

The Scientific Explanation of *Ṣayḥah* as a Divine Punishment of Some Ancient Tribes Mentioned in the Qur'an

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ABSTRACT:

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The narration of the life of some of the past tribes who lived after Noah has been mentioned in detail or in summary in the Qur'an. The fate of these tribes has mostly ended in divine punishment, which based of the geographical location, the type of sins of the people, and other reasons, this punishment has had different external manifestations, such as storm, *ṣayḥah*, sinking into the ground and drowning in water. Since the function of *ṣayḥah* (which is translated as loud and strong sound) as a destructive force is not as clear as the other punishments mentioned, the main goal of this research is to scientifically explain the function of *ṣayḥah* as a divine punishment. Due to the semantic similarities of *ṣayḥah* to sound wave (a type of pressure wave), the proposal here is the correspondence of *ṣayḥah* to shock wave which can be defined as a strong sound wave with a large amplitude. Recent advances in science have shown that this type of wave has a very high destructive power and has the ability to cause serious damage to living tissues of the body. In this research, first, the different meanings of the word *ṣayḥah* have been studied according to Arabic lexicons, and then the verses of the Qur'an related to punishment by *ṣayḥah* that some past tribes have suffered have been carefully investigated. After studying the possibility of the destruction of the *ṣayḥah*, both in terms of the Qur'an and the latest developments in physics, as a suggestion for scientific interpretation, shock wave, which is a type of sound waves, has been proposed as a possible example to the punishment by *ṣayḥah*.

KEYWORDS: Interdisciplinary Qur'anic Studies, Scientific Interpretation, *ṣayḥah* in the Qur'an, Shock Wave, Qur'an and Science.

1. Introduction

Narrating the fate of some ancient tribes has a prominent role in the Qur'an. Although the end of many of these past nations has ended in divine punishment, there are also nations mentioned in the Qur'an as survived nations; the population of almost 100,000 people, under the guidance of Yūnus after coming out of the fish body is one of these examples (Q. 37:147-148). The discussion about the past in the Qur'an is not limited to the nations with divine messengers (be it a prophet or a messenger) who have led to salvation or damnation, but the narration of the two sons of Adam can also be found in the Qur'an (Q. 5:27-31). According to God's repeated commandments in various places in the Qur'an, including after narrating the fate of different peoples in *Sūrah al-Shu'arā'*, the main purpose of telling these stories is to learn from divine signs (Q. 26: 68, 103, 121, 139, 158, 174 & 190). This is the reason why God did not mention the names of the lands of the nations, the race of people of those nations, the time of occurrence and even the names of the people in the narrative of the fate of the predecessors and has given priority to quoting instructive parts.

As it has been mentioned, most of the tribes and nations whose destiny God narrated in the Qur'an have finally suffered divine wrath and punishment, and this punishment has manifested itself in different ways. In *Sūrah al-'Ankabūt* (Q. 29:40),¹ four types of divine punishments that have afflicted the past generations are mentioned.

"Each one of them We seized for his crime: of them, against some We sent a violent tornado (with showers of stones); some were caught by a (mighty) Blast; some We caused the earth to swallow up; and some We drowned (in the waters): It was not Allah Who injured (or oppressed) them: They injured (and oppressed) their own souls."

As mentioned earlier, the divine punishments in the previous nations were in various forms, one can say that this variety of punishments was related to the type of sin of that people, the land they lived in, or even the facilities they boasted about, which is out of the scope of our discussion in this article. One of the punishments mentioned by God in different parts of the Qur'an is the punishment through *ṣayḥah*. In this research, we will first examine the meaning of *ṣayḥah* in the Arabic language, and then in the Qur'an text. In the next step, we will investigate the people who suffered

¹ - فَكَلَّا أَخَذْنَا بِذَنبِهِ فَمِنْهُمْ مَنْ أَرْسَلْنَا عَلَيْهِ حَاصِبًا وَمِنْهُمْ مَنْ أَخَذَتْهُ الصَّيْحَةُ وَمِنْهُمْ مَنْ حَسَفْنَا بِهِ الْأَرْضَ وَمِنْهُمْ مَنْ أَغْرَقْنَا وَمَا كَانَ اللَّهُ لِيُظْلِمَهُمْ وَلَكِنْ كَانُوا أَنْفُسَهُمْ يَظْلِمُونَ (العنكبوت/40).

such torment according to the Qur'an. By clarifying the meaning of *ṣayḥah*, we will examine its possible scientific equivalents and after answering the following questions, we will summarize the contents.

- 1- What scientific equivalents can be found to explain *ṣayḥah* as a divine punishment?
- 2- Can sound waves cause destruction or vital damage in humans?

2. *The meaning of Ṣayḥah in Lexicons and the Qur'an*

The word *ṣayḥah* (rooted from the letters Ṣ Y Ḥ) is said to mean a voice (Ibn Manẓūr, 1995, 2:521) and a loud voice (al-Farāhīdī, 1988, 3:270). It has also been said that *ṣayḥah* originally means a sound that comes from breaking wood or tearing cloth (al-Rāghib al-Iṣfahānī, 1991, 282). It is also said that *ṣayḥah* means "a great sound" that usually comes out of the mouth of a human or an animal, but it is not specific to it, but includes any great sound (Makarem, 1993, 9:200).

From the root of *ṣayḥah* (ṢYḤ), only the word *ṣayḥah* is used in the Qur'an, which is repeated 13 times. From one point of view, the verses containing the word *ṣayḥah* can be classified into three categories; The first group of verses that refer to the destruction of different nations by *ṣayḥah* punishment, the second group of verses that mention *ṣayḥah* as one of the events before or at the same time as the Resurrection (Q. 36:49 & 53; 38:15; 50:42) and the third category, which includes only one verse, means a noise or a loud voice (Q. 63:4), which does not have any of the characteristics of the previous two categories. Although in the verses of the second and third categories, the meaning of sound (for *ṣayḥah*) is mentioned, in this research, only the verses of the first category will be examined and studied, because our goal is to study the verses that mention *ṣayḥah* as the punishment of the past generations.

In the first category, there are 8 verses in which the names of the destroyed tribes are explicitly mentioned in 4 of these verses and in some others indirectly or without names. The verses of Surah Q. 11 & 54 are explicitly related to the people of Thamūd, whose prophet was Ṣāliḥ; Verses Q. 11:94 & 15:73 also clearly refer to the destruction of the people of Madyan (whose prophet was Shu'ayb) and the people of Lūṭ respectively. In the other 4 verses where the word *ṣayḥah* is mentioned, the name of a tribe is not explicitly mentioned, which we will briefly discuss here.

The verse Q.29:40, as mentioned in the introduction, refers to 4 types of punishments that have led to the destruction of the past generations, one of these punishments is *ṣayḥah*. Some scholars consider the saying in this verse

to be related to the people of Thamūd and the people of Shu‘ayb (Madyan) (Tabataba‘i, 2011, 16:127) and another scholar considers the saying in this verse related to the people of Thamūd and some other tribes. (Makarem, 1993, 16:273). Some of the earlier commentaries have also mentioned the people of Thamūd and the people of Shu‘ayb for *ṣayḥah* in this verse; as an example, al-Ṭabarī (2004, 20:97) has narrated the same thing under narrations from some companions. By referring to other interpretations, it can be seen that more or less others have raised the same words. However, looking at the previous verses (Q. 29:38 & 39), it may be used as if the torments of verse 40 are related to the tribes mentioned in verses 38 and 39, respectively. Since ‘Ād, Thamūd, Qārūn and Pharaoh were mentioned before this verse, the punishments mentioned in verse 40 are *ḥāṣib* (storm), *ṣayḥah*, *khasf* (swallowing by the ground) and drowning, in the same order. It is worth mentioning that in verse 36, the people of Madyan (Shu‘ayb) are mentioned, and immediately in the next verse, the punishment of that people (*rajfah*) is mentioned. Therefore, the possibility that *ṣayḥah* in verse 40 includes the people of Madyan is weakened. By expressing the possibility that the torments mentioned in verse 40 will return to the torments of the tribes mentioned in the previous two verses, *ṣayḥah* mentioned in this verse will also be related to the people of Thamūd. However, as the commentators also mentioned, they all pointed to the example of the people of Thamūd (in most cases together with the people of Shu‘ayb) in this verse.

Another verse, in which the punishment of *ṣayḥah* is implicitly assigned to a tribe, is verse Q. 15:83. Although this verse is about the Companions of the Stones, the context of the verses, the characteristics of the people (building houses out of the mountain) and also their punishment (*ṣayḥah*), have led prominent commentators to consider the Companions of the Stones to be the same as the people of Thamūd (Tabataba‘i, 2011, 12:185; Makarem, 1993, 11:122; al-Ṭabrisī, 1993, 6:528; al-Rāzī, 1999, 19:157; al-Ṭabarī, 2004, 14:34).

Another verse that is the subject of discussion is Q. 23:41, about which there are different opinions. Makarem (1993, 14:235) suggests two possibilities for the people mentioned in these verses; the people of ‘Ād and the people of Thamūd. Further, by pointing out that the punishment of the people of ‘Ād was severe through a strong wind and because the punishment of this people, *ṣayḥah* was mentioned, it strengthens the possibility of the people of Thamūd. The last verse in which the word *ṣayḥah* (as a divine punishment) is mentioned and the name of a tribe is not mentioned is Q.36:29. The torment of *ṣayḥah* is described in this chapter related to the Companions of the Village. It is known and famous among the commentators that this city (village) was Antioch, one of the cities of

Levant and this city was one of the most famous cities of ancient Rome and today geographically it is a part of the territory of Turkey (Makarem, 1993, 18:339). As a summary of the verses of *ṣayḥah*, it can be said that these verses (13 items) include three categories, of which only one category of verses refers to the torment of previous generations. There are 8 verses in this category, of which 5 verses are dedicated to the people of Thamūd, one verse to the people of Madyan (Shu'ayb), one verse to the people of Lūṭ and one verse to the people of the village (city of Antiochia).

3. A possible equivalent of Ṣayḥah in modern science

In the physics of waves, depending on whether the wave needs a material medium to propagate or not, waves are divided into two categories: electromagnetic waves and mechanical waves. For example, visible light and x-rays are electromagnetic waves, and sound waves and the wave created in a rope are mechanical waves. In addition, waves can be divided into longitudinal waves and transverse waves according to the movement direction of the oscillating particles. A wave in which the particles of the disturbed medium oscillate perpendicular to the direction of wave propagation is called a transverse wave, and a wave in which the particles of the disturbed medium oscillate parallel to the direction of wave propagation is called a longitudinal wave.

Sound is a mechanical wave that comes from the back and forth vibration of the particles of the medium through which the sound wave passes. If a sound wave is traveling from left to right through air, the air particles are displaced both to the right and to the left as the energy of the sound wave passes through it. The movement of particles is parallel with the direction of energy transfer. This is what characterizes sound waves in air as longitudinal waves. Therefore, it can be said that sound waves are the most important example of longitudinal waves. They can move through any material medium at a speed that depends on the properties of the medium. As waves travel, particles in the medium vibrate to cause changes in density and pressure in the direction of wave propagation. These changes lead to the creation of a series of high pressure and low pressure areas. Sound waves themselves are divided into three categories that cover different frequency ranges. (1) Audible waves: are waves that are within the sensitivity range of the human ear. They can be produced in different ways such as musical instruments, human vocal cords and speakers. (2) Infrasound waves: are waves with a frequency lower than the audible range. Elephants can use infrasound to communicate with each other, even if they are miles apart. (3) Ultrasonic waves: are waves with a frequency higher than the audible range.

The "silent" whistle used to retrieve dogs uses ultrasonic waves. Dogs, easily hear the ultrasonic sound emitted by it, although humans cannot detect it at all. Ultrasound is also used in medical imaging. (Halliday et al., 2013, 520).

Since a sound wave contains a repeating pattern of high-pressure and low-pressure areas that move in a medium, it is also called a pressure wave (Attenborough, 2002). If we look in more detail, sound is a mechanical wave that causes particles to vibrate. Particles are a small part of the medium around the sound source, whose presence in the environment leads to an important feature; if the medium contains particles, the sound wave can propagate through it. The particles of the medium only oscillate back and forth and do not actually move in the medium. This disturbance allows energy to be transferred in the medium and this is the definition of the longitudinal wave that was mentioned in the previous sections.

Shock waves have been recognized as an acoustical phenomenon form many years, probably first noticed in connection with explosions. A shock wave is a single sound wave of great amplitude in which the maximum pressure may exceed the ordinary atmospheric pressure by several pounds per square foot. It travels at a speed greater than that of ordinary sound waves from familiar sources, such as horns and whistles. A shock wave moves away from its (stationary) source, its intensity and its speed decreases rapidly as compared to those of ordinary sound waves before dying away completely. When a shock wave passes over an observer, he/she may hear a noise like that of a distant explosion and may feel a sudden momentary push in the direction in which the shock wave is moving (Gerhard, 1967).

The scale and diversity of the shock wave phenomena is such that it has attracted a lot of attention. Shock waves in very small and relativistic scales of femtometer (10^{-15} m) in nuclear materials to shock waves in galaxy clusters with a length of gigaparsec (10^{25} m) have attracted the attention of scientists (Davison et al., 2008).

A blast wave is a shock wave which is strong enough that the background gas pressure is negligible when compared to the pressure behind the shock wave, allowing the governing equations to be simplified. The blast solution was investigated in more detail in the 1950's and 1960's. Since then, the blast solutions have been employed for describing shock waves induced by many various physical phenomena including astrophysics, blast waves driven by electricity and in shock tubes, blast waves in magneto-gas dynamics and electro-gas dynamics, gas flow in solar flares, and blast waves induced by lasers (Hendijanifard and Willis, 2015).

Different ranges of blast overpressure corresponding to standoff distances along with injuries and damages to component caused due to blast

wave are illustrated in Figure 1. As it can be seen in the figure, in the nearest range where the pressure is approximately 1373 kPa the blast wave can inflict fatal injuries to human resulting in death. As the standoff distance increases the magnitude of overpressure decreases as well. A pressure of 245 kPa and more can result in collapse of lungs whereas, 98 kPa of pressure can damage the eardrums. The blast pressure at higher standoff distance will have slight effect on the structure, such as cracks observed in the window (shirbhate and Goel, 2021).

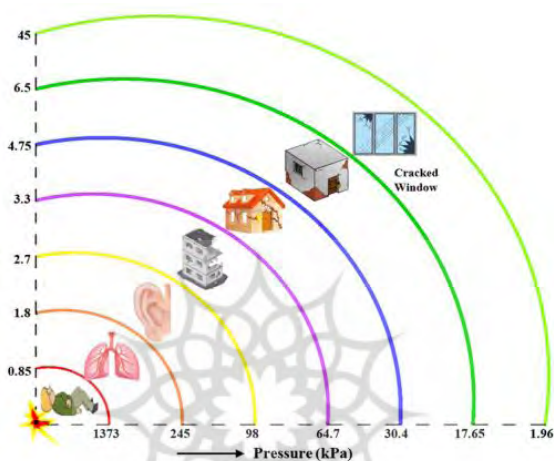


Figure 1: Blast injuries corresponding to overpressure ranges and respective standoff distances (shirbhate and Goel, 2021)

As mentioned earlier, shock waves can have destructive effects on both the environment and the biological organs of the human body. This great destruction caused by the explosion (shock) wave can be caused by a nuclear explosion, the impact of a meteorite or other celestial bodies with the Earth, or any other source of strong shock waves. As a concrete example, we can refer to an article that was published recently (in 2021) in Scientific Report (Nature Publications).

It is reported that the new archaeological excavations in the city of Tall el-Hammam, located in the western part of Jordan, show that a cosmic incident caused the complete destruction of this coastal city near the Dead Sea about 3650 years ago. Researchers estimate that the proposed airburst created a destructive power equivalent to 1000 times stronger than the Hiroshima atomic bomb. The analysis of the evidence left in the ruins of the ancient hill of Tall el-Hammam shows that a meteorite approximately 50 meters wide exploded at a height of 4 kilometers above the surface of the

earth and after a dazzling light, it created a heat wave of 2000 degrees. The heat generated was so much that it immediately burned the wooden bodies of the houses and melted metal objects such as swords, spears and even clay and brick structures. However, this was not all the destruction, a few seconds later, a huge explosion shock wave arrived and destroyed everything, including the 5-story palace complex with a solid wall 4 meters thick (Bunch et al., 2021).

In the conclusion of the above article, which was the result of the joint work of a team of 21 experts, it is noted that this explosion could not have been the result of a direct impact of an asteroid or meteor, because there is no impact crater at the site of the incident, but the blast wave caused by a celestial body such as a meteorite. They believe that Tall el-Hammam is the same as Sodom, or the city of the people of Lūt, which according to the narrations of the Bible was subject to the wrath of God due to the immoral actions of its inhabitants. Regarding this proposed airburst, an eyewitness description of this 3600-year-old catastrophic event may have been passed down as an oral tradition that eventually became the written biblical account about the destruction of Sodom. There are no known ancient writings or books of the Bible, other than Genesis, that describe what could be construed as the destruction of a city by an airburst/impact event (Bunch et al., 2021).

Bunch et al. did not mention anything from the Qur'an and its narrative about the destruction of Lūt's people and they were satisfied only with the report of Genesis, however as it was mentioned in the section discussing about the word *ṣayḥah* in the Qur'an, one of the tribes that was punished by *ṣayḥah* (which one of the possible examples of that is a shock wave), is the people of Lūt. The remarkable point here is that for the punishment of Lūt's people in the Qur'an, the word *ṣayḥah* (Q. 15:73) and a rain of stones (Q. 7:84; 26:173; 27:58) and a kind of earthquake (Q. 11:82; 15:74), are used together, which, considering all these, makes Qur'an narrative in good agreement with the findings of archaeologists in the mentioned report. It is worth noting that by studying the mentioned article and its archeological reports, it is possible to consider Thamūd tribe as another possible example for this archeological finding as well, because the 5-story fortified palaces mentioned in the article are similar to the Thamūd tribe buildings in the heart of the mountains (Q. 7:84; 15:82; 26:149). Also using the term *ṣayḥah* with more emphasis (five times) about the punishment of the people of Thamūd in the Qur'an, makes this tribe another noteworthy possible example for the reported incident.

4. Conclusion

By examining the word *ṣayḥah* in dictionaries as well as its uses in the Qur'an as one of the types of divine punishments of previous nations, a possible suggestion was made based on new scientific developments in today's world as a scientific interpretation of the verses containing the punishment of *ṣayḥah*. In this research, it was determined that the tribes that were destroyed in the past due to the punishment of *ṣayḥah* (mentioned in the Qur'an) were four tribes; The people of Thamūd, the people of Madyan (Shu'ayb), the people of Lūṭ and the people of the village (Antioch). According to the characteristics of the word *ṣayḥah* and its similarity with the sound wave (a type of pressure wave), the possibility that the shock wave (a type of sound waves) can be one of the possible examples of the punishment of *ṣayḥah* in the Qur'an was studied. With the scientific investigation of the shock wave and the physics related to it, it was found that the shock waves together with creating a very loud sound have the ability to destroy a lot (in cases where the source of the shock wave has a lot of energy). It was also shown that these destructions are not limited to the destruction of objects and have the power to cause fatal injuries to humans. An example of these severe destructions, the shock waves created by a meteorite on the surface of the earth, which was recently discovered by archaeologists, was investigated and given as evidence for the content presented in the text. Finally, since the purpose of scientific interpretation is to employ different sciences for a better understanding of the verses of the Qur'an, in this research, an attempt was made to provide a step in this direction to create new openings for a more concrete understanding of the verses of the punishment of *ṣayḥah*.

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