Research Article

An Analytical Approach to the Traces of Settlement of the City of Sakarya from Antiquity to the Present

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Abstract

According to the known history of the world, the first communities generally chose natural cave environments on the edges of sea, lake and stream for settlement and spread towards the interior of the land over time. These communities have learned to move to higher elevations in order to be protected from phenomena such as water rises and ground movements in the natural flow of the earth. It is an ironic situation that these natural phenomena that shape the earth are called disasters today.

In this context, the aim of the study is to question Sakarya River, which was formed as a result of an earthquake action, and along this river, the settlement decisions of the cultures that established living spaces within the borders of the city of Sakarya by mapping them chronologically from the Paleolithic period to the present day with an analytical approach. Within the scope of the study, the effect of the earthquake phenomenon in the city, from the ancient times to the present, while the settlement decisions are taken, will be discussed and the effect of this information on the current settlement decisions of the city will be questioned.

Types of analysis specific to the method developed within the scope of the study are; systematic literature review, epigraphic documents, aerial and archive photographs, maps. While reading the traces of settlement in the historical process, the study makes the structural constructs created by the cultures visible through the icons created within the scope of the study.

Keywords: Ancient Ages, Earthquake Action, Geographical Information, Sakarya City, Traces of Settlement.

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Araştırma Makalesi

Antik Çağlardan Günümüze Sakarya Kentinin Yerleşim İzlerine Analitik Bir Yaklaşım

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Özet

Dünyanın bilinen tarihine göre ilk topluluklar yerleşim için genellikle deniz, göl ve akarsu kenarlarındaki doğal mağara ortamlarını seçmiştir ve zamanla kara içlerine doğru yayılmıştır. Bu topluluklar, yeryüzünün doğal akışında süregelen su yükselmeleri, yer hareketleri gibi olgulardan korunabilme adına daha yüksek kotlara taşınmayı öğrenmiştir. Yeryüzünün biçimlenmesini sağlayan bu doğal olguların bugün afet olarak adlandırılması ise ironik bir durumdur.

Bu bağlamda çalışmanın amacı bir deprem hareketi sonucu oluşmuş olan Sakarya Nehri ve bu nehir boyunca, Sakarya kenti sınırları içerisinde yaşam alanları kuran kültürlerin yerleşim kararlarını, kronolojik olarak Paleolitik dönemden günümüze, analitik bir yaklaşım ile haritalayarak sorgulamaktır. Çalışma kapsamında kentte, antik dönemlerden günümüze yerleşim kararları alınırken deprem olgusunun ne derecede etkin olduğu tartışılarak bu bilginin kentin güncel yerleşim kararlarına etkisi sorgulanacaktır.

Çalışma kapsamında geliştirilen yönteme özgü analiz türleri; sistematik alan yazın taraması, epigrafik belgeler, hava ve arşiv fotoğrafları, haritalar olarak sıralanabilir. Çalışma, tarihsel süreçte yerleşim izlerini okurken kültürlerin oluşturduğu yapısal kurguları, çalışma kapsamında oluşturulmuş ikonlar aracılığı ile görünür kılmaktadır.

Anahtar Kelimeler: Antik Çağlar, Deprem Hareketi, Sakarya Kenti, Yer Bilgisi, Yerleşim İzleri.

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INTRODUCTION

Long-lasting changes such as ground movements, formation of mountains, volcanic activities, glacial movements, water movements and cycles, which are defined as geological events, contributed to the formation of the soil. The events did not end with the formation of soil. Soils are not static as geological events continue. Factors such as the results of physical and chemical events in the soil, climatic effects, and efforts to renew the soil itself cause the transformation of the earth. As the earth transforms, mountains, plains, underground and surface waters continue to form with it and form the identity of the place.

The first settlements were established on the edge of wide plains and natural harbours, on plains with fertile soils, along rivers and valleys, on natural roads and passages. The plains, rivers and valleys with fertile soils played a primary role in the selection of the place, and the cities were located near the big streams and their elbows. Those of the plains located near natural roads and gorges developed by gathering more populations.

There are different opinions about the formation and flow direction of the Sakarya River, which constitutes the main data of the study. The first view is that the graben pit formed in the area cut by the North Anatolian fault diverts the flow to Sapanca Lake-Gulf of İzmit. With the separation of Sapanca Lake from the Marmara Sea, the Sakarya River flowed to the north and reached to the Black Sea, and in this direction, it filled the graben pit where the Adapazarı Plain is located with the accumulations it brought (Türk Mühendis ve Mimar Odaları Birliği, 2012).

Another view is that the river was formed in the late Pliocene period, which started in the last period of the third geological age, which lasted from about 5.3 million years ago to 2.5 million years ago. In line with this view, which claims that the Sakarya river has always flowed towards the Black Sea, the Black Sea was 120 meters lower than today in the last glacial period and has risen to its present level in the last 8 thousand years. All of Turkey's deltas have been formed in the last 5-6 thousand years according to this new sea level (Türk Mühendis ve Mimar Odaları Birliği, 2012).

Studies of human history are generally explained through the finds of the Old Stone Age, which is defined as the Paleolithic Age with its scientific name. This period, defined by finds dating back approximately 2 million years, ended 12,000 years ago (Arsebük, 1998). When the traces of the Paleolithic and Neolithic period people in the basin formed by the Sakarya river were traced, as a result of the flakes obtained from the excavations, the remains and finds of settled life were found in the Karasu district, which has a coast to the Black Sea, and in the regions on the shore of the Sakarya River. It is observed that the settlement has continued until today in this area where the Sakarya River meets the Black Sea, which is fertile but not suitable for settlement due to its proximity to the fault line and alluvial soil characteristics. The close relations of these primitive settlements with water resources are known. Human communities living in the region have made living a way of life with frequent earthquakes and accompanying natural disasters, as in all of Anatolia. These regions have not been abandoned for centuries as they have fertile soils that allow agricultural activities.

We construct our "settlement" practices in the light of what we have gained from the knowledge of the place over time. To the extent that our settlement initiatives are compatible with the existing natural environment, we can sustain our life cycle with it in a qualified and sustainable way. Otherwise, our effort

to somehow integrate with the natural environment will succumb to ground movements such as earthquakes, which are included in its absolute cycle, causing the built environment we have created to disappear and most importantly, tens of thousands of lives will be lost.

The earthquakes with a magnitude of 7.7 and a magnitude of 7.6 in the center of Pazarcık in Kahramanmaraş province and centered in Elbistan on 06.02.2023, which we have experienced, are an important indicator that we cannot construct our attempts to create the built environment in the light of what we have obtained from the knowledge of the place. After the Kahramanmaraş-centered earthquake in our country, many studies have been carried out on post-disaster recovery both in the earthquake region and through social media channels.

However, as observed from the Kahramanmaraş-centered earthquakes we have experienced today, the pre-disaster process should be managed correctly in accordance with the requirements in order to minimize the damage that will be caused when the disaster occurs. In the Anatolian geography, which has a settlement practice dating back to the Paleolithic period; without ignoring the information about the place, it is necessary to construct an environment in which the earthquake phenomenon can be removed from being a disaster situation by using the right materials, on the appropriate ground, with appropriate planning-construction techniques.

Within the scope of the study, based on the traces of the first settlement of the city of Sakarya, which is located on the North Anatolian fault line, it was aimed to periodically examine the formation phases of the city within the borders of today's administrative city, and in this process, it was tried to discuss how the earthquake phenomenon was effective in the settlement decisions of the city.

SAKARYA URBAN DEVELOPMENT THRESHOLDS

The traces of urbanization became visible with the Hittite Civilization, which established the Anatolian unity in 3000 BC, in the region, where traces of settlements have been found since the Paleotic period and the administrative borders of today's Sakarya city are located. After the Hittites, who were divided as a result of internal turmoil in 1200 BC, the Phrygians dominated the region. When the Phrygian domination ended, the region passed into the hands of the Lydians. In the 6th century BC, the Persian Empire destroyed the Lydian Kingdom and dominated Anatolia. Macedonian King Alexander the Great defeated the Persians in the 4th century BC and dominated Anatolia. After the death of Alexander the Great, the Kingdom of Bithynia declared its independence and declared its dominance in the region including Sakarya, and in the 1st century BC, the Roman Empire ended the Kingdom of Bithynia and added the region to its lands (Turkish Statistical Institute, 2013).

The spring of the Sakarya River was formed when the waters coming out of the spring, where the ancient Sangia Ancient City is located, 3 kilometers southeast of Eskişehir Çifteler district, first became a small lake and then flowed. The basin formed by the river during its flow towards the Black Sea constitutes the settlement area of the city of Sakarya. Sakarya River, which took its name from Saggarios, a Phrygian river god in the Bithynia period, also gave its name to the province of Sakarya (Union of Chambers of Turkish Engineers and Architects, 2012). The city of Sakarya is located in the Çatalca-Kocaeli section of the Marmara Region, where this river empties into the Black Sea. The main landforms of the city are Adapazarı Plain, Geyve Strait and Sakarya Delta. Adapazarı Plain is the largest

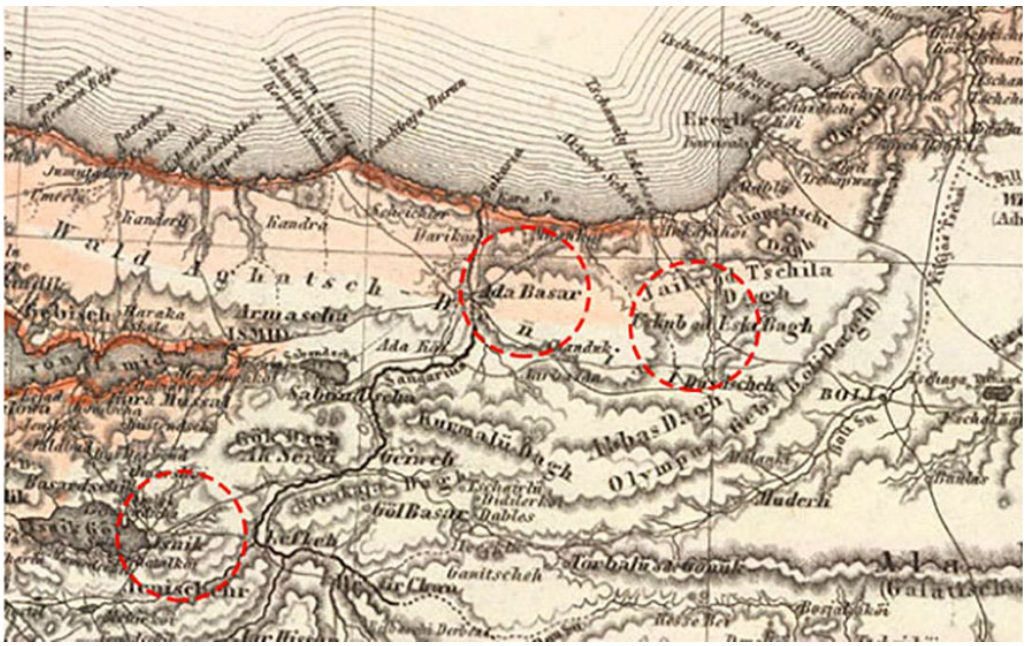


Figure 1. Map of Sakarya city and its surroundings, dated 1860 (Grassl, 2023).

alluvial plain of the Marmara Region. Adapazarı is the central district where the population of Sakarya is concentrated.

Earthquakes in the city as a result of tectonic events and the sediments carried by the rivers have been effective in taking the present state of the plain (Tuncel, 2005). Sakarya city, which passes through the North Anatolian fault line in its south, has experienced earthquakes that caused great damage in the city with the effect of the alluvial ground. In addition, the city of Sakarya has a strategic importance in terms of its location with centers such as Nicomedia (today İzmit), Nikea (İznik) and Prusias (Düzce), which have witnessed important events in the historical process (Figure 1).

Sakarya city, which is located on the third and fourth time geological structure, has been destroyed and rebuilt by the earthquakes that have been experienced since ancient times, with the effect of the active North Anatolian fault line passing through its south. According to the data obtained from archaeological, epigraphic, numismatic and literary sources, 300 earthquakes and 40 tsunamis, dated between 2100 BC and 1900 AD, occurred in the city. Especially the earthquakes that occurred in the 4th century AD caused great damage in the city (Doğancı, 2015). The city, which was established on the alluvial ground passing through the North Anatolian fault line from its south, has suffered greater damage in the last century, in the earthquakes of 1943, 1967 and 1999, due to the concentration of the population in the Adapazarı Plain (Akyol & Hayır, 2007).

Although Sakarya city suffered great damage each time in the earthquakes, it continued to maintain its presence in the same region. The city has been an important settlement for civilizations throughout history due to its climate diversity, water resources, fertile agricultural lands, and land-river-sea transportation relations. These features can be listed as the reasons why the city, which was destroyed by earthquakes since ancient times, did not change its settlement area.

The Traces of Settlement of Ancient Civilizations Between the Paleolithic Period and the Hellenistic Period in Sakarya City

It is accepted that the people of the Paleolithic Age, who are hunter and gatherer communities living under the limiting and determining pressure of nature; did

not know how to produce food and only fed on wild vegetables, fruits, roots and animals they hunted (Arsebük, 1998). Since the cave settlements were scattered and sparse settlements for the Paleolithic period man, who is defined as the "cave man", to accommodate the wandering, gatherer and hunter communities; the Paleolithic period man built simple and less differentiated shelters in order to maintain his life. It is observed that there are structures that can be easily erected and removed, covered with light materials such as leather, reeds, branches, mud, etc. While the shelters were used for sleeping-resting and limited individual activities, collective activities and interaction were carried out around the fire in the campsite (Acar, 1996).

Before the transition to the Neolithic period, there was a transitional phase in which hunter-gatherer and settlement prevailed together in Anatolia. The fertile, wetland basins where natural food and game animals are abundant and the proximity of the regions to the ore regions; made settled life possible for the people of the period. As a result of these data; it can be interpreted that sedentary life was not started by agriculture, and that agriculture provided the necessary surplus for the division of labor and barter, and thus the continuation of the settlement. When the shelters built in the period are examined; it is observed that there are small cellars, warehouses and hearths in the shelters, and that they are similar to the round planned shelters of the previous period (Acar, 1996).

The need for worship brought by our belief systems is another important factor in the transition to settled life. We can experience an example of this in the buildings built by Neolithic people in Göbeklitepe. New areas were needed for storage as a result of processes such as food processing and drying brought about by the surplus product produced by agriculture, which ensured the continuation of the settlement in the period. In addition, the common living areas seen in the hunter-gatherer society have been replaced by residential areas with the effect of agricultural production. Due to the growth-proof nature of the round houses, the rectangularization of the house became inevitable and the first step of the "grid planned structures" was taken (Acar, 1996). In the Çatalhöyük settlement, where advanced irrigated agriculture was started and pottery was made for the processing, storage and circulation of surplus agricultural products; the first

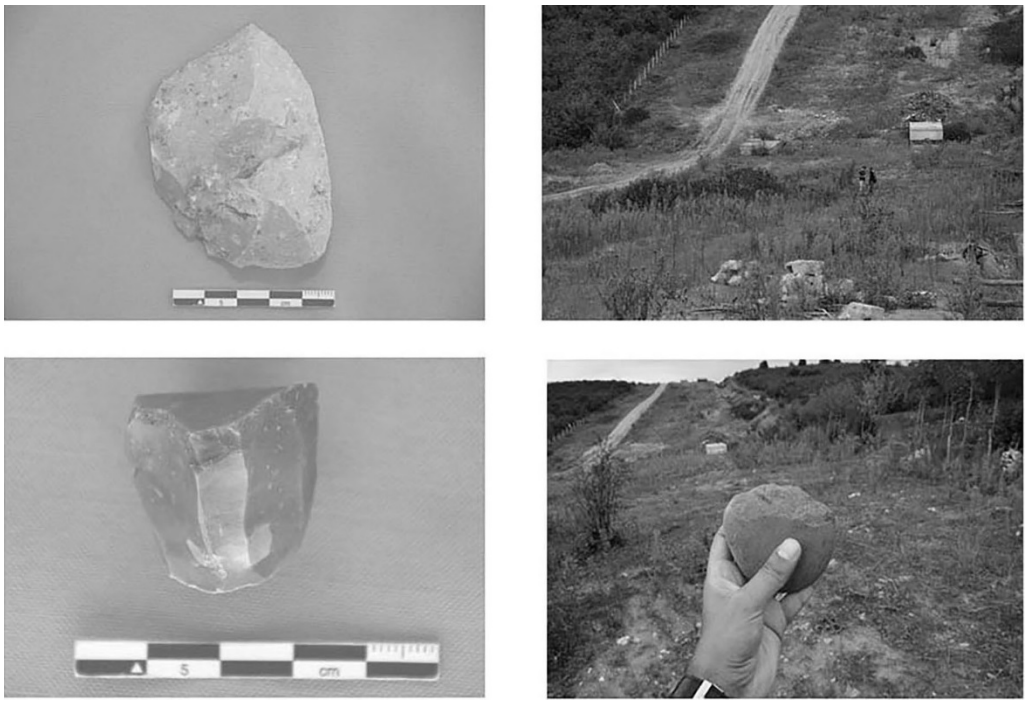


Figure 2. Paleolithic settlement traces in Sakarya (Tay Project, 2023).

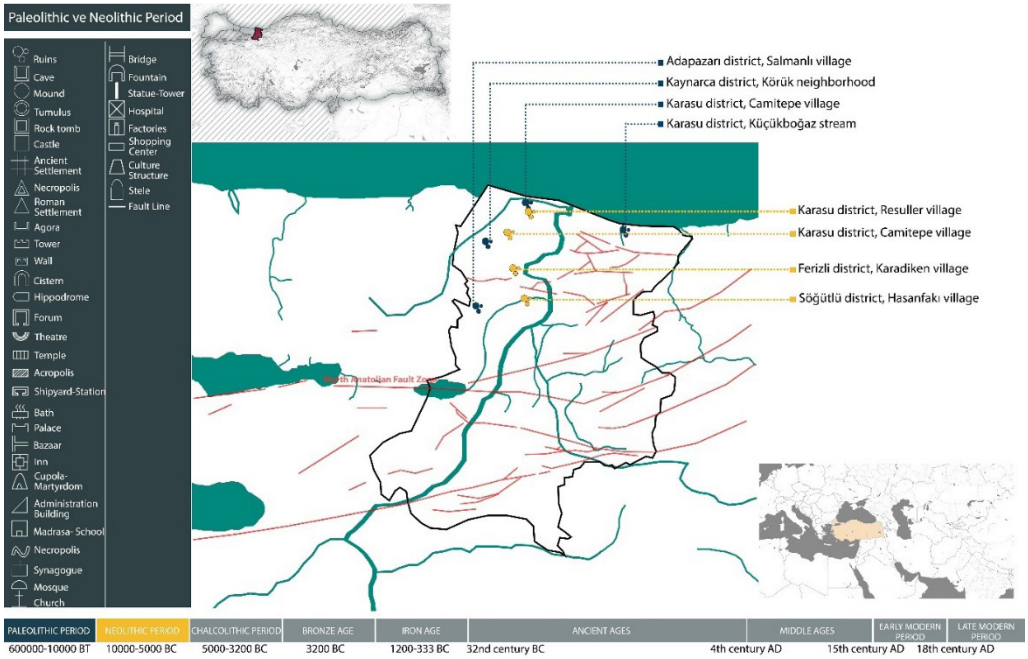


Figure 3. Paleolithic and Neolithic period settlement traces in Sakarya city (The map was created by the authors with data from the Tay Project site).

known city plan in history was depicted on the walls of a house (Acar, 1996; Tuğaç, 2021). In the process that developed with agricultural production and domestication of animals in the Neolithic period, basic vital practices began to be produced that will build today's urban life, the traces of which will continue to this day.

When traces of the Paleolithic and Neolithic period people, whose daily practices are basically known, are traced in Sakarya city; it is seen that the settlements are concentrated in the Karasu district, which has a coast to the Black Sea, and in the regions along the Sakarya River, as a result of the flakes obtained from the excavations (Tay Project, 2023), (Figure 2, 3).

In the Chalcolithic period, when agriculture was centralized and animal husbandry developed, population growth was experienced due to climatic data and geographical conditions becoming similar to today's. Mining developed and metals such as copper and tin began to be processed. As a result of these developments, a new order has emerged in which men's labor and skills come to the fore, unlike the main-centered order based on women's labor. In this new order, trade is dealt with and power is centralized by replacing the egalitarian order (Acar, 1996; Tuğaç, 2021). When the settlements of the Chalcolithic period people in the city of Sakarya were examined, flint flakes were found in Kaynarca district, which has a coast on the Black Sea, and stone hand ax and hand-shaped terracotta mug in Kocaeli district Sakarya (Tay Project, 2023), (Figure 4).

Developments such as maritime trade and the invention of writing in the Bronze Age, which came to the forefront with its metal richness, intensified "prehistoric globalization" (Acar, 1996). During the period, "megaron-type houses" with a square or rectangular plan, front entrance, one room with a hearth in the middle, built of adobe or stone materials became widespread (Akurgal, 1990; Bozkurt & Altınçekiç, 2013). The hierarchical developments in the period are reflected in the spaces with structures such as the palaces and head temples of the inner castle, and capitals rise from among the cities. With the development of trade, an enriching urban life is formed in the kingdom centers (Acar, 1996). When the artifacts found in the Bronze Age in Sakarya were examined, red slipped pottery belonging to the Advanced Bronze Age II-III was found on the Taraklı-Göynük road (Tay Project, 2023), (Figure 4).

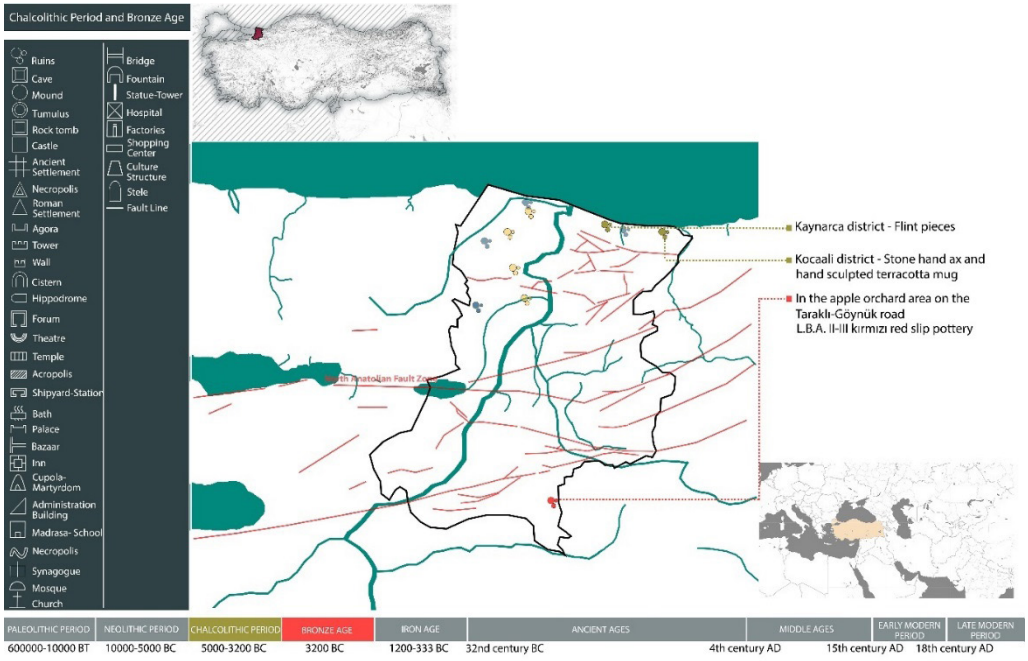


Figure 4. Chalcolithic and Bronze Age settlement traces in the city of Sakarya. (The map was created by the authors with data from the Tay Project site).

The Phrygians (750-300 BC), who ruled in Central Anatolia during the Iron period (1200-333 BC), developed in woodworking and used stone as a material (Tuğaç, 2021). When the structures built by the Phrygians are examined; adobe structures with a megaron plan, stone foundations and stone or wooden beams on the upper parts are observed (Arslan, 2016; Bozkurt & Altınçekiç, 2013). When the Iron period settlements of Sakarya city are examined; it can be seen that Erenler district, which constitutes the central settlement of today's Adapazarı, Tarseia / Tarsos Ancient City in Küçükesence village, Kabaia / Kabia Ancient City in Geyve district, Malagina Ancient City in Mekece village of Pamukova district, Taraklı district, Lamneis Ancient City and Taraklı district, Oka Ancient City settlements are observed (Adak, 2017), (Figure 5).

When the Hellenistic period settlements in Anatolia are examined; it is observed that while the principle of equality was observed in the residences in the classical period settlements, the concept of "luxury" began to take place in settlement

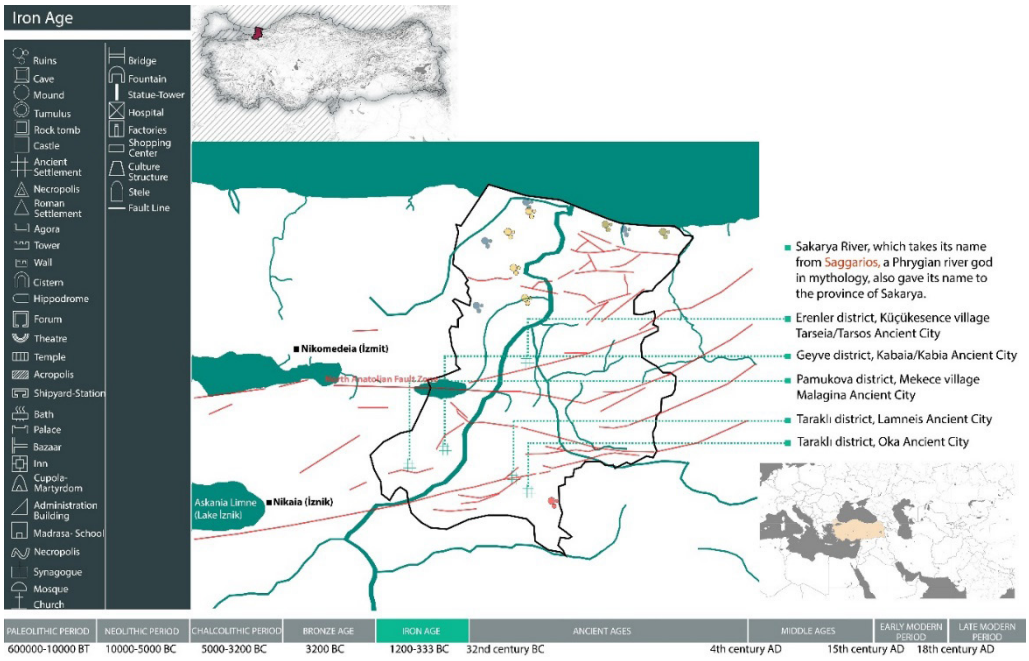


Figure 5. Iron period settlement traces of Sakarya city (The map was created by the authors with data from the related article, Adak, 2017).

practices by deteriorating the principle of land integrity and equality in the following process. The residences have a peristyle -a rectangular open courtyard surrounded by columned corridors- in direct proportion to the magnificence of the house. This type of housing, which belongs to the Hellenistic period, has undergone significant changes during the Roman period (Abbasoğlu, 1996). When the artifacts belonging to the Hellenistic period in Sakarya were examined, steles and cemeteries were found in Akyazı district (Adak, 2017).

When the settlement structure of Sakarya city until the Roman period is examined, the proximity to the water source is the main element that creates the settlement. The city was chosen as a settlement by ancient civilizations due to its coast to the Black Sea and the presence of the Sakarya River.

Sakarya City Roman Period (27 BC-AD 395) The Relationship Between Ground Movements and Settlement Construct

When the Roman period settlements that influenced by the Hellenic culture are examined; the city of Timgad, which provides ease of defense and was implemented for reasons such as social hierarchical structure and material use, has the characteristics of typical Roman period settlements although it is not located in Anatolia. The houses are generally houses with inner courtyards but besides these, the first examples of multi-storey mass housing were also encountered. City; the city square has merged with the agora and the acropolis and left its place to the forum. Roman Empire was divided into two in 395 AD. The Western Roman Empire was destroyed, and the Eastern Roman Empire (Byzantine) continued to rule in Anatolia (Tuğaç, 2021).

While reading the settlement practices of Sakarya when the Roman period is examined, according to some researchers, Sakarya was completely dependent on the city of Nicomedeia (today İzmit) during the Roman period. Others, by ending the eastern border of Nicomedia at Sapanca Lake or the Sakarya River, accept that the Adapazarı Plain belongs entirely to Prusias (today's Düzce). Samanlıdağ (Sophon) was a natural border to the city which was located between Nikomedeia and Nikea which were the important centers of the period (Adak, 2017).

In Sakarya, which was on the transit route of important centers in the Roman period, various stations and market places were established in order to supply the army. Plateas which corresponds to the vicinity of Beşköprü or Dörtyol built on Çark Stream and Demetriu are some of the stations that functioned as market places. The ancient city of Tarseia/Tarsos (today's name Küçük Tersiye/Küçük Esence), which is located close to the center of Adapazarı, which is the current center of Sakarya, which was chosen as a settlement during the Iron period; also continues its existence as a settlement during the Roman period. The early name of the city is Tarsos, which supports the data we have obtained. The place name Tarseia continued to exist as Tertiary until the 20th century (Adak, 2017). The selection of the region as a settlement during the Iron period and its location close to the water can be listed as the reasons why the region continued its existence as a settlement during the Roman period, despite the alluvial ground. (Figure 6, 7).

Sakarya City Byzantine Period (395-1453) The Relationship Between Security Element and Settlement Fiction

In the period when the Roman Empire was dissolved in Anatolia and the Byzantine Empire ruled, the atmosphere of trust was lost as a result of the wars between the tribes in Western Europe. With the economy based on agriculture, the administration passed into the hands of the feudal lords and the Middle Ages began. The lack of an environment of trust caused the medieval cities

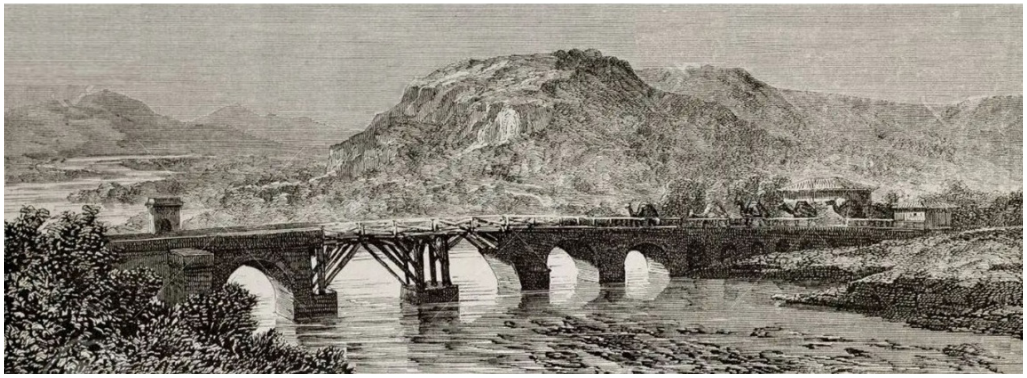


Figure 6. Old view of the Ancient Roman Bridge over the Sakarya (Sangarius) River, Bithynia region, Turkey, (İğdir, 2023).

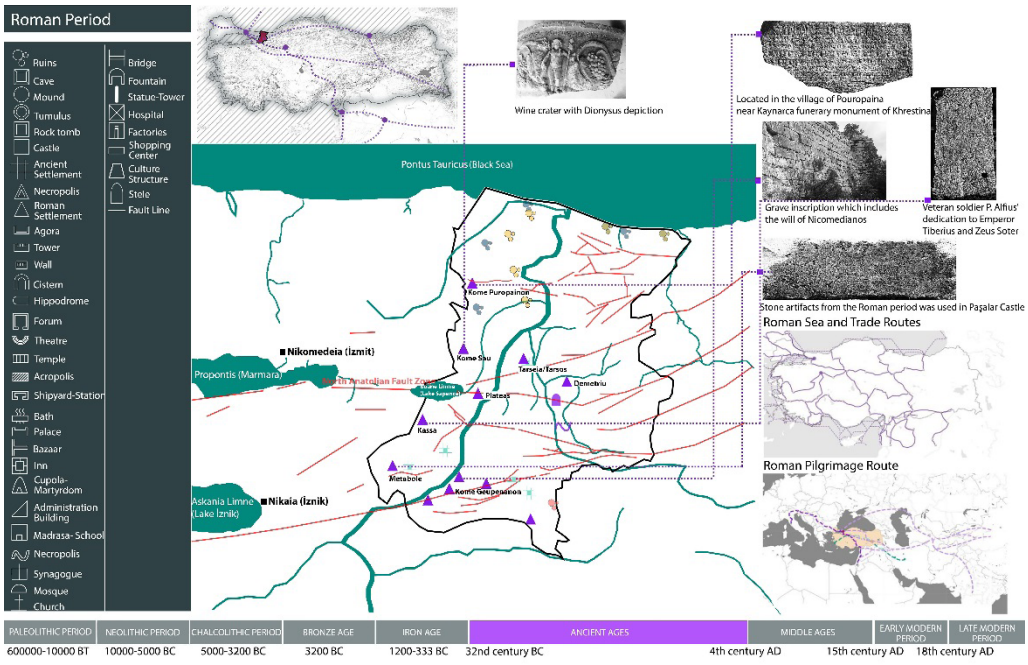


Figure 7. Roman settlement traces of Sakarya city (The map was created by the authors with data from the related article, Adak, 2017).

to develop inwardly within the walls. The gridal form applied in the Roman period deteriorated and the organic structure compatible with the topography became dominant. It is observed that buildings such as hippodrome, temple, and theater were abandoned during the Byzantine period and that religious structures were given importance. In addition, it is observed that the housing structures have returned to the village order (Tuğaç, 2021).

In parallel with these data, when the Byzantine period works in the city of Sakarya are examined; it seems that the castles, the castle bastion and the Sangarios (Justinianus) Bridge are the works that have survived to the present day. Justinianus (today's name Beşköprü) between 553 AD-561 AD was built by the Byzantine Emperor Justinianus. There is no water flowing under the bridge at the moment as the Sakarya River, which flowed in the region by splitting into two branches at the time it was built, changed its bed and flowed in the other branch as a whole. Due to the high flow rate of the river during the Byzantine period, 4 bridges were built and demolished in the region and the bridge was named "Beşköprü" (Akyol, 2007), (Figure 8).

Metabole (Paşalar) Castle which contains thousands of architectural elements from the Roman settlement to the Middle Byzantine period, is also one of the important works of the period (Adak, 2017). When the traces of the Byzantine period settlements are examined, it is seen that the settlement was planned by keeping the security factor in the foreground (Figure 9).

Figure 8. View of the Justinian Bridge dated to the 1880s (Old Türkiye Photos Archive, 2023).

Investigation of the Settlement of Sakarya City in the Ottoman Period (1299-1922)

With the victory of the Battle of Manzikert in 1071, the gates of Anatolia were opened to the Turks. It is observed that the Turks adopted the settled life even before they came to Anatolia. Since the Turks raised horses in Central Asia, they had to relocate and there are certain migration routes. They used tents as shelters for spring and winter quarters. As a result of the excavations carried out in Transoxiana and Khorasan; it is observed that the Turks built structures with a square plan, four iwans, a central dome and large courtyards in Central Asia. The traces of this scheme whose origin is based on nomadic culture, will also show itself in Turkish houses in Seljuk and Ottoman architecture. Tents located

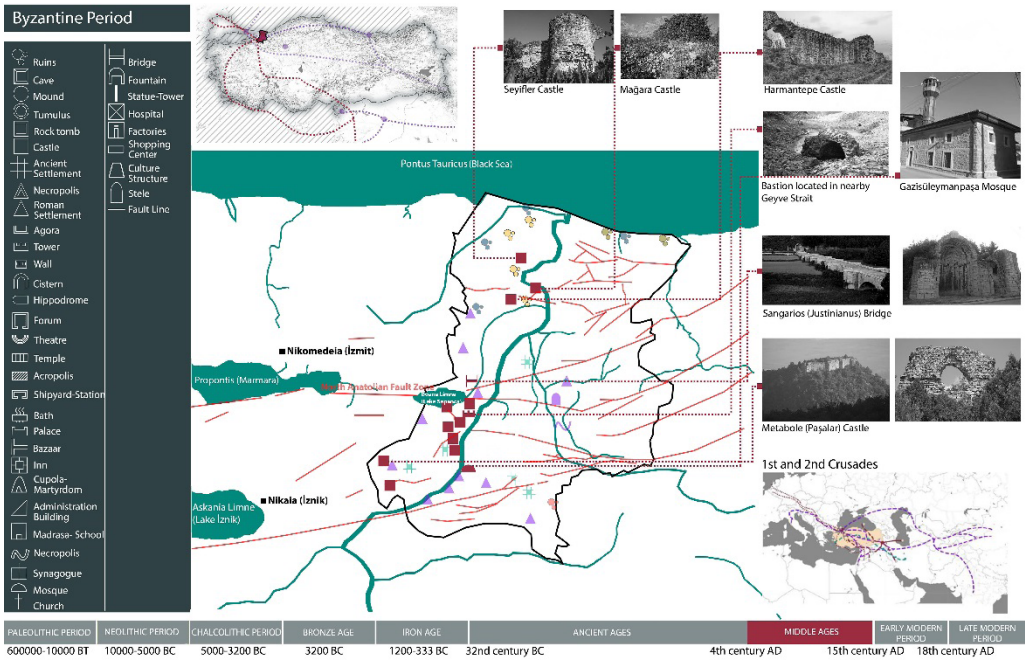


Figure 9. Traces of Byzantine period settlements in the city of Sakarya (Sources of the images are indicated in the bibliography and the map was created by the authors with data from the relevant doctoral thesis, Yıldırım, 2003).

around the common area and where they stayed during migration will appear as rooms and sofas in the Turkish house. During the period of the Anatolian Seljuk State, new functions were given to the existing structures, such as the conversion of churches into mosques, and the city developed by joining the Byzantine cities. During the period, castle-city settlements continued to get stronger (Tuğaç, 2021). The Ottoman Empire was established as a result of the collapse of the Anatolian Seljuk State and the strengthening of the Ottoman Principality.

While examining the settlement structure in the Ottoman period; it can be divided into 3 periods: Early period (14th century-15th century), Traditional/Classical period (16th century-18th century) and Westernization period (19th century-20th century). The Ottoman Empire gave importance to urbanization from the early period. While settling around existing cities, as in the Seljuk period, it also built its own organic order. In the organic urban settlement, the built environment is built by acting together with natural data (Figure 10).

In the 17th century, a settlement policy was determined in order to settle the Ottoman people and as a result of the Celali Revolts, the people migrated from the countryside to the city. In this period, it can be said that security which is the main element that constitutes the settlement setup of Byzantium also played a role in the construction of Ottoman urban settlements. Ottoman cities with ethnic, religious, economic and social diversity; they are settlements that are in harmony with the natural environment, the size of the parcels increases as they move away from the city, small adjoining structures in the middle of the city center with public buildings, there are no class differences and the neighborhood culture is widespread. The bazaar where commercial activities are carried out in Ottoman cities is an important center (Tuğaç, 2021).

With the reform movements that came with the Tanzimat Edict declared in 1839, Ottoman cities experienced transformations in physical, social and administrative areas. Along with the traditional organic city plan in urban

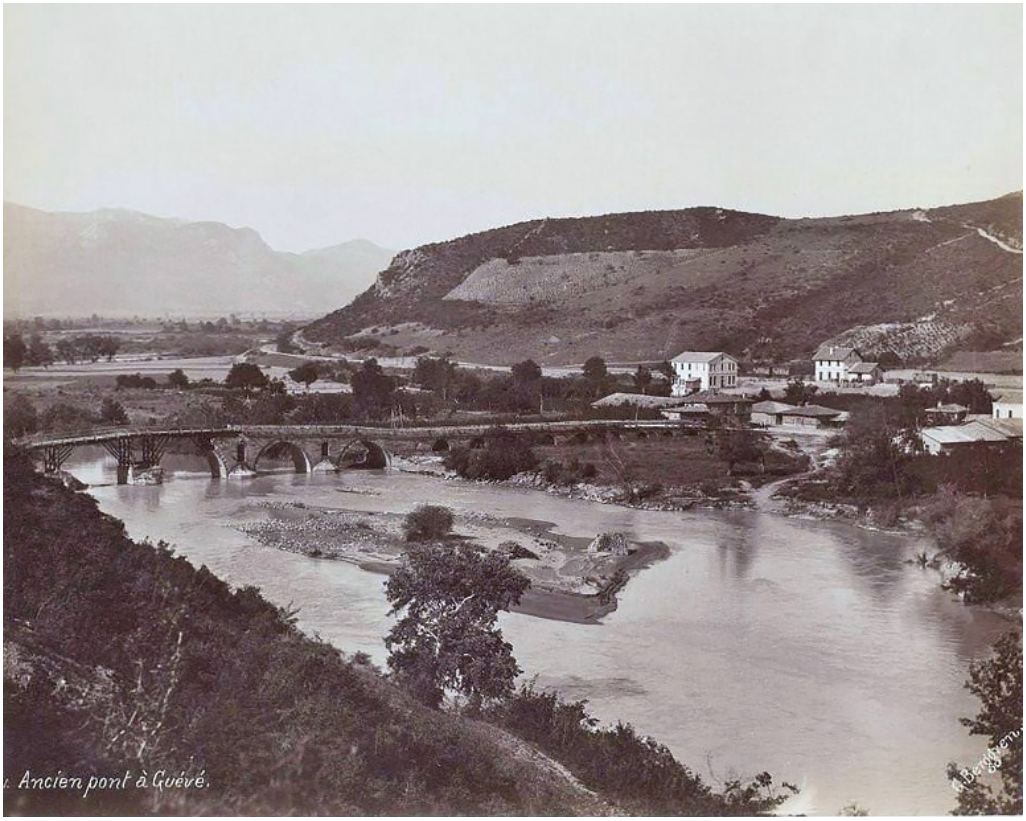


Figure 10. Old view of Geyve Bridge over Sakarya River and Geyve district of Sakarya province (Old Türkiye Photos Archive, 2023).

settlements, the grid city plan has also begun to be seen as a result of reasons such as the development of railways, the destruction of the traditional texture in natural disasters, and the transition to the nuclear family process in the social structure (Aliağaoğlu & Uğur, 2016; Özcan, 2007). In the period, row type houses were built and multi-storey housing culture began to become widespread with apartment building (Bilgin, 1996).

In parallel with these developments when the settlement practices of Sakarya are examined, it is known that there was a settlement called "Island" or "Ada village" at that time. The Island Village was formed by transforming the Adapazarı Plain and the surrounding forest areas into agricultural areas and since the 16th century it has formed the core of the present city. A village named Ada was developed as a market place in the location where today's city settlement is located and the city began to be named with this name. The city of Adapazarı was named after the second word of its name, the "market" because it was established as a marketplace before. The word "island" was taken because those coming from the east to the marketplace had to cross the Sakarya River and those coming from the west had to cross the Çark Water and the settlement surrounded by water had an island appearance (Karaer, 2020), (Figure 11).

Figure 11. The view of Kadı Bridge, located in the borders of Serdivan district of Sakarya province, from the 1890s (left), (Adapazarı History, 2023) and view of Adapazarı district of Sakarya province, dated 1901 (right), (Old Türkiye Photos Archive, 2023).

Sakarya city, which has been an important transit point since ancient times and was a marketplace during the Ottoman period, became a commercial center towards the 19th century. Adapazarı was a district of the İzmid sanjak of the Hüdavendigar province in 1852. With the establishment of the municipal organization in 1869 and the articulation of the Haydarpaşa-Ankara railway line to the city in 1899, the development of the city of Adapazarı on the southwest-northeast axis accelerated (Karaer, 2020), (Figure 12).

Figure 12. The view of Adapazarı Station, dated 1914 (Sülük, 2023).

Kaynarca Şeyh Müslihüddin Mosque, a wooden bell-style mosque built by Şeyh Müslihüddin, the sheikhülislami of Sultan Orhan Gazi, Taraklı Yunuspaşa Bath, Geyve II. Bayezid Bridge which is the only bridge example that has survived from the Ottoman period and Geyve Elvanbey Lodge are important structures built in the period. In addition, Sinan Bey Inn, which is one of the important structures that indicates the commercial position of Geyve, located on the middle arm road route in the Ottoman triple road system connecting Anatolia to İstanbul, is one of the works of the Ottoman period that has survived to the present day (Çetin, 2006), (Figure 13).

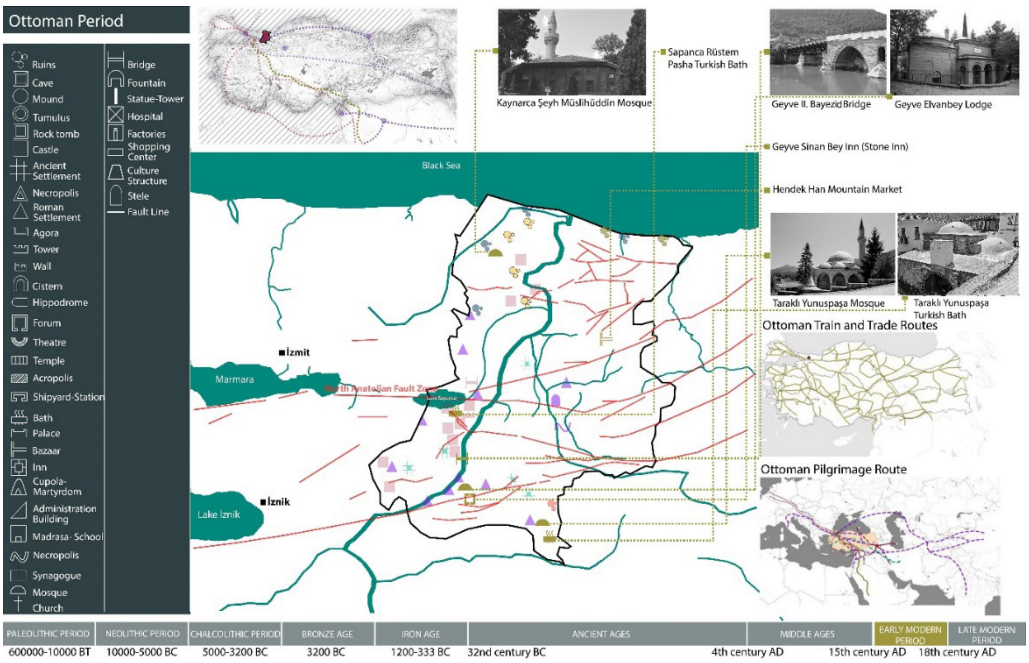


Figure 13. Traces of Ottoman period settlement in Sakarya city (The map was created by the authors and sources of the images are indicated in the bibliography).

When the settlement structure of the city of Sakarya in the Ottoman period is examined in outline, it is observed that ethnic groups played an important role in creating the built environment. This effect has continued until today and has created the cosmopolitan structure of the city. Another important turning point is the transformation of the city's built environment with the westernization movements of the Tanzimat period. During the Ottoman period, the settlement was generally along the east of the Sakarya River and moved to the west over time.

Investigation of Sakarya City Republican Period (1923-Present) Settlement Fiction

The transformation of settlement practices in Anatolian cities from the proclamation of the Republic to the present can be examined under 4 main headings: 1923-1950: Early Urbanization Practices, 1950-1980: Unplanned Urbanization Period, The Built Environment Transformed by the 1980-2000 Neoliberal Era Decisions and Transformation of the Built Environment after the 2000s.

1923-1950: early urbanization practices

In early urbanization practices, the capital Ankara was accepted as a prototype for all Anatolian cities; boulevards, streets and intersections were designed with a gridal plan scheme and a radical modernization was made (Tuğaç, 2021). Stone, wood and adobe, which are the materials of the place of residence, were abandoned and the structures were built using concrete, steel and glass materials. State housing built in this period is considered to be the origin of mass housing (Bilgin, 1996). As a result of the granting of housing loans for cooperatives

in 1945, housing production patterns changed and an "idealized modern housing image" was created by moving from traditional housing typology to two-storey houses and the first cooperative spaces (Tuğaç, 2021).

1950-1980: unplanned urbanization period

In the period between 1950 and 1980, the population migrating from the countryside to the city, with the effect of industrial developments such as mechanization in agriculture, caused unplanned urbanization with slums. With regulations such as zoning amnesty and the Condominium Ownership Law published in 1965, reinforced concrete apartments have become increasingly common (Bilgin, 1996; Tuğaç, 2021), (Figure 14).

Figure 14. Aerial photograph dated 1963 of Adapazarı district of Sakarya city (Sakarya Metropolitan Municipality Archive, 2023).

The built environment transformed by the 1980-2000 neoliberal era decisions

As a result of economic restructuring within the framework of neoliberal policies implemented after 1980, developments such as the establishment of metropolitan municipalities and the regulation of zoning rights have led to rapid urbanization of the built environment (Tuğaç, 2021). In addition, after the Marmara earthquake in 1999, in the 2000s as a result of the important transformations in Turkey's housing policies such as the creation of TOKİ houses, a period was entered in which new construction practices were constructed.

Transformation of the built environment after the 2000s

After the 1999 Marmara earthquake, the way of housing and settlement practices were questioned, and a series of regulations were made in the housing production process, such as the published earthquake regulations. And as a result, a uniformized housing stock resistant to earthquakes has emerged. When the transformation of the built environment after the earthquake is examined; it is observed how important it is to accept the earthquake, which is the main goal of the article, as a location information and to design the built environment together with the earthquake phenomenon.

When the various structures that have survived to the present day in the city of Sakarya, pointing to the period of Turkey, are examined; People's House, Atatürk's House, Yeni Mosque and Orhan Gazi Bazaar maintain their presence in the city with their historical layers (Figure 15). Uzunçarşı, which is one of these structures, was not heavily damaged in the 1999 Marmara earthquake due to its 2-storey and earthquake-resistant structures. The main axis of the city of Adapazarı in the southwest-northeast direction was formed by the filling of the formerly stream-swampy area with soil by the inhabitants and the first settlements were located on opposite sides of the stream bed. The roads were constructed parallel to the stream and the main axis emerged. Uzunçarşı is located at the end of the axis parallel to this axis. A large part of the tradesmen in today's Uzunçarşı consists of immigrants who migrated at that time. This reflects the cosmopolitan nature of the city.

Figure 15. Traces of Republican period settlements in Sakarya city (The map was created by the authors and sources of the images are indicated in the bibliography).

When traces of urban development have been traced in the city of Sakarya since ancient civilizations, the settlement in the land close to the water source and with a solid ground draws attention. During the Bithynia period, it was settled in the Tarseia/Tarsos (today's Küçük Esence) region on the edge of the Sakarya River, close to Adapazarı. In the Roman period, the settlement in Yenikent, close to the center of Adapazarı, where earthquake houses were built after the 1999 Marmara earthquake, draws attention. The relationship between the settlement decisions on the land with solid ground in the Roman period and today's settlement practices will be discussed in detail in the conclusion and evaluation section. As the urban growth process of Sakarya city continues to be examined, it was settled along the east of the river during the Ottoman period and it seems that the settlement shifted to the west over time. In the Republican period, the city developed on the southwest-northeast axis until the 1999 Marmara earthquake. After the earthquake, the development in the west of the Sakarya River slowed down and turned to the northwest (Hayır & Akyol, 2007), (Figure 16, 17).

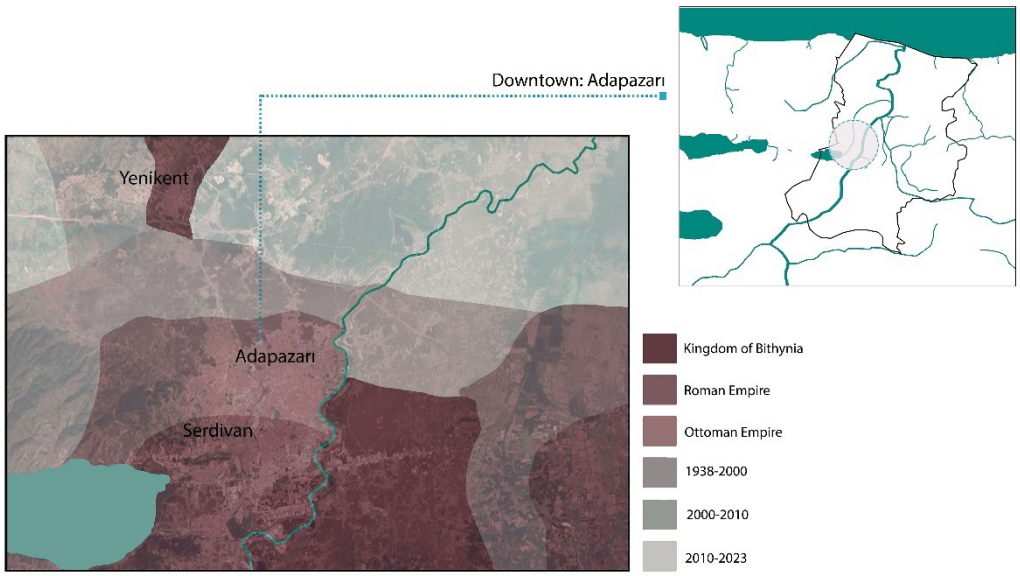


Figure 16. Adapazarı district of Sakarya city and its surrounding urban development (The map was created by the authors).

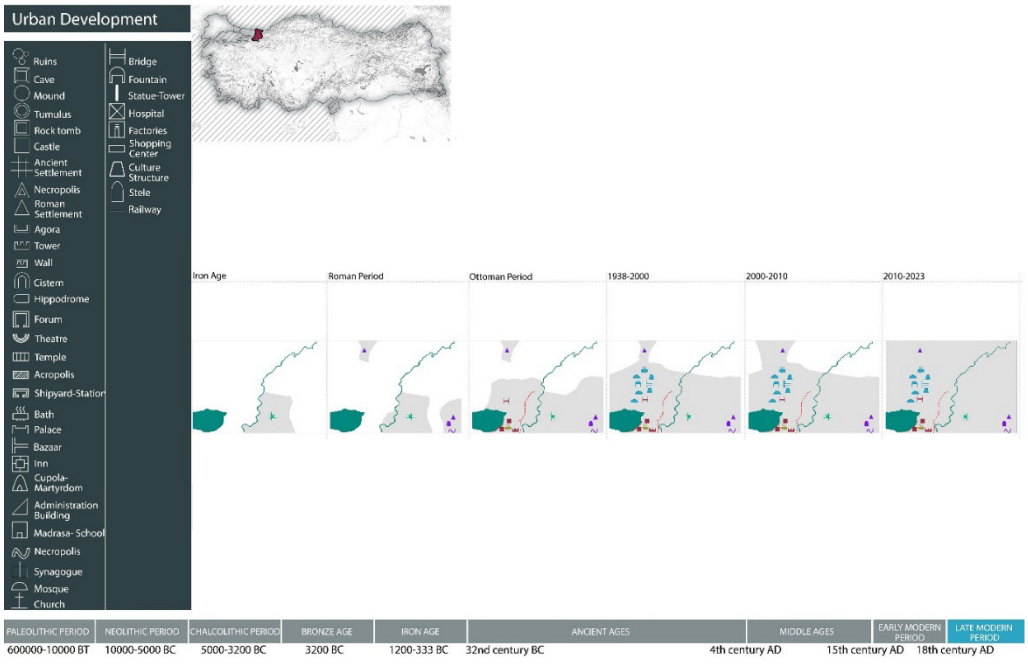
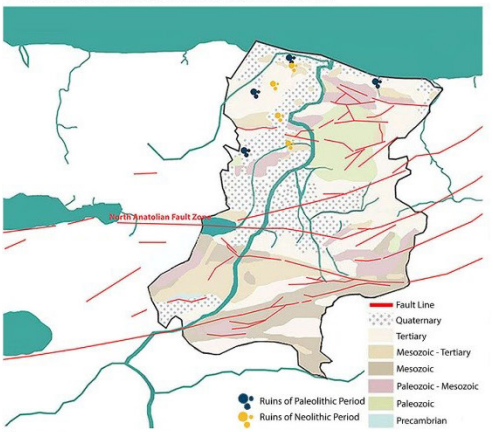


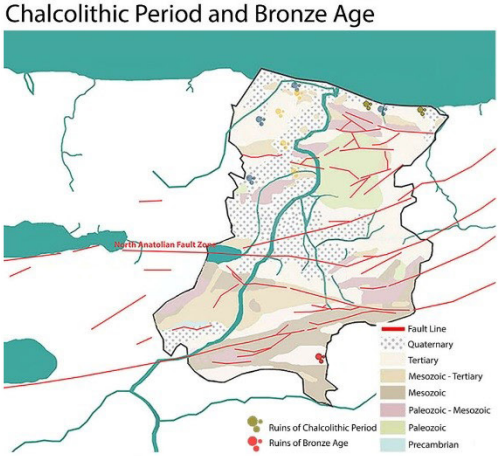
Figure 17. Urban development map of the city of Sakarya from the Iron Age to the present (The map was created by the authors).

When the settlement traces from the ancient times to the present are examined comparatively in the city of Sakarya the proximity of the settlements to the water source during the Paleolithic, Neolithic, Chalcolithic and Bronze Ages draws attention. Although the practice of settlement close to water was continued in the Iron Age and Roman period, it is observed that settlement was given importance on land with solid ground. In the Byzantine period traces of settlements where the security element was at the forefront can be reached along the west of the Sakarya River through the castles, the castle bastion and the Sangarios (Justinianus) Bridge. During the Ottoman period the settlement shifted to the east of the river and generally there was a settlement on solid ground (Table 1).

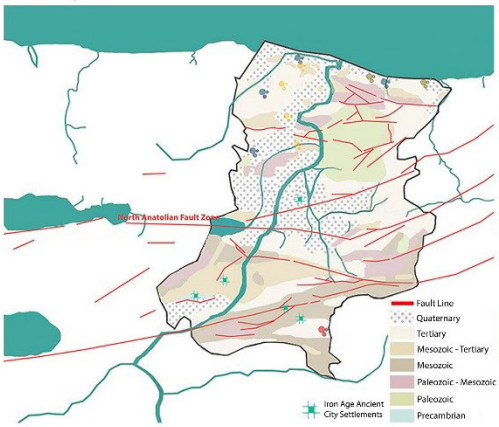
Paleolithic and Neolithic Period



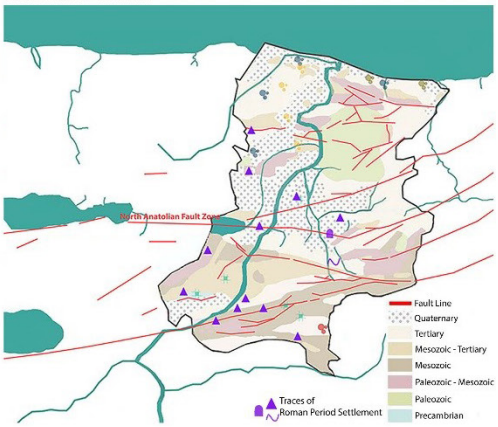
Chalcolithic Period and Bronze Age



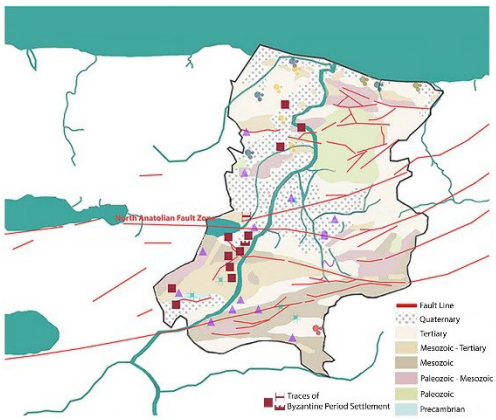
Iron Age



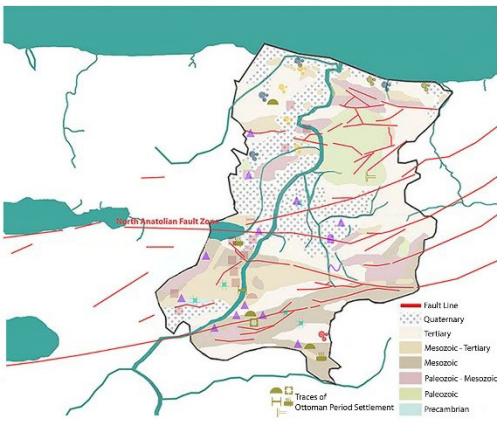
Roman Period



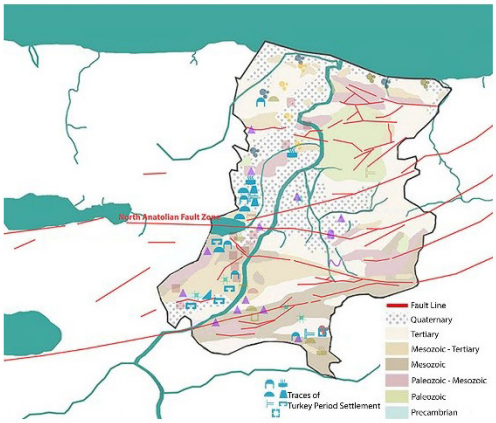
Byzantine Period



Ottoman Period



Turkey Period



During the Republican period the settlement shifted to the west of the river and the city continued to grow on the southwest-northeast axis until the 1999 Marmara earthquake (Table 1).

Table 1. Examination of the relationship between the settlement traces of Sakarya city from ancient times to present the earthquake phenomenon. The transition from the young alluvial soil to the old solid ground is in the south direction and the ground differentiations are indicated by colours. A large part of the city consists of alluvial ground with the effect of the river and precambrian land is observed in Pamukova district (The map was created by the authors).

THE PLACE OF EARTHQUAKE CASE IN SAKARYA CITY SETTLEMENT PRACTICES

The city of Sakarya, located on the North Anatolian fault line, has experienced earthquakes that caused great damage and loss of life throughout history. The Nicomedia and Nikaia earthquakes that took place in 120 AD during the Roman period and the earthquakes estimated to have occurred between 161-192 AD caused great damage to the settlements of the Bithynia Region close to today's Adapazarı. In addition, the earthquakes experienced in 268-270 AD, 358 AD and 368 AD also caused damage to the Roman period ancient city settlements in the region (Şahin, 2000). The earthquakes in the region caused serious damage to the ancient city settlements, causing the settlements to be concentrated on rocky lands with solid ground. Kome Sau Antique City near Karaman, which is one of the village settlements close to Adapazarı, draws attention because it is the region where the city is desired to be moved after the 1999 Marmara earthquake.

When the Byzantine chronicles are examined in order to understand the effects of the earthquake phenomenon on the city of Sakarya, it is understood that a significant part of the 548 earthquakes that occurred between 500 BC and 1890 AD occurred during the Eastern Roman (Byzantine) period and that these earthquakes caused great destruction in the city. In the information obtained from the Byzantine chronicles while the place and date of the earthquake were generally reported, the damage caused by the earthquake and the number of disaster victims were also reported. During the earthquakes experienced in the city during the Byzantine period, tsunamis sometimes occurred and caused great destruction, and the important castles and churches of the period were destroyed (Ekin, 2005).

Earthquake is an important phenomenon that accompanies the attempts to create the built environment in the city during the Ottoman period. In particular, the earthquake that occurred on September 10, 1509, which Ottoman historians called Kıyamet-i Suğra (Little Apocalypse), destroyed many monumental structures in the city and caused great damage in the city. Severe earthquakes occurred in the city in 1719, 1788, 1878, 1894 and 1912 which sometimes brought tsunamis together during the Ottoman period, and also caused significant damage. The earthquake that occurred on July 10, 1894; it caused the minaret of Orhan Mosque in Adapazarı to fall and many buildings were damaged. The fact that one of every five buildings is unusable after the earthquake and there is not a single structure that was not damaged by the earthquake shows the severity of the earthquake. It is stated that the waters of the Sakarya River rose during the earthquake and invaded the fields. Despite all the negativities caused by this earthquake, the fertile land of the region draws attention according to the transfer of western travelers and missionaries (Ekin, 2005).

"Despite all these disadvantages that the country presents, I advise European companies and even small entrepreneurs: Do not give up on your agricultural and industrial projects. The soil is truly astonishingly productive: the humid climate is extremely suitable for vegetation. The natives and immigrants here - Turks, Armenians, Bosnians, Bulgarians, Circassians, Tatars, etc. - cultivate in a way that can be considered primitive. They start fires or cut down trees in the forest to open a field. They obtain a product that European farmers who farm according to the rules in their country can emulate (Ekin, 2005, p. 690-691)."

When Evliya Çelebi talks about Sapanca in his Travel Book, he points to the Sapanca Rüstem Pasha Bath which is a work of Mimar Sinan, built during the Ottoman period with the words "It has a beautiful mosque, a bath, a beautiful

bazaar". As a result of a great earthquake that took place in the region in 1719, the complex was destroyed and in a decree written to the Sapanca judge for its repair the bath was also requested to be repaired (Çetin, 2006, p. 243).

Although sufficient information cannot be obtained from the archive documents in the sources reached about the earthquakes affecting the city of Sakarya during the Ottoman period, it is possible to read in detail the damage caused by the earthquake in the city and the impressions of the city after the earthquake from the reports of western travelers and missionaries.

When the earthquakes experienced in the city of Sakarya during the Republican period are examined, the earthquakes in 1943 (6.9 intensity), 1967 (7.1 intensity) and 1999 (7.4 intensity) caused greater damage in the recent past. The earthquake, the epicenter of which was Gölcük on August 17, 1999, caused loss of life and great destruction in the city of Sakarya and its surroundings (Hayır & Akyol, 2007). The city, which suffered great damage especially in the center of Adapazarı, suffered great destruction as a result of the collapse of the buildings on the east of the line that separates Tığcılar Neighborhood and Semerciler Neighborhood (Bol et al., 2007), (Figure 18, 19, 20, 21).

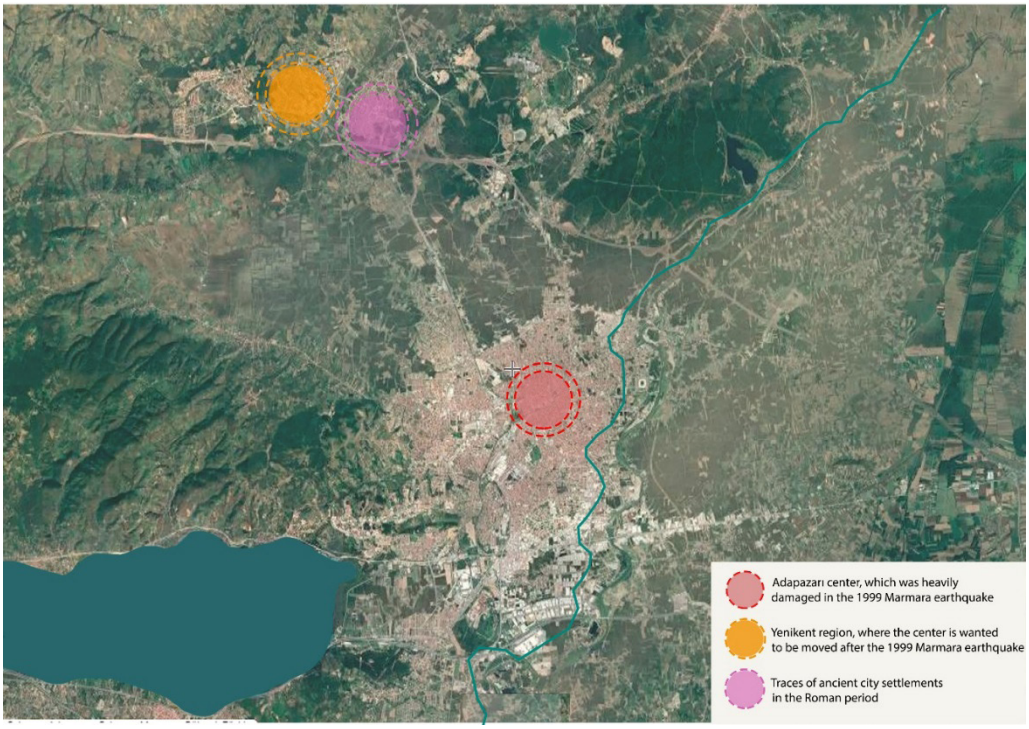


Figure 18. Adapazarı center, which was heavily damaged after the 1999 Marmara earthquake, and the Yenikent region where the center was wanted to be moved after the earthquake (The map was produced by the authors based on the image obtained from Google Earth dated 2023).

After the 1999 Marmara earthquake which the city of Sakarya experienced, a report was prepared for the creation of new settlements on solid lands for the city of Sakarya and its affiliated settlements after the 1999 earthquake, with the work of experts from MTA, TÜBİTAK and METU institutions. The conclusion reached by the report is that the structures on and in the immediate vicinity of the active fault and the structures built on the soils with high liquefaction feature, suffered great damage as a result of the earthquake. In addition, during the construction process of buildings, construction errors and defects are also important factors that cause damage. As a result of the report, Yenikent region which is located close to the center of Adapazarı and whose ground is resistant to earthquakes was presented as a new settlement area. (General Directorate of Mineral Research and Exploration, 2000).

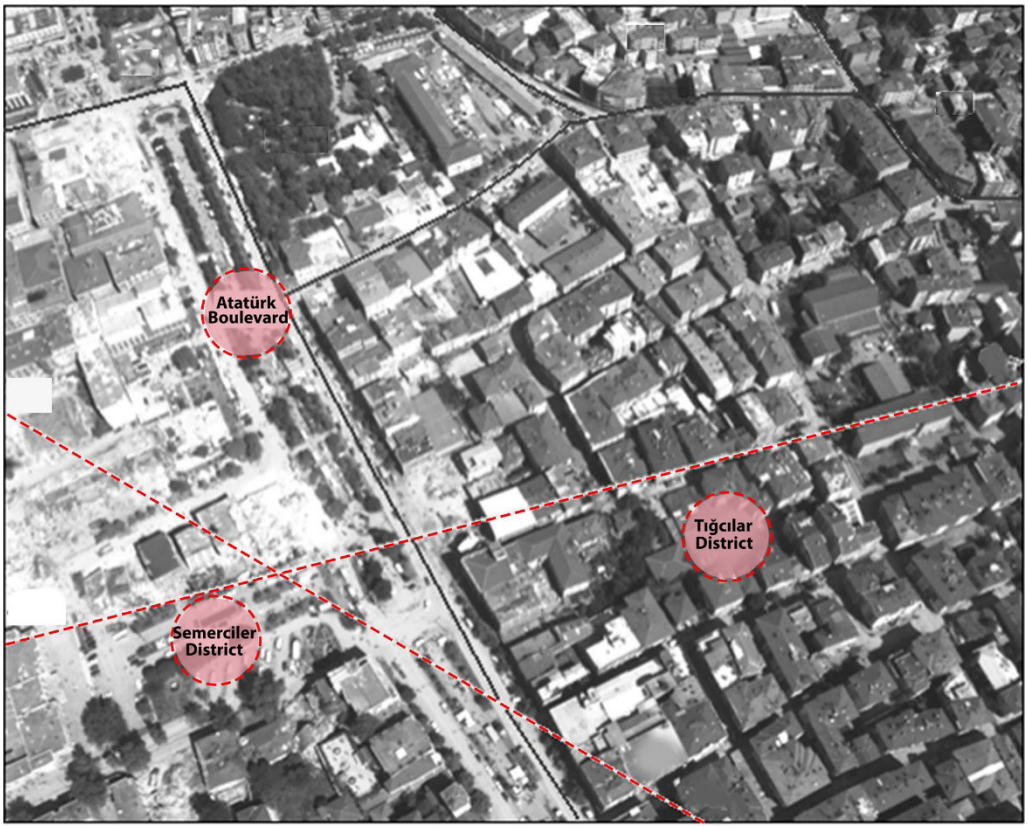


Figure 19. Aerial photograph of damaged areas in the center of Adapazarı after the 1999 Marmara earthquake (Bol et al., 2007).

Figure 20. The view of Çark Street in the Adapazarı district of Sakarya, damaged in the 1999 Marmara earthquake, 20 years after the earthquake (Mediabar News Archive, 2019).

Figure 21. The view of the Yenidoğan Neighborhood in the Adapazarı district of Sakarya, which was damaged in the 1999 Marmara earthquake, 20 years after the earthquake (Mediabar News Archive, 2019).

As can be seen, the city of Sakarya, located on the North Anatolian fault line, was destroyed by the earthquakes it experienced in the historical process and was rebuilt. For this reason, the earthquake phenomenon should be one of the main factors that should be given priority in urban planning decisions. Although the alluvial ground where the Sakarya River and Sakarya River, which was formed by the earthquake action, poses a risk for the settlement due to the earthquake; it has been preferred for settlement by civilizations since ancient times due to

its fertile lands and strategic location. The fact that civilizations chose the same region for settlement each time caused the accumulation of cultural layers in the region and made us question the factors affecting the relationship between the inhabitants and the "place". As a result of all these, within the scope of the study, it is tried to be revealed that reading the data of the place, which creates the identity of the city and contributes to the urban memory; is one of the main elements that should be given importance in city planning initiatives. In order to minimize the damage in the new earthquakes that are expected to occur in the city, it is valuable to accept the earthquake phenomenon as a local data and to make planning initiatives in this direction.

CONCLUSION AND EVALUATION

Man is so closely related to his place of residence that our knowledge of this place will enlighten us about a local as well. Anatolian geography is the most important center where people have built their "settlement" practices from ancient times to the present. This geography exists in a continuous dynamic cycle with ground movements. In this context, within the scope of the study, the settlement practices of civilizations from ancient times to the present were examined in the city of Sakarya, which is defined within the administrative borders today, which exists with the earthquake phenomenon (Figure 3,4,5,7,9,13,15). Located within the settlement network of the Sakarya River, which forms a cultural backbone in the city with its waters coming out of the spring, which is 3 km southeast of Eskişehir Çifteler district, the region today called the city of Sakarya within the administrative borders, is tried to be put forward together with the earthquake phenomenon that brought it into existence.

The city, which has existed with the phenomenon of earthquakes since 2100 BC, was chosen as a settlement by civilizations such as Hittites, Phrygians, Lydians, Persians, Ancient Macedonian Kingdom, Bithynia Kingdom and Roman Empire. While the earthquake phenomenon razes the city to the ground and re-creates it, it also offers fertile lands to it. This is one of the important reasons why the city was chosen as a settlement by civilizations from ancient times to the present. From the cultural layers that have accumulated on top of each other, traces of the built environment built by the Roman Empire and the Ottoman Empire, which preserved its existence after the earthquakes, have continued. The cultural heritage that preserves its existence after the earthquakes is an important document not only for the Anatolian geography but also for the whole world. It is valuable to protect this cultural heritage in order to make sense of the relationship that human beings have established with the place in settlement practices.

Despite the devastating earthquakes experienced by Sakarya city, the Sangarios (Justinianus) Bridge, which was built in the Byzantine period, and the Metabole (Pashas) Castle, which contains thousands of architectural elements from the Roman settlement to the Middle Byzantine period, are among the important works that have survived to the present day. In addition, the city preserves its cultural richness with works such as Kaynarca Şeyh Müslihiddin Mosque, Taraklı Yunuspaşa Mosque, Geyve II. Bayezid Bridge was built in the Ottoman period, and Uzunçarşı, Community Center, Atatürk House, New Mosque and Orhan Gazi Bazaar was built in the Republican period. The aim of the study is to lay the groundwork for constructing the environment that will enable to transfer this wealth to future generations.

Even though the 1999 Marmara earthquake caused great destruction in the city, the city continues to exist in the same region (Figure 23). In order to minimize

the damage to the city following the new earthquakes that may occur in the city, after the 1999 Marmara earthquake; it was decided to move the city center to the Yenikent Region, which includes the Karaman, Korucuk and Camili campuses, which are lands that are well grounded against earthquakes. After the decision taken, collective disaster houses were built in Karaman, Camili and Korucuk campuses, respectively, and it was aimed to unite the workplaces destroyed in the earthquake in the industrial estates created. In order to support the development of the city in this direction, it is aimed to move the governor's campus and various schools, which are planned to gather all the official institutions of Adapazarı, to this region. While the development of the city on the southwest-northeast axis before the earthquake tends to the northwest after the earthquake; the city continues to develop in the direction of Serdivan district with the influence of Sakarya University and individual preferences (Hayır & Akyol, 2007).

After the 1999 earthquake, the development of the city in the direction of Yenikent region was supported and plans were made to move the center to this region. However, Yenikent Region, where the center is wanted to be moved, has been included in the urban development as a secondary center, and the people of Adapazarı continue their daily practices such as shopping, sports, eating and drinking, social activities, as in the past, in Çark Street and its surroundings, which still maintains its quality as a city center today. This is an indication that after various natural disasters such as earthquakes, urban planning initiatives should be carried out with interdisciplinary collaboration with concepts such as belonging and urban memory that create the city.

When the Roman period ancient city settlements are examined; it is observed that the ancient city settlement of Kome Sau, one of the settlements located close to the center of Adapazarı, coincides with the Yenikent region, where Adapazarı city center was intended to be moved after the earthquake (Figure 22).

While the earthquakes that the city of Sakarya experienced in the historical process somehow guided the attempts of the ancient city settlements of the Roman period to create the built environment, it is a problematic approach to include such an important issue in the urban development process only after a devastating earthquake. It is observed that the earthquake phenomenon experienced by the city of Sakarya since ancient times is the dominant factor that should be included in the urban development process of the city, considering the expected big Istanbul earthquake. It is valuable to read the information about the place correctly so that the earthquake can be removed from being a disaster situation and included in settlement practices.

The fact that the city exists in the same region after devastating earthquakes shows; that the task of creating cities that are resistant to various natural disasters such as earthquakes should be handled with the common approach of people from different disciplines such as sociology, psychology, architecture, urban and regional planning, engineering and earth sciences. The establishment of settlement practices with an interdisciplinary common approach can contribute to the creation of the sense of belonging that the residents establish with the city. If a planning approach in which the earthquake phenomenon, which is the ancient knowledge of the place, is taken into consideration while planning the settlement structure of Sakarya city, which has such fertile lands, the earthquake can be removed from being a disaster situation that destroys the city. The aim of the article is to transfer the data that will accompany this process to the planning approaches of the future and to contribute to the literature.

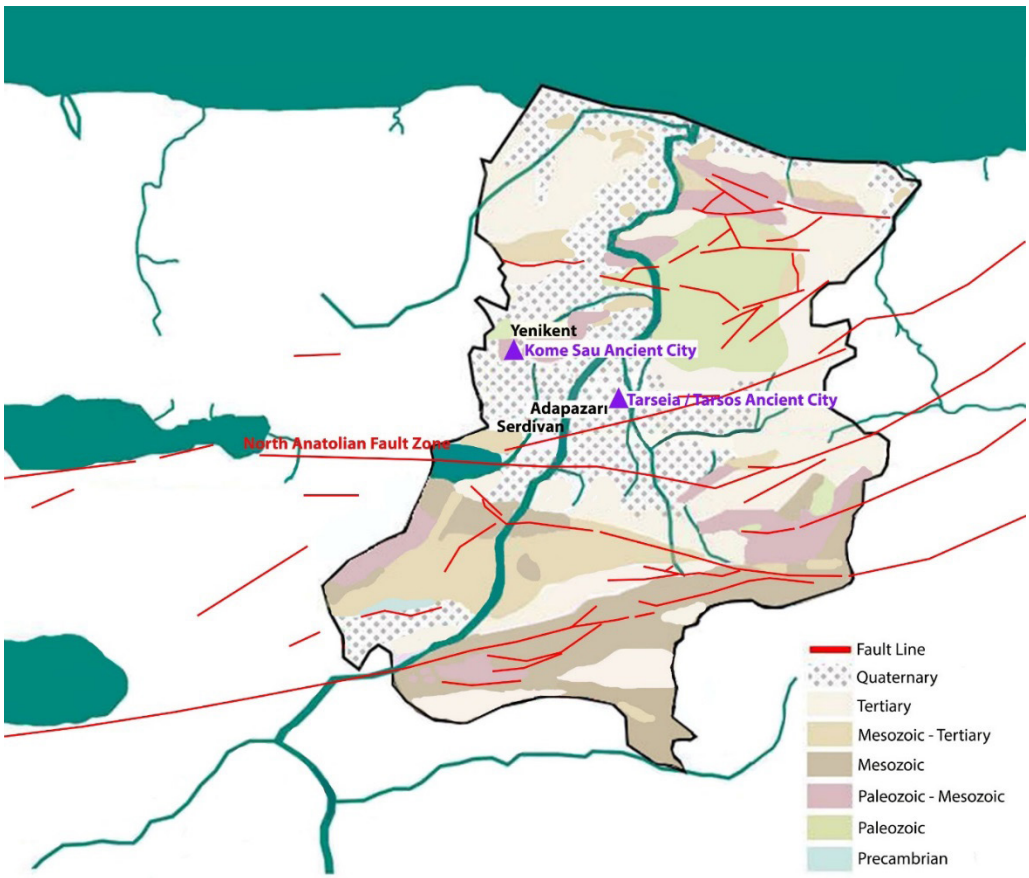


Figure 22. Sakarya city today's city center and traces of the Roman period ancient city settlement. The transition from the young alluvial soil to the old solid ground is in the south direction and the ground differentiations are indicated by colours. A large part of the city consists of alluvial ground with the effect of the river and precambrian land is observed in Pamukova district. Map was created by the author with the data obtained from the related article (Kurt & Duman, 2016).

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Confict of Interest

No confict of interest was declared by the authors.

Authors Contribution

All author(s) individually 1) participated the design process, collecting data and analysing the data examined, 2) participated the writing the draft and critically evaluating the content, 3) approved the final version of the article and took all responsibility for this manuscript. While the 1st author Ayse Tugce Balaban was involved in the process at a rate of 75%, the 2nd author Elif Yesim Kösten was involved in the process at a rate of 25%.

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Ethics Committee Approval

Ethics committee approval was not required for this article.

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In this research, the necessary permissions were obtained from the relevant participants (individuals, institutions, and organizations) during the survey and in-depth interviews.

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