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# The Relationship Between Wind and Rain in the Qur'an:
## Thematic Interpretation Approach and Meteorological Analysis

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**Abstract**. Wind and rain are natural phenomena around us that are considered normal. In fact, both can only happen with the power of Allah SWT, humans are unable to intervene in it. Scholars have interpreted verses related to wind and rain from a linguistic perspective, but this is not enough to explain this phenomenon more fully. This research was prepared as an effort to complete thematic interpretation studies to reveal the relationship between wind and rain in the Al-Quran using a scientific interpretation method approach and meteorological analysis. The method used is literature study by referring to the tafsir of al-Thabari, Ibn Kathir and al-Tantawi as well as scientific articles in the field of meteorology. The results of the study show that; There are seven verses in the Koran regarding wind (al-Riyah) which are related to rain. Not all wind is related to rain. Wind can help the process of forming clouds and moving clouds, help the rotation of the rainy season, and be a source of information about the rainy season or daily rain events. However, there are interpretations from several Muslim scholars that are not in accordance with current meteorological studies. This is possible due to limited knowledge when the interpretation was made or limited understanding and references by the author more broadly in the field of meteorology.

**Keywords:** thematic Qur'anic revelation; al-Qur'an meteorology; scientific interpretation of wind and rain.

## Introduction

Wind and rain are natural phenomena that occur frequently, leading people to view these occurrences as ordinary. However, humans often fail to realize that the happening of wind and rain is a manifestation of the power and will of Allah (SWT). Despite technological advancements, humans are unable to intervene in these events. The Quran, in numerous verses, urges humanity to draw lessons from various natural phenomena around them, allowing them to witness the signs of the greatness of Allah SWT. In Surah Al-Baqarah, verse 164, Allah SWT states:

إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ وَالْفُلْكِ الَّتِي تَجْرِي فِي الْبَحْرِ بِمَا يَنْفَعُ النَّاسَ وَمَا أَنْزَلَ اللَّهُ مِنَ السَّمَاءِ مِنْ مَاءٍ فَأَحْيَا بِهِ الْأَرْضَ بَعْدَ مَوْتِهَا وَبَثَّ فِيهَا مِنْ كُلِّ دَابَّةٍ وَتَصْرِيفِ الرِّيَاحِ وَالسَّحَابِ الْمُسَخَّرِ بَيْنَ السَّمَاءِ وَالْأَرْضِ لَآيَاتٍ لِقَوْمٍ يَعْقِلُونَ

*"Indeed, in the creation of the heavens and the earth, the alternation of the night and the day, the [great] ships which sail through the sea with that which benefits people, and what Allah has sent down from the heavens of rain, giving life thereby to the earth after its lifelessness and dispersing therein every [kind of] moving creature, and [His] directing of the winds and the clouds controlled between the heaven and the earth are signs for a people who use reason."*

The Quran serves as a guide for humanity, containing commands for reflection on the signs of Allah's greatness. Wind and rain are frequently mentioned in the Quranic verses. Rain, for instance, is mentioned in 66 verses using various expressions, both literal and figurative. Meanwhile, the term for wind, "*al-rih*", appears 19 times in singular form and 10 times in plural form, "*al-riyah*".

The connection between wind and rain in the Quran is intriguing and worth studying because wind is a crucial element in the process of rainfall. Scholars of interpretation have explained the linguistic connection between wind and rain, but modern meteorological advancements may provide new insights into existing interpretations.

Until now, numerous studies have delved into the examination of wind and rain as two natural phenomena mentioned in the Quran. Regarding the wind, Imam[1] and A'yun[2] conducted a thorough analysis of the interpretation of wind in the Quran using a scientific approach. This approach explains the types, names, and influence of the wind on human life, such as aiding in the precipitation process, assisting in pollination, and providing energy for sailing boats. Similarly, Muslim[3] added that the functions of the wind include acting as a catalyst for cloud movement, leading to rainfall, influencing the formation of ocean waves, and serving as a harbinger of warnings. Concerning rainfall, Nurafipah[4] elucidated a scientific study on the interpretation of rain, emphasizing its benefits as a divine gift from Allah SWT. Meanwhile, Mubin[5], with contemporary meteorology, classified the functions of the wind as conveying good news, causing damage, and issuing warnings to humanity.

While these studies effectively present wind and rain in the Quran, there is still a gap in research that fully explains the interconnection between wind and rain as mentioned in the Quran. Moreover, the meteorological explanations in these studies have not been fully disclosed. This research is organized to explore the knowledge regarding the interrelation of wind and rain as expressed in the Quran, simultaneously reinforcing or correcting the explanations provided by interpretation scholars based on scientific literature in the field of Meteorology.

To examine this matter, the author employs a literature review method based on the thematic interpretation study, utilizing the scientific interpretation approach to uncover the signals of the Quran based on scientific theories, specifically in the field of meteorology. The thematic interpretation method involves collecting and interpreting Quranic verses with similar themes[6]. According to al-Farmawi in Putra[7], the thematic method is an approach that discusses Quranic verses according to predetermined themes or titles. All related verses are gathered, then thoroughly and comprehensively examined from various aspects, such as the reasons for revelation (asbab al-nuzul), vocabulary, and others. Everything is explained in detail and completeness, supported by evidence or facts that can be scientifically justified, including arguments derived from the Quran, hadiths, or rational thinking.

In this study, the author employs an analytical interpretation approach using the method of *al-'ilmy exegesis*, a form of interpretation that utilizes scientific theories to elucidate the content of Quranic verses[8]. The author earnestly endeavors to delve into various disciplines of scientific

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[1] Saiful Imam, "Angin Dalam Al-Quran (Studi Analisis Tafsir al-Qur 'an Dengan Pendekatan Sains)" (Skripsi, Semarang, Uneversitas Islam Negeri Walisongo, 2018).

[2] Qurrota A'yun, "Angin Dalam Perspektif Al-Qur'an (Stusi Tafsir Tematik)" (PhD Thesis, IAIN PONOROGO, 2019).

[3] Muslim Muslim, "Perspektif Al-Qur'an Tentang Angin," *Al-Misykah; Jurnal Kajian Al-Quran Dan Tafsir* 1, no. 1 (2020): 66–88.

[4] Nain Siti Nurafipah and Agus Fakhruddin, "Integrasi Quran dan Sains dalam Proses Hujan," *Mumtaz: Jurnal Studi Al-Quran dan Keislaman* 5, no. 01 (June 30, 2021): 33–40, https://doi.org/10.36671/mumtaz.v5i01.139.

[5] Nurul Mubin, "Meteorologi Dalam Perspektif Al-Quran Dan Sains Modern," *SPEKTRA: Jurnal Kajian Pendidikan Sains* 6, no. 2 (2020): 168–79.

[6] Syaeful Rokim, "Mengenal Metode Tafsir Tahlili," *Al-Tadabbur: Jurnal Ilmu Al-Qur'an Dan Tafsir* 2, no. 03 (2017).

[7] Aldomi Putra, "Metodologi Tafsir," *Jurnal Ulunnuha* 7, no. 1 (July 30, 2018): 41–66, https://doi.org/10.15548/ju.v7i1.237.

[8] Putri Maydi Arofatun Anhar, Imron Sadewo, and M. Khoirul Hadi Al-Asy Ari, "Tafsir Ilmi: Studi Metode Penafsiran Berbasis Ilmu Pengetahuan Pada Tafsir Kemenag," *Prosiding Konferensi Integrasi Interkoneksi Islam Dan Sains* 1 (October 1, 2018): 109–13.

knowledge and philosophical perspectives derived from these verses. The aim of incorporating scientific exegesis in this study is to bridge scientific discoveries with the Quran, highlighting the miraculous nature of the Quran by demonstrating that various contemporary scientific findings were indeed mentioned in the Quran more than 14 centuries ago[9]. In this context, the author scrutinizes interpretative studies by Ibn Kathir, Al-Tha'labi, and Al-Tantawi concerning these verses to uncover linguistic meanings (lughawi) as well as the related historical narrations (riwayat atsar). Finally, the author presents meteorological studies that are pertinent to the interpretations of scholars, thereby offering explanations that either reinforce or rectify existing interpretations based on meteorological literature.

## Discussion

### *The Words "Wind" and "Rain" in the Quran*

The word "rain" is mentioned 71 times in 66 verses in the Quran, both in its literal and figurative forms, indicating the meaning of rainfall[10]. On the other hand, the word "wind" is mentioned a total of 29 times in the Quran. The singular form of the word "wind," al-Rih, is mentioned 19 times, while the plural form, al-Riyah, is mentioned 10 times. Al-Qurthubi explains that in many places in the Noble Quran where Allah (SWT) is mentioned to send al-Rih (wind) in the singular form, it signifies punishment, whereas every instance where wind is mentioned in the plural form signifies ar-Rahmah (the mercy and compassion of Allah).[11]

Based on the author's investigation, the term "al-Rih" in the Quran is not associated with rain, while the term "*al-Riyah*" is consistently coupled with the word rain either before or after its mention. The author also observes that out of the 10 instances of the mention of "*al-Riyah*", 7 verses link the wind as a factor influencing rain. These verses are found in Surah Al-A'raf:57, Al-Hijr:22, Al-Furqan:48, An-Naml:63, Ar-Rum:46,48, and Fatir:9. Meanwhile, two verses in Surah Al-Baqarah:164 and Al-Jathiyah:5 mention the changes and movements of the wind as a natural phenomenon concurrent with other natural phenomena that warrant reflection. In addition, the term "*al-Riyah*" is mentioned as a form of threat in Surah Al-Kahfi:45, describing it as a strong wind that scatters dried plants. This suggests that not all winds are related to rain, as some winds do not lead to rainfall.

The author also observed in the verses that mention the wind as a factor influencing rain, Allah SWT asserts His power by attributing the wind to Himself. Allah SWT attributes the verb "*arsala*" in Al-Furqan:48 and Fatir:9, "*arsalna*" in Al-Hijr:22, and "*yursilu*" in Al-A'raf:57, An-Naml:63, Ar-Rum:46, and 48 to Himself. This indicates that the changes and movements of the wind are the will of Allah SWT, and no one is capable of creating or controlling these changes and movements except Allah SWT. It is evident that, until now, there is no technology that can modify the movement of the wind, and even weather modification technology takes into consideration the movement of wind direction, cyclones, wind speed, and other elements.[12]

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[9] Nor Syamimi Mohd et al., "Pendefinisian Semula Istilah Tafsir'Ilmi," *Islamiyyat* 38, no. 2 (2016): 149.

[10] Khalwani, Hasyim, and Miftahudin, "Kata Bermakna Hujan Dalam Al-Quran (Tinjauan Semantik Dan Stilistika)."

[11] Muḥammad bin Aḥmad Al-Qurṭubī, *al-Jami 'li Aḥkām al-Qur'ān*, ed. Abdullah bin Abd Muhsin al-Turky, vol. 22 (Riyadh: Dar 'Alam al-Kutub, 2013).

[12] Tri Handoko Seto et al., "Pemanfaatan Teknologi Modifikasi Cuaca Untuk Redistribusi Curah Hujan Dalam Rangka Tanggap Darurat Banjir Di Provinsi DKI Jakarta Dan Sekitarnya," *Jurnal Sains & Teknologi Modifikasi Cuaca* 14, no. 1 (June 30, 2013): 1–11, https://doi.org/10.29122/jstmc.v14i1.2676.

In the book *Essentials of Meteorology* by Ahrens, it is explained that wind is the movement of air (generally horizontal movement) that arises due to differences in pressure between one location and another[13]. Typically, wind blows from high-pressure areas (regions with colder temperatures) to low-pressure areas (regions with warmer temperatures). Wind is categorized into several groups based on direction (origin/destination of the wind) and speed, scale, location, and the forces causing it. Various types of wind based on direction include easterly winds (coming from the east), westerly winds, and so on. Based on speed, wind is distinguished into 13 types according to the Beaufort scale (scale 0 to 12), ranging from the weakest speed called "calm" (speed between 0-0.2 m/s) to high-speed winds (exceeding 32.7 m/s known as hurricanes) [14]. According to scale, wind is differentiated into microscale, mesoscale, and macroscale[15]. For example, in the microscale, there is turbulence, while examples of mesoscale winds include local winds like sea breezes, land breezes, mountain winds, and valley winds[16]. The forces causing wind are divided into two, namely the primary force or the force that causes air to move, which includes pressure gradient force and secondary forces or forces that influence wind movement such as changes in speed/strength, direction, and so on. Secondary forces consist of Coriolis force, centrifugal force, and frictional forces. The balance of these various forces causing wind results in different types of wind such as geostrophic wind, cyclonic wind, anticyclonic wind, and so on. An example of Geostrophic Wind is provided in Figure 1[17].

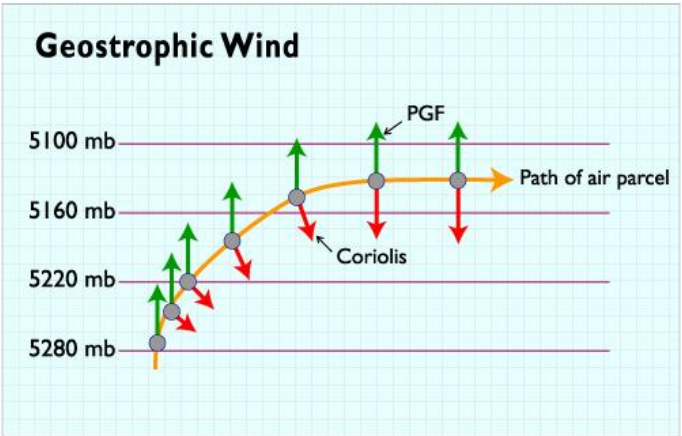


Figure 1. Geostrophic Wind (Source: Sageography.co.za)[18]

According to meteorology, wind is not always associated with rain because not all winds carry water vapor, depending on the regions they traverse. Winds that carry water vapor include sea breezes, which originate from the sea and blow towards the land. Westerly Monsoon winds (Asian-Australian monsoon category) mark the onset of the rainy season in many parts of Indonesia (areas with monsoonal rainfall patterns, such as most regions in Java, Bali, and Nusa Tenggara) (Figure 2). Orographic winds heading towards mountains sometimes also carry water vapor, leading to orographic rainfall (Figure 3). On the other hand, there are winds that do not carry water vapor, such as easterly Monsoon winds (Asian-Australian monsoon category), signaling the onset of the dry season in Indonesia. Winds descending from mountains (leeward side) usually result in dry

[13] C. Donald Ahrens, *Essentials of Meteorology: An Invitation to the Atmosphere* (Cengage Learning, 2014).
[14] Ahrens.
[15] Ahrens.
[16] Ahrens.
[17] Handoko et al., *Klimatologi dasar : landasan pemahaman fisika atmosfer dan unsur-unsur iklim*, ed. Helda Astika Siregar, 1st ed. (Bogor: IPB Press, 2017), https://opac.perpusnas.go.id/DetailOpac.aspx?id=1138969#.
[18] Eugene Brown, "1 Changes in Energy Balance – SA Geography," sageography.co.za, January 18, 2012, https://sageography.co.za/wiki/grade-12/grade-12-climate-and-weather/1-changes-in-energy-balance/nggallery/slideshow.

winds as the moisture has already fallen in the windward region of the mountain (Figure 3). This aligns with the indications found in the Quran that not all winds contribute to the formation of rain.


Figure 2. West Monsoon as an indicator of the rainy season in Indonesia, and East Monsoon as an indicator of the dry season in Indonesia (Source: Pijarnews.com)[19]

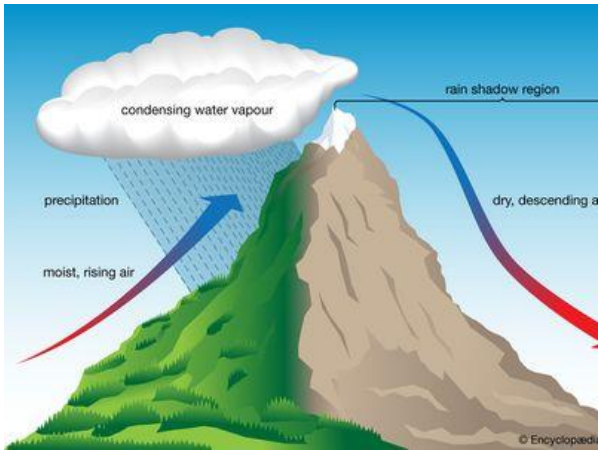


Figure 3. Orographic Wind (Source: Britanica.com)[20]

### *The Role of Wind in Rainfall*

Wind plays a significant role in rainfall as it contributes to the formation of clouds and cumulonimbus. According to Mu'jizat, wind assists in the initial stages of cloud formation, accumulating them, lifting them to higher atmospheric layers, dissolving other particles, and transforming them into electric ions[21]. Research findings disclosed by Thayyarah in his book reveal that there are various types of winds related to clouds and rainfall, namely: winds that evaporate water from the surface, winds responsible for transporting clouds and water vapor from one place to another in the atmosphere, subsequently accumulating them. Additionally, there are winds

[19] Dian Muhtadiah Hamna, "Angin Monsun Asia akan Melintas di Sulsel, Bawa Hujan Lebat," Pijarnews.com, January 7, 2020, https://www.pijarnews.com/angin-monsun-asia-akan-melintas-di-sulsel-bawa-hujan-lebat/.

[20] "Orographic Precipitation | Definition, Cause, Location, & Facts | Britannica," Britanica.com, accessed November 22, 2023, https://www.britannica.com/science/orographic-precipitation.

[21] Mu'jizat Mu'jizat, "Proses Turunnya Hujan dalam al-Qur´an (Suatu Analisis Tafsir Tahlili terhadap QS. al-Rum/30: 48)" (diploma, Universitas Islam Negeri Alauddin Makassar, 2018), http://repositori.uin-alauddin.ac.id/14071/.

tasked with dispersing cumulonimbus clouds into rain and distributing it to various locations on Earth[22]. These expressions undoubtedly require further and well-founded explanations

The author observed that among the 7 verses mentioning the connection between wind and rain, several expressions in the Quran highlight the influence of wind on rain using language that is easy to understand yet carries profound meaning. Some of the expressions include the wind being described as *busyran* (bringing good news), *lawaqih* (pairing clouds), *fatutsiru sahaban* (forming clouds), and *yasuuqu* or *yujzy sahaban* (moving clouds). The descriptions are as follows:

***The wind serves as a busyran (good news) of the arrival of rain.***

The wind as a *busyran* (good news) is mentioned in several verses, namely in Surah Al-A'raf:57, Al-Furqan:48, An-Naml:63, and Ar-Rum:46. In these verses, Allah SWT emphasizes that He sends the wind as a *busyran* (good news) before the arrival of His mercy (i.e., rain). In An-Naml:63, Allah uses the term *mubasyirat*, the plural form of *mubsyirah*, which means bearer of glad tidings.

Ibnu Katsir explains that the wind, as a harbinger, brings the good news of Allah's mercy in the form of rain. According to Ibnu Katsir, the wind has several characteristics of submission to Allah, including the wind that brings forth clouds, the wind that carries clouds, the wind that propels clouds, the wind that precedes clouds as good news, the wind that dries the earth, and the wind that unites clouds to bring about rain[23]. At-Thabari[24] and Al-Qurtubi[25] narrate some recitations that read *nusyran*. At-Thabari explains that *al-Nasyru* in the language of the Arabs refers to a cool and gentle type of wind that can generate clouds

In meteorological studies, there are several winds closely related to rainfall, and the presence of these winds can be associated with the occurrence of rain or the onset of the rainy season. Among these winds are:

a. Monsoon Wind

Monsoon comes from the Arabic word "*mausim*", which means season. This wind occurs due to the temperature difference between land and a vast ocean[26]. The movement of monsoon winds is dominant at low latitudes and generally affects regions around the Indian Ocean[27]. The movement of monsoon winds crossing vast oceans can carry water vapor, leading to increased rainfall in the areas it passes through[28]. The onset of the wet monsoon coincides with high rainfall conditions in the regions traversed by the monsoon wind[29]. For example, the Asian monsoon wind causes maximum rainfall in Southeast Asian regions such as Malaysia and Indonesia[30].

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[22] Nadiah Thayyarah, *Buku Pintar Sains Dalam Al-Quran: Mengerti Mukjizat Ilmiah Firman Allah*, 3rd ed. (Jakarta: Zaman, 2014).

[23] Ismail ibn Amr Ibn Katsîr, *Tafsîr Al-Qur'ân al-'Aẓîm* (Kairo: Dar al-Hadith, 2011).

[24] Muhammad bin Jarir al-Thabary, *Jami'al-Bayan an Ta'wil Ay Al-Quran*, ed. Ahmad Muhammad Syakir, 1st ed. (Beirut: Muassasah al-Risalah, 2000).

[25] Al-Qurṭubī, *al-Jāmi 'li Aḥkām al-Qur'ān*.

[26] Ahrens, *Essentials of Meteorology*.

[27] Xiaoping Wang et al., "Perfluorinated Alkyl Substances in Snow as an Atmospheric Tracer for Tracking the Interactions between Westerly Winds and the Indian Monsoon over Western China," *Environment International* 124 (March 1, 2019): 294–301, https://doi.org/10.1016/j.envint.2018.12.057.

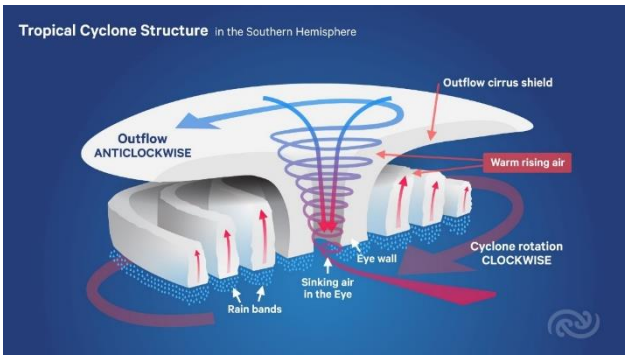
[28] Bin Wang and Qinghua Ding, "Changes in Global Monsoon Precipitation over the Past 56 Years," *Geophysical Research Letters* 33, no. 6 (2006), https://doi.org/10.1029/2005GL025347.

[29] T.N. Krishnamurti, Lydia Stefanova, and Vasubandhu Misra, *Tropical Meteorology: An Introduction*, Springer Atmospheric Sciences (New York, NY: Springer, 2013), https://doi.org/10.1007/978-1-4614-7409-8.

[30] Bin Wang and Zhen Fan, "Choice of South Asian Summer Monsoon Indices," *Bulletin of the American Meteorological Society* 80, no. 4 (April 1, 1999): 629–38, https://doi.org/10.1175/1520-0477(1999)080<0629:COSASM>2.0.CO;2; Gigih Bangun Wicaksono and Rahmat Hidayat, "Extreme Rainfall in Katulampa Associated with the Atmospheric Circulation," *Procedia Environmental Sciences*, The 2nd International

b. Cyclonic Wind

Cyclonic wind is wind that moves towards low pressure and forms a vortex. This wind also has an impact on rainfall in a particular region[31]. Cyclonic winds have different names in various places, such as Typhoon, Hurricane, and Tropical Storm. An example of the structure of a tropical cyclone can be seen in Figure 4. Generally, cyclonic winds move at a relatively high speed, carrying moist air masses (clouds) from the ocean[32]. Cyclonic wind events are typically associated with regions of open water at mid to low latitudes[33]. Cyclonic winds are linked to increased rainfall in the areas around the cyclone because the movement of winds over water brings moist air[34]. For example, Cyclone Cempaka intensified daily rainfall in parts of Java[35], Typhoon Kai-tak caused heavy rain in Vietnam and the Philippines[36], a tropical cyclone around China led to daily rainfall exceeding 50 mm in the Shanghai area[37], and Typhoon Meg caused extreme rainfall in Taiwan[38].




Picture 4. Structure of a Tropical Cyclone in the Southern Hemisphere
(Source: Scincemediacentre.co.nz[39]

Symposium on LAPAN-IPB Satellite (LISAT) for Food Security and Environmental Monitoring, 33 (January 1, 2016): 155–66, https://doi.org/10.1016/j.proenv.2016.03.066.

[31] Dasol Kim et al., "Influence of Vertical Wind Shear on Wind- and Rainfall Areas of Tropical Cyclones Making Landfall over South Korea," *PLOS ONE* 14, no. 1 (January 2019): 1–20, https://doi.org/10.1371/journal.pone.0209885.

[32] Zhiyuan Wu and Naire Mohamad Alshdaifat, "Simulation of Marine Weather during an Extreme Rainfall Event: A Case Study of a Tropical Cyclone," *Hydrology* 6, no. 2 (2019), https://doi.org/10.3390/hydrology6020042.

[33] Muhammad Najib Habibie, Sri Noviati, and Hastuadi Harsa, "Pengaruh Siklon Tropis Cempaka Terhadap Curah Hujan Harian Di Wilayah Jawa Dan Madura," *Meteorologi Dan Geofisika* 19, no. 01 (2018): 1–11.

[34] Manuel Maass et al., "Long-Term (33years) Rainfall and Runoff Dynamics in a Tropical Dry Forest Ecosystem in Western Mexico: Management Implications under Extreme Hydrometeorological Events," *Forest Ecology and Management* 426 (2018): 7–17, https://doi.org/10.1016/j.foreco.2017.09.040; Kenneth E. Nussear and Todd C. Esque, "Desert Biogeography: Mojave," in *Encyclopedia of the World's Biomes*, ed. Michael I. Goldstein and Dominick A. DellaSala (Elsevier, 2020), https://doi.org/10.1016/B978-0-12-409548-9.11916-5.

[35] Habibie, Noviati, and Harsa, "Pengaruh Siklon Tropis Cempaka Terhadap Curah Hujan Harian Di Wilayah Jawa Dan Madura."

[36] Zhiyuan Wu and Naire Mohamad Alshdaifat, "Simulation of Marine Weather during an Extreme Rainfall Event: A Case Study of a Tropical Cyclone," *Hydrology* 6, no. 2 (June 2019): 42, https://doi.org/10.3390/hydrology6020042.

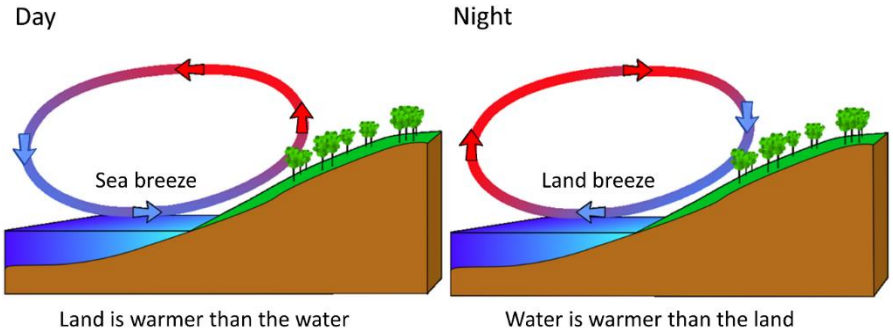
[37] Lina Bai et al., "Climate Trends in Tropical Cyclone-Induced Precipitation and Wind over Shanghai," *Tropical Cyclone Research and Review* 11, no. 3 (September 1, 2022): 219–24, https://doi.org/10.1016/j.tcrr.2022.09.002.

[38] Ting-Chen Chen and Chun-Chieh Wu, "The Remote Effect of Typhoon Megi (2010) on the Heavy Rainfall over Northeastern Taiwan," *Monthly Weather Review* 144, no. 9 (2016): 3109–31, https://doi.org/10.1175/MWR-D-15-0269.1.

[39] "Tropical Cyclones - Expert Q&A," www.sciencemediacentre.co.nz, February 15, 2020, https://www.sciencemediacentre.co.nz/2020/02/15/tropical-cyclones-expert-qa/.

c. Sea Breeze

On a daily scale, there are Sea Breeze and Land Breeze that cause rainfall in inland or coastal regions. Sea Breeze and Land Breeze occur due to differences in heating between the land and the ocean (Figure 5). During the daytime, the land heats up faster than the ocean, resulting in Sea Breeze carrying moist air masses inland. Meanwhile, during the night, the ocean is warmer than the land, causing Land Breeze. Sea Breeze and Land Breeze are related to the peak of daily rainfall in a region. Kousky V. E. conducted research in the Brazilian region and found that coastal areas experience the peak of daily rainfall at night, which is associated with Land Breeze. On the other hand, inland areas about 100-300 km from the coast experience the peak of daily rainfall during the day, which is related to the occurrence of Sea Breeze[40].




Picture 5. Land and Sea Breezes (Source: rwu.pressbook.pub)[41]

The movement of wind direction associated with rain can provide information for predicting rainfall, whether seasonally or daily. The movement of the wind direction carrying rain clouds is a crucial element in the weather observation process, allowing for the estimation of potential rainfall in a specific area over a certain period[42], although this cannot be guaranteed as the wind direction may change due to other atmospheric factors. Similarly, the onset of the rainy season can be predicted based on climate variables such as wind, rainfall (historical/previous), and the combination of wind with outgoing longwave radiation (OLR) or cloud cover[43]. This explanation corroborates what is mentioned in the Quran that the presence and movement of wind direction can serve as a source of information for the occurrence of rain.

***Wind pairs with clouds***

The wind is characterized in Surah Al-Hijr, verse 22, with the attribute *lawaqih*, translated as "*and We sent the wind fertilizing (for plants)"*. The word *lawaqih* is, according to At-Tantawi, the plural form of *laqihun*, and the original word *al-Laqih* refers to a female camel that receives the sperm and carries the fetus in her abdomen. The wind is attributed with this characteristic because it carries the seeds, which are the cause of rainfall, similar to how a female camel carries a fetus in her abdomen[44]. Ibn Abbas, Ibn Masud, Ibrahim al-Nakha'i, and Qatadah, as mentioned by Ibn Kathir,

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[40] Vernon E. Kousky, "Diurnal Rainfall Variation in Northeast Brazil," *Monthly Weather Review* 108, no. 4 (April 1, 1980): 488–98, https://doi.org/10.1175/1520-0493(1980)108<0488:DRVINB>2.0.CO;2.

[41] Paul Webb, "8.3 Winds and Climate," in *INTRODUCTION TO OCEANOGRAPHY*, E-Book (Rhodes: Roger Wiliam University, 2023), https://rwu.pressbooks.pub/webboceanography/chapter/8-3-winds-and-climate/.

[42] Ardytha Luthfiarta et al., "Analisa Prakiraan Cuaca Dengan Parameter Suhu, Kelembaban, Tekanan Udara, Dan Kecepatan Angin Menggunakan Regresi Linear Berganda," *JOINS (Journal Inf. Syst., Vol. 5, No. 1, Pp. 10–17, 2020, Doi: 10.33633/Joins. V5i1. 2760*, 2020.

[43] Fithriya Y Rohmawati, Urfana Istiqomah, and Rahmat Hidayat, "Season Onset Prediction Based on Statistical Model for Malang Regency, East Java," *Agromet* 36, no. 1 (March 17, 2022): 21–30, https://doi.org/10.29244/j.agromet.36.1.21-30.

[44] Mohammad Sayed Tantawi, *Al-Tafseer Al-Waseet Lel-Qur'an Al-Kareem* (Kairo: Dar Nahdet, 1997).

are of the opinion that the meaning of *lawaqih* is that the wind is paired with clouds, resulting in rainfall. However, another opinion interprets it as the wind pollinating flowers and plants[45].

According to Meteorology, the concept of wind "pairing" with clouds means that the wind has the ability to evaporate water vapor from the water surface and then transport this water vapor to another location, thus the wind is considered to pair water vapors into clouds. The wind can carry water vapor and condensation nuclei (aerosols) to other regions

In addition to transporting water vapor, the wind also carries aerosols that act as condensation nuclei or Cloud Condensation Nuclei (CCN). Aerosols are fine particles (particulate matter) that are very small and light enough to float in the air, such as salt particles, dust, combustion residue, and others[46]. Dominantly, aerosols come from the ocean as salt particles are carried by the wind moving over the water surface[47]. The direction of the wind also influences the diffusion of aerosols, which affects cloud formation. Aerosols floating in the air will attract water vapor, forming water droplets that make up clouds[48]. The illustration of aerosols can be seen in Figure 6.

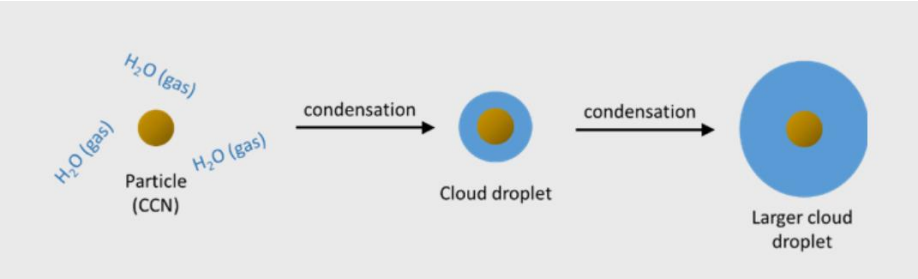


Figure 6. Illustration of aerosols as condensation nuclei for water vapor. Source: CAICE [49]

Based on the explanation, it can be understood that the meaning of the wind's role in pairing or matching in the Quran can be interpreted as the wind's role in pairing water vapor and condensation nuclei (aerosols) to form clouds. This is in line with At-Tantawi's interpretation that the wind carries seeds that are the cause of rainfall.

### *The wind assists in cloud formation*

The wind is also mentioned in the Quran as a factor in forming and moving clouds. This is mentioned in Surah Ar-Rum verse 48 and Surah Fathir verse 9. In these two verses, Allah mentions the impact of the wind, which is "*fatutsiru sahaban"*. Al-Thabari interprets "*fatutsiru sahaban"* as: "Then Allah creates with that wind clouds, and the word *sahaban* is the plural form of *sahabah* (cloud)"[50]. Al-Thantawi explains the meaning of *fatutsiru sahaban* as: "The wind sent by Allah

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[45] Ibn Katsîr, *Tafsîr Al-Qur'ân al-'Aẓîm*.

[46] S. Fuzzi et al., "Particulate Matter, Air Quality and Climate: Lessons Learned and Future Needs," *Atmospheric Chemistry and Physics* 15, no. 14 (July 24, 2015): 8217–99, https://doi.org/10.5194/acp-15-8217-2015.

[47] S.S. Prijith, Marina Aloysius, and Mannil Mohan, "Relationship between Wind Speed and Sea Salt Aerosol Production: A New Approach," *Journal of Atmospheric and Solar-Terrestrial Physics* 108 (February 2014): 34–40, https://doi.org/10.1016/j.jastp.2013.12.009.

[48] Kathryn J. Mayer et al., "Secondary Marine Aerosol Plays a Dominant Role over Primary Sea Spray Aerosol in Cloud Formation," *ACS Central Science* 6, no. 12 (December 23, 2020): 2259–66, https://doi.org/10.1021/acscentsci.0c00793.

[49] CAICE, "Introduction to Aerosols," National Science Foundation Center for Chemical Innovation., CAICE, accessed October 26, 2023, https://caice.ucsd.edu/introduction-to-aerosols/.

[50] al-Thabary, *Jami'al-Bayan an Ta'wil Ay Al-Quran*.

moves through the air according to His will, and with it, it moves and disperses clouds from one place to another"[51].

Al-Thabari narrates the words of Ubaid bin Umair in interpreting "*yursilu al-riyaha fatutsiru sahaban"*, he said: "There are four types of wind: Allah sends the first wind that dries, making the earth dry. Then Allah sends the second wind, which forms clouds and makes them pieces of clouds. Then Allah sends the third wind, which combines the clouds and makes them piled-up clouds. Then Allah sends the fourth wind, and that is when the rain falls". [52]

After the clouds form, then Allah, as mentioned in Surah Ar-Rum verse 48, shapes the clouds into various forms as He wills.

اللَّهُ الَّذِي يُرْسِلُ الرِّيَاحَ فَتُثِيرُ سَحَابًا فَيَبْسُطُهُ فِي السَّمَاءِ كَيْفَ يَشَاءُ وَيَجْعَلُهُ كِسَفًا فَتَرَى الْوَدْقَ يَخْرُجُ مِنْ خِلَالِهِ ۖ فَإِذَا أَصَابَ بِهِ مَنْ يَشَاءُ مِنْ عِبَادِهِ إِذَا هُمْ يَسْتَبْشِرُونَ

*"Allah is the one who sends the winds, and they stir the clouds, then He (Allah) spreads them in the sky as He wills, and He makes them clump together, then you see rain coming out from their gaps. So, when He sends it down to His servants as He wills, they rejoice at once".*

Al-Thabari narrates from Qatadah that the meaning of "*fayabsutuhu fi al-samaa kaifa yasya"* is "so Allah gathers the clouds", while the phrase "*wa waj'aluhu kisafan*" means "and makes those clouds into separate pieces".[53] On the other hand, Al-Thantawi interprets "*fayabsutuhu*..." to mean that Allah, in His own chosen and desired manner, spreads these clouds at various atmospheric levels, sometimes making them thick and at other times scattering them, occasionally from the north and sometimes from other directions. Regarding the term "*kisafan*", according to him, Allah makes the clouds into pieces that pile up, some on top of others.[54]

In Surah An-Nur, verse 43, it is mentioned, "*Tsumma yuallifu bainahu fayaj'alahu rukaman*", which translates to "Then Allah gathers the clouds and makes them pile up". Al-Thantawi explains that this means Allah gently and calmly moves the clouds, causing them to connect and gather together, forming "*rukaman"* or stacks of clouds piled on one another. [55]

According to meteorology, cloud formation does not occur by combining small clouds into larger ones. Instead, cloud formation is preceded by evaporation. Wind plays a role in accelerating evaporation. If the wind speed is low, evaporation is minimal, resulting in a lower potential for cloud formation[56]. McVicar et al, using 30 years of data from various countries, stated that global wind speeds have decreased by 0.0014 mm/s, leading to a reduction in evaporation ranging from 1.31 to 3.19 mm[57].

The process of cloud formation begins with the process of evaporation (the change of water into vapor). The resulting vapor is light (due to warm air temperature), causing it to rise to a certain height in the atmosphere. In the troposphere, when atmospheric conditions are unstable (usually during the daytime due to sunlight radiation), as the air rises, the temperature decreases, leading to the condensation of water vapor into droplets or ice crystals, forming clouds. Condensation also occurs when water vapor is forced upward due to topographic obstacles (such as mountains) or the convergence and meeting of two different air masses (front). The causes of

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[51] Tantawi, *Al-Tafseer Al-Waseet Lel-Qur'an Al-Kareem*.
[52] al-Thabary, *Jami'al-Bayan an Ta'wil Ay Al-Quran*.
[53] al-Thabari.
[54] Tantawi, *Al-Tafseer Al-Waseet Lel-Qur'an Al-Kareem*.
[55] Tantawi.
[56] Tim R. McVicar et al., "Global Review and Synthesis of Trends in Observed Terrestrial Near-Surface Wind Speeds: Implications for Evaporation," *Journal of Hydrology* 416–417 (January 24, 2012): 182–205, https://doi.org/10.1016/j.jhydrol.2011.10.024.
[57] McVicar et al.

cloud formation result in different types of rainfall, namely convective rainfall, orographic rainfall, convergent rainfall, and frontal rainfall (Figure 7). The role of the wind in this process is to transport water vapor to specific locations where it gathers and forms clouds. Additionally, there are types of winds that indicate the formation of convective clouds. These winds are called Vertical Wind Shear (strong horizontal wind changes to vertical). Strong vertical wind shear results in the formation of larger convective clouds[58].

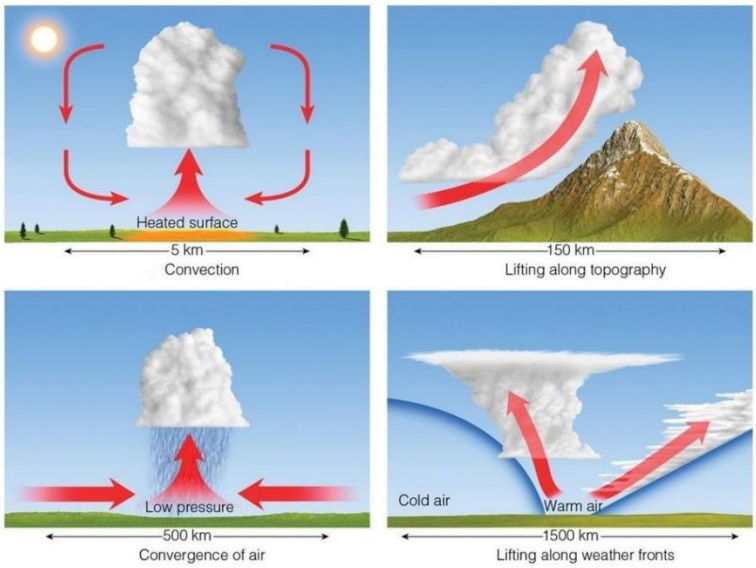


Figure 7. Types of Rain Based on Their Causes (Source: Ahrens)

According to Meteorology, cloud forms can vary depending on internal and external processes in their formation. Internal processes include isobaric cooling, adiabatic cooling, adiabatic-isobaric cooling, and isobaric mixing. External processes involve the convective, orographic, front, and convergence cloud formation, as explained earlier. There are several cloud classifications known in Meteorology and are categorized based on their altitu[59]. The classifications for these cloud types are as follows: A) High Clouds: Cirrus Clouds, Cirrocumulus Clouds, Cirrostratus Clouds. B) Medium Clouds: Altocumulus Clouds, Altostratus Clouds. C) Low Clouds: Stratocumulus Clouds, Stratus Clouds, Nimbostratus Clouds. D) Vertically Developing Clouds: Cumulus Clouds, Cumulonimbus Clouds[60]. The types of clouds mentioned can be seen in Figure 8.

[58] Tomáš Púčik, Pieter Groenemeiger, and Ivan Tsonevsky, *Vertical Wind Shear and Convective Storms* (European Centre for Medium-Range Weather Forecasts, 2021).

[59] Rahmat Hidayat and Sonni Setiawan, *Termodinamika Atmosfer*, vol. 2 (Bogor: IPB Press, 2023).

[60] Handoko et al., *Klimatologi dasar : landasan pemahaman fisika atmosfer dan unsur-unsur iklim.*

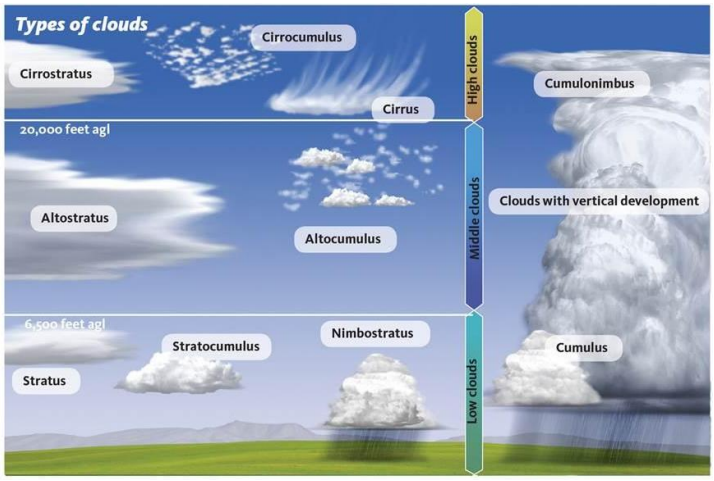


Figure 8. Types of Clouds (Source: www.aopa.org)[61]

Based on this explanation, it is true what is conveyed in the Quran that the wind assists in the formation of clouds. Then, by His power, Allah forms those clouds according to His will and in the manner He desires, which involves both internal and external processes in the clouds. Therefore, it is not accurate to associate cloud formations solely with the wind, as mentioned in some interpretations.

### *The Process of Rain Occurrence*

In Surah Ar-Rum, verse 48, as well as in Surah An-Nur, verse 43, it is explained that after the clouds form, "*fa tara al-wadqa yakhruju min khilalihi*", which means you will see water droplets coming out from between them. Al-Thabari interprets *al-wadqa* as rain, citing Mujahid's opinion that it means water droplets[62]. Al-Tantawi explains: "And you will see the *al-wadqa*, that is, the rain coming out from between them, meaning emerging and falling from the interstices of the clouds, that is, from the particles of the clouds. Then it pours down, meaning the rain falls on whatever He wills among His servants". Ibn Kathir explains: "Sometimes clouds come from the direction of the sea filled with water, as mentioned in the verse: *He it is who sends forth the winds as heralds of His mercy, till when they bear a heavy-laden cloud, We drive it to a dead land, then We send down water thereon and bring forth therewith fruits of every kind. Thus do We bring forth the dead that you may remember.* (Al-A'raf/7:57)".[63]

Meanwhile, there are various interpretations that understand the role of the wind in bringing rain. As mentioned by Ubaid bin Umair regarding types of wind, "...then Allah sends the fourth wind, and rain falls"[64]. Similarly, Nadia Thayyarah explains that there are winds tasked with dispersing overcast clouds into rain and distributing it across different places on earth[65].

Meteorological explanation of the process of rainfall is when water droplets in the clouds unite/aggregate with other water vapor, increasing in size. In meteorology or climatology, the mechanism of merging these water droplets occurs through two processes: the Bergeron-Findeisen process in cold clouds and the Collision-coalescence process in warm clouds (clouds with

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[61] Jack Williams, "Weather: Correlating Cloud Types," Text, www.aopa.org, June 17, 2016, https://www.aopa.org/news-and-media/all-news/2016/august/flight-training/weather.

[62] al-Thabari, *Jami'al-Bayan an Ta'wil Ay al-Quran*.

[63] Ibn Katsîr, *Tafsîr Al-Qur'ân al-'Aẓîm*.

[64] al-Thabari, *Jami'al-Bayan an Ta'wil Ay al-Quran*.

[65] Nadiah Thayyarah, *Buku Pintar Sains Dalam Al-Quran: Mengerti Mukjizat Ilmiah Firman Allah*, 3rd ed. (Jakarta: Zaman, 2014).

temperatures at the cloud top greater than -15° C) [66]. An illustration of the process of water droplet aggregation can be seen in Figure 9. At that point, the upward buoyant force is unable to counterbalance the increasing gravitational force (downward direction) as the cloud particles grow larger. Consequently, the enlarged cloud particles descend as rain.

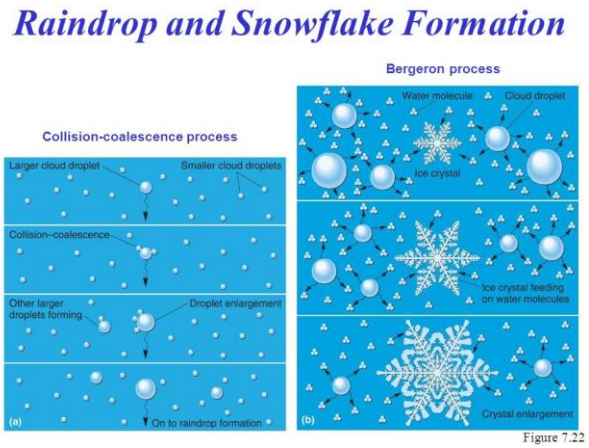


Figure 9 Illustration of Collision-Coalescence and Bergeron Processes (Source: kaiserscience.wordpress.com)[67]

This corroborates what has been described in the Quran regarding the occurrence of rain, which takes the form of droplets emerging from the crevices of clouds. On the other hand, the author has not yet obtained a scientific explanation for what some scholars have asserted, that it is the wind that causes water to descend from the clouds, as mentioned by Ubaid bin Umair and Thayyarah.

***The wind moves the clouds.***

Allah SWT declares that the wind moves and shifts clouds from one place to another. Allah SWT uses the verb *saaqa-yasuuqu*, meaning to drive away clouds, in Surah Al-A'raf:57; "So when the wind had carried them [clouds], We drove it [the rain] toward a dead land...". The same term is used in Surah As-Sajda:27 without specifying the wind as the causative factor. "Do they not see that We drive rain to a dry land...". The meaning of the phrase "*saaqat al-Rih al-Sahab*" is that the wind propels and lifts the clouds.

Another word that means to move is "*yuzjiy sahaban*", mentioned in Surah An-Nur verse 43, which means to push. Al-Thantawi explained that the word *yuzjiy* is derived from the word *al-Izjaa*, which means to push slowly and gently. The meaning of the word *yuzjiy* from Surah An-Nur:43 is, "You know - O people of understanding - and see with your own eyes that Allah Almighty pushes the clouds in the sky with His will, with a gentle push in the direction He desires".

The role of wind in moving clouds according to Meteorology can be interpreted as wind carrying water vapor or clouds from one place to another. For example, in this regard, there are Sea Breeze, Valley Wind, and Zonal Wind.

Oceanic wind moves water vapor or clouds from the sea towards the land. The evaporation process predominantly occurs at sea, but the substantial amount of rainfall takes place on land due

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[66] Wenhua Gao et al., "A Study of the Fraction of Warm Rain in a Pre-Summer Rainfall Event over South China," *Atmospheric Research* 262 (November 1, 2021): 105792, https://doi.org/10.1016/j.atmosres.2021.105792.

[67] "KaiserScience: Image," accessed November 22, 2023, https://kaiserscience.files.wordpress.com/2015/03/raindrop-and-snowflake-formation-bergeron-process.jpg.

to the wind's movement carrying water vapor from the ocean[68]. Sea breeze carries clouds/water vapor towards the land, leading to rainfall on the land. Valley wind plays a similar role, moving from the valley towards the mountains. If this wind passes through humid regions, it carries water vapor. When passing over mountains, the water vapor transforms into clouds, resulting in orographic rainfall.

Meanwhile, zonal winds influence the propagation of rainfall in a region. Yanase et al. state that the diurnal propagation of rainfall in Sumatra is influenced by zonal winds (winds blowing from west to east). When westerly winds blow, rainfall shifts to the east, while easterly winds cause rainfall to shift westward. This indicates that winds play a role in the daily shift of rainfall, especially in the Sumatra region[69]. In general, winds can move clouds, and the characteristics of these clouds depend on the region and the characteristics of the areas they traverse[70]. Additionally, the strength of the wind can also impact the transport of water vapor and influence the formation of convective clouds[71].

Therefore, the role of the wind in moving clouds that bring rain, as mentioned in the Quran and interpreted by scholars, aligns with the meteorological explanation.

***The wind aids in the alternation of rain.***

The influence of the wind, which moves and shifts clouds from one place to another, results in the alternation of rain from one location to another. The continuous blowing of the wind in a specific direction over a certain period also determines the rainfall received in a particular region. In Surah al-Furqan verse 50, this is explained following the discussion about the wind as *busyran*.

وَلَقَدْ صَرَّفْنَاهُ بَيْنَهُمْ لِيَذَّكَّرُوا فَأَبَىٰ أَكْثَرُ النَّاسِ إِلَّا كُفُورًا

*"Indeed, We have truly alternated it (the rain) among them so that they may take heed. However, most people are unwilling (to express gratitude); instead, they deny (the blessing)."*

Al-Tantawi explained *Laqad sharrafna bainahum*, meaning; "We have alternated the rain that falls from the sky, so we have bestowed it in different places, at different times, with different characteristics. Thus, we increase it in some regions and decrease it in others, then withhold it in certain places. All of this is based on our wisdom and will. [72] Al-Thabari narrated from Ibn Abbas commenting on this phrase: "Rain does not fall in the same quantity in one year as it does in another, but Allah alternates this rain among His creations," then he recited: *Laqad sharrafna bainahum*. [73]

Explanation regarding this in meteorology, as mentioned earlier, is that wind influences the rainy season. For example, the monsoon wind is related to the rainy season in specific regions. The monsoon wind is a seasonal change in wind direction caused by the temperature difference between land and sea on a larger scale[74]. For instance, the rainy season in Indonesia is associated with the westerly monsoon wind, but if the easterly monsoon wind occurs, Indonesia will experience the

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[68] Anastassia M. Makarieva, Victor G. Gorshkov, and Bai-Lian Li, "Precipitation on Land versus Distance from the Ocean: Evidence for a Forest Pump of Atmospheric Moisture," *Ecological Complexity* 6, no. 3 (September 2009): 302–7, https://doi.org/10.1016/j.ecocom.2008.11.004.

[69] A. Yanase, K. Yasunaga, and H. Masunaga, "Relationship between the Direction of Diurnal Rainfall Migration and the Ambient Wind over the Southern Sumatra Island," *Earth and Space Science* 4, no. 3 (2017): 117–27, https://doi.org/10.1002/2016EA000181.

[70] Harold D. Orville, Richard D. Farley, and John H. Hirsch, "Some Surprising Results from Simulated Seeding of Stratiform-Type Clouds," *Journal of Applied Meteorology and Climatology* 23, no. 12 (December 1, 1984): 1585–1600, https://doi.org/10.1175/1520-0450(1984)023<1585:SSRFSS>2.0.CO;2.

[71] Wicaksono and Hidayat, "Extreme Rainfall in Katulampa Associated with the Atmospheric Circulation."

[72] al-Thabary, *Jami'al-Bayan an Ta'wil Ay Al-Quran*.

[73] Tantawi, *Al-Tafseer Al-Waseet Lel-Qur'an Al-Kareem*.

[74] Ahrens, *Essentials of Meteorology*.

dry season. The direction of the monsoon wind changes every six months, causing seasonal changes in various regions of Indonesia.

Based on the author's research in the exegesis of Ibn Kathir, Al-Tha'labi, and Al-Tantawi, there is no interpretation linking the role of the wind to the alternation or rainy season. However, the author observes that Surah Al-Furqan verse 50 is located immediately after verse 48, which explains the wind as a *busyran*. This seems to suggest that the arrival of the rainy season is influenced by specific winds, as explained in the meteorological explanation above.

### *Interpretations Not Found in Meteorological Studies*

Based on the discussion above, there are interpretations from some Muslim scholars that the author has not found in meteorological studies. For example, the opinion that there is a Wind that combines clouds into layers, as mentioned by Ubaid bin Umair and quoted by Al-Tha'labi. Based on the author's exploration in meteorological studies, the formations of stacked clouds or others are not directly influenced by the wind but occur due to internal and external processes in cloud formation, as explained earlier.

Similarly, the opinion of Ubaid bin Amir is that there is wind that causes rain to fall, or as expressed by Thayyarah, there is wind tasked with dispersing overcast clouds into rain. To the best of the author's knowledge, the process of rain occurrence is not caused by the wind, but rather by water droplets forming overcast clouds undergoing the *Bergeron-Findeisen* process in cold clouds and the *Collision-coalescence* process in warm clouds. As a result, cloud particles become large enough and are attracted by gravity, causing them to fall as rain.

Interpretations that do not align with current meteorological studies may be due to the fact that the scientific knowledge available at the time of the interpretation was not as advanced as it is now, or it could be attributed to the author's limitations in delving deeper into meteorological references. The author relied on primary reference books and meteorological journals that have been studied by the author.

## Conclusion

Based on the thematic study regarding the correlation between wind and rain in the Quran, it can be concluded that what the Quran reveals aligns with the current developments in meteorological studies. Among the findings are that not all winds are associated with rain. The author found that out of the 10 mentions of *al-Riyah* (plural form of wind), as many as 7 verses associate the wind as a factor influencing rain. These references are in Surah Al-A'raf:57, Al-Hijr:22, Al-Furqan:48, An-Naml:63, Ar-Rum:46,48, and Fatir:9. Meanwhile, the term *al-Rih* (singular form of wind) is not linked to rain. The role of the wind in relation to rain includes aiding in the formation of rain and directing the movement of rain clouds, assisting in the rotation of rainy seasons within a region, and serving as a source of information about the onset of the rainy season or daily rainfall events.

This study substantiates that expressions in the Quran related to science and knowledge are not in conflict with current scientific studies. It demonstrates the scientific miracles of the Quran. Based on this study, the author suggests the importance of encouraging a thematic scientific approach, especially in the interpretation of verses that explain various natural phenomena, to gain a deeper understanding of Quranic texts and to appreciate the greatness and majesty of Allah.

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