvironment of the western Alborz during the late Middle Pleistocene. The site seems to have been visited sporadically by the late Lower Paleolithic hominins while cave bears used it extensively as a denning place.

As for the Lasulkan, no detailed information about the nature of the probable volcanic ash layers and their relative age are available in Egami (1963). Volcanic ash layers have been reported from the Kura basin and the south Caspian area: (i) in the lower part of the Akchagil Stage (2.4–1.8 Ma) deposits (ca. 2.4 Ma) in the Kura basin (Djavadova and Mamula, 1999); and (ii) the upper part of the Apsheron Stage (1.75–0.7 Ma) deposits (ca. 0.7 Ma) in the south Caspian shores (Yasini, 1981) and the Kura basin (Djavadova and Mamula, 1999). The Damavand volcano in the central Alborz became active from at least 1.8 Ma with periodical continuation to about 7.3 ka BP (Davidson *et al.*, 2004). Although detailed study of the Damavand volcano revealed limited thin volcanic ash seams within the lahars deposits and pumice flows over the flanks and close vicinity of the volcanic cone (Allenbach, 1966; Davidson *et al.*, 2004; Mortazavi *et al.*, 2009), no fingerprinting and radiometric dating analyses have been conducted on the reported ash seams in the Alborz Mountains.

Recent modeling of the Damavand fallout indicated tephra dispersal being dominantly toward the east in all season, based on dominance of westerly tropospheric winds (Mortazavi *et al.*, 2009). Therefore, if the reported ash seams from the Dailaman area [230 km to the NW of the Damavand volcano] are genuinely direct volcanic fallout deposits, it is impossible at present to assign them to the Damavand (Alborz). Therefore, if the ash layer in Dailaman is really volcanic, it is possible that they are from a volcano in the Caucasus region such as Aragats (Armenia), Elbrus (Caucasus) or Ararat volcanoes (Manuel Berberian, personal communication 2010). The volcanic ash deposits could have resulted in significant environment disruption and the daily life of the Pleistocene hunter-gatherers living in the study area.

Yarshalman is the highest and the only known Middle Paleolithic site in Gilan. Unfortunately the small size of the lithic samples collected at the site do not allow any further insight to the nature of the lithic industry and Middle Paleolithic occupation of the site. Because of its high altitude it might have been used by the Middle Paleolithic groups with subsistence strategies adapted to upland resources available in such mountainous region during warmer period of last interglacial or interstadials.

Compared with the Lower and Middle Paleolithic records, the Upper Paleolithic and Epipaleolithic periods are relatively well represented in Gilan. The known sites are mainly concentrated at Amarlou and Rudbar regions at altitude between about 800–1200 m a.s.l. (Fig. 1; Table 1). While some of these sites have produced typologically characteristic artifacts such as small end-scrapers and truncated elements that could be assigned to Epipaleolithic, none of the known sites provided artifacts attributable to Upper Paleolithic with any certainty. This is also the case at the eastern and central part of the Alborz Mountains where the large number of sites fall within the Epipaleolithic period, with only one exception, the open-air site of Garm Roud 2 that produced a rich bladelet industry associated with faunal remains that are dated to the end of the OIS 3 (Berillon *et al.*, 2007, 2009).

We have to wait until the Korean-Iranian teams publish the result of their recent research in Chapalak, and Malehan-A caves that may contain

Upper Paleolithic evidence. In general it seems that these sites in Amarlou and Rudbar represent highland stations within the mobile trajectory of the late Paleolithic groups. However, more evidence is required to support this tentative conclusion.

Despite extensive erosion and disturbance processes in various parts of Gilan and their effects on preservation of human Pleistocene occupational remains, there are many potentially rich areas that should be taken into consideration for further field research. The terraces of the Sefidrud gorge and its tributaries, karstic caves in limestone outcrops, loess/paleosol sequences at Rostamabad, and the probable volcanic ash beds at Dailaman are particularly promising for the future prospects.

A large number of surveyed cave and rock shelter sites contain evidence for the Bronze/Iron Age human activity, and may have functioned as temporary herding camps or other purposes such as burial of human remains. Despite their rich archaeological and paleontological evidence, most of the caves and rock shelters in Gilan continue to be threatened by illegal excavations. Although a number of the aforementioned sites are registered on the National Register of Historic Places, it is necessary to find more effective strategies for their conservation and management.

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### Notes

1. The recent re-analysis of the flint collection from Lasulkan by Yoshihiro Nishiaki of the University of Tokyo showed that all the flint specimens are naturally fractured geofacts and there is no artifacts in the lithic collection. For more information see Nishiaki, 2009.