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Research Article

Environmental effects of the old Tigris River course between Kut and Nasiriyah

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Abstract

The course of the old Tigris River is located between three provinces (Wasit - Misan - Dhi Qar), surrounded from the east and north by the current Tigris River, on the west by the Gharraf River and on the south by the Euphrates River, and the area of the study is (16473.2 km2). The course of the old Tigris River in the study area between Kut and Nasiriyah was characterized by its instability in its course through time, since the Holocene era until its last change in the late Sassanid era, where the course moved from its original course, where moved between Kut and Nasiriyah, to its current course (Kut- Amara). This change has left many environmental impacts.

Keywords

Tigris River, Kut, Nasiriyah, Environmental effects

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Introduction

Historical geography aims to follow the ancient surface changes of the features of the earth's surface in terms of being part of the historical geographical documentation, and it is an important part of the geography divisions, and the geography of the present is gaining depth and meaning by referring to the geography of the past, and several definitions and objectives of geography have emerged. This study came within this branch of geography, which is a natural historical study of the ancient Tigris River, as well as clarifying the civilizational appearance that prevailed at the time, represented by the locations of villages and cities that were located on it or near it and affected by its various activities. Therefore, this study attempts to draw an accurate picture of past geographical conditions or elements affecting the appearance of these features on the surface and knowing what those features are, in light of what is now known about the processes that help the emergence of those features. We should pay attention to describing those processes that led to the change of certain elements in the environment during time, it is believed that they are what gave them their distinctive features. The phenomena of the study area are nothing but an end, and conclusion in which we live. We did not reach them until after a stage of development that preceded the current stage, which, too, may develop and in a period other than the situation we are witnessing now.

Purpose of the study

To identify the environmental changes of the ancient Tigris River, which affected the nature of human activity at the present time

Study Problem

Are there environmental impacts left by the old Tigris River when it changed its course, and did these environmental effects lead to the extinction of a civilization that spanned for thousands of years, represented by the locations of the first villages and cities dating back to more than (4000 BC) have these lands turned into decertified, barren lands expelled due to a change in the natural environment.

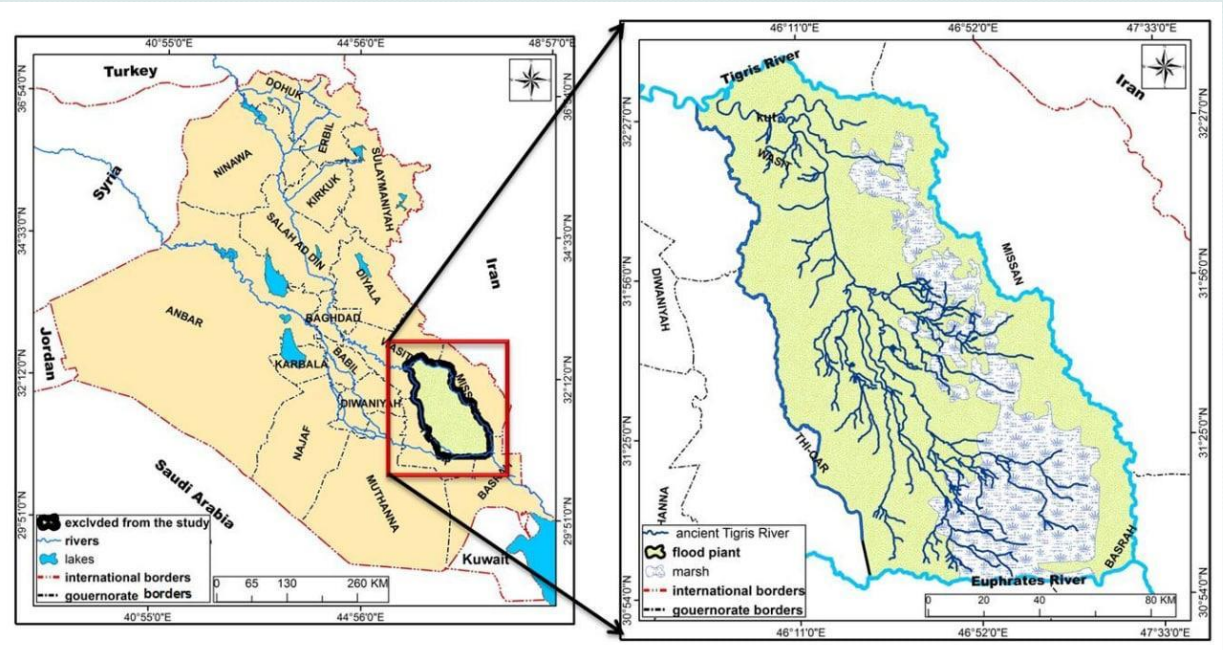
Study Hypothesis

There are environmental effects left by the old Tigris River when it changed its course, and these environmental effects led to the extinction of a civilization that extended for thousands of years, represented by the locations of the first villages and cities dating back to more than 4000 BC, and these lands turned into decertified and expelling lands due to a change in the natural environment.

The limits of the study area

It is located between two latitudes (31 02 04-34 31 23) in the north, and longitudes (46 41 55 – 47 54 45) in the east. Geographically, it lies between three governorates (Wasit - Misan - Dhi Qar) as it is surrounded from the east and north by the current Tigris River. On the west is Gharraf River and on the south is the Euphrates River. The area of the study area is (16473.2 km2).

Map (1) the location of the study area in Iraq



Source: - Based on the Al-Kut - Nasiriyah - Al-Amarah board, at a scale of 1:100000 and the output of the 10 Arc map program.

The natural characteristics of the area

First: the environmental changes of the stream

Geology of the area

In order to know the geological events that contributed to the formation of the earth appearance and to know the origin of the materials from which it was formed for a region, it is important to know the geological history of the sedimentary plain, that the geological events in Iraq and the study area are events that took place in the world as well, in the Pre-Cambrian Period, the Arabian Peninsula was connected In the Iranian plateau to the east and the African continent to the west, which is part of the ancient Archean continent, and its surface was a bend and convex refractive heights in the western Arabian Peninsula, which was part of this fold, as there was a regional concavity in the middle of this fold which is now the Iraqi alluvial plain and the Arabian Gulf (Kassab & Abbas, 1987).

Stratification

The sediments of the study area vary according to the different geological ages, which range between the Pleistocene (the oldest) and the Holocene (modern sediments) and is part of the flood plain whose thickness ranges between (150-200) m. as indicated in map (2), the sediments of the Pleistocene era cover most parts of the study area, and the upper limit of these sediments reach 15 m below the surface of the earth, and the thickness of these sediments in the area reaches 174 m. , the sediments consist of clay, sand and silt, which are overlapping with each other in the layers (Buday, 1980).

Structural Geology

Many studies have confirmed that Iraq's geological history was closely related to the Arab plate and Iranian plate, which resulted in the Zagros-Taurus mountain range. As during the Miocene era, the range of Aden - Red Sea subsided, which led to the collision of the Iranian plate with the Arab plate in the northeastern part, as it formed torsional mountains. Some researchers estimated the amount of movement about (1.5 cm/year) and the collision led to the division of the Arab plate into two parts, the Arab shelf and the Arab shield on which the land of Iraq is located (Al-Barwari & Yaqoub, 1992) and since the study area is considered within the unstable range area, most of which

occupied the sedimentary plain range, which is bounded on the northeast by the low folds range (Al-Sakni, 1993) among the structural phenomena in the region are the faults (Salman-Samawah Fault and Amara-Zahra Fault) and the folds (Tal al-Hawa fold and Abu Amud fold)

Ancient climate

The climate of Iraq is a variable climate in its climatic elements from the Quaternary period until the present time, and this is due to its spatial location, which was affected by the climatic periods represented by the succession of rainy and dry phases, as the Quaternary period reflects an integrated picture of the ancient geographical environment and explains the course of events that affected the environment in which it is recognizing it from the geomorphological and geological evidence present in the study area and the most climatic changes that greatly affected the determination of the features of the prevailing surface of the earth, which was unique in a climatic character that distinguishes it from the third geological time, the Quaternary time was characterized by alternating rainy and non-rainy periods in the middle latitudes and icy and non-icy periods in the higher latitudes, which affected the Iraqi climate in terms of the increase in precipitation rates that caused the emergence of devastating floods in the sedimentary plain areas and this led to an increase in river erosion processes in the mountainous and semi-mountainous areas, and then transfer of large quantities of sediments from the high areas and their deposition in the low areas, and to facilitate the study of the climate in the Quaternary time in Iraq, it can be divided into periods;-:

Climate changes in the Pleistocene era

This era is divided into three periods, the first of which is the early Pleistocene. In this period, the climate was characterized by heavy rains that caused destructive floods and a drop in temperatures, which led to an increase in the process of river erosion and the transfer of sediments from high to low areas. During this period, tectonic uplifting movements occurred that caused important changes in the rainy period. Kassab and Abbas (1987) As for the period that followed, the middle Pleistocene is a dry period in which the process of water erosion was active. As a large part of the river terraces were stripped during this period, and evidence of this is the terraces of the Tigris River and its valleys in terms of the succession of erosion and sedimentation. The monsoons increased the amounts of rain, and high temperatures led to an increase in evaporation rates (Al-Saadoun, 2000) and the last era was the late Pleistocene, during this era, Iraq witnessed high humidity and an increase in precipitation, and the reason for the transition of the climate between dry and wet is a change in the trends of the prevailing anticyclones that are responsible for the precipitation (Al-Jubouri, 1985).

Climate changes in the Holocene era

These changes are considered the beginning of the greenhouse or interglacial period, as after the last glacial period that reached its peak (14,000 years ago) before the present, the ice began to retreat and the climate witnessed a clear improvement in temperature, and the earth entered the interglacial period Which we are still living until the present time, as the temperature has become similar to its current rates.

Modern climate

Climate is one of the natural factors that interfere directly and indirectly in the appearance of the earth's surface through its elements represented by solar radiation, temperature, rain, wind and humidity, as well as activating geomorphological processes such as mechanical and chemical weathering and erosion represented by the movement of rocky crumbs.

Heat

It is the main source for transferring the sun's energy to the earth surface. The angles of solar radiation and its cities, i.e., the length of the day, control the temperatures, there are theoretical hours of solar brightness that the earth receives during the average bright daylight hours from sunrise to sunset (Al-

Samarrai, 2001).

The annual average of the normal temperature of the Kut station was (24.5) m and Hay station (25.6) m. As for the Nasiriyah station, it reached (26.7) m, and the annual average of the maximum temperatures for the stations (Kut, Hay, Nasiriyah) reached (33.3-31.9-32.5) m, respectively. As for the average minimum temperature, its annual average reached (18.9-17.4-18.9) m, respectively. (Ministry of Transport and Communications, 1989-2019)

Rain

Rain in the study area is characterized by its low quantities and fluctuations in terms of the fall season, which is a general characteristic of Iraq's rain. It is one of the important climate elements that affect the volume of water discharge and the occurrence of floods, as well as through its impact on the process of erosion and the increase of sediment, the role of rain in the study area is shown through the effect of raindrops on fine and incoherent crumbly sediments and soil particles, as it works on the scattering and volatilization of these particles and thus leads to soil collapse, due to the increase in hydraulic pressure caused by raindrops on unstable loose granules on the bank (Buringh, 1960; Dulaimi, 2000). The total rainfall for the Kut station was (140) mm, Hay station (133.5) mm, and Nasiriyah station (120.6) mm (Buringh, 1960; Dulaimi, 2000).

Soil

means the fragile layer that covers most of the land surface with a thickness that varies from place to place between a few centimeters and several meters. It contains various mineral elements that are the result of the disintegration of rocks, and organic elements resulting from the decomposition of the remains of animals and plants. Al-Omari (1968) The soil of the study area is part of the newly formed alluvial plain soil, which was formed mainly from the accumulation of sediments carried by the waters of the Tigris River and its tributaries. Five types of soils prevail in the study area as in Map No. (6), namely:-:

Table (2)
Areas of Buringh soil varieties for the study area

Name	Area/km2	Percentage
The soil of the shoulders of the rivers	1711.3	10.39
Soils of river basins flooded with silt and poor drainage	8501.8	151.6
marsh soil	1611.5	9.78
Soils of swamps and marshes flooded with silt	1475.4	8.96
swamp soil	3173.2	19.26
Total	16473.2	100.0

Source: - From the researcher's work based on the Kut - Nasiriyah - Al-Amarah board at a scale of 1:100000 and the outputs of the Arc map10.6 program

Natural Plant

It is an important part that cannot be underestimated in the construction and development of landforms, and it is a reflection of environmental conditions such as climate and soil and the interaction between these conditions and other factors such as the biological, human and topographic factor (Al-Awadat, 1985). The natural plant works to protect the soil from wind and water erosion and also protect the soil from erosion. As its roots that penetrate the soil are of great importance, they work on soil cohesion and reduce the speed of water currents, Abboud and Waheed (2016) and the natural plant grows in the study area on the banks of irrigation channels, drains, marshes and swamps, and its density varies from one place to another according to the natural conditions of the area. The density and distribution of vegetation cover was studied in the region shows that the value of (NDVI) ranges between (1-) and (1+), and positive and close values to the correct one indicate the presence of dense vegetation cover, while close negative values

to zero indicate to barren lands or rocky outcrops, according to this indicator, the values ranged between (-0 - 0.5) from the plants in the area and Table (3)

Table (3)
Plant Cover Indicator

Vegetation Coverage Index (NDVI)(	Class	Area/km2	Percentage
-0 – 0.03	Marshes and swamps	2982.2	18.10
0.2 – 0.04	flood plain	8920.7	54.15
0.5 – 0.3	plant density	4570.3	27.74
		16473.2	100

Source: Based on the satellite visual on 17/4/ 2020, the results of the Spectral Reflection Index (NDVI), and the outputs of Arcmap10.6.

Topic Two

Environmental effects of changing the course of the ancient Tigris River

First: The current environmental impacts of the old Tigris River course after it changed its course to the east

The length of the old Tigris River course is (301.5)km from Kut to Nasiriyah, the northeastern part of it contains many important historical cities and archaeological sites that were economically and culturally prosperous, the lands surrounding the stream were many farms in which the residents of those cities and villages took care of them, but now they are barren desert lands, back swamps and swamps devoid of farms, except for some of the few lands that some farmers reclaimed and watered from modern irrigation projects, and the river is a land that has no water or there are parts of it that take Its water is from irrigation and drainage projects, we will discuss the life in the stream before and after its course has changed..

The environmental changes caused by the stream

Marshes

This name is given to low lands that are flooded all or most of the year and in which reed and papyrus plants grow (Khalis & Al-Ashaab, 1988). As a result of this form of ground movements and as a result of the movement of tectonic plates, places were left in the sedimentary plain area after the withdrawal of the ancient sea in the form of depressions that were not filled with sediments that carried by rivers because of imperceptible or slow ground movements over the ages. Ibrahim (2014) Saadiya Marsh is located on the eastern side of the study area between Kut and Al-Amarah. It is not possible to determine its area because it has an unstable area due to its change from one season to another according to the amount of water that reaches it from various sources such as rain and floods, and according to the dry and wet years.

Back swamps

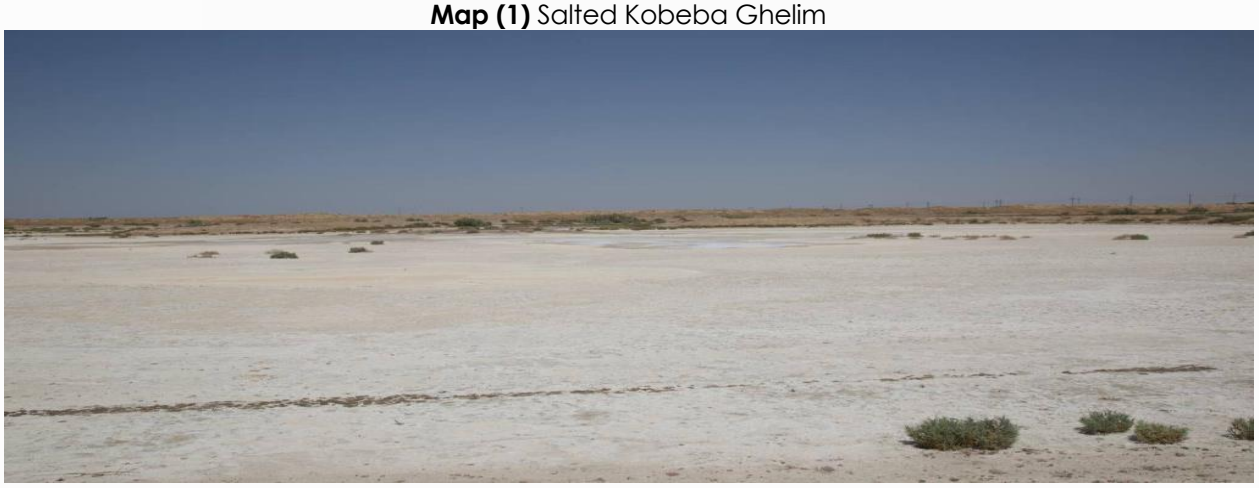
They are one of the most prominent geomorphological features in the study area and this is because the river has its own flood plain when it was formed. , When the floods occurred the river overwhelmed its flood plain, and when the level decreased, the river began to precipitate its load from the largest to the smallest, so it formed a low area filled with flood waters. When the modern Tigris River formed, It had a flood plain, and the flood plain of the ancient Tigris and the floodplain of the modern Tigris converged, The flood overwhelmed the modern Tigris River, and when the flood ended, it began depositing its load and creating a low area with small-sized sediments, so it formed a marsh area from the ancient and modern Tigris River. These swamps form on soils where water does not evaporate and does not sink into the ground as quickly as it dries up and for this reason

remains saturated with water and more water appears on the surface than it needs to be saturated. Jerry (2007) The swamp is formed as a result of the absence or presence of a simple slope that does not help the flow and movement of water, which leads to the stability of the water in its place, and this is called the temporary swamp, as for the swamps in the study area, which are located on the edge of the old Tigris River, they are permanent swamps that were formed either due to floods that occurred in ancient periods or due to sedimentation processes that formed in a previous geological period, which led to their transformation into permanent swamps (Sharaf, 2008).

Al Sabkhas

Al Sabkhas are known as salty gatherings formed in the flat plains, and most of them are found in the areas of rivers that have undergone a change in their courses, and this is what is found in the study area. The sabkha is one of the shallow and flat depressions that are usually close to the level of groundwater and covered with a salt crust formed as a result of water evaporation due to climatic change, and it is one of the newly formed geomorphological forms. As these depressions are flooded with water in winter and spring and dry in summer. When these lands are filled with water when rain falls, the salts melt and change their features, or the water forms a layer underneath that contains groundwater and is often salty rocks, so it works to transfer water to the surface, and this water is exposed in a short time to the process of intense evaporation resulting from the high temperatures in the summer leave a salt crust on its surface, and this crust is represented by sodium salts and sodium chloride salts. Where its thickness depends on the location of Al Sabkha and the rate of evaporation, such as salted Kobeba Ghelim as in the picture (1)

Map (1) Salted Kobeba Ghelim



Source: field study on 4/6/2021

Second: The environmental impact of the old Tigris River course after changing its course on the sites of ancient cities and villages

There is no river that is changed its course without the presence of various factors that affected it, as it could be due to climatic changes in a certain period of geological times, and this is related to several factors, including the amount and nature of surface runoff, the nature of the soil, the composition and hardness of rocks and tectonic activity. Ghanem (1998) When all these factors combine at the same time, it leads to a change in the course in a short period of time, and the Tigris River is one of the rivers that has changed its course for several times, and the main cause of change is the course of internal factors that the course has no effect in it, but the reason is related to the density of the present structures at the beginning of the course at a point of Its transformation, which is the faults as Salman Samawah fault , the faults of Amara - Al-Zahra, and also the presence of folds such as the folds of Abu Amud and the folds of Telh Al-Hawa. There are many hills and archaeological sites, including those that have disappeared dating back to the Abbasid, the Sassanid, the Umayyad era in the study area, which indicates that it was an ancient population settlement area affected by many geographical factors that affected the emergence of cities, including the commercial cities because of their location on the important trade route that connects the Arabian Gulf with Ashur, and the reason for the large number of cities in this region is the administrative, economic, political and social importance., the geomorphological processes of the ancient Tigris River and the resulting phenomena have a great impact on human settlements.

the other reason is that the area is flat and fertile and irrigated by the Tigris River and its branches, which made it very important and that the names of the cities change in every period of time ,due to the floods that overwhelm the banks and divert rivers course , due to the loose alluvial soil in the area (Dixey, 1962).

Table (4)
Archaeological Sites Heights

S/N	Name	The distance between the archaeological site and the stream	lowest height	highest height	river level	Archaeological site area	Geographical coordinates		Administrative site
							y	x	
1	Wasit old city	4741	11	15	11	654433.4	32.18	46.27	Wasit
	Srifin village	4405.5	10	13	10	50807.3	32.14	46.34	Wasit
	Tell Abu Dabae	7342	11	13	11	72425.7	32.29	46.36	Wasit
	Lagash	27384.7	7	9	5	235621.6	31.65	46.18	Dhi Qar

Source 1 – Depending on Google Earth, the cities were extracted based on the topographical maps, of Hay , Al-Maimuna Al-Rifai, Al-Islah , scale 1:100000 ,and the satellite visual Luqm 8 (LAND SAT) of 1/6/2013 SAT of 6/4/2019 with accuracy 15. and field study.

The influence of the ancient Tigris River on cities and economic activity before its course turned to the east

First: - The effect on the establishment of human settlements

The ancient city of Wasit

It is the ruins of Islamic city of Wasit , which is the historical city of Wasit, one of the most important Arab and Islamic cities known in Iraq,. the city is located on the western side of the old Tigris River (32.18 N) and (46.09 E). On the eastern side was the city of Kaskar, Cleo (2006) opposite of the city connecting the two cities with a bridge of ships, and on each side of the river was a mosque, the city was surrounded by two walls and two trenches, and then the two cities merged until it became one city linked by common economic, political and cultural interests. Wasit became a designation for the two cities, where Ibn Hawqal mentioned about them: "The city of Wasit on both sides of the Tigris and the Tigris is divided into two halves, and the two halves are opposite each other, a ship bridge crosses by any one from one side to the other., and he mentioned Wasit was owned by a man who lived in a village called (Dawardan) east of Wasit, where Al Hajjaj bought from him for 10 thousand dirhams. Al-Ali (1970) This city was in the time of the Umayyad Caliph Abdul-Malik Ibn Marwan, the capital of Iraq, after the Umayyad era, Wasit lost its position as a capital, but it remained a prosperous center of knowledge and Arab Islamic civilization with other Arab cities, and the city remained full and inhabited until the Tigris River began to change its course towards the city of Al-Amarah, and the city was abandoned in 1107 AH - 1795 AD,. only the gate that is located on the eastern side of it, which has remained in existence until the present time, has an area of (654433.4) m 2 and is far from the old Tigris River course (4,741 m) and its highest (15 m) and the lowest height (11 m) and the level of the stream reached 1 m. the minaret (Wasit city gate) is located in it. It is the gate of the Sharabeyya School in Wasit. located in the eastern part of the city in its northern corner, Its height is 11 m.

Map (2) Wasit Gate (Al Sharabeya School)

Source: - field study 25/12 2020

Al-Sarifin village

It is a village located in Al-Awda area , in Al-Hay District(25) It is geographically located within the geographical coordinates (32.14 N - 46.34 E), and its ruins is located in the eastern part of the old Tigris River course . and known, Abdullah bin Taher its ruins today is located on the old village, and Yaqut al-Hamawi mentioned it in the Mu'jam al-Buldan and he said: Al-Sarifin: from the villages of Wasit, known as (the village of Abdullah), which is Abdullah bin Taher, and the other Saifi on the upper Nahrawan (Al-Rikabi, Al-Dalfi, & Al-Qaisi, 2013), and it was mentioned in the modern Assyrian documents that it is the same city of Serabo written in the cuneiform sources (Al-Din, 1957), and the origin of its name refers to the purification and refining of things such as coffee, reeds, minerals and the meaning of reed bundles in Arabic. Woven reeds, and this Akkadian formula was received with saturated annexation (Al-Hamawi, 1997), and in this village there was a tomb that they claim to be the tomb of Masrouq bin Al-Ajda' al-Hamdani. of (10 m) of height with the level of the river, which also reached (10 m) and the highest level (13 m) 3-Tell Abu Dabaa: It is an archaeological hill located in the western part of the old Tigris River. which is located in Kilo 51 , Beit Lutfi Dhaidan village within Wasit district (Al-Wasiti, 1986) and geographically located within the geographical coordinates (32.29 North - 46.36 East) and its name came in the cuneiform texts i the city (Sabbakhi), as it was mentioned in the documents of Neo-Assyrian era that it is located within the borders and suburbs The city of (Tell Khamban), which is located in the province of (Rashi) and indicates that it is located on the borders of the country of Elam and is called by this name because of the presence of hyenas in this area from that time until now (photo no.) and this hill is far from the stream (7342 m) and its total area reached (72425.7 m 2) and its lowest height is (11 m) with the level of the river, which also reached (11 m), and the highest height is (13 m).

Map (3) The pits of hyenas in Tell Abu al-Dabaa

Source: The field study on 4/6/2021

Lagash

Its name was mentioned in many documents that came from the earliest historical periods. The southern part of Mesopotamia was characterized by the large spread of small and large cities and villages, the city of Lagash was one of those ancient Sumerian cities (Al-Ahmad, 1978) and Dhi Qar was one of the oldest Sumerian cities which is a clear picture. of the Sumerian civilization, (33) The city of Lagash is located between the old Tigris River and Al Gharraf River in southern Iraq within the borders of Nasiriyah Governorate, 24 km east of the city of Shatrah,. in the period between the third millennium and the end of the first millennium BC, the ancient Tigris River was flowing towards the current Shatt al-Gharraf, passing through the city of Lagash and then pouring into the Arabian Gulf because the coast of the Arabian Gulf was advanced to near modern Nasiriyah (34), which was interspersed with irrigation channels, which made it economically and commercially prosperous, the reason for the emergence and prosperity of this ancient city. The remains of this city are known as "Tilul Al-Hiba". Many excavations conducted in the site in the year of 1877 AD – 1977 AD – 1891-1948 – 1990) (Steele, 2007). The city of Lagash was characterized by an important location with abundant water and fertility in the soil as well as an important military activity. Tripp (2002) One of the most important hills in it is Tell Al-Haba, its total area reached (235621.6 m2) and its lowest height (7 m) with the level of the river, which also reached (5 m) and the highest height (9 m). Tell al-Haba is the main center of the Kingdom of Lagash, where it was known as (URUK) in the ancient Sumerian era. Its geographical location is located in Al-Dawiya district, far from the city of Nasiriyah (57 km), and it is considered one of the largest archaeological sites in the Near East. It is surrounded from the north and north-east by Hor Al-Awena and from the south-east by Hor Ghamuka, and it dates back to the era of the third early dynastic period , Excavations were carried out in this mound by Coldway in each of the years (1886-1887 AD) in the upper part of the site. Expedition from the University of Chicago worked in the site in (1968 AD - 1969 AD), where two main temples were discovered Badge (1966), This mound is far from the stream (32281 m) and its total area reached (2063328.5 m2) and its lowest height is (5 m) with the level of the river, which also reached (5 m) and the highest height is (11 m).

Tello

This site is located astronomically on the intersection line (31.56 north - 46.18 east) and geographically located within the lands of the southern plateau in the province of Dhi Qar in the south of the Suq Al Sheuokh district. The old name of this site is the city of Girsu and the shape of this hill is rectangular and uneven, its name came from Tell Hawara, meaning the white hill because of its ruins that appear white when looking from far distance , and other said that its name is taken from the hill of panels because of the large number of clay tablets found in it. Khalaf (2005) This hill is far from the stream (32281 m) and its total area reached (114646.6 m2) and its lowest height is (10 m) with the level of the river, which also reached (10 m), and the highest height is (16 m).

Map (4) Tello or the city of Girsu

Source: field study on 25/12/ 2020

Second; The effect of changing the course of the ancient Tigris River on economic activity

Economic activities are of great importance in human life and are the basis for building civilization., climate and environmental conditions play an important role in directing economic activities in the life of the ancient man, the results of these activities are evident from the important archaeological remains that help researchers to track the stages of human life in the development his ancient civilization.

Agriculture

Agriculture was of great importance in the economic life of the study area because it was the main source in human life, and the people of the region had been working and living in it since the dawn of the first civilizations, and the land of Mesopotamia was characterized by appropriate natural conditions such as fertile soil and abundant water, geomorphological processes also played a major role in the diversity of agricultural crops and their distribution in the study area, due to the difference in the type of sediments from one place to another according to the proximity and distance from the course of the river. Salih (1988) the Greek and Romans writers named Mesopotamia as (DURADO), meaning the land of goodness and gold in agriculture, to the extent that Herodotus estimated it one hundred or two hundred times, and some of them exaggerated in exporting the agricultural crop, and that this name was only called man's work and effort, especially in the regulation of irrigation, which is the basis of agriculture, and the study area is considered one of the most fertile lands because it is a flat land surrounded by rivers on all sides, and the large number of Al-Bataeh in it led to the attraction of the population to it and settled in it and establishment of agriculture in a large way on it, as it was planted with various kinds of grains, fruits and vegetables, where these agricultural lands were located on the eastern and western side of the stream and watered from it and its branches from which it takes its water.

Industry

River basins have a major role in providing raw materials that helped to establish industries, as many industries that were linked to the riverbed appeared because of the water sources it provides, as well as industries that depended on river sediments, the most important of them are the brick factories, where that era is famous in construction and architecture as a result of the availability of raw materials on which the industrial process depends, such as silk, wool, and cotton, or because of the human need for clothing. It became the urgent human need for fabrics and textiles, and Kaskar became famous for the production of clothes, it was known as Kaskar clothes, as well as the emergence of simple wood industries and developed into luxury materials for the development of economic and social life., among the raw materials on which the wood industry depends, are palm wicker, sedge, papyrus, and reeds.

Trade

Due to the large number of existing rivers, the fertility of the lands, the diversity of crops and the availability of food and consumer items, this led to the flourishing of trade in this region, as it was a crossroads of several ways to link the Tigris River, Kut, Nasiriyah and Amara, and these things worked to stimulate the movement of trade and became a main source of state revenue, and that some of the trade materials in the study area, exported or imported, are low-priced materials (such as stones, timber, barley or copper). There was foreign trade, as they exported rugs to Armenia, and fabrics and wines to various countries (Al-Maskoni, 1949; Ghanima, 1922). For this reason, large quantities of these materials were achieved in one trade process, in order to achieve the desired benefit from trade first to cover the expenses of the commercial trip secondly, and that one of the best means of transportation for these commodities is water transport, which was characterized by its large and cheap, and these means were found in the ancient Tigris River and its branches, and the network of canals that served the purposes of irrigation and navigation(42).

Conclusions

1- The presence of the study area within the range of the unstable sidewalk, led to a state of its instability topographically as a result of the presence of tectonic movements, which resulted in a rise in the topography of the area, and thus affected the stability of the river course of the old Tigris River in its various paths.
2- The soils of the study area are transported soils by Tigris River course, so we find that some of these soils date back to the age of the Tigris River in the Pleistocene..
3- The dominant plants in the study area in the rainy periods were the plants of the Mediterranean basin. As for the dry periods, palm trees and desert plants were abundant. Before the transformation, there might have been trees of the Eucalyptus, willow, blink and bramble trees, in addition to fruit trees. at the present time, reeds and sedges prevail in the riverbed
4- There are many human settlements along the course of the ancient Tigris River.

Recommendations

1- Interest in studying ancient river courses because of the lack of studies about them.
2- Interest in the use of geographic information systems (GIS) and **satellite images** in the detection of ancient river courses.
3- Conducting a detailed study of the ancient cities and villages located in the study area with the help of the state board of antiquities and heritage.
4- Paying attention to archaeological sites and preserving them, and investing archaeological sites economically and making them archaeological tourist places with an economic return to the country.

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