Interaction of Prehistoric Heritage with Today's Landscape: The Case Study of Arslantepe Mound in Malatya, TURKEY

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Abstract

Like most mounds comprising the crucial cultural landscape information sources such as political, economic, religious, etc. dynamics, of their age, one of the most critical factors for Arslantepe Mound to survive to date and to host a number of civilizations are its location. It is thought that being located outside the flood plain borders of the Euphrates River, while also being located within an area surrounded with alluvial soil fed from the rivers, and accordingly bearing the characteristics to be a residential area from Late Chalcolithic Age to 5.000 Byzantine Period B.C. as a settlement area with the ability to govern the products and production process, including the ability to process the raw material in the region are recognized to be the most significant factors for Arslantepe to be named as the oldest city state known to world. On the other hand, it is also known that the location of mound above the environmental connections is of vital importance for the mound to have a powerful defense system. In the light of above-stated information, it is conferred that this area as listed within the Prehistoric World Heritage Candidates has managed to survive today thanks to its landscape characteristics. In this paper, it is aimed to investigate the interaction between the Arslantepe Mound from prehistoric age with today's modern landscape. Viewshed analysis method has been utilized for determining the interaction area of the mound. The natural and cultural landscape source values of the Arslantepe Mound interaction area were established within the boundary of the mound interaction boundary. As a result of the field studies carried out within the scope of the project numbered 217O290 supported by the Scientific and Technological Research Council of Turkey (TUBITAK) and the findings obtained from the excavations carried out to date, the landscape change has been revealed in today's context. Within the scope of field studies, natural landscape features such as topography, climate, hydrology, soil structure, geology, and flora and cultural landscape features such as settlement pattern, land uses, economic structure, and property status were examined in the interaction area of the mound. Within the scope of the obtained findings, our objective has been set to bring about the landscape changes of Arslantepe Mound within the historical development process.

Keywords

Prehistoric heritage • Landscape value • Archaeological landscape • Arslantepe Mound • Malatya

1 Introduction

Arslantepe Mound Archaeological Protected Area is situated in the territory of Orduzu quarter of the city of Battalgazi district, Malatya province (Fig. 1). The cultural filling of Arslantepe Mound is 30 m in height. As a result of excavation work from 1930 to our time, it has been considered to be a "mound" structure with its multi-layered artificial form. The systematic excavation work began in 1962 and it was identified as a result of excavation work from the sculpture of the lion, which was identified at the entrance of the palace at the beginning of the 1st millennium BC (Frangipane, 2012).

Arslantepe exhibits the characteristics of an uninterrupted settlement from the Late Chalcolithic Age to the Byzantine Period of 5000 BC as a settlement that can control its lands and process raw materials in the region due to its rich water resources and high agricultural potential, as a result of this, it is out of Euphrates River flood area boundary as a location choice (Bökönyi, 1993; Sadori et al., 2012). As a result of the excavations in the mound, a temple belonging to 3600–

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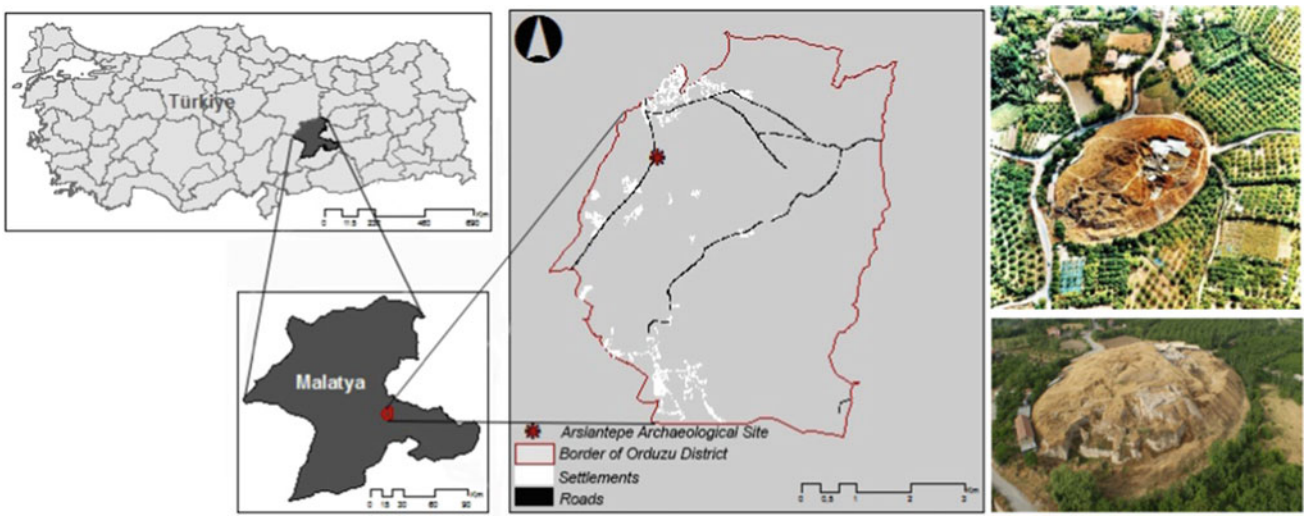

Fig. 1 Location of Arslantepe Mound (Tuna, 2019)

3500 BC, an adobe palace belonging to 3300–3000 BC, seal prints, and metal artifacts were found. According to the data obtained, Arslantepe is the official, religious and cultural center, in which aristocracy was born and the first form of state emerged (Frangipane, 2001; Liberotti et al., 2009).

The culinary structure and the containers (painted pottery belonging to Ubaid period) revealed in the excavations show that they belong to the Late Chalcolithic 1–2 period according to the radical carbon analysis (Ballossi Restelli, 2008). In the Late Chalcolithic 3–4 period, Temple C at the top of the mound and the side rooms in the temple, dishes, and seal prints in the rooms indicate that the temple had central authority at that time (Manuelli, 2010; Liberotti & Quaresimar, 2010). In line with the findings obtained, it is stated that the temple is not only a place where religious ceremonies take place but also a center where public and economic activities are carried out (Frangipane et al., 2001, 2003). Arslantepe Mound surface area expanded in 3350 BC (Late Chalcolithic 5) and a community of public buildings was built in this area. In the first known "public palace", it is not the place where the princes or manager lives, but the different public activities of central institutions (religious, economic, political, and administrative) are used as a structure. Among the findings obtained during excavation work in which two small-sized temples are located in the public palace and where the entry of people into the two temples is restricted. This shows that the realities of religion in the economic and political administration in society are not centralized (Frangipane et al. 2001). One of the buildings in the palace is the structure of warehouses. The warehouses inside the palace found that agricultural products were used for redistribution to a large number of people (Frangipane, 2000, 2001, 2008).

It is known that after the fires in the Late Phratry Period, the abandoned public space separated from the Syrian-Mesopotamian culture that continued its effects in Early Bronze I and a new culture based on Eastern-Anatolian Transcaucasian traditions that dominated from the beginning of Early Bronze II to Early Bronze III emerged. This finding is due to the construction of cities surrounded by walls as well as a settlement order in line with the urbanization tradition of Anatolia (Alvaro et al., 2008; Ardissone et al., 2008; Frangipane, 2003).

After 1700 BC, Arslantepe was used as a city called Melidia-Meliddu of the Hittite Empire, which expanded toward the Euphrates River. Melidia, the Hittite capital, was abandoned after it was captured by Assyrian king Sargın II in 712 BC. It was used as a Roman village between the fifth and sixth centuries AD and completed its settlement as a necropolis in the Byzantine period (Frangipane, 2012). Its mound today surrounds agricultural lands and apricot gardens. The first excavations in Arslantepe were carried out in the 1930s by the French team led by Louis Delaporte. Although deep boreholes were opened after World War II, continuous excavations were started in 1961 under the chairmanship of Alba Palmieri of La Sapienza University. Excavation works are underway under the presidency of Prof. Dr. Marcella Frangipane, from La Sapienza University, since 1990 to our time. In summary, the chronology of the mound is specified in Fig. 2 according to the excavation studies data in the Arslantepe Mound.

Arslantepe Mound is included in the Provisional List of UNESCO World Heritage Sites as of 2014 in the status of an outdoor museum. From the extraordinary universal value measures, which are a condition for the inclusion by the Arslantepe Mound World Heritage Committee on the World

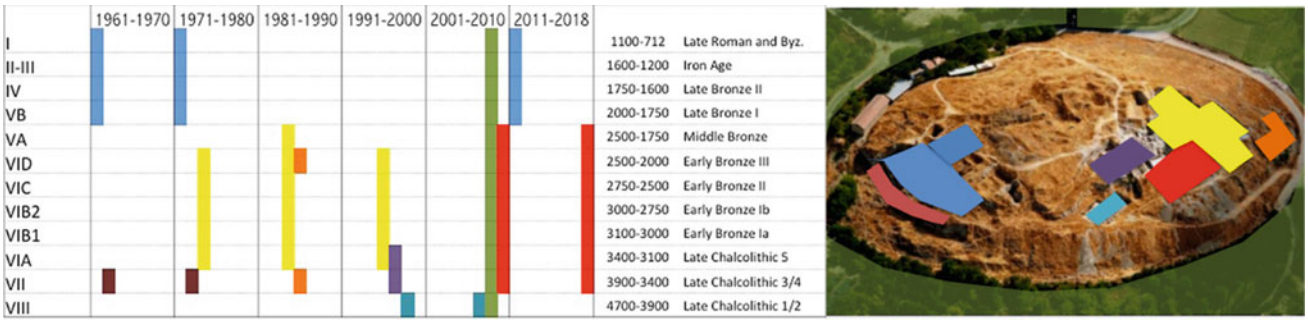

Fig. 2 Choronology of Arslantepe Mound (Balossi Restelli, 2019)

Heritage List, to 3 cultural criteria (criteria (ii, iii, iv)) as of 2019, Arslantepe Mound Archaeological Site has applied to ICOMOS as sole candidate of Turkey to become part of the UNESCO World Heritage List.

2 Material and Method

The objective of defining the communication with the landscape of the Arslantepe Mound, which dates from the prehistoric period, is to define the limit of the mound-environment interaction. As the boundary of interaction, the areas where Arslantepe Mound dominates in terms of visibility and the area where archaeological site and surface findings are dense have been determined.

Like many archaeological heritages, one of the most important factors in the ability of Arslantepe Mound to reach multi-layered cultural filling to date and to host many different civilizations is the location of the mound. It is thought to be a major factor in the fact that the river of the Euphrates is located outside the border of the floodwaters, that it is located in a river-fed area surrounded by alluvial lands having approximately 7000 years history and that it will be able to acquire the reputation of becoming the first known city state of the world. On the other hand, it is known that it is of great importance that the mound has a strong defense system and has a dominant position in environmental connections. From here, it is preferable to use the visibility (viewshed) analysis method to detect the mound interaction membrane. For visibility analysis, other heights have been taken into consideration from the point where Arslantepe Mound is located. The numerical height model of the area was created with a resolution of 3 m × 3 m according to the WGS84-UTM 37N coordinate system by photogrammetric documentation after fixed-wing drone flight and by means of ground control points established by RTK GPS method. The tools and materials used for photogrammetric documentation were obtained within the scope of the project "*Development of Archaeological Landscape Restoration and Management Strategy in Arslantepe Mound and Its Territory*" which was supported by the Scientific and Technological Research Council of Turkey (TUBITAK project number 217O290). Arslantepe Mound location was determined and transferred to open-access QGIS software. The Arslantepe Moorish location and movement-visibility analysis from elevation steps are utilized by the "Viewshed Analysis" module in the relevant software. After the visibility analysis, the zones visible from the Arslantepe Mound were detected. The regions that appear as a result of the analysis are overlapped with the region where the archaeological findings are intense and there are periodic similarities as a result of the surface research and Arslantepe Mound interaction area boundary is determined in Fig. 3.

The natural and cultural landscape source values of the Arslantepe Mound interaction area were established within the boundary of the mound interaction boundary. Within the scope of the findings obtained from the land works and excavation works, it is aimed to reveal the change of landscape in the context of today.

3 Results

3.1 Prehistoric Landscape of Arslantepe Mound and Its Surrounding Within the Scope of Archaeological Findings

Archaeological excavations in Arslantepe, which have been on for more than half a century, provide important data on the way the society is organized, the forms of power, and changes that have occurred over time, as well as in determining the pattern of settlement at that time. Although the Arslantepe site offers only a small amount of evidence regarding a very vast area—the Malatya Plain—the knowledge of archaeological history of Arslantepe allowed to establish a connection between the many events observed at the site and life in the surrounding plain, where a diverse set of landscapes was shaped over time by changes in population patterns and in the use of land. (Di Nocera, 2019). Surface investigations in the Plain of Malatya detected a

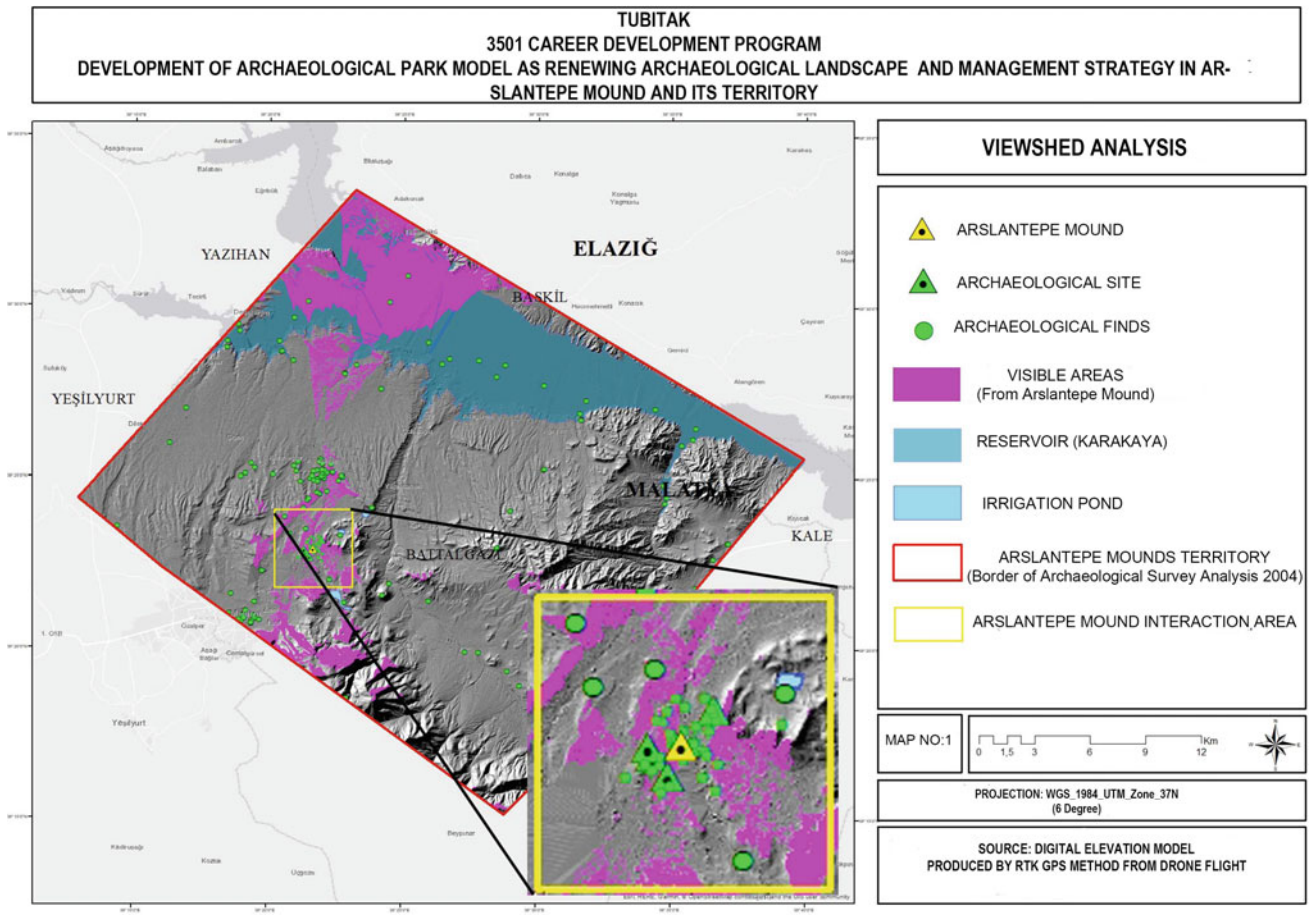

Fig. 3 Determining the border of Arslantepe Mound interaction area with viewshed analysis (Tuna, 2019)

very small number of settlements dating back to the same period as the Arslantepe Mound in Period VIII (Late Chalcolithic 1-2 (4700–3900 BC). The areas in which these settlement systems are located provide important data with the topography of that period. Two of sites are built on tells, one on a tabular summit and one on a glacis, that is, a level with a very slight slope connecting detrital sediments and the wide valley floor, strongly connected with water springs. None of these sites has a dominant character (Di Nocera, 2008, 2019).

In the Malatya Plain, sites dating back to the same age (Period VII, Late Chalcolithic 3-4, 3900–3400 BC) belong to different geomorphological categories, as in the previous period: 2 are built on *tells*, 1 on the *glacis*, 2 on *flat land* and 1 on a *complex of hills*. The impression is that, although some forms of administrative power started to emerge at Arslantepe, the economy of the site and the surrounding area was still family-based and enjoyed a certain amount of independence (Di Nocera, 2019; Di Nocera & Frangipane, 2012). Period VI_a 3400–3100 BC de Arslantepe reports that the settlements around the surrounding area have disappeared and the rural landscape has changed, and Arslantepe is the center of the Malatya Plain. Although livestock was predominantly at this time, the agricultural landscape started to develop in light of archeobotanical data. With agricultural production, the centralization layout is considered to have changed in relation to previous periods. In Early Bronz Age I-II, 3100–2500 BC several sites are distributed over the central plain and in the piedmont area, some of them along the Euphrates. 60% out of 38 sites is placed on natural mounds, most of them are characterized by single-phase settlements. In Early Bronze Age III (2500–2000 BC) the sites are distributed along the course of the Euphrates. 46% out of 45 sites is built on *tells*. The mounds started to form during the Early Bronze Age III and have a clearly stable nature, with several settlement phases. This tendency, bringing about a slight decrease in the number of settlements, continued without interruptions until the Middle Bronze Age (Arslantepe V-A) (Di Nocera, 2019).

The following periods, Hellenistic-Roman, Imperial Roman, Late Antiquity, Byzantine, and Islamic have been clearly recognized in the Arslantepe excavations; however, the site is not the only or dominant center in the area anymore (Di Nocera, 2019; Schneider, 1970). In these times, the

concentration of settlement shifted from the center of power, Arslantepe Mound to the settlement of the Battalgazi (the Old Malatya), which is north of the mound. The historic Center of Battalgazi retained its central structure until the first half of the 20 century. It is thought that the use of mound as a military legion instead of a settlement in the post-Roman period was due to the devastation caused by the earthquakes in the north-west direction of the settlement to the Old Malatya (Battalgazi) region and as a result of the severe earthquake in Malatya in 1893 and 1905, it is believed that the settlement in Old Malatya moved to the region called today's Malatya City Center in the southwest direction.

Geographical investigation results describe the paleoenvironmental conditions in the periods when Arslantepe Mound was dated. The findings from the research were determined from the end of the last Molytic Center (B.C. 4200) an increase in erosion was discovered, but the reasons were not fully understood (Dreibrodt et al., 2014). Zooarcheological analyses have revealed the growth of the rabbit population in Arslantepe VI A period, while the month and deer species have decreased (Bartosiewicz, 2010). This indicates that the semi-open coniferous forest cover in the region has turned into an open meadow cover. This change was also monitored by the change in the tree varieties used in the structures in the mound (Alvaro, 2010; Bartosiewicz, 2010). Nevertheless, it is understood from the presence of dense hydrophilic plants that this period of settlement is under a rainier and more humid climate (Masi et al. 2012a, b). The presence of these plants has also documented the presence of a wetland near mound (Sadori & Masi, 2012). The presence of oak and pine seeds in a room (Period VIC) discovered in Arslantepe Mound as a result of archaeobotanical investigation proves that the humid climate prevails.

3.2 Natural Landscape Values of Arslantepe Mounds Surrounding (Today)

In defining the interaction, which is today's landscape of Arslantepe Mound and interaction area, the field studies carried out within the scope of TUBITAK project, the digital equipment provided and the information obtained from the

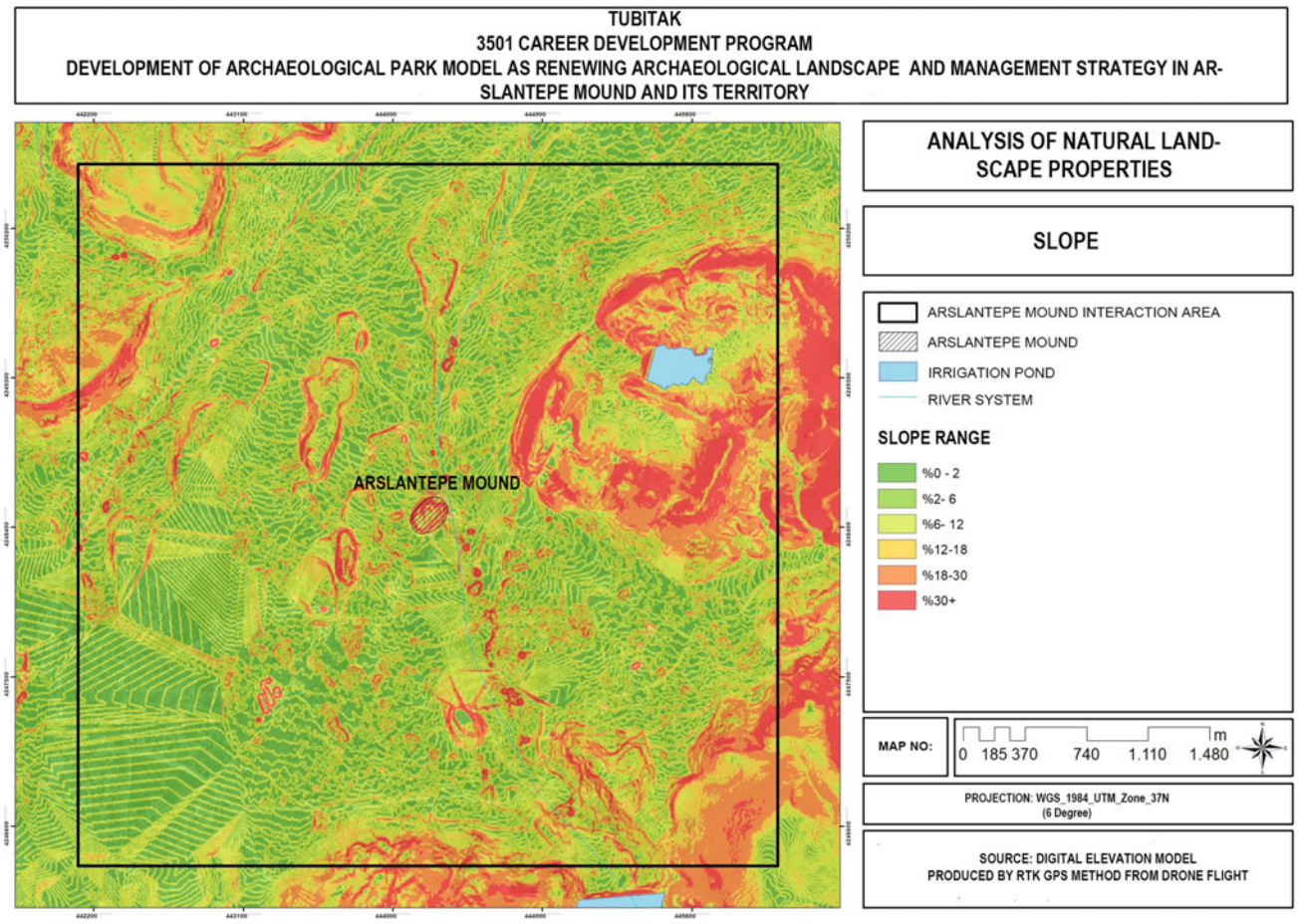

Fig. 4 Slope status of Arslantepe Mound interaction area (Tuna, 2019)

competent authorities (map, report, etc.) were utilized. Topography, climate, hydrology, soil structure, geology, and flora characteristics were examined within the scope of natural landscape features.

Topography: When the numerical height model of the mound interaction area is examined, it was determined that Arslantepe Mound environment is generally surrounded by flat areas and the mound interaction area of the dominant height group in the range of 1000–1200 m increases in the direction of south and south-east. When the geomorphological structure of Arslantepe Mound, which is determined to be 30 m high as a result of excavation studies, is evaluated, it is seen that mound wall is surrounded by plains and plateaus in northwest, southeast, and south of the area. It is known that it is in close interaction with Arslantepe Mound in terms of geological formations owned by Gelinciktepe and Yılancıktepe located on the large plateau located closest to the mound and archaeological findings detected in Gelinciktepe (Figs. 4 and 5).

When the slope status of the mound interaction area is examined, it is seen that the dominant slope group is 0–2 and 6–12, and the regions with high slope are concentrated in Gelinciktepe in the east of Arslantepe Mound.

Soil: When the soil groups within the border of the mound interaction area are examined, it is observed that the state soil group is surrounded by alluvial lands by 72.22% of the state territory group in the vicinity of the Arslantepe Mound. I. Class lands (arable land) constitute 66.67% of the mound interaction area.

Hydrology: The Arslantepe Mound shows that it is close to the water supply, the most important place selection criterion, as is the case in other mound settlements that have a significant historical history during the establishment period. As can be seen in Fig. 6, Orduzu Stream, which used to feed on Euphrates River today, takes its source from Karakaya Dam Lake and surrounds Arslantepe Mound in the east–west direction. A large number of wells and ponds identified by landfill observations with the 1/25,000-scale Land Use Map shows that agricultural production is dense. Çatlak and Üç Pınar on Orduzu Stream, which is the main water resource with its regular water regime, was an important water resource for Arslantepe Mound in the past and continue to be

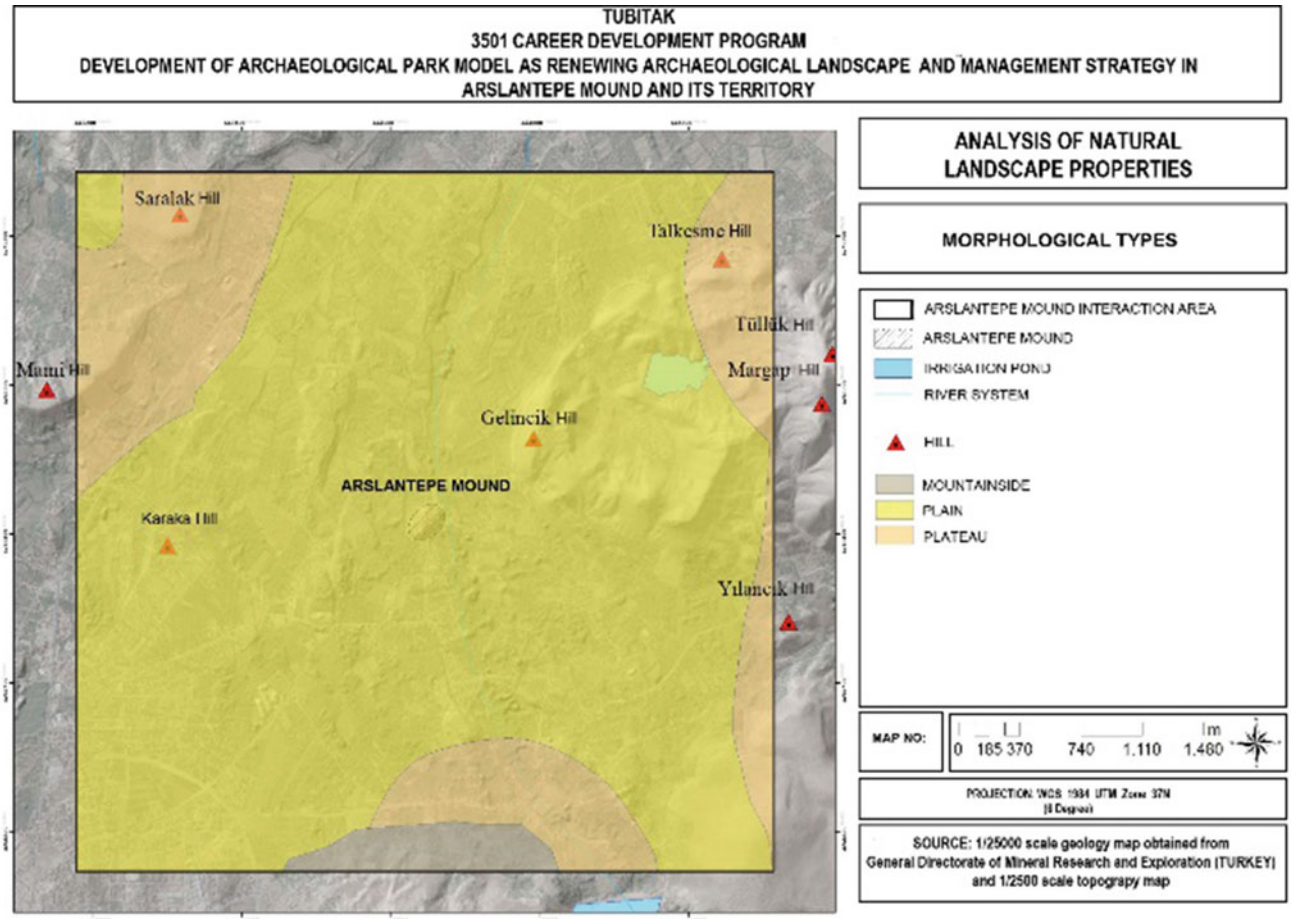

Fig. 5 Morphological types of Arslantepe Mound interaction area (Tuna, 2019)

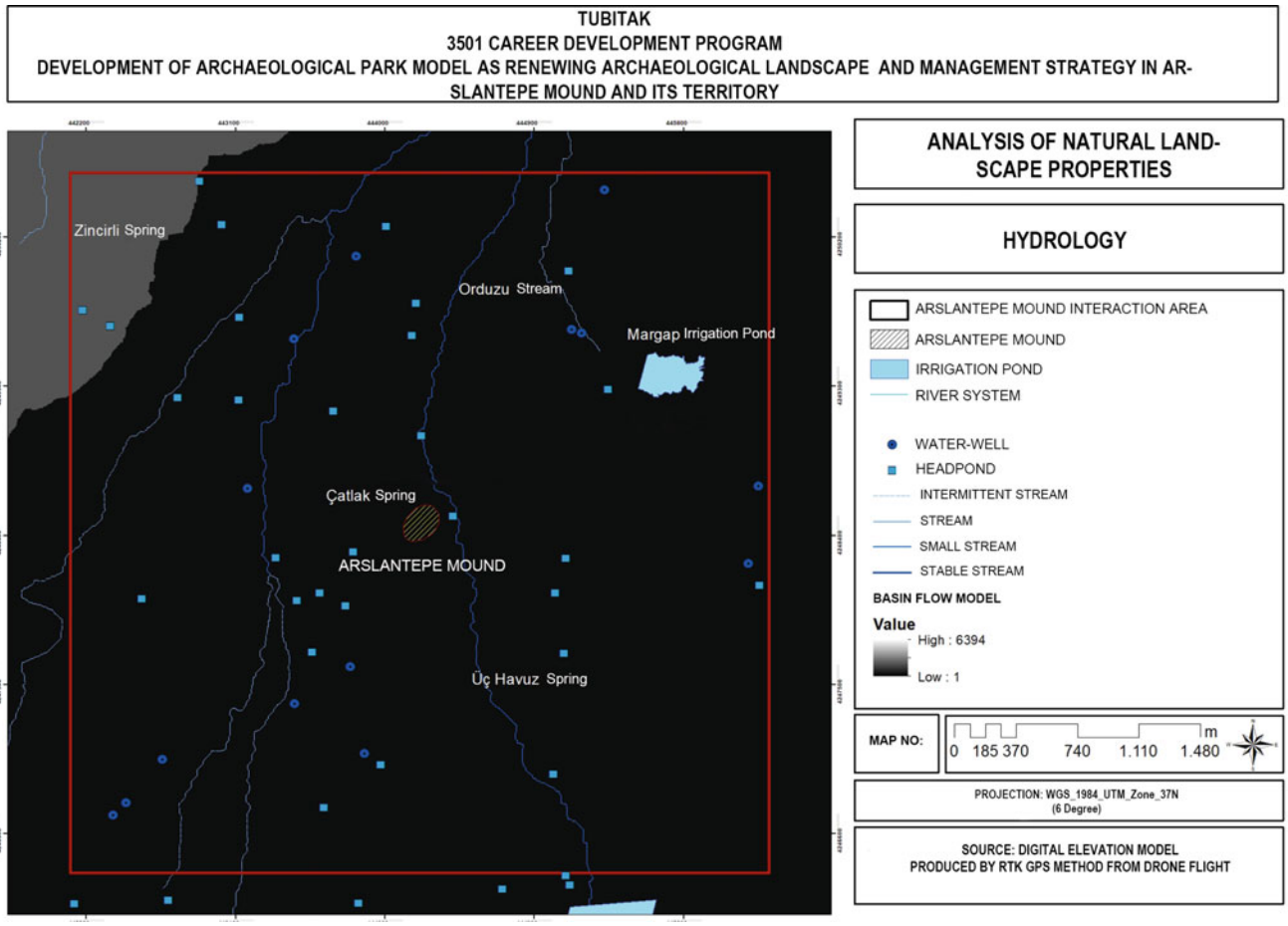

Fig. 6 Hydrology of Arslantepe Mound interaction area (Tuna, 2019)

important especially for agricultural production in Orduzu Neighborhood today. In particular, the irrigation channels fed from these streams form an important part of the settlement area (Fig. 6).

Geology: When we look at the geological formation map prepared for the mound interaction area, it is seen that predominantly quarternary aged alluviums in the immediate vicinity of Arslantepe Mound, tuff geological formation in the vicinity of Gelinciktepe-Tulluktepe, and pebble stone-sandstone-mudstone geological formations in the ages of lower Miocene and Pliocene in the north-west and south-east boundaries are concentrated (Fig. 7).

Flora: Since modern agricultural practices are intense in Arslantepe Mound and its close vicinity, it was observed that natural vegetation is significantly damaged. According to the information obtained within the scope of the field studies, it was determined that natural species are concentrated in Gelinciktepe in the east of Arslantepe Mound. In the vicinity of Gelinciktepe, *Achillea pseudoaleppica* Hausskn. ex Hub.-Mor., *Astragalus melitenensis* Boiss., *Cota wiedemanniana* (Fisch. & C.A. Mey.) Holub, *Elymus lazicus* (Boiss.) Melderis subsp., *Maarrubium globosum* Montbret and Aucher ex Benth. subsp. globosum, *Paronychia kurdica Boiss.* subsp. haussknechtii Chaudhri, *Salvia euphratica* Montbret and Aucher var. euphratica, Verbascum Euphraticum Benth., *Verbascum splendidum* Boiss, *Allium scabriflorum* Boiss., *Asphodeline damascena* (Boiss.) Baker subsp. rugosa E. Tuzlaci, *Gundelia tournefortii L.* var. armata Freyn & Sint., *Iris sari* Schott ex Baker, *Scorzonera tomentosa* L. Endemic plant species have been detected.

Using the orthophotos obtained from Land Registry Cadastre Malatya Provincial Directorate as an orthophotos base, the information obtained from Land Registry Cadastre General Directorate parcel inquiry open-access address and field studies and open-green area systems within the mound interaction area were identified in detail. As shown in Fig. 8, agricultural green areas are dense, and aqueous fields dominate the agricultural green areas. It was also observed on the lands and studies where the apricots, apples, mulberry, cherries, and walnut trees are planted, which are concentrated in aqueous fields. Another type of agricultural green area that has an important rate is wetland-garden-dry fields. These areas were observed to be used as seasonal dwellings, which are mostly described as

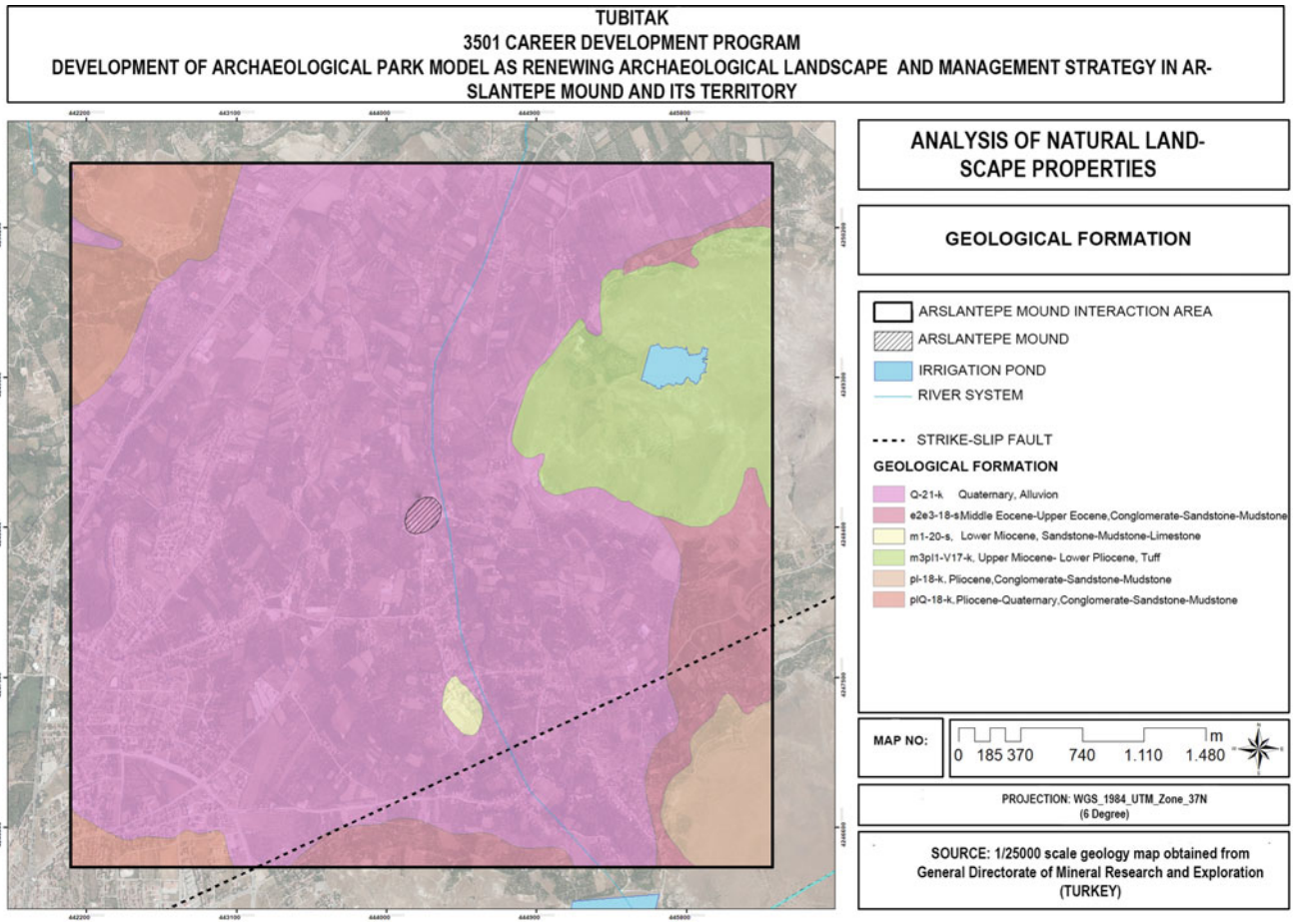

Fig. 7 Geology of Arslantepe Mound interaction area (Tuna, 2019)

"gardens" by Orduzu locals living in Malatya city center or other cities in summer months. It was determined in interviews with local people that poplar and willow fields along the stream bed are grown for commercial production purposes.

3.3 Cultural Landscape Value of Arslantepe Mounds Surrounding (Today)

Settlement Structure and Urban Space Utilizations: The field studies were conducted in 2018 and 2019 in order to determine the settlement pattern of the mound interaction area. Up-to-date orthophotos were used as underlays during field operations. Detected utilizations were transferred to the open-access QGIS software and a database was created. Analysis parameters such as building types, structural systems, physical properties of buildings, structure-floor heights, and traditional housing distributions were used in database design (Figs. 9 and 10).

When looking at the types of structures in the area of mound interaction, it is observed that 96.30% of housings are of high density, 1.42% is in housing-trade, 0.87% is stable-depot, 0.48%, and trade and educational structures are followed.

According to the data determined by land operations, the types of structures with a masonry (adobe) construction system within the mound interaction area are shown to be dense. In discussions with the local people, it was found that the use of adobe material continues and that the necessary property (white clay) is provided in the vicinity of Gelinciktepe and Yılancıkepe. It is observed that the density of reinforced concrete structures is 47.35%. The large percentage of reinforced concrete structures was found to have improved due to illegal construction.

When looking at the ply heights of the structures in the mound interaction area, it is observed that 42.53% of single-layered structures are dense. High-level (4 and above) settlement buildings were found to be concentrated along the southwest of the area of interaction of the mound, and are typically used as settlement areas for parcel applications.

When evaluating settlement typologies with traditional Turkish architecture, it was found that organic-developing

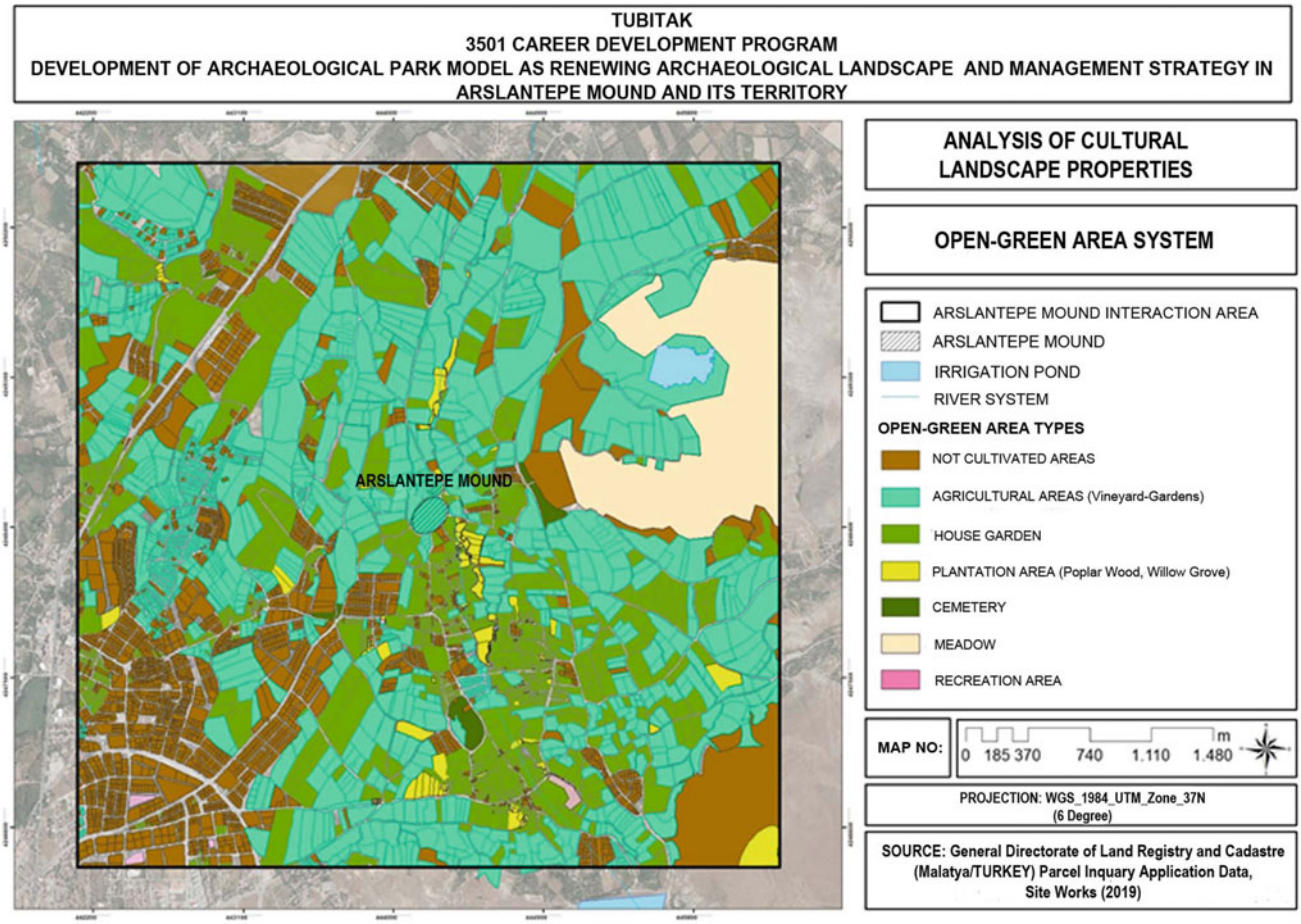

Fig. 8 Open-green system of Arslantepe Mound interaction area (Tuna, 2019)

settlements are mostly located in the attached buildings, mostly in the courtyard, and the floors of courtyard settlements are covered in the street, with the upper floors of the settlement and windows facing the street. The results of the land works indicate that the traditional street tissue was generally preserved on the close wall of the Arslantepe Mound, but it was found that the structure structures had serious destructive in the structural construction and the majority of which were unusable.

Ownership Status: Using the orthophotos obtained from Land Registry Cadastre Malatya Provincial Directorate as an orthophotos base, the information obtained from Land Registry Cadastre General Directorate parcel inquiry open-access address and field studies and land ownership status within the mound interaction area were identified in detail. According to the data obtained, there is a high concentration of private land. The fields belonging to the Municipality of Malatya, the Municipality of Battalgazi, the Ministry of National Education, and the Ministry of Treasury are other areas of public property.

Areas subject to Special Law: The areas subject to special law within the mound interaction area include agricultural protected areas and 1st and 3rd-degree archaeological protected areas. Interaction areas of Büyük Ova Protection Areas, which are the areas where land loss and land distortions are determined to develop rapidly due to various reasons such as high agricultural production potential, erosion, contamination, improper or misuse, and are therefore protected by the Council of Ministers Decision, cover 44.31% of the interaction area. The field boundaries that have gained agricultural protected area status under the scope of the Büyük Ova Protection area are provided by the Malatya Directorate of Agriculture and Forestry. The 3rd-degree archaeological protected area covers 3.5% of the mound interaction area and 1st-degree archaeological area covers 0.56% of the protected area (Fig. 11).

Economic Situation: The economy in Malatya is largely dependent on agriculture and the industry in which agricultural products are processed. 70% of the active population is involved in agriculture, livestock, fishing, forestry, and

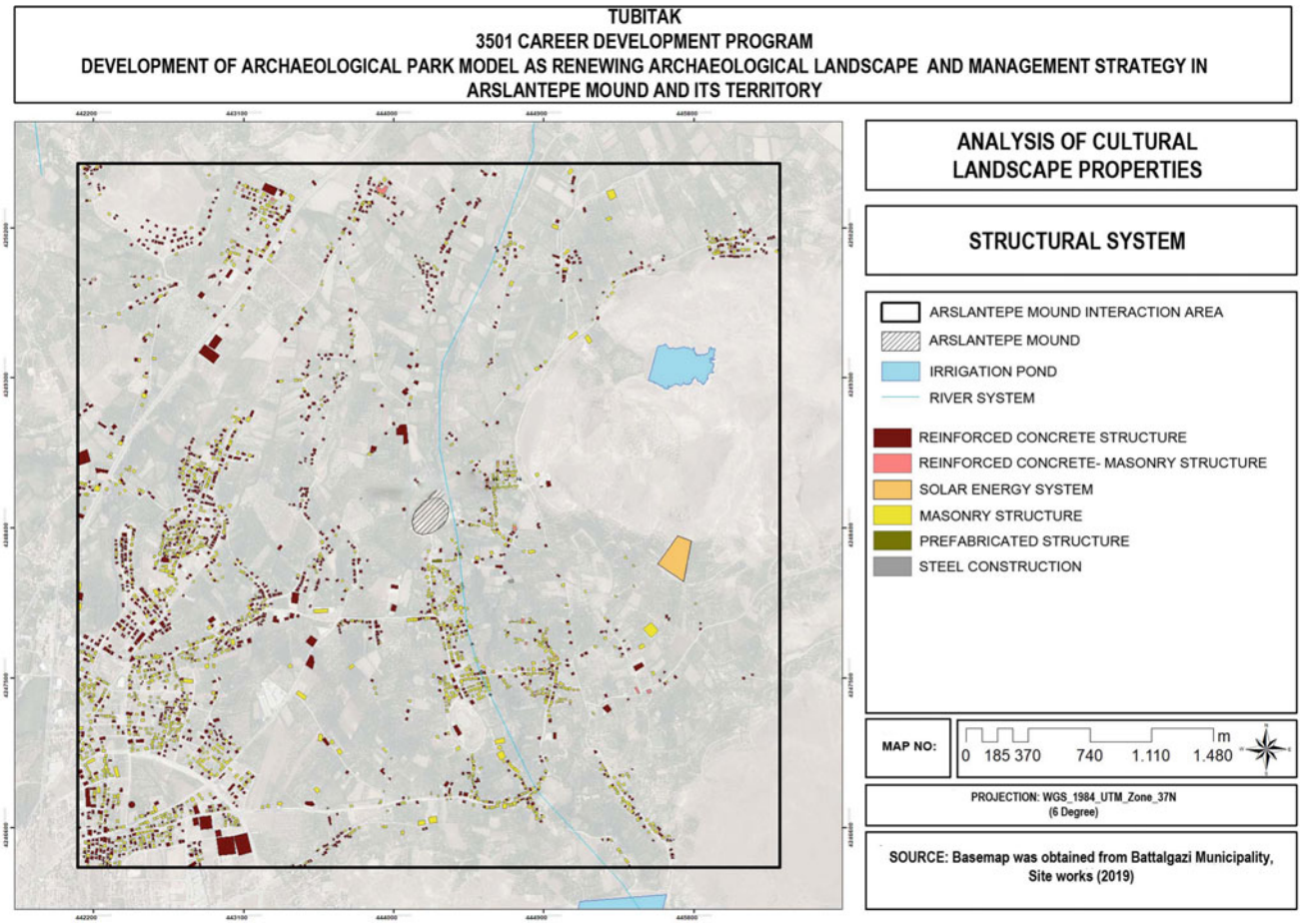

Fig. 9 Structural system of Arslantepe Mound interaction area (Tuna, 2019)

hunting. 35% of the annual gross state is provided from agriculture and 20% from industry and 12% from the service sector. Malatya meets approximately 53.4% of apricot production of Turkey and 85% of dry apricot exports of the world (URL 1), with an average yield of 329.655 tons of age.

Arslantepe Mound is situated in the territory of the Orduzu Quarter and here, the agricultural product pattern is varied substantially. Agriculture is, therefore, the main source of living. It contributes significantly on a city-wide basis in the production of, especially raw apricot. There are also 2 apricots-based after-market manufacturing factories in the quarter. The other economic source of input for the inhabitants of the quarter is excavation works of Arslantepe Mound. Excavations, which were carried out for many years (about 50 years) and which were attended by the people who provide seasonal employment and reside in Orduzu, are of high importance in terms of providing the first insurance entries of many citizens.

The most important change in the comparison of prehistoric landscape and the 21st-century landscape, which is tried to be defined in light of the data obtained from excavation and surface research, appears to be on climate. Climatic changes also bring about changes in the agricultural landscape and thus in manufacturing forms and settlement patterns. It is concluded that climate change can have an effect on the change of the central position of the Arslantepe Mound.

4 Conclusion

In this study, landscape changes from the date of Arslantepe Mound, which has proven to be a key center in the prehistoric period and where measures were taken toward becoming a UNESCO World Heritage with its superior universal values, were revealed up to this time.

Arslantepe mound, which was the center of the region where it was located in the prehistoric period, has lost its centralist position today. Today, the mound is located at the periphery of the current city center. It has been determined

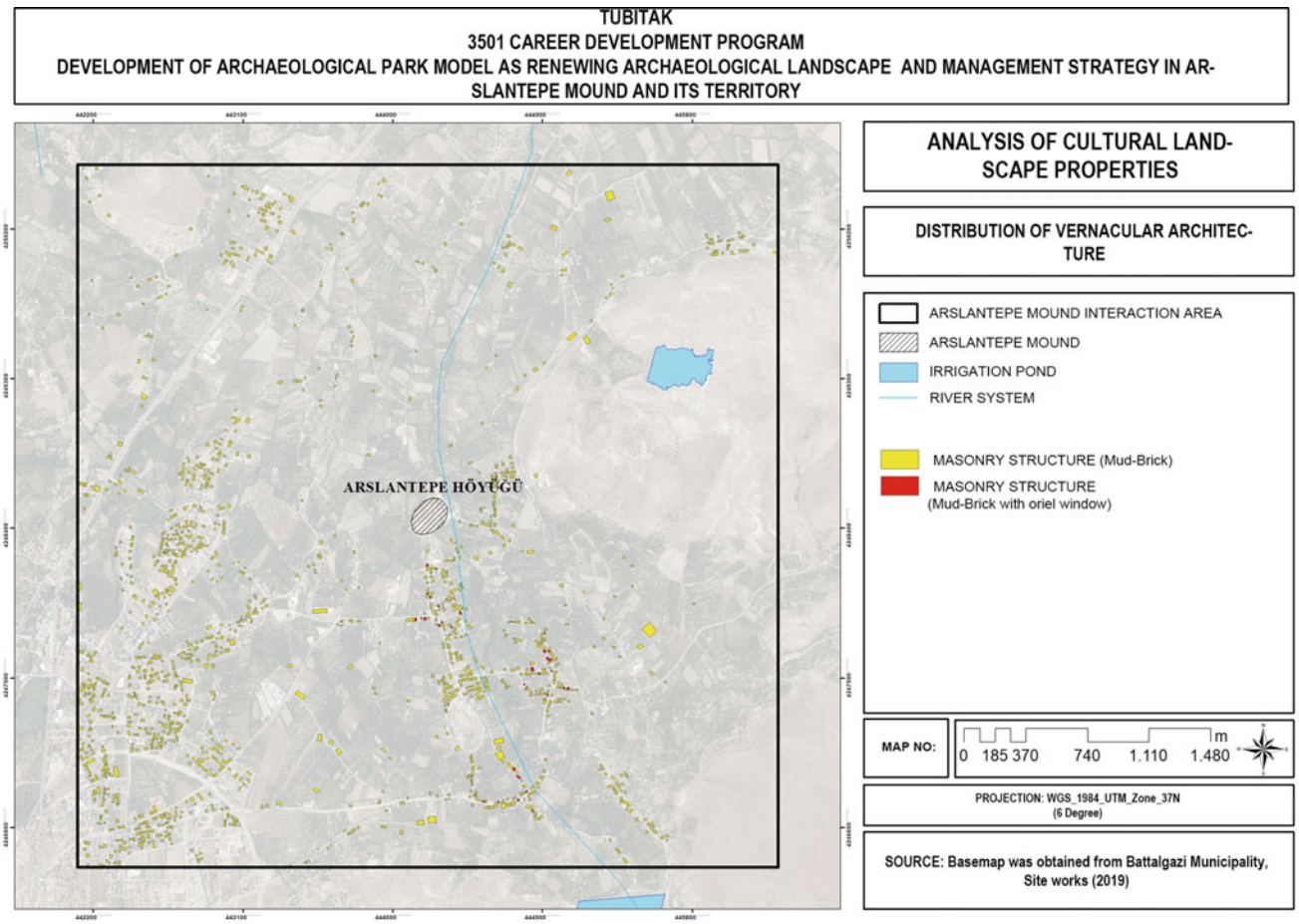

Fig. 10 The distribution of vernacular architecture of Arslantepe Mound interaction area (Tuna, 2019)

that agricultural production is dominant in the economic structure of the region from past to present.

When the green area system is examined, the intensity of the agricultural landscape character in the immediate environment draws attention. In the agricultural product pattern, it was determined that fruit growing (especially apricot cultivation) came to the fore. It is seen that there is a significant change in the green area character in the context of the past-present. According to the findings obtained from archaeobotanical and zooarchaeological studies, it has been determined that the species that can develop in humid climatic conditions have been replaced by flora and fauna species adapted to the terrestrial climate.

Considering the settlement pattern, mud brick, which is the characteristic building material of Arslantepe Mound, is also used in the houses in the immediate vicinity. However, as of the twentieth century, it was determined that the reinforced concrete structures were intensified and gradually reached the mound's immediate periphery. This situation negatively affects the original silhouette of the mound, which has the characteristics of world heritage.

The need to detect landscape changes is essential for ensuring the adaptation of archaeological sites, considered as background sources of information, to modern urban life and for today and to understand the past and shape the future for today. The investigation within this scope is also of utmost importance, especially in terms of the change in climate parameters, to provide the basis for the development of predictive models for future environmental conditions.

The detection of the change in environmental conditions will also contribute to the development of a historical environmental planning approach that will protect against the negative effects of urbanization activities in the immediate vicinity of the prehistoric Arslantepe Mound.

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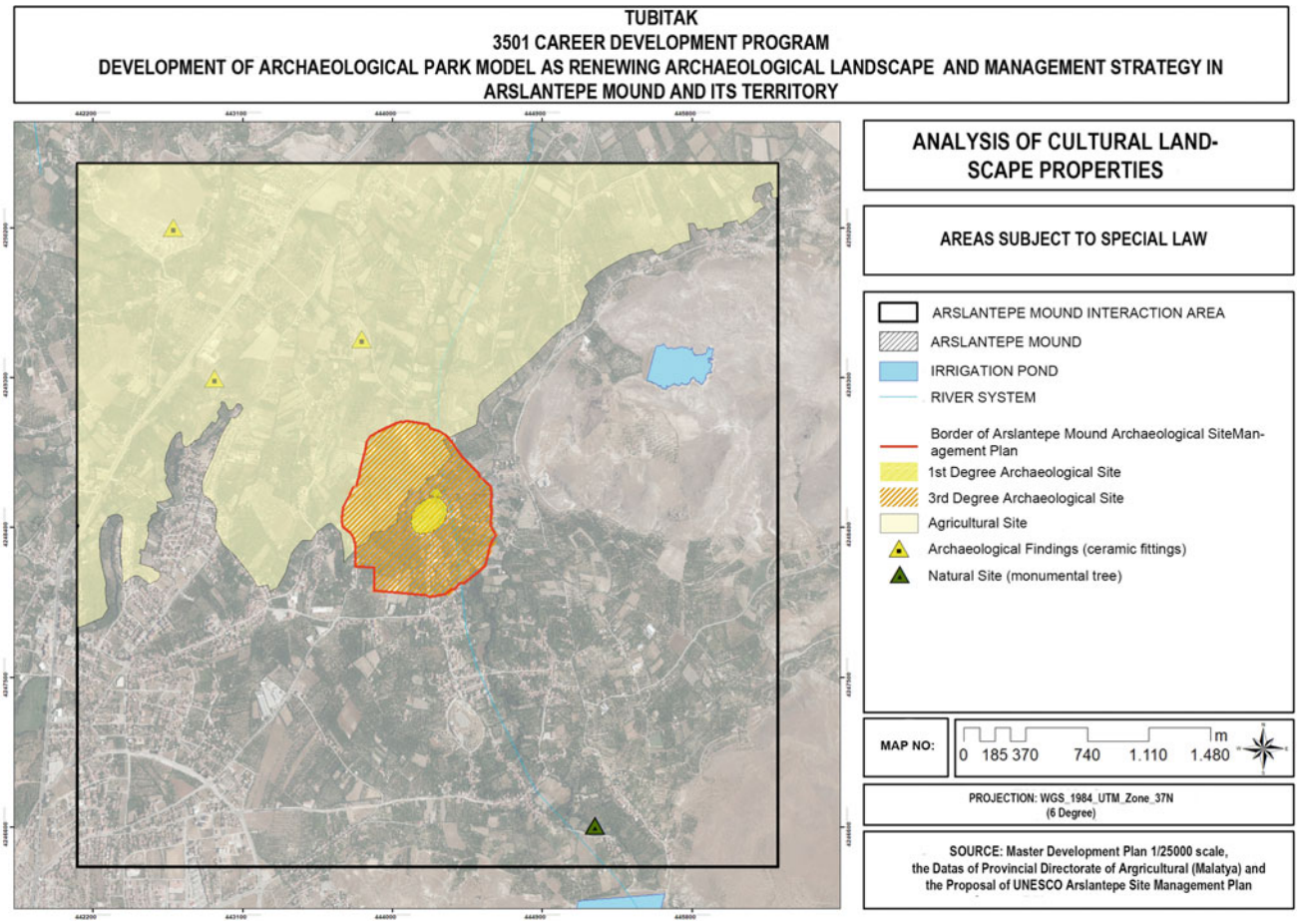

Fig. 11 Areas subject to special law of Arslantepe Mound interaction area (Tuna, 2019)

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