

## Earthquakes, Archaeology and the ancient records

### in Mesopotamia and the Zagros

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#### **Abstract:**

The history of this planet began with earthquakes, and one day it will end with them! It is a natural threat to the race of humanity and what humanity built. Zagros ranges rose as one of the results of the earliest earthquakes. The recent strong earthquake that hit the Zagros and part of Mesopotamia on November 12, 2017 with a magnitude of 7.3 affected heritage buildings in several cities and towns and archaeological layers and structures as well.

This paper deals with earthquakes and archaeology, the recorded earthquakes in the cuneiform and Islamic medieval records, and their effects on the cities, public buildings, economy, and societies. What are the effects of the earthquakes on the archaeological layers and structures? Do we have to pay more attention during our archaeological excavations since the recent earthquakes and historical records tell us that very strong earthquakes hit the Zagros and Mesopotamia? What are the effects of the recent strong earthquake of November 12, 2017 on the heritage and archaeological sites in Sulaimania and Garmian regions, as a case study in this paper? What are the threats to the exhibited and stored objects in the local museums and their buildings? Do archaeologists have to add "earthquake" as a result of strong damage to a layer or strata or abandonment of a site during their archaeological excavations? Did previous excavators in the Zagros and Mesopotamia pay attention to the ancient earthquakes and their effects on life and on the ancient monuments and sites? Do we have to add "Archaeoseismology," the archaeology of earthquakes in the Zagros and Upper Mesopotamia, to the field of archaeology in these regions?

**Keywords:** Earthquakes, Zagros, Upper Mesopotamia, Archaeology, cuneiform and Islamic Medieval records, Archaeoseismology.

## **1. Introduction**

The recent strong earthquake on November 12, 2017 at 18:18 UTC that hit the Zagros had its epicenter in Sarpol-Zahab at the Iranian-Iraqi border with a magnitude of 7.3. It damaged modern and heritage buildings and shook the Mesopotamian plains as well. Due to this, the author of this paper searched for the historical records in both cuneiform and Islamic medieval records for the recorded earthquakes in Upper Mesopotamia and the Zagros in these records and found a rich documentation of the history of the earthquakes. Also, the author looked at the reports of the archaeological excavations and documentations of the earthquakes and the linked earthquakes with destructions and damages for the ancient monuments and archaeological layers, but the author only found a few examples, and the author realized that most of the local and foreign archaeologists who work in the Zagros and Mesopotamia not yet paid attention to the historical and modern earthquakes and their effects on the archaeological layers, ancient societies and the damages of cultural heritage. Just to make them pay attention to this subject, the author dealt with the effects of the earthquake on archaeology and heritage in the area under study in this paper and encouraged archaeologists and researchers to pay more attention to this subject in the Zagros and Mesopotamia.

## **2. Previous studies**

The subject Earthquake and Archaeology or Archaeoseismological, study the relation of archaeology and earthquakes, and earthquakes in the historical records is rather new in modern archaeology, of course there are some areas as Greece, Rome, eastern Mediterranean, western and eastern Anatolia, the areas around Van Lake, Syria, the Levant, Egypt, Japan, etc. are well known for their historical strong earthquakes, therefore the field of archaeoseismological studies are already in advanced level concerning the mentioned areas, but for the Zagros and Mesopotamia there are only few individual attitudes. In the last decade, some important studies have been published on that subject related to different areas of

the world, for instance, on Minoan earthquakes (Jusseret & Sintubin 2017). An important study deals with the use of archaeological data to study earthquake history on the Iranian Plateau (Berberian & Yeats, 2001, p. 563-584). Another study dealt with earthquakes in the Zagros and the Iranian sides, published by Mostafazadeh (Mejrdad et al., 2000, 1–10) and Berberian & Yeats, 2001, 56–78. This study dealt with specific cases of earthquakes in the Zagros. Other papers dealt with the strong earthquakes of the 12th century that hit Upper Mesopotamia and Syria (Raphael, 2010, 59–67, and Kazmer & Major, 2010, 185–198). As far as I know, there is only one paper dealing with earthquakes in ancient Mesopotamia; it deals with an Assyrian letter and other Assyrian records mentioned briefly in a paper published by Thompson (1937, 186–189). And for the medieval periods, two studies dealt with natural disasters; one of them, written by the historian Mahdi Haruti, studied earthquakes and their effects on the medieval Kurdistan society in the light of medieval Islamic records ("Haruti 2014, 41–43"). The other paper by Maha Hameed studied the medieval earthquakes in Nineveh in light of the medieval Islamic records. (Hameed, 2011, 73–93), both written in Arabic.

And there are other specific notes made by excavators who paid attention to earthquakes as a result of severe damage to ancient settlements or specific archaeological layers and their effect on the abandonment of the site, as in the case of Marlik Tepe (Negehban 1996, vol. 1, 16, 19–20) and Shanidar Cave (Solecki 1971, 125–127). And for the Urartian sites and the effect of earthquakes on the Urartian monuments, (KARAOSMANOĞLU & ALI YILMAZ.2014, 120–127).

### **3. Earthquakes in Mesopotamia and the Zagros in the historical records**

#### **1.1. Earthquakes in the cuneiform records**

Any historical record that dates earthquakes before 1900 AD has great value for geologists, archaeologists, and historians as well. (Ambraseys 1971, 375–379). The oldest known records about earthquakes in the Zagros and Mesopotamia appear in the Middle Assyrian royal inscriptions. Four strong earthquakes hit the Assyrian heartland, and the reports came from the two Assyrian capitals, Nineveh and Dur-Sharrukin (Khorsabad). The epicenter of these earthquakes is not known exactly, but perhaps it was somewhere in the Zagros. Unfortunately, yet there is no discovered record from the Zagros itself about these earthquakes, but it can be traced from the archaeological layers in future, already in Marlik Tepe an earthquake from the layers contemporary with the late Middle Assyrian and Neo-Assyrian periods noticed from the destruction layers date to the 1000-800 BCE

(Negahban 1996, 16, 20). In the Assyrian records, four strong earthquakes were recorded, two of them during the Middle Assyrian period in the 13th and 12th centuries BCE, and the other two earthquakes were recorded in the Neo-Assyrian letters in around 706 BCE and 669 BCE.

### 1.1.1. Earthquakes in the Middle Assyrian records

The Assyrian king Shalmaneser I (1274–1245 BCE) mentions the history of the temple of Ištar/Šawška in Nineveh. It was built by Šamšī-Adad I (1860–1776 BCE), then restored by Aššur-uballit (1365–1330 BCE), then a strong earthquake damaged the temple of Ištar, therefore Shalmaneser I restored and reconstructed both of them. He mentions this event in detail in his royal inscriptions:

*“At that time the temple of the goddess Ištar, mistress of Nineveh, my mistress, [which] Šamšī-Adad (i), the king, my predecessor, had previously built (and which, when) it became dilapidated, Aššur-uballit (i), my forefather, later restored that temple **had been damaged in an earthquake and was in ruin. [I cleared away] (the debris) entirely and reconstructed its weakened portions. I rebuilt the fallen sections from top to bottom. deposited my clay inscriptions.**” (RIMA I, A.0.77.17., 6-9. p.206).*

In another record, Shalmaneser I says that not only the temple but also the ziggurat of Ishtar in Nineveh were damaged due to the earthquake:

*“At that time the temple of the goddess Ištar, mistress of Nineveh, my mistress — (its) wall and ziggurat had been damaged in an earthquake and were in ruin. I rebuilt that ziggurat from top to bottom. [The wall and gate of the temple of the goddess Ištar], my mistress — I cleared away their debris (and) rebuilt the ruined sections from top to bottom. The gate [of the temple of the goddess Ištar] I rebuilt.” RIMA I, A.0.77.17., 7-10., p.208.*

In his royal inscriptions, Tukulti-Ninurta I (1243–1207 BCE) uses an earthquake as a metaphor for his powerful attack on Katmuhu land and their shrines; he says, "Like an earthquake, I shook their shrines." (RIMA I, A.0.78.1. 27–29, p. 235). Such an expression related to the effects of the earthquake that hit Nineveh and the temples and shrines during the reign of his father Shalmaneser I a few decades ago. Therefore, the Assyrian king wanted to compare the power of him and his army with earthquakes shaking shrines.

## **An earthquake hit Assyria during the reign of Aššur-rēša-iši I (1133–1116 BCE)**

The Assyrian king Aššur-rēša-iši I refers to two earthquakes that hit Nineveh and caused damage to the temple of Ishtar in the city. The first one was the one reported by Shalmaneser I, and the second one hit the city and the temple during the reign of Aššur-d]ān I (1179–1134 BCE). That one was not reported by Aššur-d]ān I himself, perhaps because the earthquake only made cracks in the walls and the roofs of the temple, therefore, during the reign of Aššur-rēša-iši I they noticed that the temple needed restoration due to these damages after these earthquakes that weakened the walls and foundations of the temple, Aššur-rēša-iši I says:

***“At that time the towers of the great gate at the front of [the (monumental) lions] in the main forecourt of the temple of the goddess Istar of [Nineveh], my mistress — (the towers) which previously, at the time of Shalmaneser (i), king of Assyria, had been damaged in an earthquake (and) which Shalmaneser (i), a king who preceded me, restored; a second time they were shaken by an earthquake at [the time of Aššur-d]ān (i), [king] of Assyria, my grandfather, those towers had been weakened and become dilapidated. (In the section) from the battlements to the roof of the temple I tore down fifteen layers of brick (and) [raised (this section)] fifty [layers of brick] (thus) making it [thirty]-five layers of brick higher than before. I put stone rosettes all around them.”(RIMA 1, A.0.86.1003, 8-10, p.311).***

### **1.1.1. Earthquakes in the Neo-Assyrian period**

In the Neo-Assyrian periods several earthquakes recorded, in contrast to the Middle Assyrian period, this time the news about the earthquakes not mentioned in the royal inscriptions, but rather in correspondences to the Assyrian kings, the reports sent to the Assyrian kings about the damages made by earthquakes or specific rituals to stop earthquakes.

## **An earthquake hit Dur-Šarruken (Khorsabad)**

Kiṣir-Aššur was the governor of Dur-Šarruken, he sent a letter to Sargon II he reported about an earthquake hit the city:

***“Upon my coming from Milqia to Dur-Šarruken, I was told that there had been an earthquake in Dur-Šarruken on the 9<sup>th</sup> of Adar (XII). Perhaps the king, my lord, now says: “What damage is there within the city wall?” There is [no]ne. The temples, the ziggurat, the palace, the city wall and the buildings of the city are all well; the king, my lord, can be glad. The***

**king, my lord, will hear many things tomorrow and the day after, and say: “Why is it that you heard but did not write?” That is [why I am now writing to] the king, [my lord].”** (SAA 1 125).

If Kišir-Aššur appointed governor of the city in around 706 BCE, therefore, it seems that this earthquake happened at that time, because in the letter there is a mention of the temples, ziggurat, palace, and city walls. This means that the earthquake happened when the construction of the city was about to finish and the city had as its governor Kišir-Aššur. Perhaps the reason that the earthquake did not damage the city walls, temples, and ziggurat is because the city was already built and these monuments were newly built and could resist the earthquake, or because the earthquake was not so strong or it was a short earthquake.

### **Earthquake Rituals by the king’s exorcist**

In two letters sent from the king’s exorcist, Adad-šumu-ušur concerning a strong earthquake that hit the Assyrian heartland and other small earth shakes that lasted for two weeks, he sent a letter to Esarhaddon (681-669 BCE):

**“Concerning what the king, my lord, wrote to me: “Why have you not sent an answer to (my) letter?” I had to drive to the palace those rams which the chief cook had brought forth for me, and the writing-board was in my house. Now then, I can look at the board and extract the relevant interpretation. Concerning the ritual against the earthquake [...] (Break). I will read [...]. [To...] the ritual installations for [Ea] and Asalluhi, [t]hi[s] is the appropriate way.**

**They did not tell me about the charge of the house of Urda-Daguna, when I was there; now, however, I have entered (the house) and examined (his) flesh. Is there a child who does not behave in this way (sometimes)? Now, if it pleases the king, my lord, I will go and see him (again) tomorrow; I would return for the ritual.”** (SAA10, 202)

In the letter, we learn that the king’s exorcist, Adad-šumu-ušur was so busy with different rituals, one of which was against an earthquake, that it took him two weeks. He needed rams (perhaps for sacrifices for the rituals) for Ea as the main deity related to earthquakes, and for Ea’s son, the Asalluhi deity. Asalluhi/Asarluhi was a Sumerian deity and the oldest son of Enki/Ea, who was the deity of magic and incantations. (Black & Green 1992, 36). In the letter, the exorcist visits the



house of Urda-Daguna, he refers to examining the flesh of that person and also treats a child there, we do not know if this visit linked with the rituals against the earthquake or it is a different duty of the exorcist, because he says that he will return to the earthquake rituals after that visit, or may be the treatment of the child linked with treatments for healing him/her from the trauma of the earthquake!

**Because of the earthquake, the Assyrian crown prince should not go outdoors!**

Adad-šumu-ušur sent another letter and assures the king about the crown prince's visit to the palace:

***“To [the king, my lord]: your servant Ad[ad-šumu-ušur]. [May] Nabu and Marduk bless [the king], my lord! Concerning the crown prince's visiting the king, my lord, is it because of the earthquake that he has said: “the crown prince should not go outdoors”? It is (already) a fortnight today since the earth quaked, the pertinent ritual has been performed twice, and the king, my lord, knows the relevant interpretation. As they say, what has it to do with this? The visit of [the crown] prince would be [perfectly] all right now.” (SAA 10 203)***

From the context of this letter, we understand that the Assyrian king Esarhaddon was worried about his son and the crown prince because of the earthquake; therefore, he has been asked not to go outdoors for two weeks, and then after 15 days he could be able to visit the king. Perhaps the earthquake is linked with a bad omen.

The Assyrian astrologer Balasī writes to the Assyrian king Esarhaddon in around 669 BCE about an earthquake in the month of Sevan of the year 669 BCE:

***[The earth] quaked [again.....]: the relevant interpretation is as follows: If the earth quakes in the month Sivan (III), settlements in abandoned outlying regions will become settled again at the command of Illil. Let them findout where the evil(portended by) the eclipse has materialized, and eradicate it. Somebody should g[o] and [perform(the rituals) in Nine[veh]]. (SAA 10 55).***

Balasi sent another letter to Esarhaddon and ask him to pray for the gods:

***“Concerning the interpretation of the omen about which the king, my lord, wrote to me:”(It is said that) the king will be vilified amongst his magantes – what losses will ensue?” interpretations of monthly omens are like this: one is never similar to another, their interpretations go separately. Now this one: if he will be slighted, its explanation can only be the earthquake. It has quaked: that is bad. They should perform the ritual against the earthquake, your gods will (then) make ( the evil) pass by. “Ea has done, Ea has undone,”. He who caused the earthquakae has also created the apotropaic ritual against it. Was there no earthquake in the times of the king’s fathers and grandfathers? Did I not see earthquakes when I was small? The god has (only) wanted to open the king’s ears: “He should pray (literally ‘open his fists’) to the god, perform the apotropaic ritual and be on his guard.”(SAA 10 56)***

In that letter, the astrologer Balasī tells Esarhaddon that the earthquake is a bad omen to the king, he asks the king to pray to the gods.

### **1.1.2. Earthquakes in the mythology of ancient Mesopotamia and the social beliefs of medieval and modern peoples of the Mesopotamia and Zagros**

In ancient Mesopotamia, like other natural disasters, earthquakes were also attributed to the activities of deities. In ancient Assyria, as in Sumer, earthquakes were attributed to divine activity. Thompson refers to an Assyrian text that mentions Adad as the cause of the earthquake. ***“When Adad is wroth, the earth trembles,”*** (Thompson 1937, 187). Another text refers to Ninurta ***“When thou marchest, heaven and earth quake’ (of Ninurta).”*** (Thompson 1937, 187). As Thompson concluded that Ea was ***“more resonable explanation,”*** as the cause of earthquakes. (Thompson 1937, 187). In the Neo-Assyrian period as well Ea linked with earthquakes, as in the letter of Balasi to the Assyrian king expressed ***“(what) Ea has done, Ea has given release (thereform).”*** (Thompson 1937, 188). According to Thompson, earthquakes were attributed to Enki/Ea, the god of earth and waters, and he compared it with the social beliefs of the people of modern Basra, who ***“attribute an earthquake to the movement of the ‘buffalo of the jinn’ beneath the surface.”*** (Thompson 1937, 188). Moreover, in the Zagros and some regions of the Middle East people to the early 20<sup>th</sup> century AD believed that the earth as a planet is on back of a fish, the fish on back of a bull, earthquakes happening when the bull moves its back, the author of this paper heard this story many times during eathquakes, although nolonger people believe in this story, but people still refer to it when an earthquake happen, in some times they make jockes and say ***“one day this unstability will collapse!”*** Interstingly, in this tradetional



verison, people refer to a giagantic fish on the back of a huge bull, in addition of bull/buffalo, here, the fish is another main symbol of the Sumerian god Ea, attributed to earthquakes. Also, the medieval Abbasid historians and travelers referred to similar stories of the bull and the fish; even they recorded that the earth is on the horns of the gigantic bull, and when it moves its horns, earthquakes happen. (Haruti 2014, 43) There is no doubt these elements in the medieval and modern social beliefs of the peoples of Mesopotamia and the Zagros survived to the modern day from the ancient interpretations of earthquakes, and they had a deep root that continued for millennia.

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## 1.2. The earthquakes and the medieval records

Specialists in medieval history and archaeology studied the medieval earthquakes from both the historical and archaeological sites; here we refer to some of their recent studies. These studies made chronology for these earthquakes, according to the medieval records a strong earthquake hit Nineveh in 846 AD left huge destruction and damages to the city, around 50,000 killed in the region. Another earthquake hit Nineveh in 986 AD, a strong earthquake hit Nineveh in 1058 AD, the earthquake and vibration lasted for a long time, considered an hour! Also other earthquakes hit Nineveh in 1121, 1129, 1134 AD, and in 1137 AD a very strong earthquake hit the regions of Jazera of Syria and Nineveh, rest of Syria and Upper Mesopotamia in 1107 AD, again in 1114 AD. (Hameed, 2011, 73–93) Other earthquakes struck Syria, Nineveh, and the Zagros foothills in 1117 AD, 1122 AD, and 1169 AD. The last one hit Nineveh and other regions and lasted for days; people were afraid to stay in their houses. (Hameed 2011, 83–85; Hameed 2011, 73–93). In 1201 AD and 1203 AD, the strongest one was not only in Nineveh and the Zagros foothills but also in Syria, Egypt, and the Mediterranean shores. In 1207 AD, 1225 AD, and 1226 AD, slight earthquakes hit Nineveh and other regions. (Hameed 2011, 83–85) In Syria, Aleppo was shaken by a strong earthquake on October 11, 1138 AD, which destroyed the city and other castles in Syria and the Levant because Aleppo, located on "the meeting of two tectonic plates—the Arabian and the African," (Withington 2008, 31).

Also concerning the Zagros foothills and Nineveh and other Upper Mesopotamian regions, there are medieval records about earthquakes; for instance, in 1130 AD and 1135 AD, two strong earthquakes hit Upper Mesopotamia, Nineveh, and the Zagros. In 1155 AD and 1169 AD, strong earthquakes hit the Zagros, Syria, and Mesopotamia, even the middle and southern parts of Mesopotamia, including the cities of Baghdad and Basra. In 1179 AD, a very strong earthquake hit the Zagros ranges and shook the regions from Arbela to Armenia. (Haruti 2014, p. 130) Interestingly, the medieval Muslim historians refer to the level of the earthquakes and put three levels "strong, medium/average and slight." (Haruti 2014, 128).

#### **4. Earthquakes and Archaeological excavations; the effect of earthquakes on the ancient cities and archaeological levels, the noticed cases in the Zagros.**

#### 4.1. The first victims of an earthquake in the Zagros were the Neanderthals in Shanidar Cave!

The study of ancient earthquakes in the field of archaeology is rather new; it is called archaeoseismology. In this new field, archaeologists have to study the destruction layers, measuring damages to the ancient monuments, ancient restorations, abandonment, and migrations. The available historical records in the cuneiform records and later medieval Islamic records may help archaeologists understand the destruction layers and date the ancient earthquakes. (For some examples of this type of research, see Sintubin, M., et al., 2010, Ancient Earthquakes, USA, 185–198.)

During his archaeological excavation in the 1950s, Ralph Solecki found the first skeleton of Shanidar Man (contemporary to Neanderthals) was killed by a fallen rock from the ceiling of the cave when the man asleep around fire place. During his excavation at the cave, Ralph Solecki witnessed an earthquake. He also found that several huge stone blocks had fallen on the ground, and in different layers, these rocks slowed his excavation. Therefore, he concluded that there might have been earthquakes when Shanidar Men were living in the cave during the Upper Paleolithic (33,000–26,750 BCE). In Layer C, Solecki noticed:

***“There was some confusion in this layer because of the many boulders and stones that choked the excavation. These stones must have come from the ceiling, some having fallen with terrific force. Several fire hearths were contorted out of shape by the downthrust of the stones. Some stones which we overturned were found to have charcoal flecks adhering to their bottoms, indicating that they had fallen directly on live fires. The full realization of this was not pressed home to me until the third season, when we had found our first adult Neanderthal and, more telling, when we ourselves had experienced an earthquake in the cave. The widespread distribution of the stones in Layer C appeared to point to a sudden catastrophe which dislodged the great blocks from the ceiling. An earthquake was the logical explanation, especially since we were in an earthquake area.”*** (Solecki 1971, 125-127).

Solecki noticed the earthquake that hit the Bradost range and the cave on August 12, 1953, at 12:10 p.m.; at that time, he was busy taking photos of the layers. The author of this paper looked for the records of earthquakes at that date and time, and found only a strong earthquake happened in the Middle East and eastern Mediterranean at that date was the deadly earthquake known as Ionian

earthquake that struck the Ionian Islands, the earthquake with a magnitude of 6.8, it is surprising that this earthquake reached Shanidar Cave far east of the Ionian islands. Still there are other rocks hanged between the edges of the ceiling of the cave and perhaps will fall with future earthquakes. (fig.1-2).

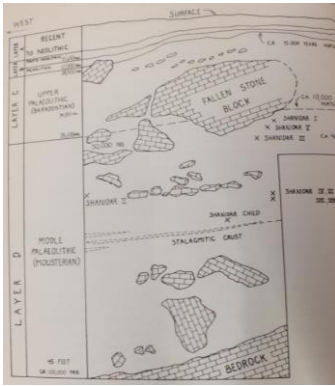


Fig.1. The stratigraphy of the four layers (A–D) at Shanidar, the fallen stone blocks and rocks identified, and how they covered the layers and skeletons of Shandidar and Neanderthal men (Solecki 1971, 126).



Fig. 2. A view of the entrance of the cave; several fallen block stones are seen in the cave, some of them falling from the ceiling of the cave. (Photo by the author, 2005).

#### 4.2. The shaken layers and royal tombs at Tell Marlik

The strong earthquakes that hit the Zagros and Upper Mesopotamia regions affected the other neighboring Mesopotamian and Iranian plateaus. Perhaps one of



the strong earthquakes mentioned in the Assyrian records had its epicenter in the Northern Zagros and shook its surrounding regions, including Assyria to the west of the Zagros ranges and Marlik to the east of them.

During his archaeological excavation at Tell Marlik, Ezzat Negahban noticed that the levels, which date back to 1000–800 BCE, are badly disturbed, and when he found broken artifacts and damaged royal tombs, he concluded that this was because of an earthquake. Moreover, the disturbed level and the broken artifacts at Marlik were linked with a natural catastrophe, precisely an earthquake, and Negahban linked this catastrophe with the abandonment of Marlik in around 1000–800 BCE. When Negahban excavated Tomb 26 (the King's Tomb), he noticed that:

***“Six-sided tomb, with different measurements on each side, encompassing an area about 6.0 m long, 4.5 m wide, and 2.5 m deep, located partly in Trench XVII B and partly in XVI B (Map 5). The tomb incorporates three large boulders in walls that are roughly built of coarsely mixed clay and pieces of broken stone with some parts filled with mud and gravel (111. IB and PL 8C). The contents of this tomb were badly disturbed when found, possibly by an earthquake or other natural action, and they were not in a horizontal layer as was the case in some of the other tombs. No skeletal remains were found except for small chips of somewhat perished bone visible in the filling. Because of the disturbed condition of the tomb, there was little evidence of the original orientation and layout of the body, and there was no stone slab or level platform arranged to hold it. However, the very rich and varied contents of the tomb indicate that it must have belonged to a powerful warrior, possibly a warrior king, with great physical strength, accustomed to using a large variety”*** (Negahban 1996, vol.1., 19-20).

Negahban noticed similar disturbance in the TOMBE 32 (the queen tomb):

***“Several larger slabs of this yellowish stone were placed above and around each other on the floor of the tomb with crushed objects in between (PL 10C), suggesting that there may have been some sort of disturbance to the tomb to bring such disorder to the contents. This disturbance may have been an earthquake or other natural action with no connection to tomb robbery, for the valuable contents of the tomb remain. Another possibility is that the large slabs formed some sort of roofing to the tomb, which fell and crushed the objects beneath.***

***Because a wide variety of jewelry is predominant in the contents of the tomb (Table 1), it may have belonged to a wealthy queen.” (Negahban 1996, vol.1., 20, also see p.16).***

However, recent studies see that no catastrophic earthquake happened in Marlik at least from 800 BCE to the Sassanian period, (Berbarian & Yeats 2001, 571-572). But before that date still the debate is open among the scholars. However, it has been suggested that because there is no historical record to support an earthquake in Marlik at that time, one should support Negahban's interpretation about the probable earthquake. (Berbarian & Yeats 2001, 571–572). But if we go back to the Neo-Assyrian records mentioned above, we find that there are these records might support happened strong earthquakes in these regions, and it seems that the earthquakes were strong enough to make threatening on the palaces and temples in central Assyria far from, the Zagros as major earthquake zone, in the Assyrian capitals and in Arbail as well, this indicates that if such a strong earthquake happened in the Zagros and its waves of shaken Assyria as well to east Marlik itself. Therefore, perhaps the strong earthquake that is mentioned in the Middle Assyrian records in the second half of the 12th century BCE (RIMA 1, A. 86.1003, 8–10, p. 311) may be linked with the earthquake of Marlik, or perhaps it is another earthquake that happened later and was not recorded in the cuneiform records.

#### **4.3. Khinis Rock reliefs and the fallen *lamassues* in the river**

The Assyrian king Sennacherib built the water canal and brought fresh water from Khinis to Nineveh, at the gate of this canal at Khinis, he carved several huge rock reliefs, below the main scene of Sennacherib and Ashur, there were semi-round sculptures of Assyrian *Lamassues* and *Apkallues*. The huge rock that was carved with the *lamassues* and *apkallues* reliefs collapsed into the river, perhaps in an earthquake (Marf 2016, 179, 390f) (figs. 3 a-b). If so, then that proposed earthquake may hit Khinis after 1853 AD, because the sketch made by Layard shows two *lamassues* there, but at the moment there is only one in the river. (Layard 1953, 178; Marf 2016, 179, 390f.). But if an earthquake causes the *lamassues* to the river, we have to study the effects of earthquakes on these aqueducts as well, because aqueducts in Assyria and Urartu faced severe damage, future studies can look for links between earthquakes and damaged aquatics.





Fig.3 a-b. The rock relief of Khinis and the fallen *lamassu* statue with an earthquake or a flood! (Marf 2016, 390).



Fig. 4. The flood of the river covers most of the fallen *lamassu*, and the flood reaches beneath the main rock relief. (Photo taken by the author on March 19th, 2019).

## 5. The effects of the strong earthquake on November 12, 2017 on heritage buildings and the local museums.

## 5.1. The effects and damages on the heritage buildings

### 5.1.1. The effects and damages on the Sherwana Castle

The strong earthquake with a magnitude of 7.3 that hit Sarpol-Zahab to the east of Kalar (ca. 100 km) caused severe damage to the attic of the Sherwana castle; it made big cracks in the north-eastern and north-western towers of the castle, and it made a big crack in the lower part of the northeastern tower. There are other cracks inside the walls and the ceilings of the first and second floors of the castle (Fig. 5 a–b).

The attic of the castle faced survey damage and was about to collapse, therefore, the specialists found that there is no way to protect this attic and will collapse sooner or later, therefore they began cleaned the attic and removed the parts that was about to collapse, then they restored or rather rebuilt the attic in its traditional style with support and funds from international NGO foundations. (Unpublished report of the Garmian Directorate of Antiquities, 2018).

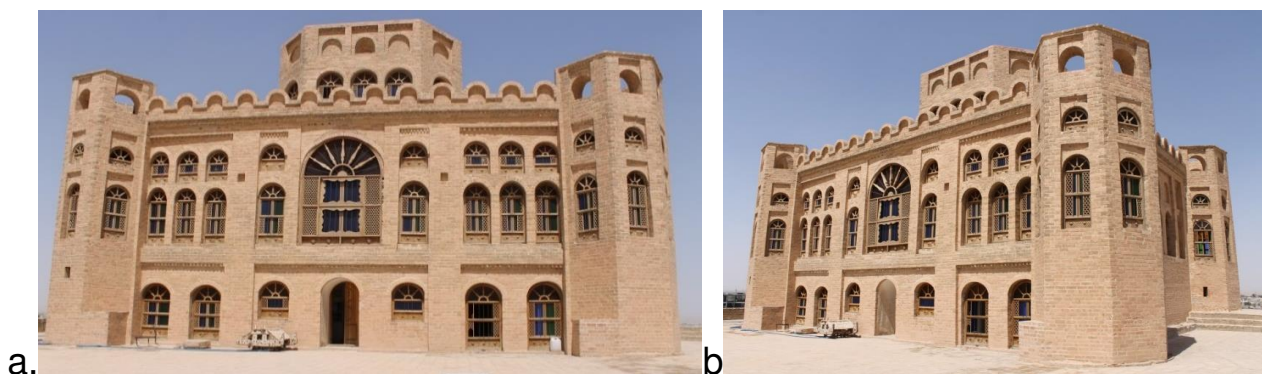


Fig. 5.a.b. The Sherwana Castle before the earthquake (photo by the author in August 2012)

Previous earthquakes in 2012 and 2013 only made small cracks in the wall of the attic. (fig.6. a.)

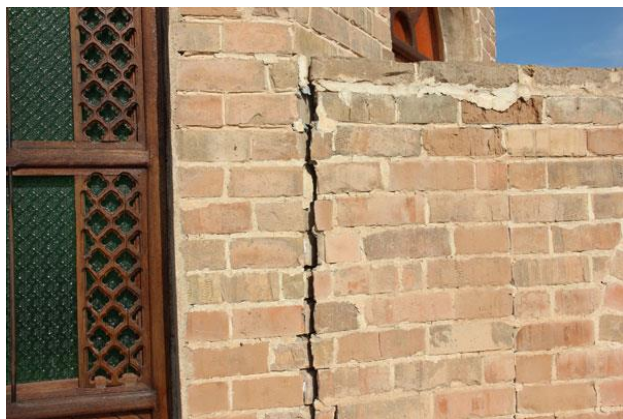




Fig. 6.a. The cracks on the wall of the attic of the castle, caused by an earthquake in 2013. ((Photo by Nawzad Latif, Archive of the Directorate of Antiquities of Garmian).



Fig. 6.b–g: The severe damage to the attic seen after the earthquake on November 12, 2017. (Photo by Nawzad Latif, Archive of the Directorate of Antiquities of Garmian).



Fig.6.f-h. there is big cracks in the northern wall of the castle. (Photo by Nawzad Latif, Archive of the Directorate of Antiquities of Garmian).

## 5.2. The effects and damages on the Museums

### 5.2.1. The effects and damages of the earth on the Slemani Museum

The Slemani Museum has not reported any damage to their exhibited objects and lockers inside the museum, but the threat is to the building itself. Although the museum was built in the 1960s, the building is still intact. However, because the earthquake was strong, it was expected to make cracks in the walls and the roof of the museum. After the earthquake, the Slemani Museum reported that the museum building was affected by the serious earthquakes that hit the city in November and December 2017. (fig.7.a-c):

***“Due to a series of earthquakes that hit the city of Slemani, several cracks occurred in the roof of the museum building, which requires immediate treatment for the purpose of preserving the museum building and not to damage the archaeological artifacts inside the museum. We ask the concerned authorities to fix these cracks as soon as possible.”***  
(Slemani Museum Report, December 8, 2017)

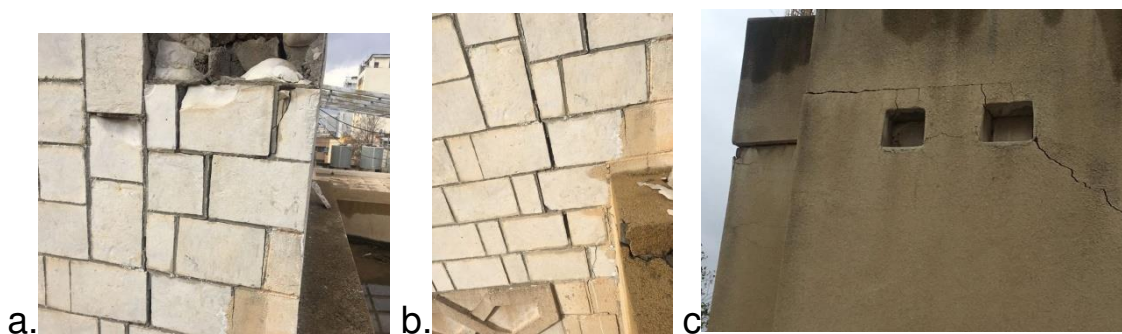


Fig.7.a-c. The damages and cracks faced the roof and the upper parts of the walls of the museum due to the strong earthquakes hit the city. (Photo by the Slemani Museum, published on <http://www.slemanimuseum.org>).

### 5.2.2. The damages after the earthquake in the Kurdish Cultural Museum

The lockers in the Kurdish Cultural Museum in the old town were shaken and the glasses of the lockers in the room exhibition of the traditional weapons were broken, because some of the exhibited weapons were fallen in the locker exhibition. This incidence may give an experience to the boards of the museum to rethink about their exhibitions for any unexpected strong earthquake in future, to protect the exhibited artifacts, the lockers, and as well the safety of the visitors of

the museum. (Unpublished report in the archive of Kurdish Cultural Museum) (fig.8.a-c).



Fig.7. a. Weapons from the early 20<sup>th</sup> century exhibited in the Kurdish Cultural Museum before the earthquake. (Photo by Erfan Osman director of the Kurdish Cultural Museum).

Fig.7. b-c. The earthquake shaken the walls and the weapons fallen down and broke the glasses of the lockers. (Photo by Erfan Osman director of the Kurdish Cultural Museum).

### 5.3. The damaged Heritage Buildings in Sulaimani

There are many heritage houses in the old town of Slemani, the house of Mr. Ahmed Qopcha in Sersheqam District is one of these heritage houses the earthquake made some cracks and damages on its façade and its walls, the author took some photos of the building after the earthquake, however, unfortunately, the damages and cracks not treated soon, due to the heavy rains of the early spring 2019 that affected the building and the western corner with part of the façade wall and part of the roof all collapsed, this is led to severe damage to the building. (Fig.8 a-g).





Fig.8. a-e. The earthquake made cracks on the sides of the gate and the fallen ornaments from the façade of the Ahmed Qopcha heritage building in Sulaimani (photos by the author November 2017).



Fig.8.f-g. The Ahmed Qopch building, its western corner and its façade collapsed due to the earthquake and the heavy storm raining of the early spring 2019. (Photo by the author in April 2019).



## Conclusions

1. The archaeological evidence proves that strong earthquakes hit Shanidar cave and the Shanidar Men/Neanderthals were the first victims of earthquakes.
2. The cuneiform records from the Middle and Neo-Assyrian periods tell us that strong earthquakes hit Nineveh and Dur-Sharrukin in the 13<sup>th</sup>, 12<sup>th</sup>, 8<sup>th</sup>, and 7<sup>th</sup>. The first two earthquakes caused severe damage to the temples and ziggurat of the temple of Ishtar.
3. The medieval Islamic records give many details about the earthquakes in Mesopotamia, Zagros, and Syria. Especially, the records focus on Mosul/Nineveh in the Assyrian heartland and Halwan/Sarpol-Zahab area in the Zagros. These records mention numbers of the victims, the damaged public and private buildings, as well the time and date and measures of the earthquakes as strong, medium and slight earthquakes.
4. In ancient Mesopotamia earthquakes linked with deities' activities and or in sometimes because of passing by devils. But Anki/Ea attributed to earthquakes, interestingly in the medieval records and modern traditional social beliefs of the peoples of Mesopotamia and the Zagros thought that earth is on a back of a huge fish, and the fish on back of gigantic bull, in Basra the bull called buffalo, or it was thought that the earth between the horns of the gigantic bull, when the bull moves its horns earthquakes happen.
5. If strong earthquakes damaged the towers, foundations, and roofs of the temple of Ishtar in Nineveh and her ziggurat there, we have to think that such a strong earthquake was much stronger at its epicenter in the Zagros than when it reached the Assyrian heartland. Therefore, we have always thought about the effects of earthquakes during archaeological excavations in the levels dating to the 13<sup>th</sup> century in Assyria and the Zagros archaeological sites and their effect on the buildings and the archaeological layers. Similarly, the strong earthquakes of the 12<sup>th</sup> century AD which hit the Upper Mesopotamia and the Zagros, surely left damages in public and private buildings and shaken the ancient archaeological layers.
6. Surprisingly, the vibration of the Ionian earthquake of August 12, 1953, reached Shanidar cave at 12:10 pm, the time when R. Solecki took photos for the Shanidar excavated layers. This incidence tells us that perhaps some earthquakes in Assyria and the Zagros foothill were not because of the Zagros Fault or Aleppo belt, but perhaps were vibrations from far places. We know that the Zagros, Taurus, and Eastern shores of were on the Major Earthquake Zones, this Zone here similar to the Fertile Crescent line, therefore, in some cases of the recorded strong earthquakes in Mesopotamia and the Zagros may have linked with one of the Zones in the Zagros, Van, Anatolia, Taurus, Syria, the Levant, and even Ionia.

7. Local and foreign archaeologists have to bear in mind the effects of the ancient earthquakes on the archaeological layers, structures, and ancient societies in the Zagros and Mesopotamia. The detailed historical records of strong earthquakes in the Zagros and Mesopotamia indicate that we need to pay more attention to the subject of archaeoseismology.
8. The recent strong earthquake of November 12, 2017 with a magnitude of 7.3 affected the heritage buildings, museum buildings, and castles in the Zagros, damaged some of them, and made cracks in the walls and roofs of these buildings:
9. In the case of Sherwana Castle, whose attic faced severe damage and was about to collapse, as well as its walls and roofs, the attic was completely restored a year after the earthquake.
10. The heritage buildings in the old town of Sulaimani faced similar damages and cracks, as in the case of the Ahmed Qopcha heritage building.
11. The earthquake made cracks in the walls and roof of the building housing the Slemani Museum. Now the museum is undergoing restoration and expansion, and they have taken into consideration any unexpectedly strong earthquakes in the future.
12. The lockers in the Kurdish Cultural Museum in the old town of Sulaimani were shaken, and the glasses of the lockers in the room exhibition of the traditional weapons were broken because some of the weapons had fallen in the locker exhibition. This incidence gave an experience to the boards of the museum to rethink about their exhibitions for any unexpected strong earthquake in future to protect the exhibited artifacts, the lockers, and as well the safety of the visitors of the museum.

Unfortunately, nothing was done for some of the damaged heritage buildings in the old town of Sulaimani after the earthquake, except these buildings were inherited by the municipality of the city and the directorate of antiquities. One of the heritage buildings, which we choose in our study as a case study of the heritage buildings is the Mr. Ahmed Qopcha heritage building, the recent strong earthquake damaged and made big cracks in the façade and the sides of the gate of the building, and unfortunately the recent rain storms made more damages to the roof and western wall, and the façade gate of the building due to these parts of the building collapsed on March 27, 2019.

## **Abbreviations**

JSEE = Journal of Japanese Society for Engineering Education.

JSG= *Journal of Structural Geology*.

SAA = State Archives of Assyria.

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### **Websites:**

The website of Slemani Museum, [www.slemanimuseum.org](http://www.slemanimuseum.org) and their formal page on

Facebook: <https://www.facebook.com/Slemanimuseum.org/photos/pcb.1576897785730192/1576882182398419/?type=3&theaterhttp://www.slemanimuseum.org>

### **Achieves and reports of local directorates of antiquities and Museums**

1. Unpublished report of Garmian Directorate of Antiquities about the damages of the earthquake that hit the Sherwana castle on November 12, 2017 2018, and the details about the restoration process.

2. Unpublished report of The Kurdish Cultural Museum in Slemani about the damages of the lookers in the museum due of the earthquake on November 12, 2017.
3. Photos of the damages of the Slemani Museum building.

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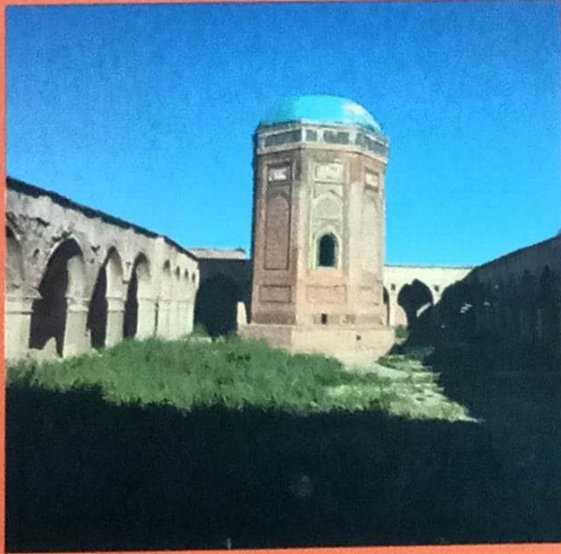
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