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The Role of Uplifted Mountains in the Hydrological Cycle: A Linguistic, Exegetical, and Geological Analysis of Qur'an 77:27

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ABSTRACT:

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The Holy Qur'an is a guide for humanity toward felicity in all eras, and at the same time, it contains precise scientific indications intended to guide scholars. This study, using a descriptive-analytical method and drawing upon library-based sources, examines one such scientific indication in verse 27 of Sura al-Mursalāt. This verse addresses the conditions and characteristics of water storage in elevated mountains for the benefit of human populations dwelling in foothills and plains. The data collected for this study were categorized into two groups: Qur'anic and scientific. The Qur'anic data were extracted from both classical and contemporary exegetical sources, while the scientific data were derived from academic articles in the fields of geography and geology. In the first step, five key terms—*jaʿalnā*, *rawāsī*, *shāmikhāt*, *asqaynākum*, and *furāt*—were subjected to etymological and semantic analysis. In the second step, scientific findings were compared with these exegetical insights. The results indicate that the Qur'an in this verse alludes to the hydrological cycle, specifically the movement of water from high elevations on the Earth's surface toward foothills and plains. Scientific findings clarify the significance of God's designation of "uplifted mountains" as the primary source of water for humanity. This significance lies in two main aspects: first, such mountains have a higher capacity than plains for receiving precipitation—especially in

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the form of snow—which is generally more voluminous and less polluted; second, these mountains are more capable of storing water, enhancing its quality, and conveying it through surface and subterranean channels to consumer ecosystems, including vegetation, wildlife, and human settlements. In the absence of towering mountains, the global water cycle would be deficient and limited primarily to coastal regions. The results also indicated that the phrase *rawāsī shāmikhāt* reflects the Qur'an's explicit reference to a remarkable scientific fact: the gradual growth of mountains. This progressive uplift is today corroborated by findings from geology and geodesy in the major mountain ranges of the world.

KEYWORDS: The Qur'an and Geology, Scientific interpretation, Mountains in the Qur'an, *Rawāsī Shāmikhāt*.

1. Introduction

In addition to its guiding mission, the Holy Qur'an has a phenomenological perspective on nature. Throughout this book, natural elements such as the sky, earth, wind, rain, trees, and especially mountains are introduced not simply as creatures but as signs of creation and bearers of meaning, wisdom, and signs worthy of contemplation. Mountains have a special place in this conceptual system, and nearly thirty verses refer to them. One of the verses that concisely and rhetorically discusses the role of mountains in the natural and vital system of man is verse Q. 77:27:

وَ جَعَلْنا فيها رَواسِيَ شامِخاتٍ وَ أَسْقَيْناكُمْ ماءً فُراتا (المرسلات/27)

And set in it lofty [and] firm mountains, and given you agreeable water to drink (Q. 77:27).

This verse discusses, on the one hand, the geological structure of the mountains, and on the other hand, the quality and method of water supply. It places two essential elements, including high mountains and fresh water, side by side in a rhetorical connection. The syntactic composition of this verse and its conceptual order suggest the possibility that there is a purposeful connection between the creation of mountains and the provision of drinking water for humans. The use of verbs such as *jaʿalnā* and *asqaynākum* alongside the two terms *rawāsī shāmikhāt* and *māʾan furātan* shows that the Qur'an in this verse uses language that is used not only to describe phenomena, but also to draw a meaningful mechanism between them.

To date, numerous studies have been conducted at the intersection of Qur'anic exegesis and the natural sciences to elucidate the relationship between Qur'anic statements and contemporary scientific findings. For

example, Barati (2022) directly provided a scientific interpretation of the motion and role of mountains in his reading of verse Q. 27:88, attempting to offer a geoscientific reading of mountainous terminology in the Qur'anic text. In parallel, Shojaie and Mazaheri Tehrani (2022), in a broader study, examined how the Qur'anic account of the creation of the cosmos corresponds with scientific models and demonstrated that interdisciplinary approaches can open new horizons for understanding religious texts. Likewise, the research by Zare et al. (2023) provides an example of using scientific Qur'anic exegesis to reinterpret Qur'anic injunctions and recommendations concerning public-health and environmental issues. Despite the extensive literature on scientific interpretation of the Qur'an, many verses — such as Q. 77:27 — have received relatively little detailed scientific and exegetical attention. The present study aims to fill this scholarly gap.

The main question of this research is how the relationship between high mountains and the supply of fresh water is analyzed in verse Q. 77:27, in the light of contemporary scientific data and Qur'anic interpretations. To answer this question, this article examines five key words of the verse using an interdisciplinary and analytical approach: *jaʿalnā*, *rawāsī*, *shāmikhāt*, *asqaynākum*, and *furāt.* These words are analyzed from a lexical and exegetical perspective, as well as from a geological, meteorological, and geographical perspective, to show how the Qur'an, with its specific linguistic structure, expresses concepts that are aligned with the natural mechanisms of the creation system—especially the water cycle in mountains. This research aims to draw an example of the conceptual harmony of the text of revelation with the system of nature, through an interpretive and scientific analysis of the verse, in order to demonstrate the capacity of the language of revelation in reflecting the complex systems of creation.

2. Methodology

The current research method is descriptive-analytic, using library resources. The data for this research were prepared in two categories: Qur'anic and scientific—the first from thirteen new and old exegetical sources, and the second from scientific sources in geography, climatology, and geology. In the first step, the explanations of the lexicographers and exegetes regarding the five key words of the verse were examined and summarized in tables based on meaning, interpretation, and source. In the second step, an attempt was made to compare the definite findings of geographers, climatologists, and geologists with the meanings of words,

phrases, and expressions of the exegetes. For example, some exegetes interpret the verb *jaʿala*, beyond "to put" and "to create," as "to make available." How does this sense relate to the role of mountain heights in the hydrological cycle, from the atmosphere to the ocean? Finally, the study synthesizes linguistic and scientific evidence to propose a coherent interpretation that assesses whether the Qur'anic language plausibly reflects observed geological and hydrological processes.

3. Findings and Discussion

In this section, the words and phrases of the verse will be examined in sequence. Each term will first be analyzed from linguistic and exegetical perspectives, followed by a scientific analysis in the second part of each subsection.

3.1. Jaʿalnā

3.1.1. Lexical and Interpretive Analysis

Al-Rāghib al-Iṣfahānī (1991) considers *jaʿala* to be a general term that is broader than *faʿala* and *ṣanaʿa*, as well as other related synonyms. The first meaning that al-Farāhīdī (1988) mentions for this verb is *ṣanaʿa*, which means "to make." Muṣṭafawī (1989) states that the sense of making is only realized when it is applied in relation to the effects, concomitants, or properties of creation and those notions close to it — that is, in senses that are subsequent to notions of "creation" and "origin." Accordingly, the essential meaning of *jaʿala* is proximate to "adjusting to certain measurements" and "rendering something into a particular state after creation and formation. The scientific section will examine what measurable parameters and strategies regarding mountains are recognized today. Bostani Afram (1996) believes that in the word *jaʿalnā*, the subject of the verb is "God" (*Allāh*), and he mentions the meanings "he took" and "he began." Qayyim (1981) provides the meaning "to place something within someone's reach; to place it near them." Given the apparent relationship between the verb *jaʿalnā* and mountains, the scientific section will examine whether mountains, according to modern science, make water accessible and available to humans.

3.1.2. Scientific Analysis

It appears that in the verse under consideration, the concept of "making available and close" refers not to atmospheric precipitation or water directly, but rather to mountains themselves. In other words, based on current

scientific understanding, in most regions of the world, human access to mountains is essential for access to fresh and sustainable water resources. In this regard, the atmospheric altitude at which raindrops form is several kilometers above sea level and the surface of flat lands and plains (Ahrens 2009). Therefore, as these droplets descend, they frequently coalesce along their path, growing larger; their fall speed also increases. Under these conditions, we envision the concept of "falling" in relation to raindrops over plains. However, in mountainous areas—especially elevated peaks that sometimes reach half or even two-thirds of that atmospheric height—this is not considered "falling." At such altitudes, droplets and even snowflakes are smaller, descending slowly and actually settling on the slopes of the mountains. Upon penetrating the mountain ranges, this precipitation becomes available to downstream populations in the form of springs, rivers, and even recharged aquifers and wells.

3.2. Rawāsī

3.2.1. Lexical and Interpretive Analysis

The word *rawāsī* has been interpreted by some scholars as meaning "stable" and "steadfast" as shown in table 1. Others have conveyed the same meaning using analogies such as an anchor for a ship (Qayyim 1981). In other words, the dominant interpretive idea is that *rawāsī* refers to something fixed, whether it be mountains themselves or a mechanism for stabilizing a moving entity—such as an anchor stabilizing a ship.

Table 1. Lexical and exegetical meaning of the Qur'anic term rawāsī

Meaning	Reference
Rawāsī derives from the root R-S-W, which denotes firmness and stability.	Ibn Fāris 1984
The verb *rasā, yarsū* means to be fixed, stable, or firm.	Al-Rāghib 1991; Ibn Manẓūr 1994
Mirsāt refers to a ship's anchor that is tied with a rope and keeps the ship immobile in the water.	Al-Farāhīdī 1988; Ibn Manẓūr 1994
Rāsīyah means anchored	Qayyim 1981
Rawāsī is applied to firm and stable things, but due to frequent Qur'anic usage, it has become predominantly associated with mountains.	Abū Ḥayyān 1999; Ibn ʿĀshūr 1999; al-Mughniyyah 2003
Rawāsī refers to firm and stable mountains.	al-Ṭūsī 2010.; al-Ṭabrisī 1993; Tabataba'i 1996; Abū Ḥayyān 1999; Abū ʿUbaydah 1961; Ibn Maʿrūf n.d.

3.2.2. Scientific Analysis

According to geological findings, mountains—especially high mountain ranges—have been forming and moving slowly on the Earth's mantle since the Earth's crust cooled atop the molten mantle. The speed of this movement for different mountain ranges varies from a few millimeters to a few centimeters per year (Mohajjal 2012). This speed is influenced by the velocity of the tectonic plates on either side of the mountain range. For example, Scotese (2015) estimates the displacement rate of the Nazca–India plate to be more than 5 mm per year. Therefore, the meaning of "steadfast" for mountains is more accurate than the meaning of "fixed." If the commentators intend by "fixed" something firm and stable—even if it undergoes movement—then there is no contradiction with scientific knowledge.

3.3. Shāmikhāt

3.3.1. Lexical and Interpretive Analysis

Ibn Maʿrūf (n.d.) and al-Ṭūsī (2010) interpret *shāmikhāt* as "high," and *shamakha* as "lifting," respectively (see Table 2). Meanwhile, Samarra'i (2016) considers *shāmikhāt* to be related to *rawāsī*, but, in line with other similar expressions in the Qur'an, he proposes a different meaning. The interpretation he offers is worthy of reflection in the field of geological sciences and geodesy as we will see below.

Table 2. Lexical and exegetical analysis of the Qur'anic term shāmikhāt

Meaning	Reference
Shāmikh means tall, and *shawāmikh* is the plural form meaning elevated ones.	Ibn Maʿrūf n.d.
Shamakha means to raise one's nose out of arrogance.	Al-Ṭūsī 2010; Ibn Fāris 1984
Shāmikhāt is the sound plural of *shāmikh* and may convey a sense of emergence or becoming	Samarra'i 2016
The phrase *rawāsī Shāmikhāt* conveys meanings of ambiguity, specification, and magnification.	Al-Qummī al-Mashhadī 1745; al-Bayḍāwī 1292; al-Zamakhsharī 1986; al-Ālūsī 1994; al-Mazhari 2004

After examining the terms *rawāsī* and *shāmikhāt* individually, we now turn to the analysis of these two terms in combination. In the use of the phrase *rawāsī shāmikhāt*, important syntactic and morphological points can be seen, which we discuss.

Shāmikhāt is the sound plural of *shāmikh* and an attributive adjective, while *rawāsī* is a broken plural. Samarra'i (2016) observes that the sound

plural may convey a sense of emergence or becoming (*hudūth*), whereas the broken plural may evoke a sense of permanence (*thubūt*). Accordingly, the broken plural in the word *rawāsī* appears to indicate that the mountains possessed the attribute of firmness from the outset of creation (despite scientific findings that they were initially small), whereas *shāmikhāt*, being a sound plural, implies the attribute of height is of later occurrence. In other words, the mountains were not erected at the moment of their creation but gradually acquired an erectness. Another Qur'anic example cited by Samarra'i (2016) is the phrase *wa qudūr rāsīyāt*, meaning fixed cauldrons in Q. 34:13. The sound plural *rāsīyāt* similarly implies that the cauldrons were first manufactured in workshops and afterward fixed in place on the ground — that is, they were not fixed from the outset. In other words, the phrase *rawāsī shāmikhāt* could have appeared in the following alternative forms, each carrying meanings different from those currently held in geological science:

- *Rawāsī shawāmikh*: mountains that were mountains and were lofty from the very beginning, so that no sense of gradualness applies either to their being mountains or to their height. Geological science does not accept this and regards mountainousness as a property that developed gradually.
- *Rāsīyāt shāmikhāt*: mountains that were initially neither mountains nor lofty, with the properties of being mountains and being tall gradually coming to them. Geological science also rejects this sense, distinguishing mountains (regardless of their height) by their lithologic character (rock) from other surface prominences such as sand dunes. Today, on Iran's Makran coast and along the continuation of the Zagros range, small peaks resembling an infant's canines are observable. In other words, sand dunes do not gradually become mountains, and a sand dune — even if taller than a mountain — is not called a mountain.
- *Rāsīyāt shawāmikh*: elevations that were lofty from the outset but gradually became mountains. The implausibility of this meaning is even clearer compared with the two preceding meanings.

Another important point regarding this phrase is whether *rawāsī shāmikhāt* is definite (*maʿrifah*) or indefinite (*nakirah*). It is indefinite which implies several possible meanings:

- Implying obscurity/unknownhood (al-Qummī al-Mashhadī 1989; al-Bayḍāwī 1997): that is, there are things in these mountains that remain obscure and unknown to us.
- Implying differentiation—a part of the whole (al-Zamakhsharī 2007):

meaning not all the mountains on earth but some particular mountains are uplifted.

- Implying grandeur and elevation (al-Ālūsī 1994; al-Qummī al-Mashhadī 1989; al-Bayḍāwī 1997). Al-Mazhari (2004) states that it depicts the massiveness and greatness of the mountains. Especially when a non-rational adjective is used in the plural, it tends to convey a sense of emphasis.

3.3.2. Scientific Analysis

We now turn to geological research regarding the uplift of mountains. Scientific studies confirm the concept of gradual elevation. Burbank (1992) describes the synergy between climatic and tectonic forces in mountain uplift, particularly in active zones such as the Himalayas. Global examples include: The uplift of the European Alps at a rate of 1 to 2.5 mm per year (Sternai et al. 2019), and the increasing elevation of the Colorado Plateau along the western edge of the Rocky Mountains in North America (Karlstrom et al. 2012). Iranian examples include: Uplift in the Eastern and Northeastern Alborz (Hollingsworth et al. 2010), especially in the Central Alborz (Ballato et al. 2008) (see Figure 1).

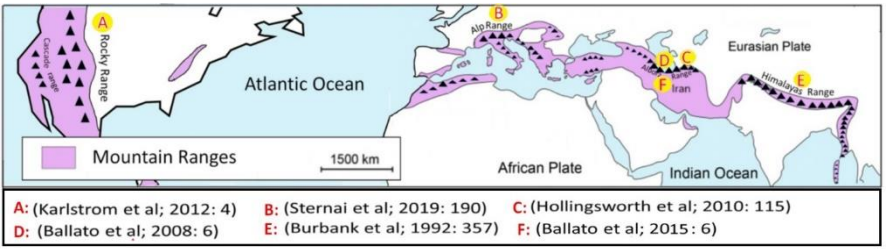

Figure 1. Gradual uplift of mountain ranges in the world

The elevation and loftiness of mountains, in connection with the water flowing from them, becomes significant from several perspectives. High mountain ranges—especially those situated along the paths of rain-bearing winds—receive greater amounts of atmospheric precipitation. Essentially, mountains are considered "water towers" in nature (Sadeghi 2002). The lofty Tibetan Plateau, situated between the borders of China and India, has been designated as the "Water Tower of the World" (Daming et al. 2004), with an elevation exceeding 8,000 meters. Many of the world's great rivers originate from this exalted mountain system. The greater height of mountain ranges enables them to access higher cloud layers that contain crystals and granules of ice and snow. According to the research of Mahmoodi and Maleki (2001), in the high mountains of western Iran—which are primarily

composed of dolomitic limestone, known as karst—the higher such rocks are situated along the slopes of these mountains, the more precipitation (and storage) they receive. In the research area of their study, namely the Bisotun and Paraw mountains, numerous karstic depressions exist, each of which constitutes a small watershed. The area of these enclosed depressions is about 80 square kilometers. At these elevations, much of the atmospheric precipitation occurs in the form of snow, with evaporation being nearly negligible. As a result, most precipitation infiltrates into the ground and is stored. In general, precipitation received in highlands is characterized by the following features.

It is colder, and the lower temperature provides the condition for an increase in dissolved oxygen in the precipitation. Physical pollutants such as dust, chemical pollutants such as industrial contaminants, and even microbial pollutants are reduced at higher elevations. However, raindrops in the lower layers of the atmosphere and above certain industrial regions can undergo changes in pH, becoming acidic, with their pH falling below 5 units (Saeediyan 2023). Likewise, in certain rocky and wave-battered coasts, raindrops can experience an increase in salinity. At higher elevations, precipitation is mostly in the form of snow, which—unlike rain—does not flow rapidly. Rather, it melts gradually, allowing more opportunity for infiltration into the mountain body.

3.4. Asqaynākum

3.4.1. Lexical and Exegetical Analysis

Table (3) presents the meanings provided by lexicographers and exegetes for the term *saqy*. Most of the meanings revolve around the axes of "giving to drink," "irrigation," and "providing water." Among these, and in relation to the findings of modern science, the broader semantic scope of "provision of water" as given by al-Fīrūzābādī (1995) and Ṣāḥib ibn ʿAbbād (1993) is especially notable.

Table 3. Lexical and exegetical meaning of the Qur'anic Term saqy

Meaning	Source
To quench thirst; bless (*barakah*)	Al-Jawāhirī 1984; Ibn Maʿrūf n.d.
Irrigation and watering	Qayyim 1981
To provide water for someone	Al-Fīrūzābādī 1995
To provide water and to draw water from a well	Ṣāḥib ibn ʿAbbād 1994

Concerning the term *saqy*, some significant point should be taken into account. Ordinarily, *siqāyah* (giving to drink) imply "water coming from some place toward the drinker." The Qur'an, in Q. 16:66, also employs the verb *saqā* for the act of making milk drinkable from the bellies of livestock: "[God] gives you to drink pure milk from what is in their bellies, between excrement and blood." One of the implications of drinking liquids such as water is that the container or reservoir must be positioned higher. In the traditions, drinking water in the manner of animals—that is, by immersing the head into a container or into a pond—has been prohibited; rather, it is recommended to draw water and raise the cup toward the mouth. Furthermore, if the Qur'anic concept of "giving to drink" is taken in the sense of "providing," the Qur'an repeatedly mentions the provision of water for humans and livestock with the phrase *wa anzalnā min al-samāʾ* (and We sent down from the sky). The one who performs *siqāyah* must necessarily have placed the water beforehand in a suitable container for storage, which—traditionally associated with the verbal noun *siqāyah*—was usually a waterskin. Related to this sense, al-Farāhīdī (1988) defined *al-siqāʾ* as a waterskin for [storing] water and milk.

3.4.2. Scientific Analysis

The term *saqy* in relation to elevated mountains can be understood in two dimensions. The first dimension is the descent of atmospheric precipitation from above the sky and onto the mountains, leading to infiltration. This dimension does not mean "to give water," but rather "to prepare and provide water" for drinking. This interpretation accords with Muṣṭafawī's (1989) explanation of Q. 28:23. The second dimension is the meaning of "watering and irrigation." This understanding corresponds with Qayyim's (1981) interpretation of *saqy*. Watering becomes easy and low-cost for the beneficiary—whether human or plant—when the water reservoir is located at a higher elevation, so that, in accordance with the principle of hydrostatic balance, the water within pipes and channels flows and circulates under sufficient pressure.

In Iran, (mountainous) aquifers within hard carbonate formations of the karstic limestone masses of the Zagros, Alborz, Kopet Dagh, Central Iran, and the coastal region of Fars are of great importance with respect to freshwater reserves. Karstic domains are significant even in southern Iran for their freshwater resources (Eshqi & Servati 2003). Figure (2) illustrates the body of the Moro Mountains in Azerbaijan, Iran. The highest part of this mountain system is its central section. The storage capacity of this catchment-dominant section—depicted in dark blue—has brought about the emergence of numerous springs, generally of the same level, in the lower

terraces shown in lighter blue, thereby supplying the villages and farmlands of the foothills. It is as if these blue circles represent the multiple openings of this lofty mountain which vividly perform the function of *asqaynākum*.

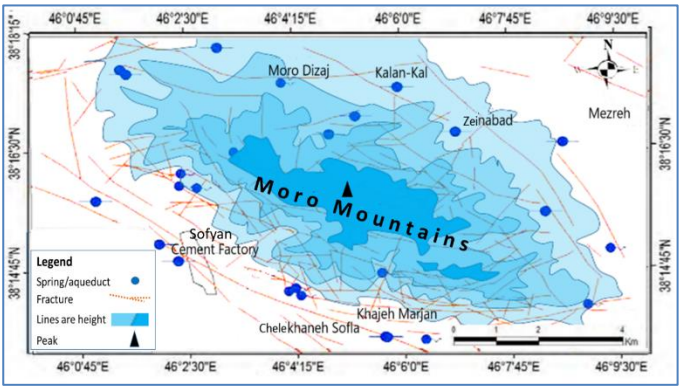

Figure 2. The link between mountain heights, water absorption, and the emergence of springs on the slopes of Moro Mountain in Azerbaijan

The natural rule for potable mountain springs is that their reservoir must be located at a higher elevation. The consequences of this higher location are twofold: The spring water, in any of the four forms—gushing, bubbling, cascading, or overflowing—persists simultaneously, or at least is replenished after withdrawal. The water becomes easily accessible to drinkers—whether plants, animals, or humans—who are generally situated downstream. This corresponds closely with the definition given by al-Fīrūzābādī (1995) for *al-isqāʾ*: "to provide a stream or water for someone." Ṣāḥib ibn ʿAbbād (1993) defines *al-isqāʾ* as "provision of water" in contrast with *al-istiqāʾ*, which denotes "drawing water from a well."

As noted above, the word *al-siqāʾ* derived from the same root, originally denotes a waterskin used to store water and then make it available to users. From this perspective, one may say that uplifted mountain ranges (*rawāsī shāmikhāt*), which serve as reservoirs and make water accessible, resemble a waterskin. In every land, rainfall during the wet season descends upon the mountains and is stored in their permeable formations such as sedimentary strata. During the rest of the year, it issues gradually from the mouths of springs—like the mouths of a waterskin—continuing onward as streams and then rivers. Concerning the feature of permanent access to water, al-Rāghib (1996) explains *al-isqāʾ* as the provision of water in such a manner that a person can use it whenever they wish. Figure (3) illustrates the extent to which the body of mountain ranges resembles a waterskin along with their aquifers and water-bearing strata.

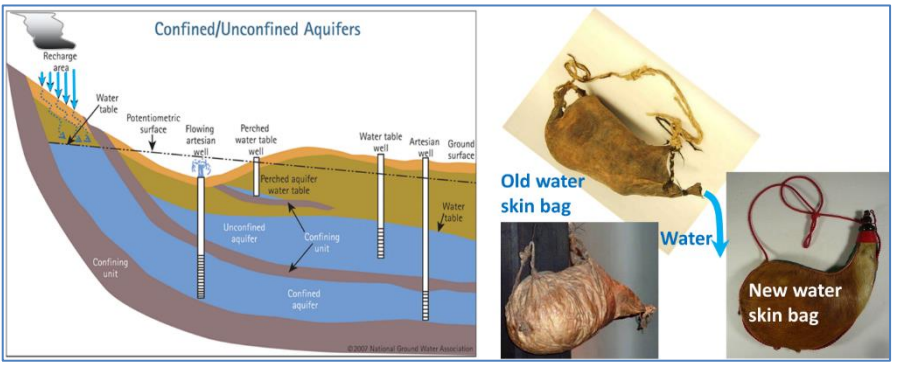

Figure 3. Similarity of the waterskin with the recharge profile of groundwater aquifers on the slopes of mountains from atmospheric precipitation

This similarity can be examined from various perspectives. The water inside a waterskin remains in a state of calm. In other words, the forms of falling, flowing, and torrenting water—descending from the sky, running through valleys, penetrating mountain bodies, and settling within sedimentary formations—are transformed, according to the slope of the aquifer, into a very slow movement. Through field research and interviews with elderly experiencers regarding the relationship between the quality of water and the environment of the waterskin, it was confirmed that the water inside the waterskin gradually improves in terms of both temperature and even palatability. In a clay jug containing water, mineral substances such as gypsum migrate to the outer surface, forming a white layer that gradually covers the external wall, which must be scrubbed off from time to time. Similarly, the water moving within the aquiferous layers of mountains improves in quality through the slow dissolution of beneficial elements and compounds. It should be noted that stones such as gypsum and salt, which can render water hard and saline, due to their greater solubility compared to other beneficial or neutral compounds, have been washed away from highlands over millions of years and carried into basins and deserts. For example, the accumulation of gypsum and salt deposits in Iran today—related to hot and arid climates in the past—appears in the form of domes, saline lakes, and deserts in the lowlands of central Iran, such as Lake Namak and Howz-e Soltān, as well as in the Khuzestan plain.

The water inside a waterskin, during its normal period of use, is secure from evaporation; likewise, water infiltrated into the body of mountains is entirely protected from the interference of evaporative processes. For this reason, one of the most significant criticisms leveled today against dam construction in countries with hot and arid climates, such as Iran, is the evaporation capacity of up to 3,000 millimeters per year from the surface of

reservoirs behind dams—amounting to a loss of three million cubic meters of water annually (Sedaghat 2000). Just as a waterskin has an opening, so too the stored waters within the bodies of mountains emerge through four types of springs—gushing, boiling up, trickling, and overflowing—thus providing access for every thirsty creature and every beneficiary.

Moreover, *siqāyah* (the act of offering water to drink) entails prior will and consent. This feature becomes apparent when comparing the condition of "utilizing water from mountain springs and streams" with that of "utilizing water from wells or desalination facilities by the seashore." It is as though springs and streams are open and expansive tables, inviting every passerby from afar toward themselves. By contrast, wells and similar installations remind one that humankind, through the exertion of labor and expenditure, has excavated them in order to raise water to the surface via various stages of temperature and pressure adjustment, or to render it suitable for use. Accordingly, every applicant for the utilization of such resources must bear costs or, at the very least, obtain permission.

3.5. Māʾan Furātan

3.5.1. Lexical and exegetical analysis

Muṣṭafawī (1989) considered *furāt* a noun, arguing that in the Qur'an this term appears in contrast to *uǰāǰ*. Most of the lexicons have interpreted this word as the Arabic expression *māʾ ʿadhb* which means fresh water (al-Farāhīdī 1988; Ibn Durayd 1988; Ibn Fāris 1984; al-Jawharī 1984; al-Rāghib 1991; Ibn Manẓūr 1994; al-Fīrūzābādī 1995; Ṣāḥib ibn ʿAbbād 1993; Qayyim 1981).

3.5.2. Scientific Analysis

Slope, elevation, and rock fractures are three influential factors in the formation of springs, such that most springs occur within a distance of less than 300 meters from fracture zones (Vafadar et al. 2015). For example, the Shemshak Formation in the body of Mount Moro, consisting of alternating layers of limestone and sandstone, contains the greatest abundance of springs. The next highest abundance of springs is found in alluvial terraces at the foothills, which are fed by units of hard formations. It should be noted that the variation in spring water is less than that of surface waters (Solaimani et al. 2013), and this may be one of the reasons for their palatability. In this regard, the change in well water—from fresh to saline, and then from saline to bitter—occurs with the depletion of fresh water reserves and the reaching of the cone of depression to the saline aquifer at

deeper levels. In mineral springs, various elements are found. For instance, in the Garab Spring (Haji Hashemi et al. 2019), the elements sodium, sulfur, calcium, magnesium, potassium, and silica were present in descending order of abundance.

4. Conclusion

In this study, the exegetical and scientific dimensions of five terms from the verse Q. 77:27—*jaʿalnā*, *rawāsī*, *shāmikhāt*, *asqaynākum*, and *furāt*—were analyzed and explicated. Based on the most recent findings in the sciences of geography, climatology, and geology, it was demonstrated that the elevation and height of mountains make infiltrated precipitation available to all plant, animal, and human communities downstream; this corresponds to the meaning of "making accessible" inherent in *jaʿala*. Numerous geological studies indicate the gradual uplift of mountains over several million years since their formation. Considering that the sound plural in Arabic can convey a sense of emergence or becoming, in the phrase *rawāsī shamikhāt* the use of the sound plural in the adjective *shamikhāt* for mountains may indicate the Qur'anic reference to the gradual growth of the mountains. The aquiferous layers within mountain bodies—regarding their form, capacity, increase of beneficial minerals, and the mechanisms of springs and water-yielding rivers—correspond to the semantic dimensions inherent in the root *saqy*. The purity and sweetness of most springs and rivers originating from highlands—due to their being free of saline compounds such as salt, heavy elements such as lead, and pollutants of chemical or microbial origin; as well as their possession of dissolved oxygen and generally low temperature—give meaning to the Qur'anic expression *māʾan furātan*.

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References

Abū Ḥayyān, M. (1999). *Al-Baḥr al-Muḥīṭ fī al-Tafsīr*, Beirut: Dār al-Fikr.

Abū ʿUbaydah, M. (1961). *Majāz al-Qurʾān*. Cairo: Maktabah al-Khānijī.

Ahrens, C. D. (2009). *Meteorology Today: An Introduction to Weather*, Climate, *and the Environment*. Brooks/Cole Pub.

Al-Ālūsī, M. (1994). *Rūḥ al-Maʿānī fī Tafsīr al-Qurʾān al-ʿAẓīm*. Beirut: Dār al-Kutub al-ʿIlmīyyah.

Al-Azharī, M. (2000). *Tahdhīb al-Lughah*. Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī.

Al-Bayḍāwī, ʿA. (1997). *Anwār al-tanzīl wa-asrār al-taʾwīl*. Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī.

Al-Farāhīdī, K. (1988). *Kitāb al-ʿAyn*. Qom: Hijrat.

Al-Fīrūzābādī, M. (1995). *Al-Qāmūs al-Muḥīṭ*. Beirut: Dār al-Kitāb al-ʿIlmīyyah.

Al-Jawharī, I. (1990). *Al-Ṣiḥāḥ, Tāj al-Lughah wa Ṣiḥāḥ al-ʿArabīyyah*. Beirut: Dār al-ʿIlm lil-Malāyīn.

Al-Mazhari, M. (2004). *Tafsīr al-Mazharī.* Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī.

Al-Mughnīyah, M. J. (2003). *Tafsīr al-Kāshif*. Tehran: Dār al-Kutub al-Islāmīyah.

Al-Qummī al-Mashhadī, M. (1989). *Kanz al-Daqāʾiq wa Baḥr al-Gharāʾib*. Tehran: Ministry of Culture and Islamic Guidance.

Al-Rāghib al-Iṣfahānī, Ḥ. (1991). *Jāmiʿ al-tafsīr*. Riyadh: Madār al-waṭan al-ʿArabī

Al-Rāġhib al-Iṣfahāniī, Ḥ. (1996). *Mufradāt alfāẓ al-Qurʾān*. Beirut: Dār al-Shāmīyyah.

Al-Ṭabrisī, F. (1993). *Majmaʿ al-Bayān fī Tafsīr al-Qurʾān*. Tehran: Naṣīr Khusru.

Al-Ṭūsī, M. (2010). *Al-Tibyān fī Tafsīr al-Qurʾān*. Beirut: Dār al-Iḥyāʾ al-Turāth al-ʿArabī.

Al-Zamakhsharī, M. (1986). *Al-Kashshāfʿan Ḥaqāʾiq Ghawāmiḍ al-Tanzīl*. Beirut: Dār al-Kitāb al-ʿArabī.

Al-Zamakhsharī, M. (2007). *Muqaddimah al-Adab*. Tehran: University of Tehran Press.

Ballato, P., Landgraf, A., Schildgen, T. F., Stöckli, D. F., Fox, M., Ghassemi, M. R., Strecker, M. R. (2015). The growth of a mountain belt forced by base-level fall: Tectonics and surface processes during the elevation of the Alborz Mountains, North Iran. *Earth and Planetary Science Letters*, 425, 204–218. https://doi.org/10.1016/j.epsl.2015.05.051

Ballato, P., Nowaczyk, N. R., Landgraf, A., Strecker, M. R., Friedrich, A.,

Tabatabaei, S. H. (2008). Tectonic control on sedimentary fancies pattern and sediment accumulation rates in the Miocene foreland basin of the southern Alborz Mountains, northern Iran. *Tectonics*, 27(6). https://doi.org/10.1029/2008tc002278.

Barati, G. (2022). Scientific explanation of mountains movement on verse 88 of Surah al-Naml from the Noble Qur'an. *Journal of Interdisciplinary Qur'anic Studies*, *1*(2). http://dx.doi.org/10.37264/jiqs.v1i2.10

Bostani Afram, F. (1996). *Al-Munjid: Arabic–Persian alphabetical dictionary*. Transl. Mehyar, R. Tehran: Collection of Arabic Cultures.

Burbank, D. (1992). Causes of recent Himalayan uplift deduced from deposited patterns in the Ganges basin. *Nature*, 357, 680–683. https://doi.org/10.1038/357680a0

Daming, H., Wenjuan, Z. & Yan, F. (2004). Research progress of international rivers in China. *J. Geogr. Sci.* 14, 21–28. https://doi.org/10.1007/BF02841103

Eshqi, A. and servati, M. (2003). The Potential Factors of Karst Water Sources Pollution in Karde Basin (Koppet Dag Zone) "Mangement and Prtotection of Karst Water Sources". *Geography and Development*, *1*(2), 149-170. https://doi.org/10.22111/gdij.2003.3820

Haji Hashemi, S. Jahantigh, O. Noedoost, F. (2019). The effect of Gorab saline mineral spring irrigation on photosynthesis, growth and physiology of wheat (Triticum aestivum). *Journal of Plant Process and Function*, 8(32), 157-176.

Hollingsworth, J., Nazari, H., Ritz, J., Salamati, R., Talebian, M., Bahroudi, A., Walker, R. T., Rizza, M., Jackson, J. (2010). Active tectonics of the east Alborz mountains, NE Iran: Rupture of the left-lateral Astaneh fault system during the great 856 A.D. Qumis earthquake. *Journal of Geophysical Research*, 115 (B12). https://doi.org/10.1029/2009jb007185

Ibn ʿĀshūr, M. (1999). *Al-Taḥrīr wa al-Tanwīr*. Beirut: Muʾassasah al-Tārīkh al-ʿArabī.

Ibn Durayd, M. (1988). *Jamharah al-Lughah*. Beirut: Dār al-ʿIlm lil-Malāyīn.

Ibn Fāris, A. (1984). *Muʿjam Maqāyīs al-Lughah*. Qom: Maktab al-Iʿlām al-Islāmī.

Ibn Manẓūr, M. (1994). *Lisān al-ʿArab*. Beirut: Dār al-Fikr.

Ibn Maʿrūf, M. (n.d.). *Kanz al-Lughāt*. Tehran: Maktabah al-Murtazawiyah.

Karlstrom, K.E., Coblentz, D., Dueker, K., Ouimet, W., Kirby, E., Van Wijk, J., Schmandt, B., Kelley, S., Lazear, G., Crossey, L.J., Crow, R., Aslan, A., Darling, A., Aster, R., MacCarthy J., Hansen, S.M., Stachnik, J., Stockli, D.F., Garcia, R.V., Hoffman, M., McKeon, R., Feldman, J., Heizler, M., Donahue, M.S., & the CREST Working Group. (2012). Mantle-driven dynamic uplift of the Rocky Mountains and Colorado Plateau and its surface response: Toward a unified hypothesis. *Lithosphere*, 4(1), 3–22. https://doi.org/10.1130/L150.1

Mahmoodi, F. & Maleki, A. (2001). Karst evolution and its role in groundwater resources in the Bistoun-Parav Mountains, *Physical Geography Research*, 40, 93-105.

Mohajjal, M. (2012). Scientific miracle of the Majid Qur'an about the existence of faults, various parts in the Earth's crust and its surroundings. *The first conference on the miracle of the Qur'an*. Tehran: Shahid Beheshti University.

Muṣṭafawī, Ḥ. (1989). *Al-Taḥqīq fī Kalimāt al-Qur'ān al-Karīm*. Tehran: Ministry of Culture and Islamic Guidance.

Qayyim, A. (1981). *Contemporary Arabic–Persian Dictionary*. Collection of Arabic Dictionaries Press.

Sadeghi, S. R. (2002). The analysis of floods over mountainous areas, *Proceeding of Seminar on Reducing the Effects and Prevention of Floods*, Golestan Province Governor's Office, 134, 43-159.

Saeediyan, H. (2023). A comprehensive overview of the effects of acid rain on different parts of the planet. *Integrated Watershed Management*, 3(1), 72-88. https://doi.org/10.22034/iwm.2023.1995634.1066

Ṣāḥib ibn ʿAbbād, I. (1993). *Al-Muḥīṭ fī al-lughah*. Beirut: ʿĀlam al-Kutub.

Samarra'i, F. S. (2016). *Maʿānī al-abnīyyah fī al-ʿArabīyyah*. Damascus: Dār ʿAmmār.

Scotese, C. R. (2015). Plate Tectonics Driving Mechanisms: Some simple rules that explain why the plates move the way they do. *Technical Report*. https://doi.org/10.13140/2.1.3376.8325

Sedaghat, M. (2000). *Water Resources of Iran*. Tehran, Payam-e-Noor Publishing.

Shojaie, H. and Mazaheri Tehrani, B. (2022). Formation of the Universe from the Viewpoint of the Quran and Science. *Journal of Interdisciplinary Qur'anic Studies*, 1(1), 43-56. https://doi.org/10.37264/jiqs.v1i1.3

Solaimani, K., Zandi, J. & Zandi, S. (2013). Evaluating the Efficiency of Geostatistical Methods for Mapping Spatial Distributions of Springs TDS and PH (Case Study: Mirdeh Watershed, Kurdistan). *Journal of Environmental Studies*, *38*(4). https://doi.org/10.22059/jes.2013.29863

Sternai, P. et al. (2019). Present-day uplift of the European Alps: evaluating mechanisms and models of their relative contributions. *Earth-Science Reviews*, 190, 589–604. https://doi.org/10.1016/j.earscirev.2019.01.005

Tabataba'i, M. H. (1996). *Al-Mīzān fī Tafsīr al-Qurʾān*. Qom: Jāmiʿah Mudarrisīn.

Vafadar, M., Waezi, A., Moayyed, M., Aghaei, V. (2015). Study of the Role of Lithology and Fractures in the Emergence of Springs and Discharge Rate: A Case Study of Moro Mountains in East Azerbaijan, *1st International Congress on Earth, Space and Clean Energy*, Ardabil, University of Mohaghegh Ardabili.

Zare, F., Jaladat, A. M. & Baghbani, M. (2023). Being Awake at Dawn: A Religious Austerity or a Hygienic Recommendation (A Scrutiny Based on the Holy Qur'an, Traditional Persian Medicine and Modern Medicine). *Journal of Interdisciplinary Qur'anic Studies*, 2(1). https://doi.org/10.37264/jiqs.v2i1june2023.12