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The Paleolithic Survey of Holeylan, Central Zagros, Iran

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Abstract

An insight into the geomorphological characteristics of Holeylan as well as its suitable environment in the Central Zagros convince us that it has a capacity, more than ever shown, in presenting Paleolithic sites. Thus, the necessity of doing an intensive archaeological survey in this valley with the aim to explore the Paleolithic sites became apparent and was achieved only in the autumn of 2015.

The research questions are mainly based on the number of sites, their type and size, geographical variables influencing the site selection patterns among the Paleolithic societies, tool making techniques and identifying raw material sources in Holeylan.

During the survey, 103 sites, including 24 caves and rock shelters as well as 79 open air sites were identified with utilities such as residential compounds, seasonal camps and hunting ambushes. Among them, only one of the rock shelters was situated in the eastern most part of the valley. The open air sites formed on the natural hill tops with terraces overlooking Seymareh and Jezman Rivers and their tributaries. Climate and tectonic features seem to be the two main reasons that made Holeylan as one of the most important valleys of central Zagros during the Paleolithic era. Moreover, water resources and its elevation above the sea level were the most important components which led settlements access to raw materials. Chert pebbles and cobbles accumulated in the bed by rivers were resources of tool making in Holeylan Valley during the Paleolithic period.

Keywords: Paleolithic Survey; Central Zagros; Holeylan Valley; Paleolithic Settlements; Stone Tools.

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Introduction

Nearly eighty years have passed since the archaeological studies on Holeylan by Sir Aurel Stein (Stein, 1940). So far, only a few surveys have been conducted in this area. Also, a lack of cohesion in most of those studies caused uncertainties about the cultural situation of the region during early periods. Undoubtedly, Peder Mortensen's regular field studies in the area can be considered as the most focused research work before the 1979 Islamic Revolution. In his surveys, Mortensen could discover a significant number of Paleolithic settlements as well as some of the sites belonging to different periods (Mortensen, 1993). Pal Barik is one of the most popular Paleolithic sites in the archaeological context of Iran where Acheulean hand axes were discovered. In addition, a Danish expedition made speculations that helped enhance our relative knowledge of the Paleolithic Period in Holeylan Valley soundings at 2 caves.

It has been more than four decades since the archaeological activities were pursued in this area by Mortensen and new data were published in relation to the Paleolithic sites of Western Asia, the authors showed their determination to submit a research proposal on a systematic archaeological survey of this region with a Paleolithic approach to the Iranian Centre for Archaeological Research[1] in order to obtain the survey permission. After that, one-month intensive survey was carried out that resulted in the discovery of a large number of Paleolithic sites. A number of the sites were identified through the framework of a Holeylan Valley discovery program, which was carried out in 2012, in order to record the archaeological sites in the National Relics Index of Iran which made the recent survey process easier. Based on the data from this survey, it can be stated that our understanding of the Paleolithic Period in Holeylan Valley, at the moment, is brighter than the past few decades.

Natural Geography and Geomorphology of Holeylan Valley

Holeylan Valley is located in central Zagros and the northern bank of Seymareh River, northeast of Ilam province. According to political divisions, this valley is in compliance with Holeylan County in Holeylan District and Chardavol City. Holeylan District is attached to Kermanshah province from the northwest and north, with Lorestan province from the northeast, east, southeast and south and with the central part of Chardavol City from the west (Fig. 1).

Holeylan Valley (Fig. 2) is surrounded by a number of Zagros Mountains named Qelasam, Dwem Ronah, Hwilon, Charmi, Marr Aw, Zardelan, Zakhah, Kwerran

1. The aforementioned research proposal was formulated by one of the authors, Davoud Davoudi, under the title "Survey and Identification of Paleolithic Sites in Holylan Valley" and was done on the basis of permit no. 943141.00.5990 issued on 10.11.2015 for one month from Iranian Research Institute of Cultural Heritage, Handicrafts and Tourism.

Bezan, Owlaqua and Kwehwilah. The presence of main straits and passages such as Sipela, Hamam Lan and Shah Biaq have linked the area to other parts of Central Zagros. On an average, Holeylan Valley is 900 meters above the sea level. Some of the mountains surrounding the valley reach to 1,700 meters above the sea.

In terms of Selyanof Climate Class, Holeylan is in the intense and middle semi-arid class. A small part in the north-east of this area is semi-humid. This situation is somewhat different from the UNESCO Climate Class. The UNESCO has divided Holeylan into three areas i.e. semi-arid climate with cool winters and hot summers, semi-arid climate with cool winters and very hot summers and semi-arid climate with cold winters and hot summers (Afraz Peymayesh Consulting Engineers Corporation, 2007).

The main water resource for Holeylan is Seymareh River, which is formed 25 kilometers southeast of Kermanshah by merging the two rivers of Gamasiab and Qara Su at a place known as Golah Jar between the two villages of Pasar and Faraman. Seymareh River pours into the valley through Hamam Lan Strait and leaves it through Sipela Strait. The meander of the river from the mouth of Hamam Lan to Sipela Straits is more than 30 kilometers long. The other water resources in Holeylan are Jezman River, Pal Barik, Pal Jamshid, Gelal Kaw, Soulawa tributary streams and Sarsarab, Seraw Kahrah, Kani Sarda and Gwerjkah springs.

This geographical situation has provided favorable living conditions for species of flora and fauna in this area. Vegetation in the plains is mostly bush and in the mountains is mostly woodland. Oak is the dominant species of trees. Various types of medicinal herbs, as well as coloring, resinous and aromatic plants constitute the vegetation of Holeylan. A variety of mammals, reptiles, birds, aquatic animals and insects constitute the other living species of the area.

A few scientific and technical researches have been done on the geology of some areas in Zagros and especially in Holeylan. It has only been mentioned in a number of papers published in this field. Based on the geological data that has been prepared by Lorestan Water Company (Afraz Peymayesh Consulting Engineers Corporation, 2007), the Holeylan area is a combination of Amiran, Asmari-Shahbazan, Kashkan, Gurpi, Tale Zang, Gachsaran and Imam Hassan geological formations. A small fault parallel to Seymareh River, near the border with Lorestan indicates the tectonic activities there. These formations include calcareous Marley Shale, Sand Stone and Conglomerate containing Chert Rocks (Casciello et.al., 2009; Hakimi et.al., 2010; James & Wynd 1965; Mirzaee & Moosavi Poormahram 2011; Parvin et.al., 2013). These formations belong to Cretaceous, Paleocene, Eocene and Quaternary Periods (Homke et al., 2010).

During the Quaternary Period, Amiran and Kashkan formations were the most

important sources of raw materials for tool making. In addition to Conglomerate outcrops containing Chert rocks which can be seen in abundance in the mountains surrounding Holeylan Valley, there is abundance of pebbles and cobbles in the valley due to the erosion of aforementioned formations. These made easier the human groups access to the raw materials required for tool making. The ground units in Holeylan include mountains, foothills, plateaus and upper terraces, hillsides, sedimentations, river and flood plains, as well as fan-like gravel debris. The soil class in this area includes brown steppe soils and semi-humid Lytusel soils (Afraz Peymayesh Consulting Engineers Corporation, 2007). Most of the large caves and rock shelters used by the prehistoric human groups belong to some areas in the Folded Zagros (Heydari, 2007: 657). The most important areas in this part of Zagros include Bisotun, Kermanshah (Coon, 1951; Braidwood, 1960), Khorramabad (Hole and Flannery, 1967; Hole, 1970), Kuhdasht (McBurney, 1969a, 1969b; Bewely, 1984) and Holeylan (Mortensen, 1993).

Research Background

In the spring of 1973, Peder Mortensen and a number of students from the University of Arhaus, Denmark discovered various ancient sites during a three-month intensive survey of Holeylan. Mortensen continued this study in 1974 with the cooperation of the Iranian Center for Archaeology and History of Art. He also was able to discover a number of other sites (Mortensen, 1974). In general, in Mortensen's study, 24 Paleolithic and Epipaleolithic sites including 15 open air sites and 9 caves as well as rock shelters were discovered in Holeylan (Mortensen, 1993).

Pal Barik is one of the most important discoveries of the Danish Expedition. A collection of Acheulean artifacts was obtained from this area which includes hand axes, choppers, massive points, discoid cores, end scrapers, side scrapers and denticulated and notched flakes. Larger size of stone tools is one of the characteristics of these artifacts (Mortensen, 1993: 161-162). The geomorphological study carried out by Ian A. Brooks to date the stone tools in Pal Barik is as follows:

"Piedmont geomorphic elements are the most extensive in the study area. They include gravel-veneered pediments and alluvial gravel fans which extend from the base of limestone escarpments and hogback ridges to the narrow alluvial valleys of the Saimarreh River and its right bank tributary, Jazman Rud…. Two such pediments are seen in the study area, best developed north of the Saimarreh. The higher and, thus, the older one has been extensively dissected by later erosion and remains only on interfluves, usually closer to the mountain front. … The lower and younger pediment is extensively developed both north and south of the Saimarreh. It was fashioned by streams which reduced the higher pediment to its present interfluve remnants, occupying narrow valleys between these, but broadening distally into continuous, gently-sloping surfaces. … Mortensen's 'Acheulean' artefacts found near

Sar Cam lie on the surface or the lower of the two pediments…. The geomorphic elements present and both probably predate the Last Interglacial (>130 ka before present)" (Mortensen, 1993: 162).

According to this study, Mortensen believes that although the artifacts might have been in chaos during recent periods due to plowings, the geomorphology of the area indicates that Pal Barik is younger than 130 thousand years (Mortensen, 1993: 162).

The Danish Expedition excavated the Paleolithic caves of Marr Gwergalan and Marr Rous while carrying out the survey on Holeylan. In October 1974, a 1×2-meters trench was planned at the entrance of Marr Gwergalan, which led to the identification of seven cultural layers. According to Mortensen, layers C and D in which tools such as small scrapers, notched blades, single shouldered points and geometric microliths were found belonging to the Epipaleolithic Periods (Zarzian) and the lower phases of layers D and E indicate the Upper Paleolithic Period (Baradostian) due to the presence of Burins and lack of geometric microliths (Mortensen, 1993: 165-166). In the same year, a 1×2-meters trench was dug out at the entrance of Marr Rous Cave that reached to the bed rock in the depth of 1.75 m. A total of three natural-cultural layers have been discovered in this trench: layer A1 containing surface sediments, layer A2 containing the remains of pottery and layer B belonging to the Epipaleolithic Period (Mortensen, 1993: 166).

In 2012, one of the authors of the present article re-examined a number of caves discovered by Mortensen within the framework of recording the ancient sites in Holeylan Valley in the national Relics Index of Iran which led to the discovery of some stone artifacts related to the older ages which had not been mentioned in the course of the previous studies (Davoudi et al., 2015a; Davoudi et al., 2015b). After the research conducted by the Danish Expedition in Holeylan, no further study was carried out to identify and evaluate the Paleolithic Period and the present study is the only systematic and methodical research in finding the proposed sites.

Considerations, Objectives and Methods

After more than forty years since the discovery of the Paleolithic sites in Holeylan Valley, this area was investigated during a month of intensive activities on foot and using Arial images and geographical maps between November and December 2015 with the aim of discovering more and safer evidence of the Paleolithic period.

Considering the potential environmental and topographical features of the area, it was foreseeable that a large number of Paleolithic settlements will be discovered by adopting a precise searching method. However, the topographic features and similar natural advantages in the adjacent areas led to the discovery of several Paleolithic sites in Kwerran Bezan (Alibaigi et al., 2011), Kuhdasht

(McBurney, 1970; Bewley, 1984) and Islamabad (Biglari & Abdi, 1999) areas.

In general, the objectives of this study can be explained as follows: a) Identifying Paleolithic sites in Holeylan Valley; b) Investigating topographical features of each site and its surrounding environment; c) Defyning the use of the Paleolithic sites in Holeylan; d) Recognizing destructive causes of the Paleolithic sites; e) Typology and classification of stone artifacts found in the investigations; f) Presenting a relative chronology of the discovered sites in the different phases of the Paleolithic period; g) Procurement of Paleolithic map of Holeylan; h) Investigating the importance of Holeylan in Iran and West Asia in terms of the Paleolithic issue as one of the pathways for human migration in different phases of the Paleolithic period; I) Investigating the effect of the different geographical parameters on the site selection patterns of the Paleolithic societies in Holeylan area.

Therefore, Holeylan Valley was divided into smaller units after acquiring knowledge of the details of its topography and based on its 1/25000 geographical maps and each unit was surveyed to find the Paleolithic sites. Team members moved along with a line and at intervals of 20 meters from each other. The geographical coordinates of the sites were recorded by GPS. After identifying the sites, each one of them were given a code based on the alternative code of the Iranian Center for Archaeological Research. Then, the geographic and topographic coordinates of each site and its environment were noted and their relation to each other was investigated. To better understand the descriptions, a plan was prepared for the sites in the form of caves or rock shelters. Cultural materials relevant to each area were collected through random sampling, of course, in a way that matched the purpose which was to complete the chronology and evaluate their technological diversity. Then, the materials were placed separately in bags. Photographs were taken from all the cultural materials and the typical stone tools were selected for drawing.

In the study on these artifacts, the published resources related to the Paleolithic Period and the technology belonging to it has been used. After studying the sites and cultural materials, the collected geographic information was analyzed and the effect of various geographical parameters on the formation of the sites was evaluated. The result of a one-month study on Holeylan Valley was finding 103 sites and settlements used by the human groups during the Paleolithic Period. Most of them are located on the banks of Seymareh River, tributary streams and in the mountains surrounding the valley. As previously mentioned, some of these areas were discovered in the context of recording the historical and cultural monuments of Holeylan in the spring of 2012. However, 24 sites were discovered before by the Danish Expedition that we could find them by searching their local names, their locatopns and maps and revise

the information presented for them. Therefore, some of the names determined by the Danish Expedition were replaced by the local and real names and the dating was revised according to the new data. Most of the Paleolithic sites in Holeylan Valley are open air sites (Fig. 3) and some of them are caves and rock shelters. Different species and varieties of tools have been obtained from these sites. All of the findings from this study which include 2035 pieces of stone artifacts were housed over Cultural Heritage, Handicrafts and Tourism Main Office of Ilam Province after performing preliminary studies and coding.

Lower Paleolithic Period

The situation of Lower Paleolithic Period in Holeylan is rather vague due to the lack of laboratory studies. However, the discovery of several sites in this study can relatively help us resolve some complex issues. The only site identified by Mortensen in this area is Pal Barik, recently renamed as Pal Jamshid 4 that despite the abundance of elements representing the Lower Paleolithic Period, it is still uncertain to relate it to this period. In addition to this site, 16 other sites have been identified with possible evidence of Lower Paleolithic Period in Holeylan Valley (Fig. 4). All the sites are open air sites at the bank of Seymareh River, Gelal Kaw, Pal Jamshid and Soulawa Tributary streams, except for Marr Gewrgelan Cave (Davoudi et al., 2015b), which is located at the west highlands of Kahrah village. The largest site is Chia Makhan 2 that has an area of approximately 4 hectares and is located on a natural hill along Seymareh River. The relative density of the stone tools in this area is 4 pieces per square meter. The smallest site is Ban Zemgah 1 in the north of Sarcham village overlooking Seymareh River which has an area of 350 square meters. Low density of the cultural data in this site indicates the limited activity of the human groups in the Lower Paleolithic Period. Six sites have an area between 5000 square meters to one hectare, four sites have an area between 3000 and 3500 square meters and four other sites have also an area between 2000 and 2500 square meters.

Hand axes and bifaces are the most prominent Lower Paleolithic stone tools in Holeylan (Fig. 5), which includes 13 pieces. In addition, some core/choppers and denticulate massive scrapers have been found in these sites that may indicate the spread of the culture of tool making at this period in the valley. Therefore, due to the existence of the same elements among the technology of the stone tools in different periods, the possibility of more Lower Paleolithic Sites in Holeylan is not far-fetched.

Based on the typology of some of the artifacts such as small hand axes and also based on the geomorphological studies by Ian Brookes, Mortensen determined the probable date of 100 thousand to 80 thousand years ago for Pal Jamshid 4 collection. He also believes that the typology of the tools in this site does not help much in dating it. While suspecting

that these tools which represent Mousterian technology may be obtained from the Acheulean tradition, he believes that Mousterian of Acheulean tradition in Europe and the East Mediterranean belongs to the early stages of the Middle Paleolithic Period (Mortensen, 1993: 162). Mortensen considers the collection of Pal Jamshid 4 comparable to the artifacts of two Late Acheulean sites in the area called Barda Balka and Cham Bazar in Iraq's Zagros which are similar to the classic Acheulean artifacts in Europe and Levant. However, he emphasizes that it is difficult to conclude this comparative study because none of the small hand axes is similar to each other, the choppers are simple, the flakes are rough, the points are not very typical and the scrapers are few in number. In addition, these two sites have different geomorphological features compared to Pal Jamshid 4 (Mortensen, 1993: 163).

New chronologies in Central Asia and Levant Area suggest the date of about 250 thousand years ago for the end of the Lower Paleolithic Period and the beginning of the Middle Paleolithic (Mercier and Valladas, 1994; 2003). Furthermore, Thorium/Uranium analysis on a bone fragment discovered from Layer 2 of Homian 1 Rock shelter in Kuhdasht offers the date of 148000 ± 35 years ago (Bewley, 1984). Since in addition to the bone, Mousterian tools have also been obtained from this layer, the proposed date for the Lower Paleolithic Period in Holeylan by Mortensen can be revised and connected chronologically to the Middle Paleolithic sites in Southwest Asia. However, the typological differences of the stone tools in Holeylan with these areas cannot be ignored.

Anyhow, the present study has provided an opportunity to consider a history older than that suggested by Mortensen for the Lower Paleolithic Period in Holeylan Valley. The Acheulean large biface tools in Holeylan and other areas of Iran show technological affinities with similar examples discovered from European sites (Ashton & White 2003), Caucasian (Doronichev & Golovanova 2003), East Mediterranean (McPherron, 2003) and India and Africa (Noll and Petraglia, 2003; Schick and Clark, 2003) which are worthy of consideration.

Middle Paleolithic Period

This period represents more settlements sites and cultural data than the other phases of the Paleolithic Period in Holeylan Valley. The Danish Expedition was able to identify and introduce eight Middle Paleolithic sites (Mortensen, 1993). However, this study led to the discovery of 92 Middle Paleolithic sites in Holeylan which constitute to 90% of the Paleolithic sites (Fig. 6). Furthermore, the discovery of the artifacts belonging to the Middle Paleolithic Period from several sites which previously had been attributed to the Upper and Epipaleolithic Periods could give us a hint about the older dates of these settlements (Davoudi et al., 2015a). In terms of morphology, 18 settlements have been in the form of caves and rock shelters

and 74 settlements are the open air sites scattered on the bank of the rivers, tributary streams and springs of Holeylan Valley.

The caves and rock shelters can be divided into three groups. The first group includes base-camps with a significant volume of layers and cultural data. The second group includes settlements used in accordance with seasonal and weather conditions and the third group includes low-extent caves and shelters and limited cultural data. The natural position of the third group indicates that they were probably temporary hunting dens and shelters at the time of rainfall. All of the caves and rock shelters are located at the Northwest and North of Holeylan, except for Sar Marran Rock shelter which is located at the eastern end of Holeylan Valley. Marr Gwergalan, Marr Dera Vila, Dar Marr Caves, and Darah Serah and Marr Houshi rock shelters have a privileged natural position, high-volume cultural data, high mass deposits and are among the most important Middle Paleolithic sites in Holeylan.

Among the 74 open air sites, 55 sites have an area less than half a hectare, 156 sites have an area of half to 1 hectare and 3 sites also have an area more than 1 hectare. The largest and smallest sites are also Chia Makhan 2 and Var Anjir 1 that have an area of respectively 4 hectares and 700 square meters.

The tools at this period (Fig. 7) have greater diversity than at the previous period and often include Mousterian or levallois cores, points, scrapers, blades, borers and used flakes. Levallois technique (Fig. 8) has been used in making most of these artifacts. The technological diversity and variability of these artifacts reflect on the diversity and progress of hunter/ gatherer human behavior (shea, 2013). These artifacts are sometimes comparable to the collections in the Mousterian Assemblages of Central Zagros (Coon, 1951; Bewley, 1984; Baumler & Speth, 1993). It is also likely that some Paleolithic Achuelean traditions have been repeated in the Middle Paleolithic of this area such as a Limace from Var Anjir 2 with high dorsal surface, ventral plan concave with traces of retouches on edges. Limace (Shea, 2013) probably represents early Middle Paleolithic tool making tradition in Holeylan.

Upper Paleolithic Period

Upper Paleolithic sites in Holeylan Valley have less frequency than the previous period. A total of 48 sites (Fig. 9) were identified with possible evidence of Upper Paleolithic Period that few of them have been introduced during the Danish Expedition survey. These sites consist of 13 caves/rock shelters and 35 open air sites. Among them, 23 open air sites have an area less than half a hectare, 10 sites have an area between a half to 1 hectare and 2 sites have an area more than 1 hectare. Chia Makhan 2 is the largest site with an area of 4 hectares and stone tools from different Paleolithic Periods are scattered there with high density. One of

the most important Upper Paleolithic caves explored by Mortenson is Marr Gwergalan Cave. He related the lower layers of the cave to Baradostian due to the presence of burins and lack of geometric microliths (Mortensen, 1993: 165-166).

The settlement pattern of the Upper Paleolithic Period in Holeylan is mostly similar to the previous period, with the exception that the settlements are reduced at this period. The reducing number of the Upper Paleolithic settlements is a situation that has already been reported on the adjacent areas of Holeylan such as Kwerran Bezan (Alibaigi et al. 2011), Bistoon (Biglari, 2000) and Mehran Plain (Darabi et al., 2012).

The most significant Upper Paleolithic tools obtained from Holeylan in the current study include the points, non-retouched blades and blade cores. The discovered points from Pal Barik and Derah Vilah Rock shelters and also Marr Darah Vilah Cave which are sometimes similar to the Zagros Baradoustian and European Aurignacy points (Otte et al., 2007; Otte, 2014) are some evidence of this period in Holeylan.

Epipaleolithic Period

Distinguishing some of the late Upper Paleolithic and early Epipaleolithic artifacts related to Zagroa Zarzian technique from each other has been difficult and made the identification of sites problematic. Presumably, the abundance rate of Epipaleolithic sites in the area is under the influence of unknown technological features of this period. Mortensen in his investigations in Holeylan Valley refers to 15 Epipaleolithic sites, including 6 caves and rock shelters and 9 open air sites. His soundings at Marr Gwergalan and Marr Rous Caves increase our understanding of the Epipaleolithic Period and its tool making industry in Holeylan (Mortensen, 1993). The technology of Zarzian tools is mostly based on geometrics like trapezoidal and triangular microliths (Wahida, 1999). Most of the Upper Paleolithic sites in Holeylan have Epipaleolithic tools as well. In the present study, a total of 57 sites have been identified (Fig. 10) including 17 caves and rock shelters and 40 open air sites belonging to the Epipaleolithic period. 27 open air sites have an area of about half a hectare or less than half a hectare, 10 sites have an area between half a hectare and 1 hectare and three sites have an area more than 1 hectare. Kalatah site with an area of about 15 hectares is in the form of a small isolated mountain with rocky shelters at the foot. This area could provide the environmental conditions for the largest human settlement in Holeylan in the Epipaleolithic Period due to its suitable topography. The smallest Epipaleolithic site is Var Asnjir 1 with poor dispersion of stone tools.

In the eastern part of Holeylan Valley at the confluence of Seymareh River and Doab Tributary stream, on a natural hill, is the open air site of Sar Marran 5 (Fig. 11) is located which has purely the cultural evidence of the Epipaleolithic Period. This site has an area of 2500 square meters and the density of the distribution of the artifacts is about 5 pieces per square meter. Mono-periodical nature of this site helps the identification of the Epipaleolithic

tools in Holeylan. In Gamerdi Hill which is located at the southwest of Holeylan Valley overlooking Seymareh River, some geometric michrolith of Obsidian have been observed which indicates the beginning of the use of this material for tool making at the Epipaleolithic Period.

Discussion

As previously mentioned, this study led to the identification of 103 sites related to the Paleolithic hunter/gatherer human settlements within an area of nearly 70 square kilometers in Holeylan Valley. This area is geographically in the same size to the Danish Expedition's study area. These sites include 24 caves and rock shelters and 79 open air sites. Open air sites are often located on the alluvial terraces and ridges in the form a specific pattern on the margins of Seymareh and Jezman rivers and have a favorable view to the surrounding environment. Apart from Kalatah which is a series of rock shelters and has a wide area and Chia Makhan 2 which has an area of approximately 4 hectares, there are 77 open air sites with an area less than 1.5 hectares. These sites have an area as follow: 3 less than 1000, 35 between 2000 and 3500, 19 between 4000 and 5500 and 19 other between 7000 to 15000 square meters.

During the Pleistocene different human groups had settled down in Holeylan under different climatic conditions. Since, with the evidences in hand, there is no reliable reason for settlement fluctuation during the Pleistocene, it could have been related to the climate and environmental resources, which causing in reduce or increase the population rates, especially from Middle to Upper Paleolithic. Seymareh River played an important role in providing the food for these groups. The type of the tools in each site relatively indicates its use. Presumably, some sites overlooking Seymareh and Jezman Rivers were settlements in which most of their food have provided through fishing, crayfish, waterfowl and other river creatures such as mussels. The high volume of flakes and core flakes in some of the sites such as Var Anjir 1 and Remremah suggests that most activities at these sites had been assigned to tool making. At the west of Holeylan and around Kahrah village, a number of sites are indicating hunter's activities. Most of the caves and rock shelters in Holeylan are also located in this part. The stone artifacts obtained from the West of Holeylan include a variety of sharp points, choppers and scrapers that were associated with the activities of hunting and butchering. Sarseraw spring attracted the animal species requiring water and in this way provided the conditions for hunting them by the human groups. In the vicinity of the spring, there are Sarseraw 1 & 2 Sites with a collection of stone tools and artifacts representing hunting activities in this area. Holeylan also like other parts of Zagros has the Limestone Mountains with many caves and rock shelters. Except for Sarr Marran Rock shelter, the rest of the caves and shelters are located on the west and northwest of Holeylan Valley.

One of the best models of Paleolithic caves is Marr Gwergalan with some evidence from Lower, Middle, Upper

Paleolithic and Epipaleolithic periods. Marr Aw 1 Cave (Fig. 12) is the largest cave in Holeylan with an interior area of 250 square meters. Although the oldest artifacts obtained from this cave belong to the Epipaleolithic Period, because of the widespread presence of Middle Paleolithic human groups in the valley, the possibility of using this area in more ancient periods is not far-fetched. Other important shelters in Holeylan are Marr Derah Ville and Marr Rous Caves as well as Marr Houshi, Derah Vilah and Darah Serah Rock shelters with a significant accumulation of sediments of Pleistocene deposits that their findings are far richer than the other caves and rock shelters in the area. A number of rock shelters in this area were used as hunting ambush, temporary settlements or short-term shelters during the rainfalls in Middle, Upper Paleolithic as well as Epipaleolithic periods with respect to their location and cultural evidence. In general, there is a significant relationship between the use of the sites and the technology of stone tools. Comparative studies on the artifacts and tools obtained from the sites which were related to the water creatures in Seymareh River in terms of providing the food had clear technological differences with the tools obtained from the mountains and highlands where the food was provided through hunting the animals with something like javelins. The points discovered from the sites overlooking Seymareh has a wider width profile so that made their simultaneous use as a side scraper possible. In the sites closer to the mountains, sharper tools were discovered that had a better emissivity to hunt the animals.

Access to raw materials for the tool making was easy for the Paleolithic human groups in Holeylan. A total of 2035 pieces of stone tools were discovered from the Paleolithic sites in the area. 99 percent of which are made of Chert stone. Only a few of Lower and Middle Paleolithic tools were made from lime and sand stone. The Cherts were produces from Amiran and Kashkan formations located at the north, northwest and west of Holeylan. These formations contain Conglomerate tissues with Chert pebbles and cobbles. Seymareh and Jezman rivers as well as numerous tributaries that flow from these formations through the valley have accumulated large amounts of sediments containing Chert stones at the bottom of the valley. Despite this situation, it seems that the human groups did not need much effort to procure raw materials. Usually, in the Paleolithic Period, the access to the raw materials had a relative influence on the type and quality of the technology of the stone tools (Terry et al., 2009).

In general, the stone tools in this region do not have invasive and covering retouches but have denticulated and serrated edges. Abundant raw materials were an opportunity to produce sharp tools without the need to reduce them for re-sharpening. Probably, in rare cases where access was difficult to Chert stones, tools were made through denticulating the edge of the limestone sheets. In general, the size of limestone tools is larger than the others

made from Chert. There has not been any constraint for making stone tools in favorite sizes because of the abundant Chert pebbles and cobbles. Abundant raw materials on the other hand caused the hunter/ gatherer groups had no need to carry the blanks to their place of settlement. In such a situation, it seems that hard hammer percussion, soft hammer percussion and Anvil techniques were common especially in the earlier stages of Paleolithic Period in this area since denticulating the tools was done through one of these methods. Indirect percussion and pressure flaking techniques were common in the late stages of Paleolithic Period and their works can be found specifically in core blades and bladelets. Overall, more than 50 percent of the artifacts obtained from the Paleolithic sites in Holeylan have cortex. In a further analysis, it can be said that if the tools in the Epipaleolithic sites and the areas far from the raw materials are not considered, more than 70 percent of the tools belonging to the Lower and Middle Paleolithic sites are cortical pieces. The need to make micro tools, especially in the Upper Paleolithic and Epipaleolithic Periods is the most important reason for the lack of cortical tools. In Epipaleolithic sites such as Kalatah and Gameradi, respectively about 15 and 20 percent of the total tools are cortical and this amount reduces to 5 percent in Sarr Marran 5 Site which is mono periodical and related to Epipaleolithic Period.

Conclusion

According to the above-mentioned issues, it can be said that easy access to Chert stone for tool making was one of the main reasons for the formation of human settlements in the Paleolithic Period in Holeylan. In addition, other geographic variables had an essential role in the human groups' site selection. One of these natural variables is the water resources such as Seymareh and Jezman rivers, as well as tributary streams and springs which provided food for the human groups and transported Chert pebbles from mountains to Holeylan Valley. The position of the caves and rock shelters on the heights surrounding the valley and their closeness to the alluvial hills made possible the human groups' quick switch from the mountains to the plains and vice versa. The elevation above sea level is also another important factor that must be considered.

The height of Holeylan above the sea level is lower than the other mountainous areas in Lorestan and Kermanshah. Since there is a direct correlation between elevation above sea level and temperature of an area, the lower height of Holeylan caused it to have a more favorable climate. Therefore, climate and weather condition as a favorable geographical variable had a significant role in the wide settlements of the Paleolithic humans in this area during the Ice Age. Caves and rock shelters were safe for humans during the Ice Age. It seems that despite the relatively large number of Lower Paleolithic sites and their continuing settlement in the next period, the beginning of the Middle Paleolithic

Period in Holeylan was simultaneous with the first stages of this period in Levant, Caucasus and Central Asia.

A large number of the discovered sites in the present study and the diversity of stone artifacts represent the valuable position of Holeylan in the Paleolithic studies in the Southwest of Asia. To analyze the resulting cultural material, abundant time, adequate funding, question-based and methodical researches are required. Laboratory-based research methods clearly solve the confusions and ambiguities about the Paleolithic archeology in Holeylan and Central Zagros.

It is essential to note that today, the existence of some Paleolithic sites in Holeylan have been damaging by several issues. Construction activities and related engineering activities are destroying some of the sites. Constructions of sand factories on the alluvial hills which are the context of several Paleolithic sites are also the cause of destruction. Ezat Mardi Site which is named as Seymareh C in Mortensen's reports is now completely destroyed. Creating wide and deep channels to convey polyethylene and gas lines have destroyed the cultural layers in several sites. Pal Jamshid 3 and 4, Chia Heyarkhan and Chia Makhan 2 Sites which have some evidence of the Lower Paleolithic Period have been destroyed relatively due to these activities. Annual plowing for agriculture has damaged the surface of a number of sites. Illegal excavation carried out in some other sites is as well another human culprit in this area.

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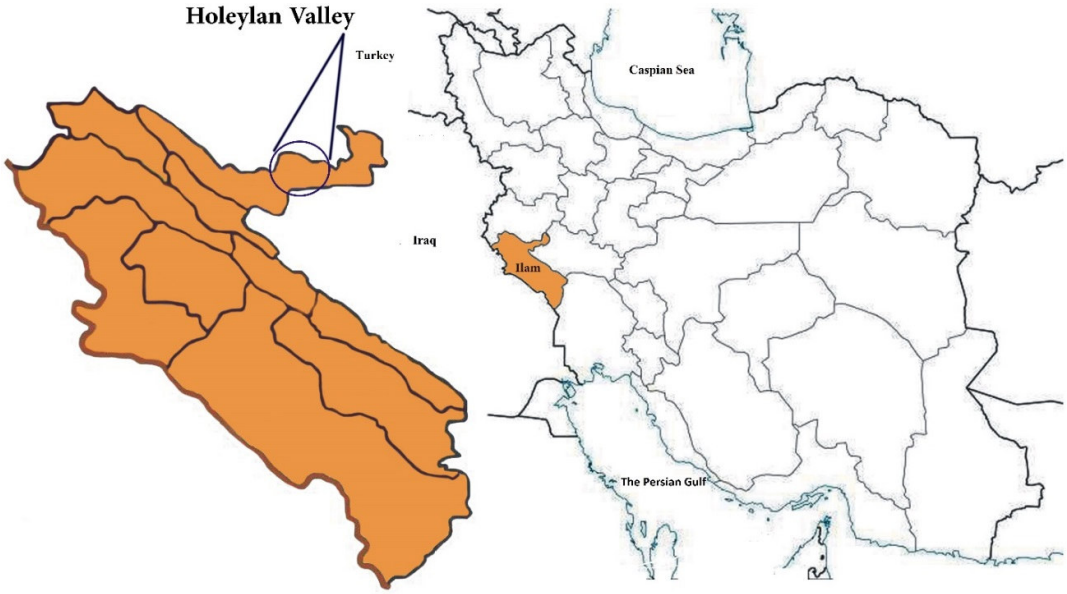

Fig. 1: The location of Holeylan Valley

Fig. 2: The landscape of Holeylan Valley (view from the top of Kwerran Bezan Mountain)

Fig. 3: The open air sites at the eastern part of the Holeylan Valley (a: Sar Marran 1, b: Sar Marran 2, c: Sar Marran 3, d: Sar Marran 4)

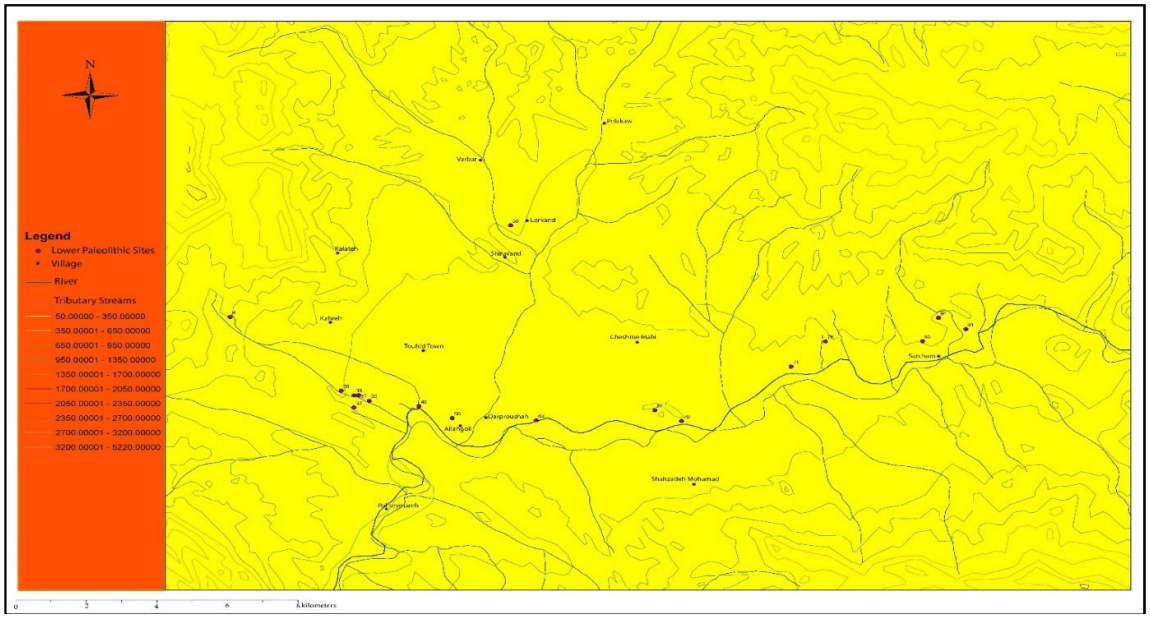

Fig. 4: Lower Paleolithic localities of Holeylan Valley

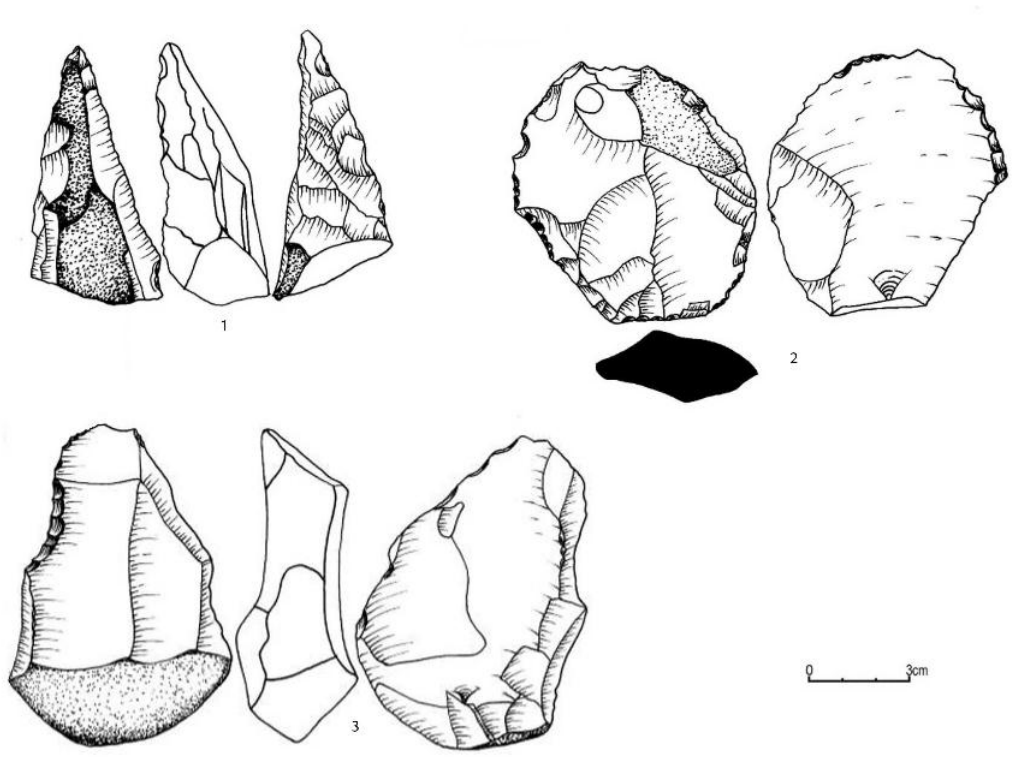

Fig. 5: Lower Paleolithic Industry in Holeylan Valley (1: Gelalkaw 4, 2: Kamtar Kweshia 1, 3: Banhoushi)

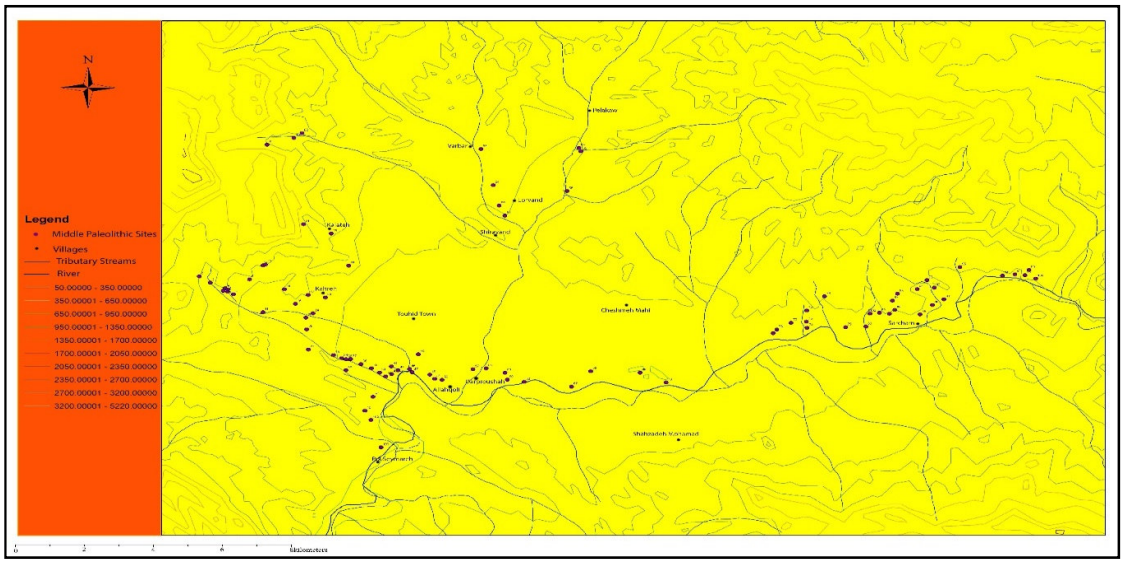

Fig. 6: Middle Paleolithic sites of Holeylan Valley

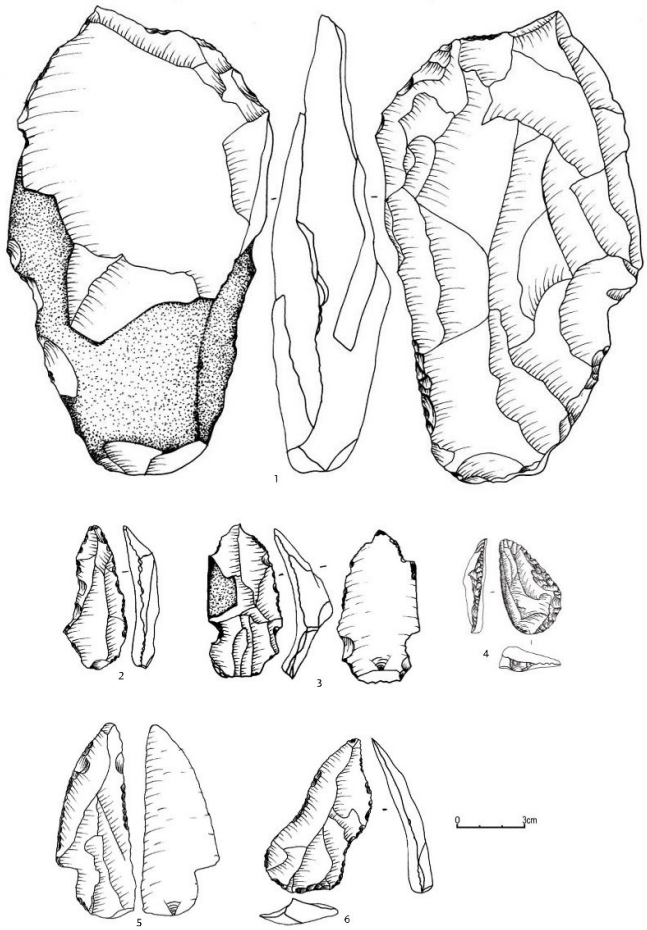

Fig. 7: Middle Paleolithic Industry in Holeylan Valley (1: Palbarik 3, 2: Chwerchwera 2, 3: Vala, 4: Dar Marr, 5: Darasera, 6: Chamshama 1)

Fig. 8: Levallois technique in Holeylan (1: Chamshama 1, 2: Sar Marran 2, 3: Zardasowar, 4: Chia Makhan 2)

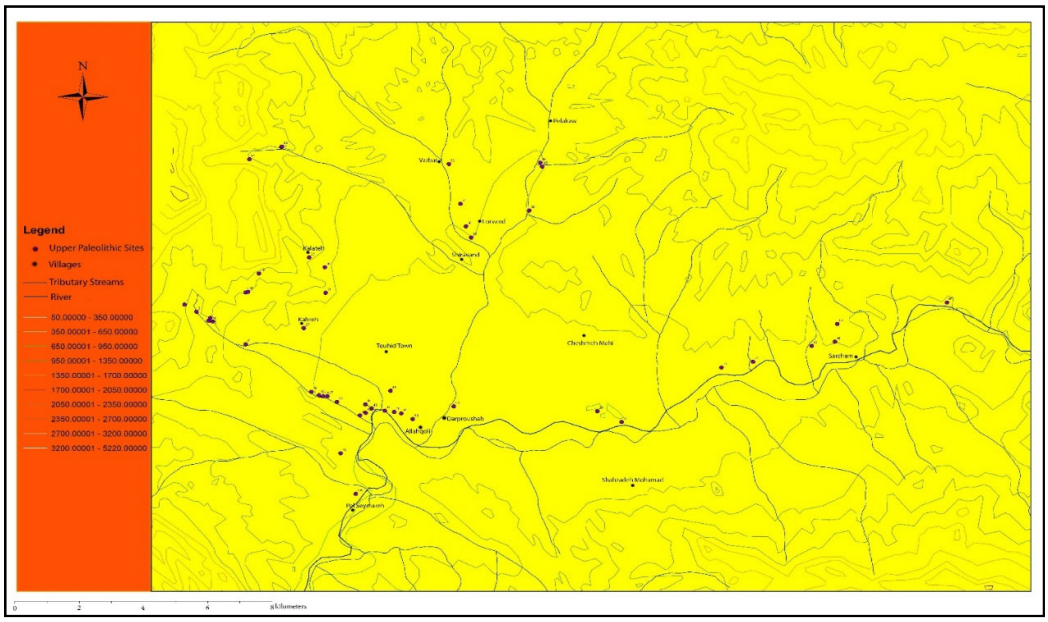

Fig. 9: Upper Paleolithic sites of Holeylan Valley

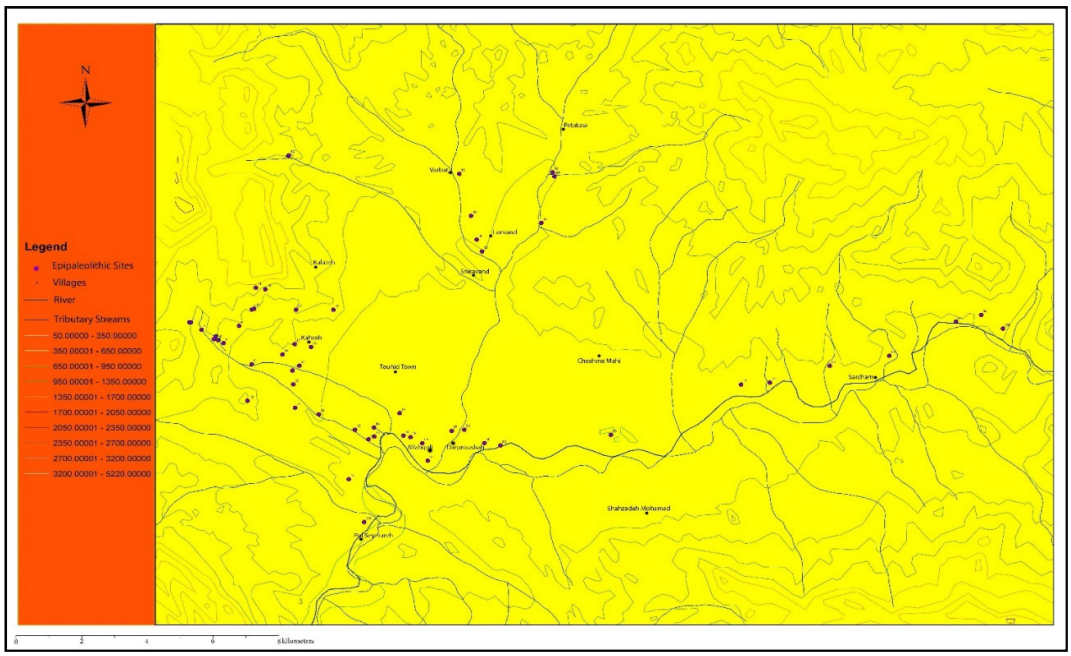

Fig. 10: Epipaleolithic sites of Holeylan Valley

Fig. 11. The open air site of Sar Marran 5

Fig. 12. Mar Aw 1 Cave

بررسی پارینه‌سنگی در هلیلان، زاگرس مرکزی، ایران

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تاریخ دریافت:۹۵/٦/۲۳ تاریخ پذیرش: ۹۵/۹/۳۰

درّه هلیلان به دلیل ویژگی‌های زمین‌ریخت‌شناسی مناسب و وضعیت مطلوب زیست‌محیطی در زاگرس مرکزی از ظرفیت‌های بیش‌تری در ارائه‌ی مکان‌های پارینه‌سنگی برخوردار است که تا کنون نشان داده شده است. بنابراین، ضرورت انجام یک بررسی باستان‌شناسی جامع و فراگیر در این دره به منظور کشف محوطه‌های پارینه‌سنگی کاملا محرز بوده است و این هدف در پاییز ۱۳۹٤ تأمین گردید. پرسش‌های اصلی پژوهش بر مبنای تعداد محوطه‌ها، نوع و اندازه آنها، چگونگی تأثیرگذاری متغیرهای جغرافیایی بر الگوهای انتخاب محوطه، تکنیک‌های ابزارسازی و شناسایی منابع مواد خام در هلیلان طراحی و تدوین شد.

در خلال این بررسی، تعداد ۱۰۳ مکان شامل ۲٤ غار و پناهگاه سنگی و ۷۹ محوطه باز شناسایی شده‌اند که کاربری‌هایی چون سکونت، اردوگاه فصلی و کمین‌گاه شکار داشتند. به جز یک پناهگاه صخره‌ای که در بخش شرقی دره واقع شده، بقیه در قسمت شرقی آن شناسایی شده‌اند. محوطه‌های باز، بر روی پشته‌های طبیعی و تراس‌های واقع در حاشیه رودخانه سیمره، رودخانه جزمان و شاخابه‌ها شکل گرفته‌اند. وضعیت اقلیمی و خصوصیات تکتونیکی، دو عامل اساسی در اشغال هلیلان به عنوان یکی از مهم‌ترین دره‌های زاگرس مرکزی در خلال دوران پارینه‌سنگی بوده‌اند. به همراه این دو عامل، عواملی نظیر منابع آبی و میزان ارتفاع هلیلان از سطح دریا، در تأمین مواد اولیه و استقرار گسترده و مداوم در داخل این ناحیه عمل می‌نموده‌اند. قلوه‌های ریز و درشت سنگ چرت که از ارتفاعات پیرامون توسط رودخانه‌ها و شاخابه‌ها جابه‌جا و در بستر درّه انباشته می‌شده‌اند، منابع مواد اولیه در ساخت ابزارهای دوران پارینه‌سنگی درّه هلیلان بوده‌اند.

واژگان کلیدی: بررسی پارینه‌سنگی، زاگرس مرکزی، دره هلیلان، استقرارهای پارینه‌سنگی، ابزارهای سنگی.

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