

An Analysis In The Light Of The Qur'an And From The Perspective Of Physical Geography: Rain

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Abstract—Islamic teachings emphasise the importance of the pursuit of knowledge and encourage its followers to read the book of the universe in all aspects of life and to study the events occurring around them. Therefore, it is vital to relate scientific findings to the Qur'an. In this study, the hydrological cycle, rain/cloud formation and process are examined with a qualitative approach and the data are analysed in terms of Islamic sources and geographical science. The scientific view explains that under the influence of solar energy and gravity, water moves between the lithosphere, hydrosphere and atmosphere, passing through the stages of evaporation, condensation and precipitation. There are verses in the Qur'an that describe/explain the process of water descending from the sky and its vital importance for all living things. As a result, the scientific explanation of the formation stages of clouds/rain, the unchanging truth that the Qur'an said 1400 years ago, is now established with empirical data.

Index Terms— Holy Qur'an, Cloud, Rain, Scientific information.

1. INTRODUCTION

All the works that we can see with the naked eye or observe with scientific instruments in the lithosphere, hydrosphere and atmosphere, such as air, water, soil and minerals, are measured, orderly and perfect activities. The science that deals with this functioning in nature and names these activities is geography. In this context, if unconscious natural elements do conscious work, there must be a hand of knowledge, consciousness and power behind this functioning [41].

Of these elements, water is an extraordinary substance, irreplaceable in many natural and engineering processes due to its unusual properties in many respects. Water participates in the functioning of the climate mechanism in a remarkable variety of ways. On this planet, water is the only chemical compound that naturally exists in three physical states (solid, liquid and vapor). The water cycle is the continuous movement of water through the various components of the Earth's climate system. Indeed, the source of water vapor in the atmosphere is water reservoirs and water on Earth. Atmospheric water vapor is transported over the continents by winds and diffusion. The mass of water on earth is constant and no water molecule can move out of the atmosphere. In other words, water is constantly moving between the lithosphere,

hydrosphere and atmosphere under the influence of solar energy and gravity. This movement of water between the lithosphere, hydrosphere and atmosphere is called the water cycle/hydrological cycle. The water cycle consists of evaporation, condensation and precipitation. The two main parameters of the water cycle are evaporation and precipitation. Precipitation occurs when the amount of condensation water exceeds the capacity of the atmosphere. On the other hand, the precipitation process takes place through the transformation/reconversion of mechanical energies. The water cycle has a high turnover rate; the average residence time of a water molecule in the atmosphere is about 9.2 days. About 90% of water molecules circulate rapidly in the atmosphere, evaporate and precipitate over the world's oceans (Figure 1). Water vapor that is blown inland and settles over the continents takes a more circuitous route back to the oceans and is routed and stored in snowpacks, vegetation, soil, wetlands, lakes or groundwater systems. The water cycle has been going on almost as long as the earth has existed. It is a crucial part of life on Earth [31] [10] [12] [23] [22] [37] [16] [15] [9] [29] [20] [2].

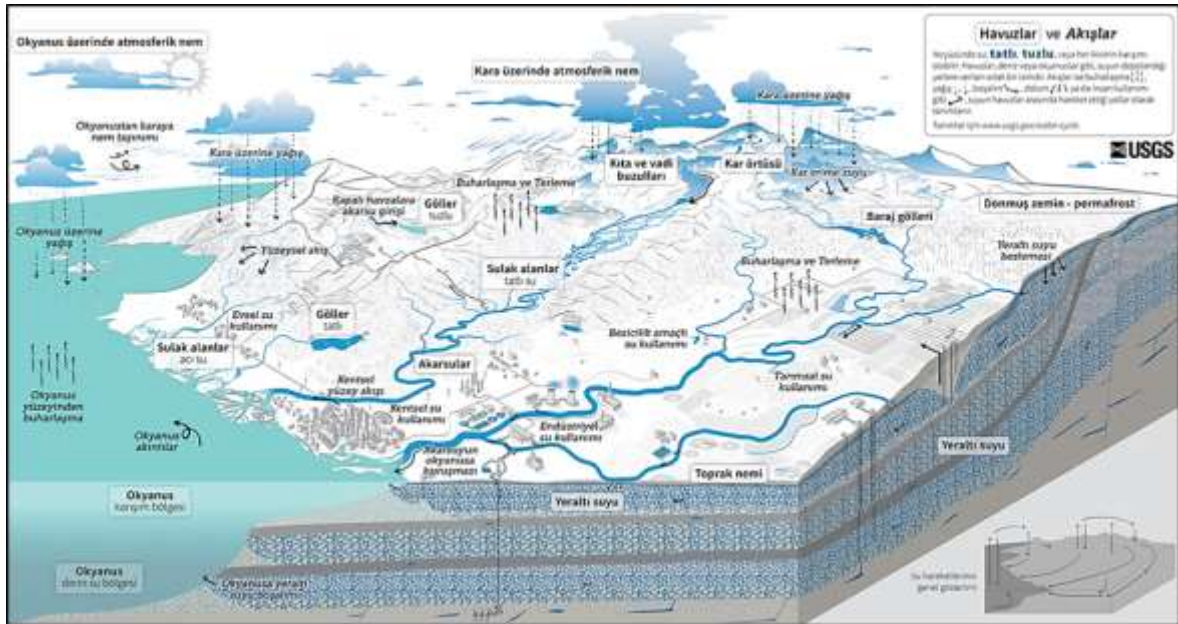


Figure 1: Main processes in the water cycle (U.S. Geological Survey, 2023)

2. PURPOSE AND METHOD

By expressing the belief in Tawheed in almost every surah of the Qur'an, the Qur'an refers to the study of nature and natural laws that will be understood centuries later [27] The Qur'an is full of vast and multifaceted knowledge. This knowledge can be categorized as man's relationship with God, man's relationship with man, and man's relationship with nature. Human research/examination/discovery of nature is almost left to human intelligence and reason [14] [32].

This research was conducted to examine the formation of clouds and rain based on the Qur'anic view as well as the scientific perspective. Thus, the findings of the study will provide a bridge between scientific discoveries and the Qur'an by emphasizing the miraculous nature of the

Qur'an on the axis of cloud and rain formation. The primary aim of this study is to evaluate the Qur'anic verses about rain together with the data of positive science. There is no effort in this study to question the compatibility of Qur'anic verses with science. Because science today only determines the unchangeable truth that the Qur'an announced 1400 years ago with the data it has obtained/observed. However, there is an effort to demonstrate that the data of positive science is an important tool in recognizing nature/universe and understanding the Holy Qur'an.

Qualitative research is a type of research in which qualitative data collection methods such as observation, interview and document analysis are used and perceptions and events are analyzed naturally. In other words, it is an approach that emphasizes investigating and understanding social phenomena in their own environment with an understanding based on theory building. The document analysis method can be used as a stand-alone method in qualitative research depending on the purpose of the research and data sources and includes the examination of different types of documents (texts, documents, etc.) written on the research topic [25] [34] [38]. In this study, national/international literature was utilized to examine the perspective of the Qur'anic verses on rain through a qualitative analysis. The data were analyzed in terms of Islamic sources and geography science. All data were then collected and evaluated descriptively.

3. FINDINGS

According to Mesoamerican culture, the rain god known as Chac was responsible for the formation of clouds and rainfall. The Chinese, on the other hand, believed that dragons could create clouds and rain. According to them, only they could create clouds by exhaling, and the sound of thunder was made by the cry of dragons. These are ancient beliefs of some cultures around the world. Based on these cultures, it is clear that they also believe in other beings who are the organizers who create the clouds and the rain. These beings are normally linked to the creator. However, culture alone is not enough to prove the actual mechanism of the process. Studying the formation of clouds and rain based on the Qur'anic view as well as the scientific perspective will improve the understanding/perspective on cloud and rain formation [29].

The Qur'an is the most important divine guide and source of guidance for mankind. In the 21st century, the dizzying pace of development/change in positive sciences and related technology does not change the fact that it is a source of guidance. There are many verses in the Qur'an that show that the entire ownership and management of the universe belongs to Allah Almighty. Likewise, one of the most striking points in the majority of the verses about rain is the attribution of the act of making it rain to Allah (swt). Allah Almighty is the absolute controller of the rain. His sending the rain is a sign of His divinity. There are different words used for rain in the Qur'an. The number of words used directly for rain is more than twenty. Other words such as mercy and sustenance are also used interchangeably for rain [35] [5].

All living and non-living elements, especially humans, are in constant interaction with water, one of the dynamics of physical geography. The importance of surface waters for flora, fauna, human life and activities is indisputable [42]. It is a prerequisite for the beginning and continuation of life/activity in a region. Therefore, rain is a gift/grace from Allah Almighty. On

the other hand, as mentioned in the passage above, rain, which is of great importance for all living things, including human beings, is mentioned in various verses of the Qur'an, and important information is given about the formation/process/effects of rain. This information, which the people of that time could never have known, shows us that the Qur'an is the word of Allah.

The inclusion of information about positive sciences in the Qur'an has led many scientists to turn to the Qur'an and study it in this direction. As science and technology have developed, the scientific orientation and progress towards the Qur'an has also developed at the same rate. The fact that the Qur'an contains some information about positive sciences does not mean that it is a book of science. The Qur'an is a book of guidance rather than a book of science. The main purpose of the Qur'an is to guide people [6]. For instance, [17, 18] explains the knowledge, will and power behind the rain and clouds by reading the universe and thinking/contemplating as the Qur'an commands by describing the duties and activities of each element in the universe as follows; "The rain contains benefits in the number of its grains and Rahmânî revelations in the number of its mules and wisdoms in the amount of its rays. Moreover, those cute and beautiful and blessed mules are so uniformly and beautifully formed that the hail, especially in the summer season, is sent and descends with such balance and order that the fierce winds, which churn with storms and collide with great things, do not disturb their balance and order; they do not collide with each other and unite the mules and make harmful masses. Of course, this lifeless, unconscious cloud, like discarded cotton, does not know us and does not rush to our rescue on its own, nor does it appear and hide without orders. Perhaps it acts on the command of a very omnipotent and merciful Commander, so that it hides without leaving a trace and suddenly appears and gets to work." Indeed, the scientific approach tries to define every object and event in nature through observation and analysis. However, the religious view, which evaluates the events in the universe in the sense of recognizing the creator/learning his names/knowing the wisdom, introduces the names of Rahim, Rab, Rezzak, Hakim, Kadir, Nazim and other names as the perpetrator of these actions when it can see mercy, compassion, sustenance, wisdom, power, balance and many other actions in the objects given to human service, for example, in water. When these two views are realized together, human beings can rise materially and spiritually [33].

3.1 Downloading of Water from The Sky

The downloading of water from the atmosphere to the earth in the form of precipitation is an event that people observe with the naked eye. It is possible to divide water into three groups according to its location: atmospheric water, surface water and groundwater. The main source of both surface and ground waters is the atmosphere. On the other hand, magma-derived waters are limited and are found only in certain regions of the earth. If there is no atmospheric water and it is not sent to the earth in the form of precipitation, it is not possible to talk about rivers, spring waters, lake and swamp waters, or even sea and ocean waters. The descent of water from the sky is an atmospheric event. There are about 40 verses in the Qur'an about the sending down of water from the sky and the plants coming to life with this water. As will be seen in some of the verse translations below, it is frequently mentioned that water is sent down from the sky. However, the type of water is not mentioned in detail. However, considering that water is in

solid, liquid and gaseous forms, it can be said that it descends in these three forms. As a matter of fact, water descends from the sky in the form of rain, snow and hail [24].

"We send down water from the sky in an appropriate measure and We keep it in the earth. Surely, We are able to remove it" (Surat al-Mu'minoon-18.) **"It is He Who sends down water from the sky in measure. With it We give life to a dead land. That is how you will be resurrected"** (Surat al-Zuhruf - 11th verse - English translation). The oceans make up 71% of the Earth's surface, and solar radiation from them powers the global evaporation process. In fact, 86% of the Earth's evaporation takes place over the oceans, while only 14% takes place over land. Of the total amount of water that evaporates into the atmosphere, only 79% returns to the oceans and 21% returns to land. Surface runoff sends 7% of land-based precipitation back to the ocean to balance evaporation and precipitation processes [21]. In other words, despite the difference in the distribution of land and sea on the earth's surface, the hydrological cycle of water is completed in a continuous balance / within a system to some extent. As a result of this cycle, the continuity of life is ensured for living life.

It is also estimated that the average annual precipitation of the Earth is 1050 millimeters per year/88 mm per month/2.9 millimeters per day. Since it is known that water does not accumulate in the atmosphere, whenever it tries to rain, the amount of water evaporating from the Earth should be equal to the amount of water falling from the sky [21]. Depending on its volume, water moves continuously in a balanced cycle. However, no matter from what height it falls, the average speed of raindrops when they reach the ground is only 8-10 km/hour. This is because of the special form they take. This special form of raindrops increases the frictional effect of the atmosphere and prevents the drops from exceeding a certain speed limit [URL, 4].

"It is He Who sends the winds as good tidings before His mercy. Finally, when the winds bear a heavy cloud, We send it to a dead land. There We send down water and bring forth with it fruits of various kinds. That is how We will bring out the dead. Surely you may draw a lesson from this" (Surah A'râf-57.) The discontinuity surface formed between two air masses different in terms of temperature and humidity is called a front. The disruption of the equilibrium by the air flow caused by the displacement of cold air by warm air creates a cyclonal movement. As a matter of fact, where cold and warm air masses meet during horizontal air movements, frontal convections occur as warm air rises over the cold air [8] [11] (Figure 2). This is a situation that can be observed by everyone as the winds that occur as the air masses approach before almost every precipitation. This is because the violent air movement that occurs in this frontolistic line raises dust particles like a hurricane in an instant, almost as if the rain is saying I am coming. In addition to the fact that people observe/feel this in their normal lives, it is a remarkable detail that scientists know the scientific system behind this event and that Allah, the God, says that we created this event/phenomenon/system/order.

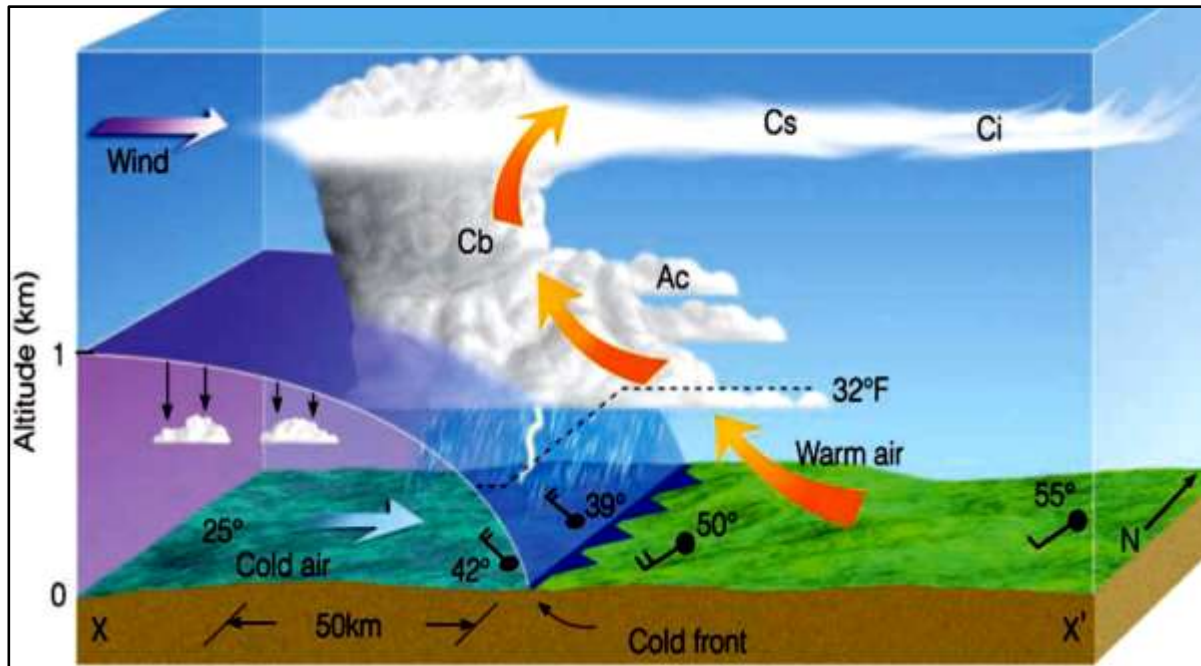


Figure 2: As a result of the air flow (wind) on the facade, the cold/dense air is trapped under the warm air and moves the warm air upwards [1].

As stated in the verse above, the weight of clouds reaches very interesting figures. For example, in the cumulonimbus cloud, which is a heavy and dense cloud with a significant vertical width in the form of a mountain or gigantic towers, water can accumulate in quantities up to 300 thousand tons. It is undoubtedly awe-inspiring that an order has been established in the sky in which a weight of 300,000 tons can stand. In the Holy Qur'an (Surah Nur-43rd verse), the cloud called cumulonimbus cloud in meteorology is likened to mountains, and indeed, when this cloud is examined visually, it is possible to see that it has such an appearance [30] (Figure 3-4). On the other hand, references to the revitalization of arid soils by rainfall point to a process that is the basis of soil fertility and a key factor in growing crops, and thus responsible for sustaining life on Earth [URL, 8].



Figure 3: View of the cumulus cloud [Source; URL, 6].



Figure 4: View of the cumulonimbus cloud [Source; URL, 8].

"It is He Who sends down water from the sky. (He said): "It is with it that We have caused all kinds of plants to grow, and from it We have brought forth a green plant from which We will cause to grow grain after grain, and clusters hanging from the bud of the date-palm, and vineyards, and olive groves and pomegranate groves, similar and dissimilar. Look at the fruit of each of them when it bears fruit and when it is ripe! Surely in all this are signs for a people who believe" (Surat al-An'am-99.) "And your Lord has made for you the earth as a bed and the heavens as a building, and has sent down water from the sky and brought forth therefrom various crops as sustenance for you; so, do not knowingly associate with Him partners and associates" (Surat al-Baqarah: 22nd verse - English Translation). Allah brings forth fruits from the ground as a result of rainwater meeting the soil. So, the whole system of this world depends on rainwater. Dead land comes to life thanks to

rainfall. Roots and seeds under dry soil sprout/green. All kinds of vegetation grow from it. While drought brings death and famine, rain brings life and growth. Despite the construction of huge dams and water distribution channels, rain is still the main source of water for agriculture worldwide. Allah has shown rain as a mercy to mankind and has mentioned it as a justification for submission to Allah's will.

"And We sent the winds as a sower and sent down water from the sky and supplied your need of water with it, and it was not you who stored it" (Surat al-Hijr: 22. Verse 22: English Translation). The verse points out that the first stage in the formation of rain is the winds. The winds inoculate the free water vapor in the air with the particles (aerosols) they carry from the seas and thus enable the formation of rain clouds. Another information about the inoculative aspect of the winds in the verse is the role of winds in the fertilization of plants. Many plants on the earth ensure the continuation of their species by dispersing their pollen through the wind. Winds carry clouds and cause rain to fall. Although artificial rain production has been attempted, there has been little success because the process depends on the presence of moist clouds. In general, scientists have been unsuccessful in producing artificial rain. Some applications have shown that the existing artificial rainfall technique does not have a significant effect in areas with very low rainfall and in the dry season in areas with moderate rainfall.

On the other hand, air modification research has made dramatic advances over the last 40 years. In the U.S.A., while a support of 19 million dollars was made in 1970, this value was 5 million dollars in the 1990s. The biggest support has come from the government's atmosphere modification program. Although this program led to some exciting new production in the field, the program was cancelled in 1995. On the other hand, the Commonwealth Institute of Science and Industry has confirmed in a report that it is impossible to end drought by artificially creating rain and that the success of some experiments depends on the type of cloud targeted and that most cloud types cannot be made to produce rain by artificial means. The second meaning of the verse is that it is impossible for man to store rain indefinitely in the sky or on the earth. Man has large reservoirs of water, but they cannot last forever. The meaning of these verses is this: No one can produce and store rain except Allah. He manages the rain cycle. He provides water for the world [26] [URL, 7] [19].

Today, it is a well-known fact that the world's population is increasing rapidly and the parallel needs are also increasing rapidly. The fact that dams, which are the largest and long-lasting (50-100 years on average) water storage structures that people benefit from today as in the past, have been insufficient to provide drinking/utility water, especially in mega cities, with global climate change in recent years, is a proof that water storage is temporary. Indeed, rain is an important element in sustaining human/living life. This is evidenced by the fact that rain is a source of fresh water for rivers/lakes/groundwater. In addition, rain makes modern life possible by providing water for agriculture, industry and electrical energy.

3.2 Formation of Rain

Rain is water droplets formed by the condensation of water vapor in the atmosphere and falling to the earth as drops larger than 0.5 mm in diameter [8]. The formation of rain takes place in

three stages. 1-The raw material of rain rises into the air. 2-Clouds [24], which are water particles suspended at different altitudes of the atmosphere, are formed. 3-When the clouds encounter a layer of cold air, the water in the cloud condenses and turns into water droplets. When these water droplets are large enough to fall, rain occurs [8].

"It is Allah Who sends the winds to move the clouds. Then He spreads the clouds in the sky as He wills, and sometimes He breaks them into pieces; finally, you see the rain coming out of them. And when He sends it down upon His servants whom He wills, those servants are overwhelmed with joy" (Surat al-Rûm-48th Verse English Translation).

According to verse 48 of Surah Rum above, three stages of the formation of clouds and rain are mentioned Stage 1: **"It is Allah who sends the winds"** ... This can be interpreted as countless air bubbles formed by the foam on the surface of the oceans constantly bursting into the air, causing water particles to be hurled skyward. These salt-rich particles will then be carried by the winds and move into the atmosphere. These particles are also called aerosols and act as water traps. They will gather around the water vapor rising in small droplets from the seas to form clouds. Stage 2: ... **"Then He spreads the clouds in the sky as He wills, and sometimes He breaks them in pieces"**. Clouds are formed by the condensation of water vapor around salt crystals/dust particles in the air. Clouds are suspended in the air and spread across the sky because the water droplets inside them are very small, between 0.01 and 0.02 mm in diameter. So, they cover the sky. Finally, the process moves to the third stage as indicated in the verse ... **"finally you see rain coming out of it"**. The water particles surrounding the salt crystals and dust particles thicken. This causes raindrops to form. The drops, which then become heavier than air, leave the clouds and begin to fall to the ground as rain [29] [URL, 4]. Ultimately, every stage of the formation of rain is described in the Qur'anic verses. As with many natural phenomena in the world, it is the Qur'an that provides the most accurate explanation of this phenomenon and informs people centuries before it was discovered by science. Indeed, the Qur'an describes the stages in the formation of rain in the order in which they occur.

In addition to the information discovered by science about the formation of clouds and rain, the process of formation is the same as that of the Qur'an. Namely, clouds, which are clusters of very small water droplets formed by the condensation of water vapor in the air at high altitudes [13] are seen in different clouds in spring, summer, autumn and winter seasons according to their altitudes and other characteristics in the atmosphere from the ground, but not all of them bring precipitation (Figure 5). However, Stratus clouds cause drizzle, Nimbostratus clouds cause continuous precipitation, Cumulonimbus clouds cause thunderstorms and hailstorms. The water particles that make up fog and clouds combine with each other and become larger. When their diameters exceed 1 mm, they fall to the earth as precipitation. As long as the temperature of the clouds during condensation is above 0 °C, precipitation occurs as rain, and as long as it is below 0 °C, precipitation occurs as snow and hail [24].

Cumulonimbus clouds begin to form when the wind pushes some small cloud fragments (cumulus clouds) into an area where these clouds merge. The small clouds then merge to form a larger cloud. When small clouds come together, the upflows within the larger cloud increase.

The air currents near the centre of the cloud are stronger than those near the edges. These air currents cause the cloud body to grow vertically, so that the cloud stacks on top of each other. This vertical growth causes the cloud body to extend into colder regions of the atmosphere. Here water drops, hail, form and begin to grow as they are pushed. When these water drops and hail become too heavy for the air currents to support, they begin to fall from the cloud as rain, hail, etc. [28].

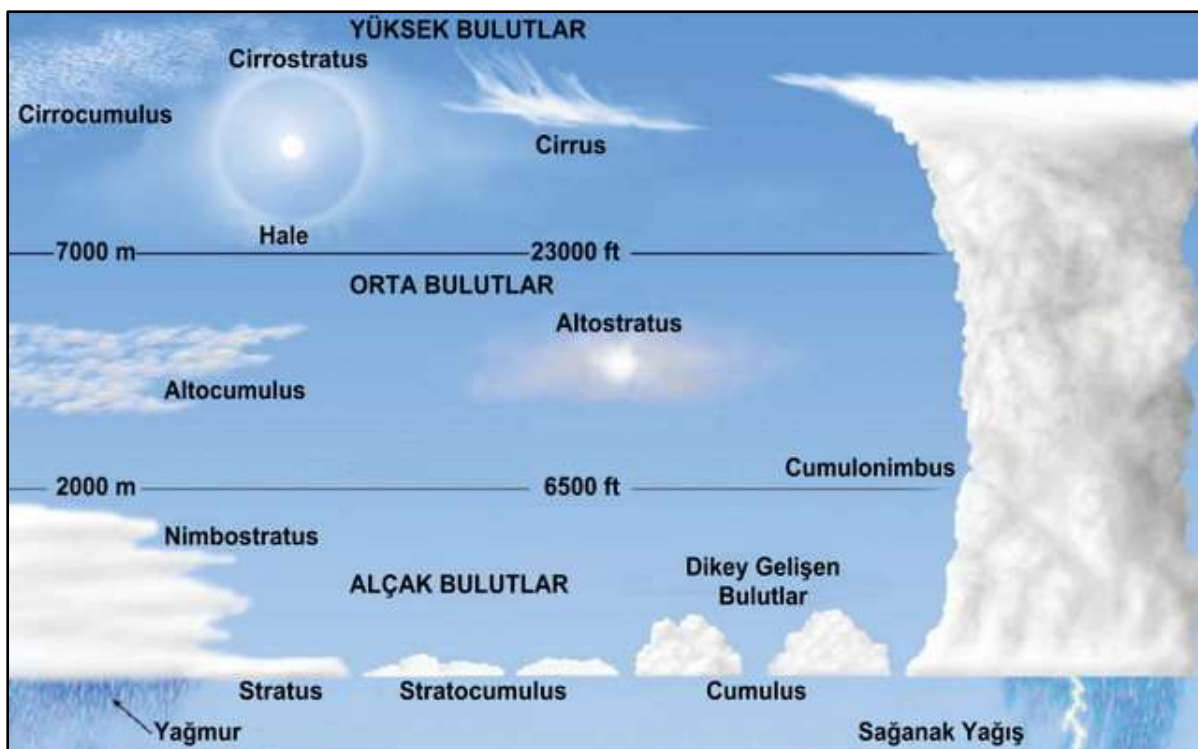


Figure 5: Cloud types [Source: URL, 5]

"Do you not see that Allah causes the clouds to move, then He joins them together, then He causes them to overlap and become a dense mass of clouds? Then you see the lightning flash through the gaps in the clouds, and He sends down hail from the sky, from the mountains of clouds therein, and He causes it to strike whom He wills, and He drives it away from whom He wills, while the brightness of His lightning almost blinds the eyes." (Surat al-Nur-43. Verse English Translation)

According to verse 43 of Surah Nur above, **"Do you not see that Allah moves the clouds"**, which means that the clouds are carried along by the wind. Then, the process moves to the second step. This verse says, **"then He joins them together, then He makes them into a dense mass of clouds, one on top of the other"**. The larger cloud is formed by the gathering together of the smaller cloud, the Cumulus cloud, which is driven by the wind in the first stage. This larger cloud is called a Cumulonimbus cloud. Finally, the process continues until the last stage, called stacking. After the coalescence phase, the upflows within the larger cloud increase. Upflows near the centre of the cloud are stronger than those near the edges. Because these upflows cause the cloud body to grow vertically, the cloud is agglomerated. This will cause the cloud body to stretch into the cooler region of the atmosphere where drops of water and hail

will form and start to grow larger and larger. When these water drops become too heavy for the upflows from the cloud to support them, they start to fall as rain, hail, etc. [29].

On the other hand, when liquid droplets collide with a hailstones, they freeze on contact and release latent heat. This process keeps the surface of the hailstones warmer than the surrounding ice crystals. When a warmer hailstone comes into contact with a colder ice crystal, an important phenomenon occurs; there is a net transfer of positive ions (charged molecules) from the warmer object to the colder object. Therefore, the hail grain (the larger, hotter particle) becomes negatively charged and the ice crystal (the smaller, colder particle) is positively charged. The same effect occurs when colder, supercooled liquid droplets freeze on contact with a warmer hailstone and small positively charged pieces of ice break off. These lighter, positively charged particles are then carried by air currents to the top of the cloud. Larger hailstones left with a negative charge are either suspended in an upward current or fall towards the bottom of the cloud. Through this mechanism, the cold upper part of the cloud becomes positively charged, while the middle part of the cloud becomes negatively charged [1]. This negative electric charge is then discharged by lightning. In summary, the main factor in the occurrence of lightning is the encounter of negatively and positively charged cloud systems [36].

Allah, has created clouds so diverse and perfect that especially those who travel by airplane have seen very clearly that when airplanes ascend, they break through these rain-laden clouds. When viewed from above, the clouds rise as if they were mountain masses. In some places they resemble piles of cotton and in others they resemble a sheet-like exhibition [40]. In this respect, the formation of clouds and the filling of the air with water vapor is an event brought about by the means and factors created by Allah. It is He who created the light and heat of the sun, and it is He who controls the temperature of the atmosphere and the earth. The wind, like an orderly, moves with instructions and drags the clouds. Ultimately, He is able to control all of this with His knowledge and power. It is only recently that meteorologists have discovered information about cloud formation, structure and function using advanced equipment such as airplanes, satellites, computers and many other technologies. This proves that Allah has given us knowledge that could not have been known 1400 years ago.

"And We sent down abundant rains from the sky, and with it grew gardens and harvested grain" (Surat al-Kaaf-9.)

According to the Qur'anic verse above, without rain there would be no life on earth. The water that comes down from the sky protects life throughout the water cycle. The benefits of this rain are not limited to the soil, which is given life, but ultimately becomes sustenance for us in the form of agriculture and livestock. The winds move the clouds and carry them from one place to another. In these verses, Allah says that He blows the winds and gathers the clouds, then sends them towards the dry land to bring rain. When dry land receives rainwater, it becomes fertile, that is, it is given life. The proof of this is that the clouds move with the help of the winds. On the other hand, not only humans but also animals, plants and trees need rainwater for their growth. Also, the source of rainwater is evaporation and 97% of evaporation comes from salty oceans. But rainwater is sweet. The reason why rain is sweet is because of another law

that Allah has established. According to this law, water carries no other impurities with it, whether it evaporates from salty seas, mineralized lakes or mud. **"We have sent down pure water from the sky"** (Surah Furqan-48.) Indeed, rainwater is pure because only pure water rises to the sky in the process of evaporation. After a while, the same water returns as rain. These micro- and macro-elements that come down to the soil with the rains are small samples of some of the traditional fertilizers (calcium, magnesium, potassium, etc.) used to increase yields. Without such natural fertilization there would be very little vegetation on the earth. Thus, if there is no rain on the earth, the ecological balance will be damaged [26] [29] [33].

"It is He who sends down water from the sky. From it He gives you both water for yourselves to drink and plants for your animals to eat." (Surat al-Nahl - 10th Verse English Translation)

According to scientific knowledge, water is of equal importance for humans, animals and plants. These verses explain that water is used as drinking water by humans, animals and trees. Trees are washed and renewed by rainwater. If there is dust on the trees and air pollution in the atmosphere, it will affect the trees and they will dry up in a short time. They will no longer produce oxygen for people. The point is that fresh water must be provided to sustain life. A cycle has to be started and maintained. God is instructing man about this cycle, which was not otherwise understood at the time [26]. The various benefits of rain, as mentioned above, are proof that rain is a gift from Allah. It was mentioned in the Qur'an centuries ago and has been discovered today by modern science.

"And ask this: If your water is withdrawn, who can bring you water from the earth?" (Surat al-Mulk, verse 30, English Translation).

Here, it is pointed out that if water, which is the most important of sustenance and the main element of life, is withdrawn into the depths of the earth (i.e. if the groundwater is depleted as a result of excessive withdrawal and the annual rains do not fall and the aquifers are not filled). It is pointed out that there is no power other than Allah who can create water on earth, and those who worship false gods instead of Allah, the Almighty, who is the owner of such unique power, are called to think about how wrong they are [URL, 10]. On the other hand, if water were to run out everywhere in the world, it would have devastating consequences for both humans and natural ecosystems. Without water, people will struggle to find clean drinking water, leading to widespread waterborne diseases. Agriculture, which relies heavily on water, would collapse, leading to food shortages. On the other hand, ecosystems will be damaged and many species will face extinction due to water scarcity. In addition, industries that depend on water for production would be severely affected, leading to economic instability. To avert such a crisis, it is crucial that global communities work together to sustainably protect and manage water resources [URL, 9].

3.3 Relationship between wind and rain

Wind and rain are natural phenomena that occur frequently, causing people to view these events as commonplace. However, people often fail to realize that the occurrence of wind and rain is

a manifestation of the power and will of Allah (swt). Despite technological advances, humans are unable to intervene in these events. The Qur'an, in numerous verses, encourages humanity to draw lessons from the various natural phenomena around them, enabling them to witness signs of Allah's greatness. The connection between wind and rain in the Qur'an is interesting and worthy of study because wind is a very important element in the rainfall process. **"Surely in the creation of the heavens and the earth, and in the alternation of the night and the day, and in the ships that sail the sea with burdens that benefit mankind, and in the rain that Allah sends down from the sky and gives life to the dead earth and causes all kinds of living things to grow therein, and in His turning and directing the winds and the clouds that wait between the sky and the earth, there are indeed many signs for a people who use their minds"** (Surat al-Baqarah-164th Verse English Translation). **"Give them this example of the life of the world: It is like the water that We send down from the sky, by means of which the plants of the earth grow and mix together, then they become rubbish blown away by the wind. Allah is all-powerful"** (Surah Al-Kahf: 45th Verse English Translation).

In this Surah the term "al-Riyah" is mentioned as a form of threat from the wind, describing it as a strong wind that blows away dry vegetation. This shows that not all winds are related to rain, as some winds do not lead to rainfall. For example, orographic precipitation is important where winds blowing from sea to land hit mountains running parallel to the coast. If the mountains are very high in such areas, the air masses leave all their moisture on the slope facing the wind and the slope at the bottom is completely dry. In other words, when the air mass passes to the non-windward side of the mountain in question, it has lost its moisture on the other slope and is far away from being able to provide precipitation to this slope [39] [9] (Figure 6).

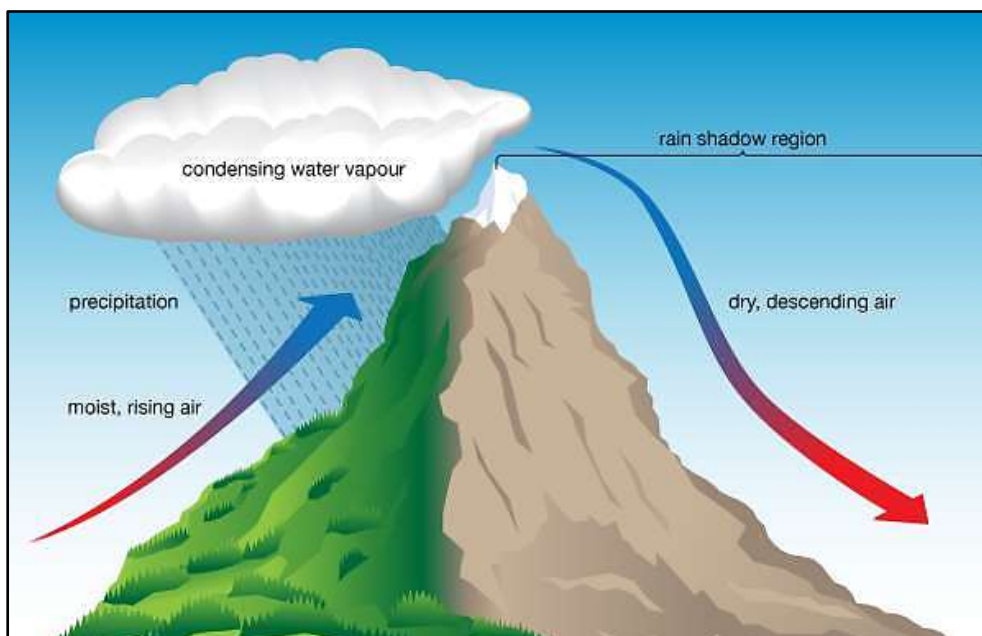


Figure 6: Orographic precipitation formation mechanism [Source: URL, 10]

3.4 Rainfall-elevation relationship

As it is known, in different regions, climate types, basin structures and the direction of arrival of the frontal systems, the amount of precipitation falling increases as the elevation increases.

The fact that the increase in precipitation per 100 m is 54 mm in the Schreiber formula and 41.4 mm in the Huber formula, which takes into account slope slopes as well as elevation [7], indicates that the increase in precipitation per 100 m varies according to the country where it is used [4]. This rainfall-elevation relationship in geography is also pointed out in the Qur'anic verse. Allah (swt) says in His book, **"The example of those who spend their wealth seeking Allah's pleasure and out of their hearts is like a garden on a sweet slope, on which rain falls abundantly, so that its produce is doubled; if it does not rain heavily, it rains thinly. Allah sees what you do"** (Surat al-Baqarah-265.) This verse points to the mechanism of orographic precipitation and also to the amount of precipitation that falls as the elevation increases. We should not forget the fact that as the elevation increases, the temperature decreases and the water requirement of plants decreases relatively. For this reason, the last part of the relevant verse states that the fine precipitation that falls meets the needs of the plants.

4. CONCLUSION

1. Bernard Palissy was the first to present the water cycle theory in 1580 AD. According to him, water evaporates from the sea and as it cools, it turns into clouds and returns to the Earth. When condensation forms in these clouds, rain falls. This water once again flows through rivers and lakes and reaches the sea, thus completing the water cycle. Bernard Palissy, in his famous research on the origin of water and natural/artificial resources, proved that rainfall is the source of water for resources. On the other hand, in the 7th century, Thales, a Greek philosopher from the city of Miletus, expressed the idea that the wind picks up drops of water from the sea that cause precipitation on the earth. The theory, which was proposed in 1580 A.D., was explained centuries ago in many verses in the Holy Qur'an [3].

2. Water is the dominant element of the divine mercy/gift and living matter, which is the element of formation in the main structure of all living things on earth and which they have to use for the continuation of their existence. When the formation stages, rates and effects of clouds and rain are examined in the context of the period when the Qur'an was revealed and the understanding of modern science, an astonishing situation emerges. The fact that the Qur'an describes the formation of clouds/rain at a time when even the names of advanced equipment such as airplanes, satellites and computers were not even known shows again and again that the Qur'an is the word of Allah, because the stages of cloud and rain formation remained a great mystery for a long time and they were discovered only after the invention of meteorological radar.

3. The Qur'an was revealed 1400 years ago, at a time when scientific understanding was limited/absent. The water cycle of the earth was clearly revealed much later with the information provided by modern science. A comparison of the information provided by science on the formation of clouds and rain with the information in the Qur'an shows that the news of the Qur'an is as unchanging a truth as ever.

4. Before the rains, the winds formed as a result of the frontolist movements occurring on the cold air front line, which plunges under the hot air as a result of the encounter between high pressure and low pressure, foretell that rain will follow. There are scientific verses in the Qur'an

(Surah A'râf-57th verse, Surah Rûm-48th verse) that point to this situation.

5. Although it varies according to different regions, the amount of rainfall increases as the elevation increases. The 20th century discovery of this scientific knowledge in the Qur'an (Surat al-Baqarah-265th verse) shows that there are verses for contemplation in the Book of Allah. The presence of such verses in the Qur'an, which descended in Arabia, where the desert climate prevails, is an indication that the Qur'an is universal.

The last word: Allah knows best..

REFERENCES

- [1] Ahrens, D. *Meteorology today: An introduction to weather climate and the environment* (3rd ed.). Brooks/Cole, 2007.
- [2] Amajama, J. Physics of rainfall. *The Journal of Scientific and Engineering Research*, 3(1), 51-54, 2016.
- [3] Ashraf, M. Importance of water in the light of Quran and Sunnah and ways of its saving. *Pakistan Council of Research in Water Resources*, 2015.
- [4] Aydınözü, D. An experiment on the increase of precipitation in every 100 M. according to our regions as we rise. *Marmara Geography Journal*, 17, 172-184, 2008.
- [5] Demir, A. The approach of the commentator Fakhr al-Dîn al-Râzî to the verses about meteorological events. *Eskiyeni*, 40, 283-302, 2020. <https://doi.org/10.37697/eskiyeni.553198>.
- [6] Doğan, M. Z. *Scientific tafsir açısından Qur'ân'in i'câzı*. (Unpublished DR Thesis). Yüzüncü Yıl University, Institute of Social Sciences, 2020.
- [7] Dönmez, Y. *Umumi Klimatoloji ve İklim Çalışmaları*. İstanbul University, 1990.
- [8] Erol, O. *General Climatology* (5th ed.). Çantay Kitabevi, 1999.
- [9] Erol, O. *General Climatology* (10th ed.). Çantay Kitabevi, 2014.
- [10] Finch, V. C., Trewartha, G. T., & Shearer, M. H. *The earth and its resources: A textbook for courses in physical geography and earth science*. McGraw-Hill, 1959.
- [11] Gordon, A., Warmick, G., Schwerdtfeger, P., & Byron-Scott, R. *Dynamic meteorology: A basic course*. Routledge, 2016.
- [12] Hobbs, J. E. *Applied climatology: A study of atmospheric resources*. Butterworth, 1980.
- [13] İzbırak, R. *Dictionary of geography terms: German French English equivalents old and new forms; (with index)*. Matbaacılık ve Ticaret Limited Şirketi Matbaası, 1964.
- [14] Kırca, C. *Qur'an and Science*. Marifet Press, 1997.
- [15] Marshall, S. J. The water cycle. In *Reference module in earth systems and environmental sciences*. Elsevier, 2014. <https://doi.org/10.1016/B978-0-12-409548-9.09091-6>
- [16] Morgan, S. *The water cycle*. The Rosen Publishing Group Inc, 2008.
- [17] Nursi, S. *Sözler (From the Risale-i Nur Corpus)*. RNK publications, 2012.
- [18] Nursi, S. *Şualar (From the Risale-i Nur Corpus)*. RNK publications, 2012.
- [19] Öztürk, T., & Koç, B. Artificial precipitation technique in weather modification processes. *Journal of the Institute of Science and Technology*, 3(1), 31-40, 2013.
- [20] Perlman, H. *Summary of the water cycle*. United States Geological Survey (USGS), 2014.
- [21] Pidwirny, M. (2004). *Fundamentals of physical geography*. University of British Columbia, 2004.

- [22] Quante, M., & Matthias, V. Water in the Earth's atmosphere. *Journal de Physique IV (Proceedings)*, 139, 37-61. EDP sciences, (2006, December).
- [23] Schlesinger, W. H. *Biogeochemistry: An analysis of global change*. Academic, 1997.
- [24] Selçuk Biricik, A. *Qur'an and Geography*. Ensar Neşriyat, 2001.
- [25] Seyidoğlu, H. *Scientific research and writing handbook*. Güzem Can Publications, 2016.
- [26] Shad, T. J. *Geographical science and the holy Qur'an: An experimental study of physical & agricultural geography in the holy Qur'an (PhD thesis)*. University of Glasgow, 1997.
- [27] Shah, Z. H. The miracle of water and the miracle of the Quran, (2023, May 19). . <https://thequran.love/2023/05/19/the-miracle-of-water-and-the-miracle-of-the-quran/>
- [28] Shaikh, S. *Clouds / water cycle / rain / Quran and science / Islam: Mysteries*, (2006, March 31). https://www.geocities.ws/mysteries_unfold/Clouds.pdf
- [29] Suleiman, M. S., Othman, M. F., & Ruskam, A. *Cloud and rain: Perspective of Quran and science*. In *International Seminar on Islamic Law Economic Education and Science Issues*. Skudai Johor, 2014
- [30] Temel, A. V. Evaluation of meteorological concepts in the Qur'an. *Religious Scientific Journal*, 57, 75-104, 2021.
- Wilfong, M., & Pavao-Zuckerman, M. Rethinking stormwater: Analysis using the hydrosocial cycle. *Water*, 12(5), 1273, 2020.
- [31] Wisler, C. O., & Brater, E. F. *Hydrology*. John Wiley and Sons, Inc, 1959.
- [32] Yaşar, H. *The verses in the Qur'an whose meaning is obscured*. Beyan, 1992.
- [33] Yenigün, K., & Yeşilnacar, M. İ. Science and religion in a drop of water. *Katre International Human Studies Journal*, 3, 147-157, 2017. <https://doi.org/10.31120/0.2018.32>
- [34] Yıldırım, A., & Şimşek, H. *Qualitative research methods in social sciences*. Seçkin Publishing, 2018.
- [35] Yılmaz, M. *Qur'ân al-kerîm'de Rain*. (Unpublished MA Thesis). Selçuk University, Institute of Social Sciences, 2009.
- [36] Zafer Research Group. *Cloud mountains*. *Zafer Magazine*, 365, (2007, May 25). <https://www.zaferdergisi.com/makale/15614-bulut-daglari.html>
- [37] Erinç, S. *General Geography*. *Büyük Ansiklopedi I-XII*. Doğan Kitapçılık, 1999.
- [38] Ersoy, F., & Ayaydın, Y. Investigation of geographical elements in social studies textbooks in local and global context. *International Journal of Geography and Geography Education*, 49, 2023. 115-132. <https://doi.org/10.32003/igge.1271388>
- [39] Türkeş, M. *Climatology and Meteorology*. First Edition, Kriter Publishing House - Publication No. 63, Physical Geography Series No. one, ISBN: 978-605-4613-26-7, 650 + XXII pages, Istanbul, 2010.
- [40] Ege, I. *Rain-laden clouds*, *Furkan Nesli Magazine*, Adana, 2012.
- [41] Seyitoğulları, M.A. *Water and water management: an analysis from the perspective of Islamic doctrine*. *Akdeniz University Journal of Institute of Social Sciences (AKSOS)*, 15, 1-22, 2024.
- [42] Matpay, B., Dogu, A. F., & Seyitogullari, M. A. *Drainage Network Characteristics, Surface Waters and Environmental Risks of Hizan and Surroundings (Bitlis)*. *Journal of Disaster and Risk*, 6(3), 797-818, 2023.

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- [U.S. Geological Survey] <https://www.usgs.gov/media/images/su-dongusu-water-cycle-turkish-png>, 2023. (Accessed 31.03.2024)
- [URL, 1] <https://en.wikipedia.org/wiki/Rain>, 2024. (Accessed 31.03.2024)
- [URL, 10] <https://stormgeo.com/insights/why-and-how-do-deserts-form>, 2008. (Accessed 20.05.2024)
- [URL, 10] <https://kuran.diyinet.gov.tr/tefsir/M%C3%BClk-suresi/5271/30-ayet-tefsiri>, 2024. (Accessed 12.04.2024)
- [URL, 2] <https://kids.britannica.com/students/article/rainfall/276645>, 2024. (Accessed 31.03.2024)
- [URL, 4] <https://www.missionislam.com/science/blessingallahrain.html>, 2024 (Accessed 31.03.2024)
- [URL, 5] <https://snowserkan.wordpress.com/2016/06/16/bulutlar-ve-bulut-cesitleri>, 2018. (Accessed 31.03.2024)
- [URL, 6]
https://en.wikipedia.org/wiki/Cumulonimbus_cloud#/media/File:Anvil_shaped_cumulus_panorama_edit.jpg, 2006. (Accessed 11.04.2024)
- [URL, 7] <https://islamqa.info/en/answers/119296/artificial-rainfall-facts-and-scholarly-opinions>, 2017. (Accessed 11.04.2024)
- [URL, 8] <http://quranreveals.com/?p=839> precipitation-Water-From Heavens, 2016. (Accessed 12.04.2024)
- [URL, 9] <https://www.quora.com/What-will-happen-if-the-water-runs-out-all-over-the-world>, 2023. (Accessed 12.04.2024)