Bu-Ali Sin University
Iranian Scientific Archaeological Association
پژوهش‌های باستان‌شناسی ایران
Archaeological Research of Iran
P. ISSN: 2345-5225 & E. ISSN: 2345-5500
Homepage: https://nbsh.basu.ac.ir/
Vol. 16, No. 49, 2026

Statistical Analysis of Settlement Patterns and Lifeways among Parthian-Period Communities in the Mountainous Highlands of Dehluran County Based on Archaeological Research

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https://doi.org/10.22084/nb.2025.29189.2671
Received: 2024/04/08; Revised: 2024/07/17; Accepted: 2024/07/28
Type of Article: **Research**
Pp: 235-253

Abstract

Dehluran County lies in an intermediate geographical zone between the southwestern highlands of the Zagros Mountains, the northwestern Khuzestan Plain, and eastern Mesopotamia. In current administrative terms, its northern uplands encompass the Sarab-e Meymeh and Zarrinabad districts and comprise a mountainous landscape formed by interconnected valleys of different sizes, with small intermountain plains occurring intermittently between the smaller and larger valley systems. The region is part of the Meymeh River watershed and, owing to its favourable geographical setting, has accommodated various human groups through successive phases of occupation, from the Paleolithic era to the present day. One of the main questions and objectives of this research is to investigate the character of the settlement patterns and the lifeways of Parthian-period communities in the mountainous highlands of Dehluran County, with special attention to statistical analyses carried out through geographic information system (GIS) methods. The study combines archaeological field survey, comprehensive library-based research, and the systematic preparation, comparison, and interpretation of GIS maps produced for the study area. Survey across roughly 1,355 km² documented 53 archaeological localities with Parthian-period cultural materials. These include 47 habitation sites, 2 cemeteries, 1 possible fortress, 1 rock relief, 1 rock shelter, and 1 tomb or subterranean structure. The spatial distribution of these localities and their overlay with GIS base maps demonstrate how natural factors influenced their formation, development, and decline. Communication routes, alongside environmental conditions, also played a fundamental role in determining the distribution of settlements during this historical period. Analysis of the full body of data generated through the different stages of research ultimately indicates the presence of a mobile society in the region during the Parthian period. This society depended mainly on pastoralism for subsistence, although agriculture was practised at certain times on intermontane plains possessing favourable environmental conditions.

Keywords: Dehluran, Mountain Highlands, Parthian Period, Settlement Pattern, Statistical Analysis (via ArcGIS).

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Citations: Shanbehzadh, A., Karamyan, Gh. & Rajabi, M., (2026). "Statistical Analysis of Settlement Patterns and Lifeways among Parthian-Period Communities in the Mountainous Highlands of Dehluran County Based on Archaeological Research". *Archaeological Research of Iran,* 16(49): 235-253. https://doi.org/10.22084/nb.2025.29189.2671

Journal of Department of Archaeology, Faculty of Art and Architecture, Bu-Ali Sina University, Hamadan, Iran.

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Introduction

The Parthian period represents a major cultural era in the broader field of Iranian archaeology. Lasting from 247 BCE to 224 CE, a total of 471 years, it extended across the whole territory of present-day Iran and into parts of neighbouring regions (Niknami *et al.,* 2006: 87). This considerable chronological and geographical extent, however, should not be understood as evidence that a wholly uniform cultural and social pattern prevailed throughout the entire area in either temporal or spatial terms (Haerinck, 1997: 124).

The changes that occurred during the Parthian period clearly differentiated it from earlier eras. Many prominent archaeologists therefore regard it as an important stage of cultural, economic, political, and social transformation in Iran (Mohammadifar, 2012: 124). Yet, despite the comparatively substantial body of research devoted to identifying this period and defining its main characteristics, fundamental questions about its cultural circumstances and its social, economic, political, settlement, subsistence, and other organisational frameworks remain unresolved and require further specialised investigation (Niknami *et al.,* 2006: 127).

The ethnic, cultural, political, and geographical diversity of the Parthian period has also made its cultural processes difficult to understand and, in many respects, obscure. Addressing these problems will require considerable time and a range of specialised research strategies, both now and in future archaeological investigations. Nevertheless, studies undertaken within clearly delimited regions can produce a more precise understanding and fuller awareness of the cultural details and processes associated with this phase of Iranian history. Such research has neither been conducted uniformly nor developed to the same extent across the broad geographical expanse of Iran. As a result, comprehensive analyses and general conclusions concerning the Parthian period throughout the country have frequently remained impossible or incomplete (Shanbehzadeh, 2023: 3).

Against this background, the mountainous highlands of Dehluran County, situated in the western hinterlands of the Central Zagros, form one of the principal intercultural regions considered in Iranian archaeology. The mountainous highlands of the Central Zagros border the area to the north and northeast, the Khuzestan Plain to the east and southeast, and the Mesopotamian plains of Iraq to the west and southwest. This geographical setting has repeatedly made the region a locus of cultural interaction during the prehistoric, historic, and Islamic periods. Nevertheless, despite

its importance, far less archaeological research has been undertaken in the highlands than in the plains of Dehluran (Sadeghi-Rad, 2023: 5). Knowledge concerning the character of settlement and the lifeways associated with it therefore remains limited, especially for the historical era and, more specifically, the Parthian period.

The mountainous hinterlands of the Zagros do not appear to have shared a single uniform cultural character. Although connected to one another, individual areas retained their own distinctive features and cultural traditions. Archaeological surveys and excavations throughout these regions generally trace the development, transformation, and chronology of nomadic and village-based communities from prehistory to the present. As already noted, northern Dehluran constituted a zone of cultural interaction between the prehistoric, historic, and Islamic cultures of the Central Zagros and those of the Khuzestan Plain and the Mesopotamian Plain. The cultural complexity of the Zagros has consistently been linked to the specific chronology of different regions, environmental changes, population fluctuations, technological specialisation, changes in settlement size, and cultural exchange. Examining these variables through analysis of the regional settlement pattern may make it possible to identify developed cultural formations, cultural communities, socially complex ranked societies, their lifeways, and other related characteristics (Sadeghi-Rad, 2023: 6).

The central research question is whether the study and analysis of Parthian-period archaeological localities identified through surveys of the mountainous highlands of Dehluran County can reveal one distinct settlement pattern or several settlement patterns. The study also asks whether analysis of the settlement patterns represented by Parthian sites in the Dehluran highlands can provide a clear account of subsistence practices, population fluctuations, and other related issues.

Accordingly, this study investigates the settlement pattern and lifeways of Parthian-period communities in the mountainous highlands of Dehluran County on the basis of archaeological research. Using evidence from regional survey, ecological studies, and statistical analyses derived from GIS data, it aims to clarify subsistence practices, identify the nature of the settlement patterns, and establish a clearer archaeological perspective on the Parthian period in this region within the wider historical and cultural development of Iran.

Research Background

The strategic position and favourable geographical setting of Dehluran,

especially the presence of its extensive plains, fostered a notable concentration of settlements associated with diverse cultural traditions over several millennia in this part of southwestern Iran. Dehluran therefore attracted the attention of archaeologists at approximately the same time as the earliest archaeological work in Khuzestan, which began in the early twentieth century (Nourollahi, 2006: 4–5). The French scholar Jacques de Morgan (Soraqi, 2008: 31), and subsequently Gautier and Lampre, were among the first researchers to investigate Dehluran archaeologically (Hole *et al.,* 1969: 8; Gautier & Lampre, 1905: 69; Vanden Berghe, 2008: 84–86). In relation to the historical periods, James Neely and Henry Wright surveyed the Dehluran Plain and neighbouring plains from 1968 to 1969 CE (1347 to 1348 SH), (Neely & Wright, 1994: 54). They also conducted more focused research on the historical periods, particularly the Elamite and Achaemenid eras (Wright & Neely, 2010: 214).

The first archaeological investigations in the Dehluran highlands, which form the study area, were undertaken by Louis Vanden Berghe. In 1972, as part of his continuing programme of research in the Pusht-i Kuh region, he conducted a survey of Dehluran. From 1971 to 1972, alongside his excavations at the Heklan Cemetery and the Dom Gar-e Parchineh Cemetery, he examined the surrounding area (Haerinck & Overlaet, 1996: 84). In addition to excavating the Heklan and Parchineh cemeteries, Vanden Berghe excavated part of the Chek Do Sa'ali structure, which belongs to the Sasanian period (Nourollahi, 2012: 7).

After the Iranian Revolution, specialists from the Cultural Heritage Organization made repeated visits to the Dehluran highlands and a small number of its archaeological remains. These visits, however, were unsystematic and conducted only on a case-by-case basis. Finally, from 2020 to 2021, Masoud Sadeghi-Rad surveyed the northern highlands of Dehluran, including both the study area and its surrounding landscape. His objectives were toDehluran andvious research, prepare the nomination dossier for inscribing the prehistoric cultural landscape of Dehluran on the UNESCO World Heritage List, evaluate the condition of archaeological remains in the mountainous highlands of northern Dehluran, and investigate interactions between the inhabitants of the highlands and plains during different periods (Sadeghi-Rad, 2023: 5).

Research Method and Study Area

This study is applied and developmental in its objectives and employs a descriptive–analytical method that is field based in character. The research

was conducted in three principal stages, each comprising several subsidiary steps.

The first stage consisted of fieldwork, which entailed a systematic pedestrian survey of the entire study area and the recording of all identified archaeological localities. The resulting observations were compiled in Excel as statistical data and subsequently integrated into a geodatabase within ArcGIS.

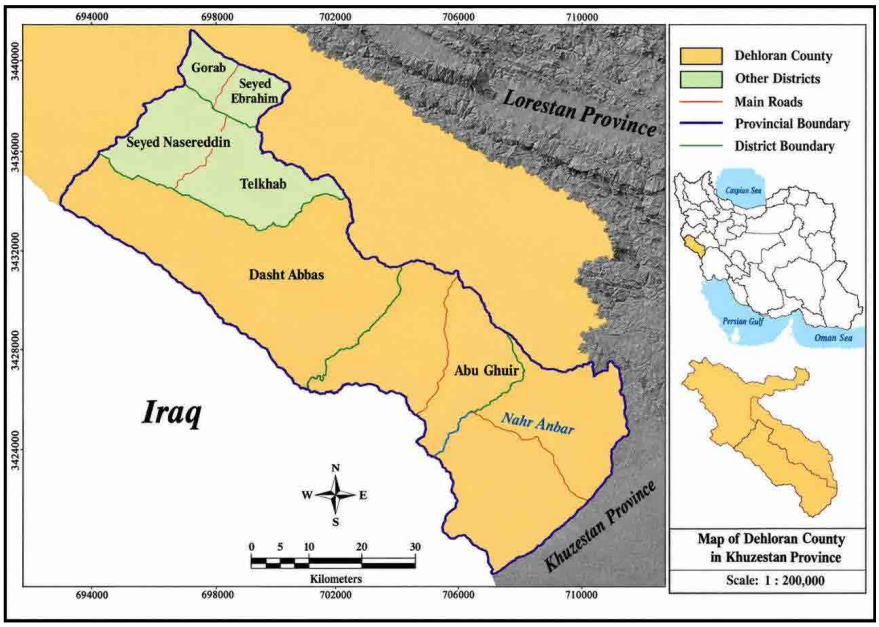
The second stage involved comprehensive library based research. This included the identification of relevant sources, a review of previous survey results and studies, the chronological classification of the recorded localities, and the collection of environmental and geographic information together with base maps and satellite imagery. All these materials were then incorporated into the GIS database.

In the third stage, the spatial data generated through the field investigation of the 53 Parthian period archaeological localities, already arranged chronologically, were compared with the information gathered from the library based studies. The site data were subsequently overlaid on base maps depicting geology, topography, climate, water resources, and vegetation, thereby enabling the research findings to be analysed.

The study area encompasses the mountainous northern portion of Dehluran County. It has a mean elevation of 1,268 m above sea level and extends from 32°50′ to 33°19′ N and 46°37′ to 47°17′ E. The area lies 55 km southeast of the city of Ilam in a straight line. Administratively, it includes Sarab e Meymeh District, comprising the rural districts of Gurab and Takhtan, and Zarrinabad District, comprising the rural districts of Seyyed Ebrahim and Seyyed Naser al Din. The total extent of the study area is approximately 1,355 km².

Physical Geography of Dehluran County

In geological terms, Dehluran lies at the westernmost extent of the Folded Zagros Zone. Limestone formations predominate in its northern and eastern sectors, while the Bakhtiari and Aghajari formations characterise the south and west. Quaternary deposits form most of the central areas (Aghanabati, 2004: 154). The county is crossed by the main active fault and several subsidiary faults (Dusti, 2015: 84). Much of Dehluran County forms part of a mountainous physiographic unit containing varied landforms, among them gorges, deep valleys, karstic features, and other comparable formations distributed across the landscape (Ahmadi, 1999: 45). Elevations throughout the county range from 46 to 2,490 m asl. The



◀Fig. 1: The study area based on political-administrative divisions (Malekmohammadi & Sadeghi-Rad, 2023: 179).

highest ground occurs in the north around the town of Meymeh, whereas the lowest elevations lie in the southern and western sectors, especially in the border regions (National Cartographic Center of Iran, 2008: 154).

The principal soil and land categories are badlands or highly dissected valley landscapes, Inceptisols, Entisols, Aridisols, and other types (Segourabravi, 2018: 83). Regarding vegetation cover, poor rangelands occupy most of the western half, moderate rangelands occur in the east, and sparse forests extend across parts of the northern county. High-quality steppe rangelands with tree cover form a belt through the northeastern and eastern sectors (Esmaeili, 2009: 76). Most of Dehluran County belongs to a hot and arid climatic zone, with semi-humid conditions occurring only in the northern highlands. The mean annual temperature in the region is 26.2°C, while mean annual precipitation amounts to approximately 271 mm (Ilam Provincial Meteorological Department, 2016: 52).

The perennial Meymeh and Duvayrij rivers constitute the principal surface water resources of Dehluran County. Both systems descend from the uplands onto the Dehluran Plain before continuing their courses into Iraq, and they have played a substantial role in shaping the alluvial architecture of the plain and sustaining continuous occupation within it. Through the erosion of sediment in the mountainous upper catchments and its progressive downstream deposition, the rivers have formed four aggradational sectors that constitute a critical subsistence base for the region's agropastoral communities. Groundwater represents an additional vital resource. The presence of 352 recorded mineral springs and an unquantified number of abstraction wells within the shallow aquifer system

indicates that the occupational viability of the county has depended on groundwater sources in conjunction with surface water (Ilam Water and Sewerage Department, 2016: 121).

Fig. 2: A view of the geographical setting of the region (Sarab-e Meymeh), (Shanbehzadeh 2023: 16). ▶

The Identified Parthian Period Archaeological Sites

The systematic pedestrian survey of the study area recorded a total of 53 archaeological localities yielding Parthian period cultural materials. The typological spectrum of these localities encompasses 47 habitation sites, two cemeteries, one probable fortress (?), one rock relief, one rock shelter, and one subterranean tomb. Of the 53 documented localities, 23 were founded de novo during the Parthian period, while 19 preserve evidence of cultural continuity into the succeeding period.

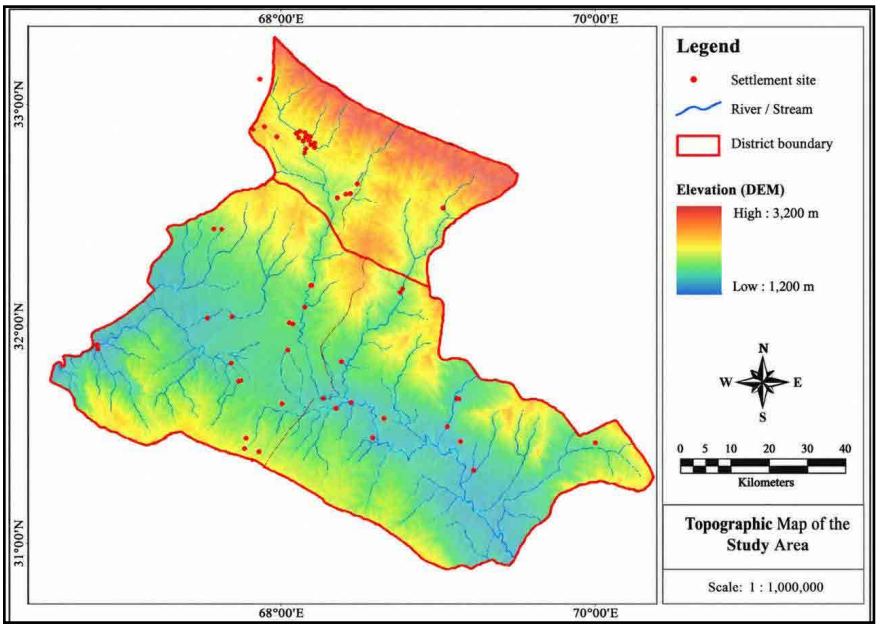


Fig. 3: Distribution of Parthian sites in the study area (Malekmohammadi & Sadeghi-Rad, 2023: 396). ▶

Environmental Factors Influencing the Formation of Parthian-Period Sites Based on Statistical GIS Analysis

From a geological perspective, the 53 identified archaeological localities are situated predominantly on limestone formations dating to the Cretaceous

Table 1: Technical characteristics of samples of Parthian potsherds recovered from the study area (Shanbehzadeh, 2023). ▼

Pottery No.	1013-n.1	1014-n.7	1020-n.1	1033-n.2	1035-n.1	1035-n.2	1035-n.3	1035-n.4	1036-n.1
Cultural Period	Parthian	Parthian	Parthian	Parthian/Seleucid	Parthian	Parthian	Parthian	Parthian	Parthian
Sherd Type	Rim	Rim	Rim	Rim	Rim	Body	Body	Body	Rim
Vessel Form	Jar	Jar	Jar	Jar	Jar	Jar	Jar	Jar	Jar
Decoration	None	Stamped	Relief	None	None	Incised	Incised	Incised	None
Exterior Colour	Brownish red	Brown	Orange	Red	Beige	Beige	Beige	Brownish red	Light brown
Core Colour	Brownish red	Brown	Orange	Light grey	Red	Red	Brownish red	Brown	Brown
Interior Colour	Brownish red	Brown	Orange	Red	Brownish red	Red	Brownish red	Brownish red	Brownish red
Inclusions	Gravel, sand, lime	Gravel, sand, lime	Gravel, sand	Gravel, sand	Gravel, sand	Gravel, sand, lime	Gravel, sand, lime	Gravel, sand, lime	Gravel, sand, lime
Technique	Wheel-made	Wheel-made	Wheel-made	Wheel-made	Wheel-made	Wheel-made	Wheel-made	Wheel-made	Wheel-made
Firing	Well-fired	Well-fired	Well-fired	Well-fired	Well-fired	Well-fired	Under-fired	Under-fired	Under-fired
Comparanda (Site)	Dehluran	Minab, Shushtar	Dehluran	Dehluran	Yazdegerd Castle	Yazdegerd Castle	Yazdegerd Castle	Yazdegerd Castle	Minab, Shushtar
Reference	Zeinivand (2015, p. 312, fig. 4-58, B)	Khosrowzadeh (2006, p. 237, fig. 28, 6); Miroschedji (1987, p. 28, fig. 6)	Horshid (2015, p. 64, fig. 14, 9); Boucharlat and Labrousse (1979, p. 34, fig. 8)	Horshid (2015, p. 114, fig. 28, 7)	Keall and Keall (1981, fig. 11-8)	Keall and Keall (1981, fig. 28-19)	Keall and Keall (1981, fig. 24-19)	Keall and Keall (1981, fig. 27-12)	Khosrowzadeh (2006, p. 229, fig. 44); Gibson (1999, p. 4, fig. 18)

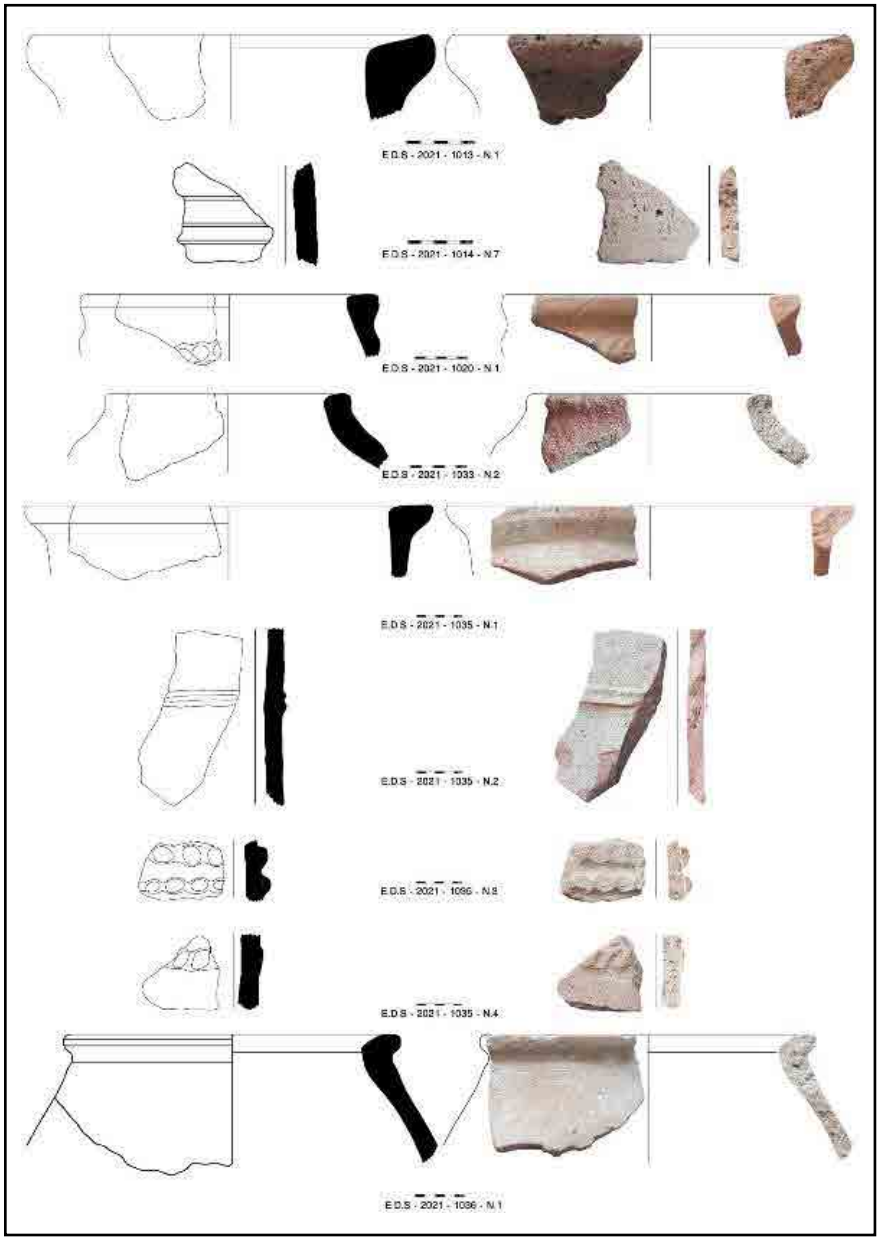


Fig. 4: Samples of Parthian pottery recovered from the study area (Shanbehzadeh, 2023). ▶

and Paleocene (3 sites), Miocene (48 sites), and Eocene and Oligocene (2 sites). Of these, Miocene formations cover approximately 75% of the study area. Several geological formations occur across the region, and the distribution of the identified sites extends over the Gachsaran Formation (40 sites), Asmari Formation (2 sites), Pabdeh Formation (4 sites), Aghajari Formation (6 sites), and Quaternary deposits (1 site). One of these geological formations occupies approximately 60% of the study area. Overlay analysis combining the archaeological site distribution with seismic hazard zoning layers shows that the region can be divided into two sectors: a northern sector characterised by high seismic risk, covering

40% of the study area, and a southern sector of moderate seismic risk, accounting for 60%. The identified localities are distributed almost evenly between these two sectors, with 27 sites in the high-risk zone and 26 in the moderate-risk zone. The principal fault and subsidiary faults occur in the southern part of the study area.

The study area ranges in elevation from 500 to 2,496 m above sea level. The 53 recorded sites are distributed almost equally between two elevation classes, each covering approximately 45% of the total area: 26 sites lie at 1,000–1,500 m, and 27 sites at 500–1,000 m. Slopes vary from 0 to 77 degrees. Most sites (31) occur on gentle slopes of 0–10°, a class that accounts for roughly half the area. Of the remaining sites, 13 are on slopes of 10–20°, six on 20–30°, two on 30–40°, and one on 40–50°. In addition, more than 40 sites are situated on slopes facing north northeast and south southwest.

Mountains dominate the landscape, covering 95% of the study area; the intermontane plain of Pahleh, confined to the central part of these highlands, makes up the remaining 5%. When classified by soil or land type, the region falls into two principal categories: mountains (85%) and hills (15%). Of the 53 recorded archaeological localities, 42 are situated in mountainous terrain and 11 on hills. The main soil and land classes consist of rocky outcrop/Inceptisol (no sites), rocky outcrop/Entisol (17 sites), badlands or highly dissected valley landscapes (34 sites), and Inceptisol (2 sites). Badlands and highly dissected valley landscapes account for roughly 75% of the entire area.

Erosion intensity is divided into four classes: very low (17 sites), low (9 sites), moderate (26 sites), and high (1 site), corresponding to 35%, 10%, 45%, and 5% of the study area, respectively. Climatically, the region is split into semi humid and semi arid zones; all 53 sites fall within the semi arid class, which extends across about 90% of the area. Mean annual temperature ranges from 6 to 18 °C and is grouped into two bands: 6–12 °C (22 sites) and 12–18 °C (31 sites); the warmer band covers approximately 70% of the region. Mean annual precipitation, spanning 50 to 500 mm, is similarly divided into two classes, 50–250 mm (26 sites) and 250–500 mm (27 sites), each occupying nearly half the area. Mean annual evaporation varies between 2,000 and 3,000 mm, with 31 sites in the 2,000–2,500 mm class and 22 sites in the 2,500–3,000 mm class; the lower evaporation class accounts for about 70% of the total area.

The study area lies within two sub basins: Dehluran (44 sites) and Daneh Tona or Cheshmeh Shahi (9 sites). The Dehluran sub basin covers roughly

70% of the region. The Meymeh River (44 sites) and the Timeh River (9 sites) are the principal watercourses, and the Meymeh basin likewise represents about 70% of the area.

Vegetation is classed into several types: mountainous, hilly, and alluvial fan rangelands (3 sites); irrigated agricultural land (no sites); high quality steppe rangelands, occasionally with scattered trees (42 sites); and vegetation associated with saline plains and sandy hills (8 sites). These categories occupy, respectively, under 5%, under 5%, 75%, and 25% of the study area. Land use classes include forest with moderate canopy cover (1 site), rangeland with moderate canopy cover (19 sites), rangeland with poor canopy cover (2 sites), rocky outcrop (1 site), dry farming (5 sites), and forest with sparse canopy cover (15 sites). Forest with sparse canopy cover accounts for approximately 45% of the area, rangeland with moderate canopy cover about 35%, and the remaining classes together for roughly 20%.

Settlement Patterns and Lifeways during the Parthian Period in the Dehluran Highlands

The long term trajectory of demographic growth and the attendant rise in the number of settlements, a pattern that began in prehistory and endured into the Islamic centuries, is clearly attested for the Parthian period as well. Surface traces of architecture were recorded at the great majority of the Parthian period sites identified across the study area. A substantial proportion of these remains can be assigned to ancient nomadic camps or seasonally occupied settlements and appear to capture the living conditions and adaptive strategies of the region's mobile communities during this time. Further evidence for the existence of seasonal settlement is supplied by the documented use of caves and rock shelters in the Parthian period. Although scatters of cultural material suggest that several Parthian period localities occasionally covered several hectares, the surface architectural footprint of none of these places, whether interpreted as permanent settlements or as seasonal ones, exceeds one hectare.

These settlement localities generally occurred on Miocene formations and the Gachsaran Formation, in areas of high and moderate seismic hazard, and between 5 and 35 km north of the region's main and subsidiary faults. Another consistent feature was their location at elevations from 500 to 1,500 m above sea level and on slopes ranging from 0 to 15 degrees. Their slope aspects broadly followed the regional topography, facing north, northeast, south, or southwest. The surrounding soils consisted primarily

of badlands or highly dissected valley landscapes and, in some cases, rocky outcrop/Entisols, while erosion intensity varied from very low to moderate. The region's semi-arid climate, with mean annual temperatures from 6 to 18°C, precipitation from 50 to 500 mm, and evaporation from 2,000 to 3,000 mm, made these lands unsuitable for agriculture. Even so, the presence of the Meymeh and Timeh rivers, high-quality steppe rangelands with occasional scattered trees, and, in some areas, vegetation characteristic of saline plains and sandy hills created favourable conditions for seasonal pastoralism. Rangelands with moderate canopy cover and forests with sparse canopy cover offered ideal environmental conditions for pastoral groups.

Taken together, the geographical features and environmental conditions of the study area, interpreted in conjunction with the available archaeological evidence as represented by the available surface archaeological record in the study area, support the view that Parthian communities inhabiting the northern Dehluran highlands generally relied on a pastoral subsistence strategy. The limited areas containing fertile and productive land were used for agriculture and probably for horticulture as well.

Roads and nomadic migration routes were another highly influential factor in the formation, development, continuity, and decline of archaeological sites in the region during this period. Because the inhabitants practised pastoral subsistence and remained mobile, roads and migration routes strongly shaped the spatial distribution of settlements. The dense landforms and the numerous, continuous valleys and ridges, which eventually lead towards the area's massive rock walls and deep valleys, created particular conditions for mobile groups. To move more easily across this terrain, these groups were necessarily compelled to follow long, level ridges or valley floors containing water, such as river courses and permanent water channels. This movement pattern among mobile groups in the Dehluran highlands is known locally as "maz o galar." In the local dialect, "maz" means an elongated ridge, whereas "galar" means a valley. On this basis, settlements were consequently established mainly along ridges or at the margins of valleys, in locations close to the routes used for movement (Sadeghi-Rad, 2023: 194).

Two of the 53 archaeological localities recorded for this period within the study area can be confidently identified as cemeteries. These burial grounds were typically sited along ancient communication routes and in the immediate vicinity of the principal settlements. The surface finds and associated evidence recovered from both cemeteries demonstrate unequivocally that jar burial was the funerary practice employed.

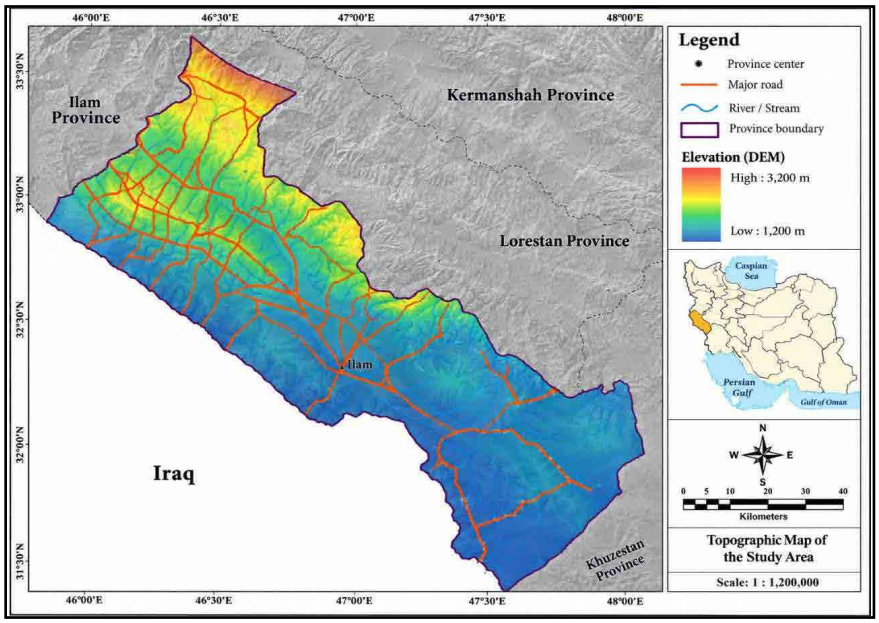


Fig. 5: Distribution and location of identified ancient migration routes in Dehluran County (Sadeghi-Rad, 2023a: 195). ▶

Fig. 6: A view of Parthian period jar burials to the east of Sarab-e Meymeh (Sadeghi-Rad, 2023: 863). ▶

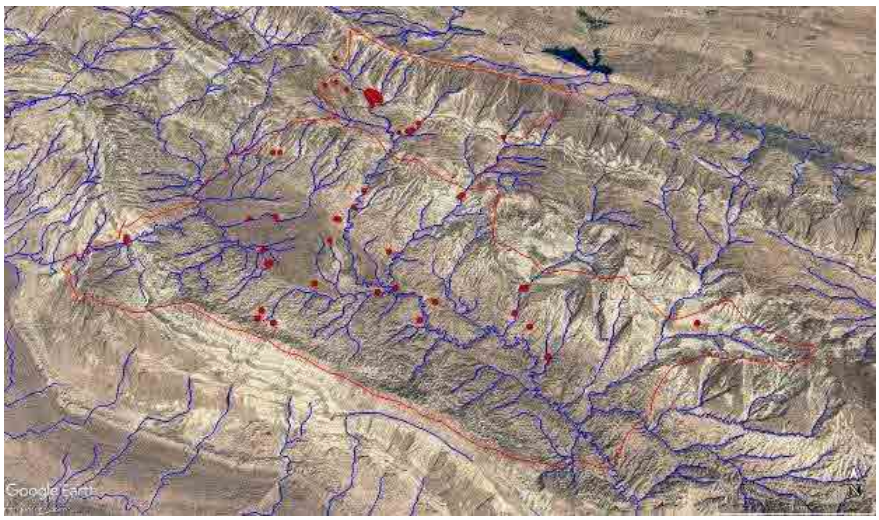
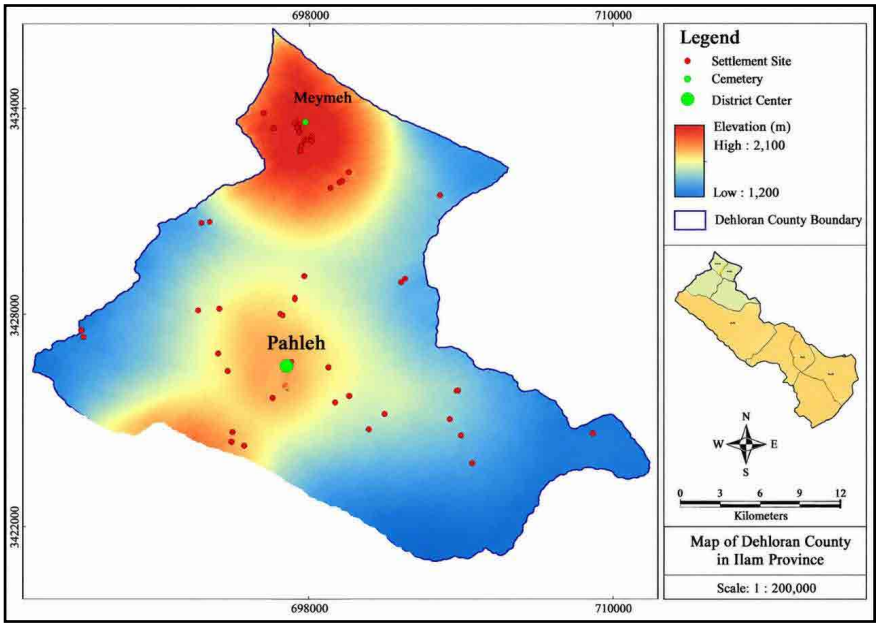


Fig. 7: Distribution of Parthian settlements in the study area along the river courses and ancient routes (Google Earth, 2022). ▶

The spatial distribution of the Parthian period archaeological localities reveals a linear settlement pattern aligned along the region's ancient routes; however, environmental variables and broader biophysical conditions also markedly influenced site density, concentrating occupation in certain sectors more heavily than in others. Analysis of the settlement evidence indicates that the Sarab e Meymeh intermontane plain, owing to its comparatively favourable geographical and environmental conditions, supported the highest site density. The area around the city of Pahleh ranked next in habitability, surpassing the remainder of the study area.



◀**Fig. 8: Distribution and density of Parthian period archaeological sites in the study area (Malekmohammadi & Sadeghi-Rad, 2023: 846).**

Conclusion

The archaeological survey of the mountainous highlands of Dehluran County, encompassing the Sarab e Meymeh and Zarrin Abad districts and covering an area of 1,355 km², recorded a total of 260 archaeological localities spanning the Paleolithic to the contemporary period. Among these, 53 produced evidence dating to the Parthian period. Knowledge of the Achaemenid and Seleucid periods in the region remains limited, and no specialised studies of their cultural materials have been undertaken; consequently, the relationship of these earlier periods to the Parthian settlement landscape is not yet understood. Nevertheless, analysis of the 53 documented Parthian period localities shows that 23 were first established during this period, while 19 display cultural continuity into the succeeding Sasanian era.

The Parthian period settlements are generally small, covering less than one hectare. The visible architectural remains consist of isolated, single

room structures with dry stone foundations and circular or rectangular plans, typically constructed without mortar. These features point to temporary, seasonally occupied settlements closely associated with a mobile pastoralist way of life. The physical setting of the settlements further reinforces their seasonal character. Sites are consistently located on foothills or on natural terraces cut into mountain slopes, a short distance from river courses and the traditional migration routes of the region. This pattern mirrors the present day practice in which local nomadic groups pitch their tents in the same locations, sometimes surrounding them with low stone walls. While the bulk of the archaeological evidence suggests that the population of the region during the Parthian period pursued a mobile lifestyle, the possibility that permanent settlements also existed cannot be dismissed; establishing their presence, however, would require targeted excavation.

The alignment of migration routes constitutes another major factor governing site distribution. Sixteen ancient migration or communication routes have been traced within the study area. These routes follow valley floors and run along mountain slopes, forming a transport network that linked different parts of the region to one another and to areas beyond. The most important of these is the Meymeh route, which parallels the Meymeh River and connects the mountain highlands to the southern lowlands. This route became the principal artery of the region as subsidiary and main roads progressively joined it. Almost all of the recorded Parthian period archaeological localities are situated along these migration routes and are aligned on a northwest to southeast axis.

During this period, the small intermontane plain of Sarab e Meymeh, which covers roughly 150 ha, functioned as the main focus of human activity within the study area. Its primacy reflects a combination of factors: a distinctive geographical position, plentiful water resources, fertile soils, and the convergence of ancient migration routes. Fifteen of the 53 identified localities are distributed across the plain at an average interval of approximately 400 m. A notable feature of their arrangement is the regularity with which they appear to divide the available space. The sites are positioned in such a way that the plain seems to have been equitably partitioned among its occupants, with each settlement holding a portion of the land. This interpretation gains weight from the observation that, until a few decades ago and to a lesser extent even today, ownership or usufruct of different sections of the Meymeh plain was held, collectively or periodically, by specific tribes or clans.

Acknowledgments
The authors extend their sincere gratitude to the anonymous peer reviewers for their insightful critiques and constructive suggestions, which significantly enhanced the clarity and scholarly rigor of this manuscript.

Author Contribution
This research is derived from the first author's doctoral dissertation. The primary data collection, encompassing all observational and analytical components, was conducted by the first author under the direct supervision and mentorship of the second and third authors.

Conflict of Interest
In adherence to ethical publication standards, the authors affirm that there are no conflicts of interest, either personal or financial, that could have influenced the content or conclusions presented in this research.

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فصلنامهٔ علمی پژوهش‌های باستان‌شناسی ایران
P. ISSN: 2345-5225 & E. ISSN: 2345-5500
نشانی پایگاه نشریه: https://nbsh.basu.ac.ir
شمارهٔ ۴۹، دورهٔ شانزدهم، ۱۴۰۵

تحلیل آماری الگوی استقرار و شیوه های زیستی جوامع انسانی دورهٔ اشکانی در ارتفاعات کوهستانی شهرستان دهلران برمبنای پژوهش‌های باستان‌شناسی

عبدالمالک شنبه‌زاده[I]، غلامرضا کرمیان[II]، مجیدرضا رجبی[III]

شناسهٔ دیجیتال (DOI): https://doi.org/10.22084/nb.2025.29189.2671
تاریخ دریافت: ۱۴۰۳/۰۱/۲۰، تاریخ بازنگری: ۱۴۰۳/۰۴/۲۷، تاریخ پذیرش: ۱۴۰۳/۰۵/۰۷
نوع مقاله: پژوهشی
صص: ۲۵۳-۲۳۵

چکیده

شهرستان دهلران منطقه‌ای بینابینی در جنوب‌غرب ارتفاعات کوهستانی زاگرس، شمال‌غرب دشت خوزستان و شرق میان‌رودان است. ارتفاعات شمالی شهرستان که از نظر تقسیمات سیاسی شامل بخش‌های سراب میمه و زرین‌آباد است، را منطقه‌ای کوهستانی با دره‌های کوچک و بزرگ به‌هم پیوسته و گاهی دشت‌های کوچک میان‌کوهی فراگرفته است. این محدوده بخشی از حوضهٔ آبخیز رودخانهٔ میمه است که به‌علت شرایط مساعد جغرافیایی طی ادوار مختلف (دورهٔ پارینه‌سنگی تا دوران معاصر) سکونتگاه گروه‌های مختلف انسانی بوده است. چگونگی الگو یا الگوهای استقراری و شیوه‌های زیستی جوامع انسانی دورهٔ اشکانی در ارتفاعات کوهستانی شهرستان دهلران با تکیه‌بر تجزیه و تحلیل‌های آماری مستخرج از نرم‌افزار GIS، ازجمله مسائل و پرسش‌های اساسی این پژوهش است. درنتیجه بررسی‌های باستان‌شناسی محدودهٔ مطالعاتی که گستره‌ای به‌وسعت ۱۳۵۵ کیلومترمربع را دربر می‌گیرد، درمجموع ۵۳ مکان باستانی با یافته‌هایی فرهنگی از دورهٔ اشکانی شناسایی گردید که از نظر تنوع مکان‌های شناسایی‌شده شامل: ۴۷ محوطه، ۲ گورستان، ۱ قلعه (؟)، ۱ نقش صخره‌ای، ۱ پناهگاه صخره‌ای و ۱ دخمه (معماری زیرزمینی) است. پراکنش مکان‌های باستانی شناسایی‌شده و هم‌پوشانی آن‌ها با نقشه‌های پایه در نرم‌افزار GIS تأثیر عوامل طبیعی بر شکل‌گیری، توسعه و اضمحلال این مکان‌ها را به اثبات رسانید. علاوه‌بر عوامل محیطی، مسیرهای ارتباطی نیز نقش اساسی در چگونگی توزیع استقرارهای این دوره دارد. درنهایت، تجزیه و تحلیل داده‌های حاصل از پژوهش‌ها صورت‌گرفته منجر به اثبات جامعه‌ای کوچ‌رو با معیشتی متکی به دامپروری و گاهی کشاورزی (در دشت‌های میان‌کوهی با شرایط مساعد محیطی) را طی دورهٔ اشکانی و در این منطقه به اثبات رسانید. به‌نظر می‌رسد، پس‌کرانه‌های کوهستانی زاگرس از ویژگی‌های فرهنگی منظمی برخوردار نبوده و هرکدام در عین به‌هم پیوستگی، دارای ویژگی‌ها و فرهنگ‌های خاصی هستند. کاوش‌ها و بررسی‌های باستان‌شناسی در این مناطق عموماً بیانگر توسعه و تطور فرهنگی و گاهنگاری جامعهٔ کوچ‌رو و روستانشینی از پیش‌ازتاریخ تاکنون می‌باشد.

کلیدواژگان: دهلران، ارتفاعات کوهستانی، اشکانی، الگوی استقرار، تحلیل آماری (GIS).

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ارجاع به مقاله: شنبه‌زاده، عبدالمالک؛ کرمیان، غلامرضا، و رجبی، مجیدرضا، (۱۴۰۵). «تحلیل آماری الگوی استقرار و شیوه های زیستی جوامع انسانی دورهٔ اشکانی در ارتفاعات کوهستانی شهرستان دهلران برمبنای پژوهش‌های باستان‌شناسی». پژوهش‌های باستان‌شناسی ایران، ۱۶(۴۹)، ۲۳۵-۲۵۳. https://doi.org/10.22084/nb.2025.29189.2671

فصلنامهٔ علمی گروه باستان‌شناسی دانشکدهٔ هنر و معماری، دانشگاه بوعلی‌سینا، همدان، ایران.

حق انتشار این مستند، متعلق به نویسنده(گان) آن است. ۱۴۰۵ © ناشر این مقاله، دانشگاه بوعلی‌سینا است. این مقاله تحت گواهی زیر منتشرشده و هر نوع استفاده غیرتجاری از آن مشروط بر استناد صحیح به مقاله و با رعایت شرایط مندرج در آدرس زیر مجاز است.
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