



Defining the Onset of Fajr: An Evaluation of Comparative Evidence of Solar Depression Standards in Indonesia.

Musliatin^{a,1,*}, Siti Tatmainul Qulub^{b,2}, Ahmad Adib Rofiuiddin^{b,3}, Firqi Hidayat^{b,4}

^a UIN Walisongo Semarang, Student of UIN Walisongo Semarang

^b UIN Sunan Ampel Surabaya, Lecturer of UIN Sunan Ampel Surabaya

^b UIN Walisongo Semarang, Lecturer of UIN Walisongo Semarang

^b UIN Walisongo Semarang, Student of UIN Walisongo Semarang

¹musliatin14@gmail.com*; ²tatmainulqulub@uinsa.ac.id ³adibudin08@walisongo.ac.id ⁴addamakyhidayat@gmail.com

Abstract : In 2010, an issue circulated in Indonesia claiming that the Fajr prayer time was set too early, which was published in Qiblati Magazine at that time. This issue eventually received responses from experts in Islamic Astronomy (Ilmu Falak), who then conducted a re-examination of the determination of the Fajr prayer time. After years of conducting a re-examination, the researchers eventually reached a conclusion and decided that the solar altitude criterion for the beginning of the Fajr prayer time used by the Ministry of Religious Affairs of the Republic of Indonesia and Nahdlatul Ulama was already appropriate, while it differed from the criterion used by Muhammadiyah. The study entitled “Defining the Onset of Fajr: An Evaluation of Comparative Evidence of Solar Depression Standards in Indonesia” aims to compare the foundations used by these three institutions in determining the Sun’s altitude at dawn. This research employs a descriptive qualitative method with a comparative and library-based approach. The findings show that the three institutions determine the beginning of the Fajr (Subuh) prayer time based on the appearance of true dawn (fajr shadiq) on the eastern horizon, which is used as the sign for the start of the Subuh prayer time, as stated in Q.S. Al-Baqarah verse 187. There are differences of opinion regarding the most preferable time to perform the subuh prayer. The Ministry of Religious Affairs holds that there are two possible times, namely ghalas and isfar. Meanwhile, Nahdlatul Ulama and Muhammadiyah consider ghalas to be the more preferable time. However, the similarity among these three institutions lies in the shar’i foundation they use, the main instruments employed, and the resulting decisions. Furthermore, the practical contribution of the study is the development and establishment of an SOP (Standard Operating Procedure) for research related to the Fajr or dawn prayer time. This SOP aims to ensure consistent results and to optimize its implementation so that it can be applied effectively in various regions across Indonesia.

Keywords : Dawn, Ministry of Religious Affairs of the Republic of Indonesia, Muhammadiyah, Nahdlatul Ulama, Prayer Time, Sun Elevation.

Abstrak : Pada tahun 2010 beredar isu waktu salat subuh terlalu cepat di Indonesia yang termuat dalam Majalah Qiblati saat itu. Hingga akhirnya terdapat respon dari pakar ilmu falak kemudian melakukan pengkajian ulang. Setelah bertahun – tahun melakukan pengkajian ulang, akhirnya menemukan hasil dan memutuskan bahwa kriteria ketinggian matahari awal waktu subuh menurut Kementerian Agama RI dan Nahdlatul Ulama sudah sesuai, Berbeda dengan Muhammadiyah yang merubah kriteria ketinggiannya subuh. Penelitian yang berjudul “Menentukan Awal Waktu Subuh: Evaluasi Bukti Komparatif Terhadap Standar Ketinggian Matahari Dibawah Ufuk di Indonesia” bertujuan untuk membandingkan landasan syar’i yang digunakan oleh ketiga Lembaga tersebut dalam menentukan ketinggian matahari pada waktu awal fajar. Penelitian ini menggunakan metode kualitatif deskriptif dengan pendekatan komparatif dan berbasis studi kepustakaan. Hasil penemuan menunjukkan bahwa ketiga Lembaga tersebut menetapkan awal waktu salat subuh dengan berpedoman pada munculnya fajar shadiq di ufuk timur, yang dijadikan sebagai tanda masuknya waktu subuh, sebagaimana didasarkan pada Q.S. Al-Baqarah ayat 187. Terdapat perbedaan pandangan perihal waktu yang paling utama untuk melaksanakan salat subuh. Kementerian Agama berpendapat bahwa terdapat dua waktu yang dapat dipilih, yakni waktu ghalas dan isfar. Sementara itu, Nahdlatul Ulama dan Muhammadiyah berpendapat bahwa waktu yang lebih utama adalah ghalas. Adapun persamaan dari ketiga Lembaga tersebut terletak pada dasar syar’i yang digunakan, instrument utama yang dipakai, serta hasil keputusan yang dihasilkan. Kemudian kontribusi praktis dari hasil kajian tersebut adalah membuat dan menciptakan adanya SOP (Standar Operasional Prosedur) yang sesuai untuk penelitian terkait waktu subuh atau fajar yang berfungsi untuk memastikan hasil yang konsisten dan mengoptimalkan SOP tersebut berguna di berbagai wilayah di Indonesia.



Kata kunci : *Subuh, Kementerian Agama Republik Indonesia, Muhammadiyah, Nahdlatul Ulama, Waktu Salat, Ketinggian Matahari.*

A. Introduction

In 2010, an issue emerged in Indonesia stating that the Fajr prayer time was set too early, as reported in Qiblata Magazine at that time. Several people have questioned whether dawn in Indonesia is 8 minutes too early. This was revealed by one of the leaders of the Al-Mubarak Mosque in Tuban, who discovered a fatwa issued by the Tarjih Council of Muhammadiyah on the Suara Muhammadiyah website, stating that dawn is 8 minutes later than the schedule issued by the government's Ministry of Religious Affairs¹. Additionally, members of the mosque congregation he attends discuss this issue in their WhatsApp groups. For example, during Ramadan, the Ministry of Religious Affairs' schedule shows that dawn in Surabaya is at 4:15 a.m., but the new schedule issued by Muhammadiyah shows it is at 4:23 a.m. They need further explanation from people who understand this astronomical matter," said Ramsono, Head of the Al-Mubarak Mosque Management Board, Tuban, as published on the Suara Muhammadiyah Website². According to Anwar Chairman of the Tarjih & Tajdid Council of the Central Leadership of Muhammadiyah on the Muhammadiyah Official Website, the determination of the start of dawn must be accurate based on an examination of the texts of the Qur'an and hadith, as well as the objective realities of the universe. Ultimately, at the 13th Muhammadiyah Tarjih National Conference in 2020, Muhammadiyah scholars gathered to discuss the phenomenon of the sun's height below the horizon at dawn. Additionally, the Tarjih Council addressed this issue because many Muslims in Indonesia and other parts of the world have inquired about it. One example is a young Muslim in Morocco who, during Ramadan, ate during the call to dawn prayer as a form of protest against the official schedule still being too early³.

Currently, discussions about the start of dawn prayers have been lively since the early 2010s and continue to this day. To date, this study can be viewed from multiple perspectives. First, viewed from the perspective of law and Maqasid Syari'ah (Qulub & Sanuri, "Aspek Maqasid al-Kulliyah dan al-Juziyyah Dalam Penetapan Awal Waktu Salat Subuh dan Isya'", 2024⁴; Firdaus, "Preferensi Perubahan Awal Waktu Subuh Pada Komunitas Masjid", 2022⁵; Qulub & Sanuri, "Tinggi Matahari Awal Waktu Subuh Perspektif Maqasid Al-Shariah", 2022⁶). Second, it can be seen from the perspective of Fiqh and Science (Hidayat, "Konsep

¹Agus Mustofa, "Waktu Subuh Di Indonesia Terlalu Cepat 8 Menit," Suara Muhammadiyah, <https://web.suaramuhammadiyah.id/2021/05/08/waktu-shubuh-di-indonesia-terlalu-cepat-8-menit/>.

²Mustofa, "Waktu Subuh Di Indonesia Terlalu Cepat 8 Menit."

³Ilham Ilham, "Muhammadiyah Putuskan Awal Waktu Subuh Ditambah, Jejak Sejarah Dari Muktamar Milad Ke 113," Muhammadiyah, <https://muhammadiyah.or.id/2021/03/tok-muhammadiyah-putuskan-awal-waktu-subuh-ditambah-8-menit/#:~:text=Tok! Muhammadiyah Putuskan Awal Waktu Subuh Ditambah,Jejak Sejarah dari Muktamar ke Milad 113.>

⁴Sanuri Qulub, Siti Tatmainul, "Aspek Maqasid Al - Kulliyah Dan Al - Juziyyah Dalam Penetapan Awal Waktu Salat Subuh Dan Isya'," *Al - Qanun: Jurnal Pemikiran Dan Pembaharuan Hukum Islam* 27 (2024).

⁵Firdaus Dkk Firdaus, "Preferensi Perubahan Awal Waktu Subuh Pada Komunitas Masjid," *Al - Marshad: Jurnal Astronomi Islam Dan Ilmu - Ilmu Berkaitan* 8 (2022).

⁶Sanuri Qulub Siti Tatmainul, "Tinggi Matahari Awal Waktu Subuh Perspektif Maqasid Al - Shariah," *Azimuth: Journal of Islamic Astronomy* 3 (2022).



Hukum dan Awal Waktu Solat Berdasarkan Hadist dan Pendapat Ulama”, 2025⁷; Fuadi, L, “Fajar Penanda Awal Waktu Subuh Dan Puasa”, 2021⁸; Alifah, Sheila Nur, “Eksplorasi Konsep Waktu Salat Dalam Al-Qur’an Perspektif Ilmu Falak”, 2024⁹; R, Cahyani, “Putusan Munas Muhammadiyah Mengenai Koreksi Ketinggian Matahari Subuh dalam Fikih dan Astronomi”, 2021¹⁰; Unggul Suryo Adi, “Problematika Awal Waktu Shubuh antara Fiqih dan Astronomi”, 2020¹¹). Finally, it can be seen from the perspective of Astronomy and Astrology (D. Abdul Wahab, Raihana Binti, “Kajian Literatur Sistematis Terhadap Penentuan Awal Waktu Subuh”, 2025¹²; H.D. Putraga, “Penentuan Awal Waktu Subuh Menggunakan Kamera DSLR Dan Metode Moving Average”, 2022¹³; M. D.Ritonga, “Penentuan Waktu Subuh Menggunakan All Sky Camera Dan Metode Moving Average di Kota Medan”, 2023¹⁴; M. Magevira, “Problematika Astronomical Twilight dalam Penentuan Awal Waktu Subuh di Indonesia”, 2025¹⁵; M. Ritonga, “Problematika Syafaq dan Fajar dalam Menentukan Waktu Salat Isyak dan Subuh”, 2021¹⁶; C. P. E. Nothaft, “Guillaume des Moustier’s treatise on the armillary instrument (1264) and the practice of astronomical observation in medieval europe”, 2021¹⁷; R. Mawad, “The Height of The diurnal atmosphere: The Twilight”, 2024¹⁸; Imron Hadi, Karlina Leni, “Studi Analisis Akurasi Perhitungan Awal Waktu Shalat Menggunakan *Universal Astrolabe*”, 2022¹⁹). From the studies in each perspective described above, the issue of dawn prayer times within the community remains unresolved. However, it can serve as basic knowledge for the community and efforts to resolve the issue of dawn prayer times in Indonesia.

The purpose of this study is to complement previous studies on the timing of dawn while providing a more comprehensive understanding to the public regarding the existing differences of opinion. Through the analysis and comparison of data from the three institutions, this research is expected to serve as a bridge in addressing the differences in determining the time

⁷ Didit Dkk Hidayat, “Konsep Hukum Dan Awal Waktu Solat Berdasarkan Hadist Dan Pendapat Ulama,” *JIMU: Jurnal Ilmiah Multi Disiplin* 03 (2025).

⁸ Lutfi Fuadi, “Fajar Penanda Awal Waktu Subuh Dan Puasa,” *Minhaj: Jurnal Ilmu Syariah* 2 (2021).

⁹ Thahir Maloko Alifah, Sheila Nur, “Eksplorasi Konsep Waktu Salat Dalam Al-Qur’an Perspektif Ilmu Falak,” *Hisabuna* 5 (2024).

¹⁰ Risma Cahyani, “Putusan Munas Muhammadiyah Mengenai Koreksi Ketinggian Matahari Subuh Dalam Fikih Dan Astronomi,” *Al-Syakhsyiyah: Journal of Law and Family Studies* 3 (2021).

¹¹ Unggul Suryo Ardi, “Problematika Awal Waktu Subuh Antara Fiqh Dan Astronomi,” *Al - Afaq: Jurnal Ilmu Falak Dan Astronomi* 2 (2020).

¹² Dkk Abdul Wahab, Raihana Binti, “Kajian Literatur Sistematis Terhadap Penentuan Awal Waktu Subuh,” *Journal of Fatwa and Falak Selangor (JUFFAS)* 2 (2025).

¹³ Hariyadi Dkk Putraga, “Penentuan Awal Waktu Subuh Menggunakan Kamera DSLR Dan Metode Moving Average,” *Jiif: Jurnal Ilmu Dan Inovasi Fisika* 6 (2022).

¹⁴ Marataon Dkk Ritonga, “Penentuan Waktu Subuh Menggunakan All Sky Camera Dan Metode Moving Average Di Kota Medan,” *Mahkamah: Jurnal Kajian Hukum Islam* 8 (2023).

¹⁵ Magevira Magevira, “Problematika Astronomical Twilight Dalam Penentuan Awal Waktu Subuh Di Indonesia,” *ASTROISLAMICA: Journal of Islamic Astronomy* 4 (2025).

¹⁶ Marataon Ritonga, “Problematika Syafaq Dan Fajar Dalam Menentukan Waktu Salat Isyak Dan Subuh,” *Al - Marshad: Jurnal Astronomi Islam Dan Ilmu - Ilmu Berkaitan* 7 (2021).

¹⁷ C.Phillip E Nothaft, “Guillaume Des Moustier’s Treatise on the Armillary Instrument (1264) and the Practice of Astronomical Observation in Medieval Europe,” *Annals of Science* 78 (2021).

¹⁸ Ramy Mawad, “The Height of The Diurnal Atmosphere: The Twilight,” *Advances In Space Research*, 2024.

¹⁹ Leni Karlina Hadi, Imron, “Studi Analisis Akurasi Perhitungan Awal Waktu Shalat Menggunakan Universal Astrolabe,” *Al - Afaq: Jurnal Ilmu Falak Dan Astronomi*, 2022.



of the Fajr prayer and to provide a sense of peace and comfort for Muslims in performing their worship. Thus, two questions can be asked: First, what is the basis for determining the initial criteria for dawn from the perspective of the Indonesian Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah? Second, how do the Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah compare in determining the height of the sun at dawn? Later, this comparison will focus on the advantages and disadvantages, as well as the differences and similarities, in the data studied. The theoretical benefit is that the public can understand and comprehend the comparative form of the data being studied. This serves as an astronomy study for the general public and additional insight for astronomy students. In practical terms, the public can practice it according to their beliefs based on clear foundations without having to differentiate between them. This is in order to dispel and eliminate conflicts among the people.

It is undeniable that technological developments are becoming increasingly widespread. There are many sophisticated tools that can support change, including in the areas of knowledge development and research. Information about the dawn prayer time being too early has been circulating since the 2010s. Since then, many scientists and research institutions have conducted preliminary research on dawn times to validate whether this is indeed true. All of this must be proven through actual research and a sufficient amount of time. The uncertainty surrounding the dawn prayer schedule has led the public to continue using the old dawn prayer schedule. Referring to this event, this article is based on three arguments: First, the issue of the dawn prayer time in Indonesia being too early has caused confusion and concern among the public about the validity of their worship in the past. Second, numerous studies have discussed this issue, given the importance of determining the timing of dawn. This can address public concerns in accordance with clear field data and sharia principles according to the Qur'an and Hadith. Third, therefore, this study focuses on the Sharia basis used by the three institutions as the starting point for research on the presence of dawn. In addition, it will later compare each of these studies. Thus, the argument states that there is a need for further research on dawn.

B. Method

The research method used is qualitative research with the type of Library Research (literature study) and employs a comparative approach, namely by comparing research results, institutional perspectives, and the criteria for determining the time of dawn from the perspectives of fiqh and astronomy. The primary data used consist of interviews with informants from each institution, as well as the Ikhbar decision of Nahdlatul Ulama and the Tanfidz decision of Muhammadiyah. Meanwhile, the secondary data include scientific papers and books discussing the issue of the Fajr prayer time and the phenomenon of dawn. The data collection techniques include literature study of scientific sources, interviews, and documentation in the form of official decisions that contain reports of dawn observations that have been published. The data analysis method used is comparative analysis, namely by comparing the results of the decisions and interview findings in terms of their similarities, differences, strengths, and weaknesses from each decision that has been established.



C. Results and Discussion

1. Fajr Time in General

The determination of prayer times is an important aspect in the practice of worship in Islam. Among the prayer times that often receive attention in scholarly studies is the time of the Fajr prayer, as it is directly related to the phenomenon of the appearance of dawn. With the development of scientific knowledge today, the discussion of the beginning of the Fajr prayer time is not only studied from the perspective of fiqh, but is also analyzed through an astronomical approach to scientifically understand the phenomenon of dawn light. This study is important so that the determination of prayer times can be in harmony with the evidences of Islamic law while also being supported by scientific observations of natural phenomena. It has been explained in the Quran and Hadith that the sign of the beginning of the dawn prayer time is the presence of dawn. According to Fiqh Studies, dawn, according to language, is the illumination of the darkness of night by the light of morning²⁰. There are also two types of dawn, namely the first, Fajar Kadzib (al fajr al-awwal). Dawn, where the light comes in a spread (المستطيل), soaring into the sky like a wolf's tail. Second, Fajar Shadiq (al fajr ats – tsany). It was a spreading white light (المستطير) along the horizon²¹. In accordance with the hadith of the Prophet Muhammad (peace be upon him), said in his hadith which reads “The dawn prayer begins when dawn (shadiq) has broken until the sun has not yet risen (HR. Muslim)”²²

The scholars agree that the beginning of the dawn prayer is marked by the appearance of the true dawn. However, the majority of scholars differ on the virtue of the beginning of dawn, which is between *Ghalas* or and *Isfar* time. The word *Ghalas* comes from the word (*al-ghalas, at-taghlis*) meaning, literally, the darkness at the end of the night mixed with the light of dawn (*zhulmah akhira al-lail idza ikhtalathat bi dhau' ash-shabah*). In terms of terminology, *ghalas* means praying at the beginning of dawn when it is still dark. The word *Isfar* originates from the word (*al-isfar*). According to the language, which means clear and obvious (*wadhaha, inkasyafa*)²³. In terms of terminology, *isfar* means prolonging the recitation of the dawn prayer until the sky turns yellow or bright²⁴. Meanwhile, according to astronomical studies, Fajar shadiq can be understood as astronomical dusk (*Astronomical Twilight*). According to astronomy, twilight is divided into three parts. First, *Civil Twilight*. The sun's altitude is between 0° and 6° below the horizon (-6°). Second, *Nautical Twilight*, the sun's altitude is 6° - 12° below the horizon. Third, *Astronomical Twilight*, the sun's altitude is 12° - 18° below the horizon.

2. The basis of Sharia Fajr Time from the perspective of the Ministry of Religious Affairs of the Republic of Indonesia

The Ministry of Religious Affairs of the Republic of Indonesia is the ministry that directly supervises hisab rukyat in Indonesia. In determining the start time of prayer, especially the time

²⁰ Arwin Juli Rakhmadi Butar-butur, *Fajar Dan Syafak Dalam Kesarjanaan Astronom Muslim Dan Ulama Nusantara* (Lkis, 2018).

²¹ Butar-butur, *Fajar Dan Syafak Dalam Kesarjanaan Astronom Muslim Dan Ulama Nusantara*.

²² Akh. Mukarram, *Ilmu Falak* (Grafika Media, 2012).

²³ Butar-butur, *Fajar Dan Syafak Dalam Kesarjanaan Astronom Muslim Dan Ulama Nusantara*.

²⁴ Butar-butur, *Fajar Dan Syafak Dalam Kesarjanaan Astronom Muslim Dan Ulama Nusantara*.



for dawn prayer, the Indonesian Ministry of Religious Affairs explained that the predetermined criteria for dawn time are accurate at -20° . These criteria were established by Mr. Sa'adoeddin Djambek, who at that time served as Chairman of the Ministry of Religious Affairs' Hisab Rukyat Agency (BHR). These criteria were derived from the ideas of his teacher, Sheikh Thahir Djalaluddin, a prominent scholar at that time. Finally, these criteria were discussed with other BHR members and then decided upon. Next, observe the dawn directly. Then, the concept of dawn can begin with observation under conditions of pitch darkness, followed by the appearance of a vertical white light like a wolf's tail, which is called the false dawn. Until then, the intensity of the white light decreased to its lowest point, spreading along the horizontal horizon, and then brightened again. That is the true dawn²⁵ The legal basis used is Allah states in the Q.S. Al-Baqarah verse 187, "We were ordered to eat or drink when a white light has risen in the midst of the dark light, then that is dawn"²⁶.

So the reference used is the true dawn. Then, regarding the best time to perform the dawn prayer according to the Indonesian Ministry of Religious Affairs, the two hadiths about the times of Ghalas and Isfar are indeed contradictory, as explained by Mr. M. Fauzi: "There are two hadiths that are the same but contradictory. That is precisely why it becomes الجمع والتوفيق which means combining and synchronizing them without conflict. Because the Prophet himself once prayed in broad daylight, it was possible to recognize one another. But he also once prayed when it was impossible to recognize one another. It's the same time as dawn. Is that contradictory? Not at all. The darkness is the beginning of dawn, and the light is the end of dawn²⁷. From his explanation, the interpretations of these two hadiths appear to be very different, but the Ministry of Religious Affairs did not choose either one. This is because both have their merits.

3. The basis of Sharia Fajr Time from the perspective of Nahdlatul Ulama.

Nahdlatul Ulama is a community organization. It also has an astronomical institute to determine the laws of worship, such as prayer times. Following the announcement from the Nahdlatul Ulama government, they also set a criterion of -20° for the time of dawn prayer. As stated by Mr. Ma'rufin Sudibyoy in his explanation of the background of the -20° criterion, "The concept of prayer times was brought by Sheikh Thahir Djalaluddin. He was the most prominent scholar in Southeast Asia, until he finally came to Indonesia. With this concept of prayer times, these criteria are also widely used in astronomical books published by Islamic boarding schools²⁸. Mr. Ma'rufin Sudibyoy added that "The value of -20° used by Sheikh Thahir Djalaluddin is the result of his own observations". In Egypt, there are many great scholars, including Ibn Yunus, who said that the value for the beginning of dawn is -18° . In addition, a scholar named Syekh Ahmad Al-Marzuqi, who came from Morocco and lived in Egypt for some time, said that the value for the beginning of dawn is -20° . Therefore, these criteria need to be reviewed and

²⁵ M Fauzi, "Latar Belakang Kriteria Awal Waktu Subuh -20 Kementerian Agama RI," 2021.

²⁶ Fauzi, "Latar Belakang Kriteria Awal Waktu Subuh -20 Kementerian Agama RI."

²⁷ Fauzi, *Waktu Terbaik Awal Waktu Subuh*, 2021.

²⁸ Ma'rufin Sudibyoy, "Latar Belakang Kriteria Awal Waktu Subuh -20 Nahdlatul Ulama," 2021.



reexamined in Indonesia²⁹. This then became another reason to conduct further research on dawn. A formal study was conducted from June 2020 to February 2021. The study involved researchers in fiqh and falak who have been studying the topic of dawn in Indonesia over the past decade³⁰. This research was conducted in various regions in Indonesia with the support of research tools that covered all of them. After a prolonged period of research, Nahdlatul Ulama ultimately decided to continue using the -20° criterion. According to Nahdlatul Ulama, dawn is defined as a faint white light that spreads horizontally across the eastern horizon. Meanwhile, based on the latest astronomical observations in Indonesia, dawn occurs when the sun is at an altitude of -20° ³¹). The legal basis used is the same as that of the Ministry of Religious Affairs, namely Q.S. Al-Baqarah verse 187. What is different is the best time to perform the dawn prayer, which is stated in the hadith of the prophet Muhammad saw, which says, “We the believing women, once participated in the dawn prayer with the prophet saw while covering their faces with veils, then after the prayer they returned to their respective homes without anyone knowing because at that time it was still dark (HR. Bukhari)³².”

The above references explain the basis for these practices. Nahdlatul Ulama agrees that the dawn prayer begins with the appearance of the true dawn. The true dawn refers to when light appears on the eastern horizon, even though it is still faint and white. This corresponds to the time of galas. The above references explain the basis for these practices. Nahdlatul Ulama agrees that the dawn prayer begins with the appearance of the true dawn. The true dawn refers to when light appears on the eastern horizon, even though it is still faint and white. This corresponds to the time of galas.

4. The basis of Sharia Fajr Time from the perspective Muhammadiyah.

Muhammadiyah is a Muslim community organization. In determining prayer times, it used to follow the government's announcement, which was based on the criterion of the sun's altitude at the beginning of dawn, which was -20° . In 2009, an issue arose in an article published in Qiblatai magazine entitled “Misconceptions about the Time of Dawn” in Editions 8, 9, and 10, Volume 4. The article stated that the time of dawn in Indonesia was 24 minutes too early³³. With the emergence of this issue, Mr. Sriyatin Shodiq, as the Tarjih and Tajdid Council of the Muhammadiyah Central Leadership, when interviewed directly in the Lamongan Religious Court Chairman's Room, said, "In 2010, when the Tarjih and Tajdid Council held a National Conference (MUNAS) in Malang City, one of the topics discussed was the criteria for the time of dawn prayer. The results of the National Conference included the criteria for the time of dawn prayer. There was a change from -20° to -18° . However, when the decision was to be issued, the criteria reverted back to the original -20° . This was because some participants of the Tarjih National Conference were still unable to reach an agreement. Given such circumstances, Muhammadiyah revised the decision again. This is because every decision issued by

²⁹ Sudibyoy, “Latar Belakang Kriteria Awal Waktu Subuh -20° Nahdlatul Ulama.”

³⁰ Sudibyoy, “Latar Belakang Kriteria Awal Waktu Subuh -20° Nahdlatul Ulama.”

³¹ Sudibyoy, “Latar Belakang Kriteria Awal Waktu Subuh -20° Nahdlatul Ulama.”

³² Sudibyoy, “Latar Belakang Kriteria Awal Waktu Subuh -20° Nahdlatul Ulama.”

³³ Persis Persis, “Kontroversi Awal Waktu Subuh,” 2020.



Muhammadiyah must be agreed upon collectively, without any party raising objections”³⁴. As time passed, the issue resurfaced several years later. The Central Leadership of Muhammadiyah mandated three observatories under its auspices, namely ISRN Universitas Muhammadiyah Prof. Dr. Hamka Jakarta, OIF Universitas Muhammadiyah Sumatera Utara, and the Astronomy Study Center at Universitas Ahmad Dahlan Yogyakarta, to conduct research on the time of dawn. Finally, the results were recorded in the 2020 Tarjih National Conference, where there was a change in criteria from -20° to -18° . The factors are in accordance with sharia principles, observations, and the results of research by previous Muslim astronomers, most of whom said that dawn appears at an altitude of -18° or -19° ³⁵. The Sharia basis used by Muhammadiyah in determining the start of dawn and the best time for prayer is the same as that used by the Indonesian Ministry of Religious Affairs and Nahdlatul Ulama, namely Q.S. Al-Baqarah verse 187, which states that the appearance of the true dawn marks the start of dawn. And the best time to perform the dawn prayer according to Muhammadiyah is during the Ghalas time. According to the hadith of the Prophet Muhammad (peace be upon him), “The Prophet Muhammad (peace be upon him) sometimes performed the dawn prayer during the Ghalas time (the darkness of the last night has mixed with the morning light) and on other occasions when the light was already bright. After that, the Prophet Muhammad (peace be upon him) prayed during the Ghalas time until he died and never repeated the dawn prayer until the light was bright (Isfar time) (HR. Abu Daud)³⁶.

The beginning of dawn prayer time is marked by the appearance of the true dawn. This has been agreed upon by the three institutions mentioned above, which have conducted research over several years. The true dawn itself refers to the white light that stretches across the horizontal horizon, which is interpreted in accordance with the words of Allah SWT in Q.S. Al-Baqarah verse 187. The white light itself is a metaphor from the verse, which is a white thread. Therefore, there is harmony between Q.S. Al-Baqarah verse 187 and its interpretation. The best time to perform the dawn prayer, according to the Prophet, was during both of those times. However, after performing the dawn prayer once during Isfar, the Prophet then returned to performing the dawn prayer during Ghalas until his death. It can be concluded that the references and sources of Sharia used are more or less the same for the three institutions.

In addition to the legal basis, there are also observation results as validation and authentic evidence in conducting observations. The following are the observation results from each institution:

5. Astronomical Data Results from the Indonesian Ministry of Religious Affair.

³⁴ Sriyatin Shodiq, “Latar Belakang Dan Landasan Syar’i Kriteria Awal Waktu Subuh -18 Derajat Muhammadiyah,” 2021.

³⁵ Shodiq, “Data Pengamatan Waktu Subuh Muhammadiyah,” 2021.

³⁶ Shodiq, “Latar Belakang Dan Landasan Syar’i Kriteria Awal Waktu Subuh -18 Derajat Muhammadiyah.”

The following is a sample of SQM data and dawn image results for the sun elevation criterion value of -20° .

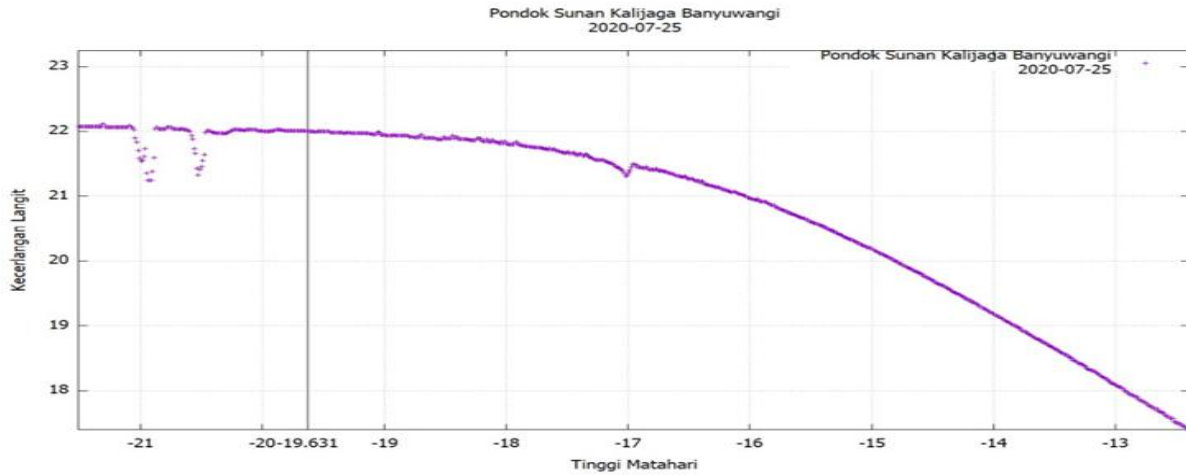


Figure 1.1 SQM Data July 25, 2020³⁷.



Figure 1.2 Results of Fajar Shadiq's Images³⁸

6. Astronomical Data Results from the Nahdlatul Ulama.

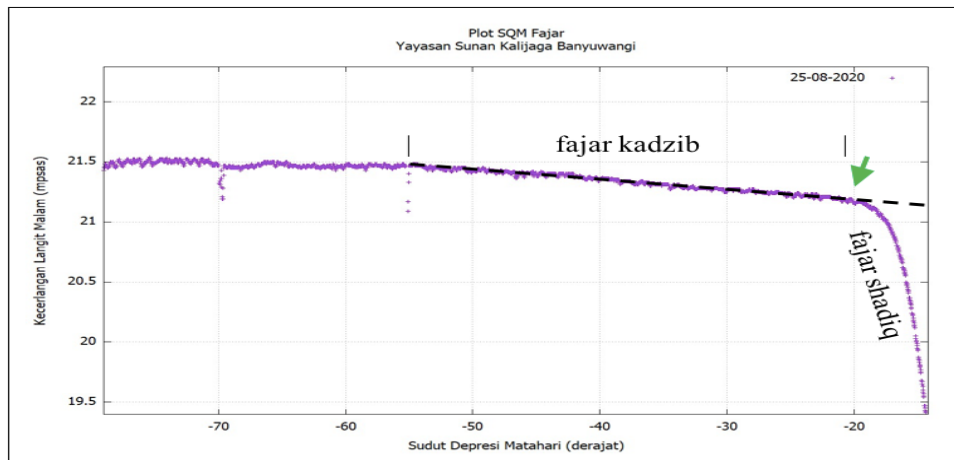
From the research results obtained, it was found that the criterion of -20° dawn shadiq had been met. These are the SQM data results and dawn image results obtained by the researchers.

³⁷ Fauzi, "Data Pengamatan Waktu Subuh Kementerian Agama RI," 2021.

³⁸ Fauzi, "Data Pengamatan Waktu Subuh Kementerian Agama RI."



Figure data by KH Zahid Moeidin



1.3 SQM recorded Ibnu Abdo El-

Banyuwangi³⁹



Figure 1.4 False dawn image results with an elevation of -21° (right) and a combination of false dawn and true dawn with an elevation of -16.9° (left)⁴⁰

7. Astronomical Data Results from the Muhammadiyah.

Muhammadiyah entrusted three observatories under the auspices of three Muhammadiyah universities to conduct research on the time of dawn. The following are the results of research conducted by three Muhammadiyah universities over several years. The results of the research are as follows:

³⁹ Sudibyo, "Hasil Kajian Awal Waktu Subuh Di Indonesia Oleh Lembaga Falakiyah PBNU," 2021.

⁴⁰ Sudibyo, "Hasil Kajian Awal Waktu Subuh Di Indonesia Oleh Lembaga Falakiyah PBNU."

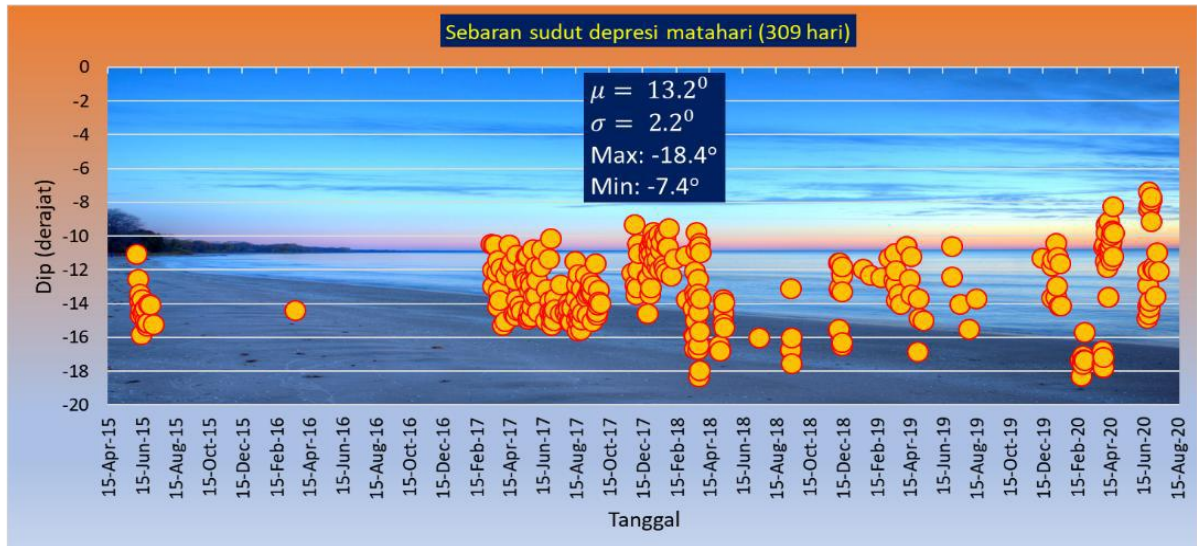


Figure 1.5 Sky Quality Measurement Data from ISRN⁴¹



Figure 1.6 Fajar Shadiq's image of Labuan Bajo when the Sun's altitude was -18° ⁴².

Based on interview data with the informant, the Indonesian Ministry of Religious Affairs conducted SQM observations and data collection. One of the data samples presented was taken on July 5, 2020, at the Sunan Kalijaga Islamic Boarding School in Banyuwangi, East Java. From this data, it can be seen that the SQM graph line of the Indonesian Ministry of Religious Affairs was interrupted at an altitude of -25° . The cause is suspected to be a network disruption in the SQM, or possibly at that time the SQM did not record data properly, or due to other factors. As a result, the graph line became unstable. Subsequently, the graph returned to normal. At an altitude of -20° , the SQM successfully captured an image of the true dawn, which serves as an indicator of the beginning of the dawn prayer time. According to the Indonesian Ministry of Religious Affairs, this is consistent with the results of the captured dawn image.

⁴¹ Shodiq, "Data Pengamatan Waktu Subuh Muhammadiyah."

⁴² Shodiq, "Data Pengamatan Waktu Subuh Muhammadiyah."



The next observation result is Nahdlatul Ulama. One of the SQM evidence presented is data on August 25, 2020, at the Sunan Kalijaga Islamic Boarding School in Banyuwangi, East Java. Are the SQM data, the graph are constant and stable at are -70° to -60° . Then the white light approached an altitude of -50° to -21° , which was detected as a false dawn. This was confirmed by the dawn image attached below. There was a white light rising upwards like a wolf's tail at a solar altitude of -21° . The true dawn appeared afterwards at a solar altitude of -20° according to the recorded SQM data and the dawn image, which showed the white light of the true dawn spreading along the horizontal horizon.

Not only Nahdlatul Ulama, but Muhammadiyah also participated in the initial observation of the dawn prayer time. In its observations, the minimum limit of true dawn (fajr shadiq) was recorded at -7.4° and the maximum limit at -20° . These SQM observation data were detected over a period of several years and were recorded by three institutions. Another factor is the research results from ITB astronomy experts, Dr. Dheni Herdiwijaya, M.Sc. and Dr. Mahasena Putra. Their findings state that the majority of the sun's altitude at dawn is -18° . This data was validated by the research results of other participants in the tarjih conference, such as Sugeng Riyadi, Bahrul Ulum, and Adi Damanhuri, who proposed the same criteria. Similarly, a study entitled "Relevance of the Sun's Altitude for Determining the Beginning of Fajr Prayer Times in Malaysia" by Moh Zambri Zainuddin et al. concluded that the sun's altitude at the beginning of dawn is -18° as a comparison. Several countries also use this criterion, such as Turkey, England, France, Nigeria, and Malaysia. Based on these factors, according to interviews with informants, Muhammadiyah decided on the -18° criterion. This was further supported by dawn imaging results, showing that when the SQM recorded data at a sun elevation of -18° , white light began to spread along the horizontal horizon, known as dawn twilight⁴³.

The results of the research conducted above should answer the trending issues circulating among the public. Based on these trend issues, there has been an impact on society to date. The following are some implications for the community. First, the community's anxiety or confusion about the validity of their prayers. Observations have been made for several years is a decision has been issued, thereby addressing the community's concerns. Second, questions arose again regarding Muhammadiyah's decision to delay dawn prayers by eight minutes, which led to speculation among certain groups in society because the decision differed from that of the Indonesian Ministry of Religious Affairs and Nahdlatul Ulama. This had an impact on people's worship practices. Third, there is a lack of education regarding the fiqh of prayer times, so it is appropriate to educate the public on this subject. One of the objectives is to dispel public debates.

8. Comparative Analysis of Determining the Criteria for the Height of the Sun at Dawn from the Perspective of the Indonesian Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah

⁴³ Shodiq, "Data Pengamatan Waktu Subuh Muhammadiyah."



As explained, the similarities and differences between each organization's opinions on the criteria for determining the time of dawn will now be presented. The following are the similarities and differences between the three criteria for the height of the sun at dawn:

a. Evidence of the similarity of the three criteria for the height of the Sun at dawn

No.	Aspect	Indonesian Ministry of Religious Affairs	Nahdlatul Ulama	Muhammadiyah
1	Sharia Basis For Dawn Time	The Dawn of Truth Rises from the Horizon	The Dawn of Truth Rises from the Horizon	The Dawn of Truth Rises from the Horizon
2	Primary Instrument Used	Sky Quality Meter (SQM)	Sky Quality Meter (SQM)	Sky Quality Meter (SQM)
3	Decision Results	It's decided	It's decided	It's decided
4	Authentic Evidence of Decision Results	In the form of a book written by Sa'adoeddin Djambek entitled prayer and fasting in the polar regions and the ephemeris book hisab rukyat published by the Director General of Islamic Community Guidance, Ministry of Religion of the Republic of Indonesia.	1 Bundle of Preliminary study results on dawn prayer times in Indonesia.	Tanfidz Munas Tarjih regarding the criteria for the start of the dawn prayer time

b. Evidence of differences in the three criteria for the height of the Sun at the beginning of dawn.

No.	Aspect	Indonesian Ministry of Religious Affairs	Nahdlatul Ulama	Muhammadiyah
1	Background to establishing these criteria	From the determination of the Ministry of Religion's Rukyat Hisab Institution (BHR)	From the determination of the Ministry of Religion's Rukyat Hisab Institution (BHR)	Starting with the issue of dawn being too early, further research was conducted and new criteria were developed. This was also supported by research by muslim astronomers of the time, which also produced similar criteria.
2	The Best Time to Perform The Dawn Prayer.	<i>Ghalas and Isfar Time</i>	<i>Ghalas Time</i>	<i>Ghalas Time</i>
3	Secondary Instrument Used	Raspberry Camera is a built-in camera on Raspberry Computers.	Digital Camera	DSLR Camera
4	Characteristics of The Research Location	The condition of the eastern horizon sky is free from light pollution	The research location must be dark with a maximum Bortle scale of 3. The research location is far from light pollution, Both permanent urban light and light such as vehicle headlights. The research location must also not be covered by thick initial attacks.	The research SOP is completely left to each observatory, therefore regarding the criteria for research locations, there are no provisions to avoid certain areas.
5	The Results of The Criteria for The Elevation of The Sun at The Stat of Dawn That Were Obtained	-20°	-20°	-18°



c. Analysis of the Advantages and Disadvantages of Determining the Criteria for the Height of the Sun at Dawn from the Perspective of the Indonesian Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah.

1) Ministry of Religious Affairs of the Republic of Indonesia

According to the research conducted by the Indonesian Ministry of Religious Affairs, there are both advantages and disadvantages. The advantages are that the sharia basis used is in accordance with the Quran and hadith, and the primary instruments used to collect data are adequate for conducting research under current conditions. This is because SQM is one of the best tools currently available for conducting research at the time of dawn prayer. This is also supported by the selection of a research location that is free from light pollution, as well as authentic evidence in the form of an ephemeris book on hisab rukyat and a book written by Sa'adoeddin Djambek entitled *Shalat dan Puasa Di Daerah Kutub* (Prayer and Fasting in the Polar Regions). Both books list the initial criteria value for dawn time of -20° and the reasons for it, which is an advantage of the dawn time research conducted by the Indonesian Ministry of Religious Affairs.

Meanwhile, the shortcoming of this dawn research is its secondary instrument, namely the Raspberry Pi camera. This camera is built into the Raspberry Pi computer. The classification of this camera makes the research less than optimal.

2) Nahdlatul Ulama

The results of research conducted by Nahdlatul Ulama have both advantages and disadvantages. The strengths are that the sharia basis used is in accordance with the Quran and hadith, the instruments used are up to date and very adequate for conducting research at dawn. The research location also supports this, as it is well-suited for obtaining satisfactory results. When linking the sharia basis for the start of dawn and the basis for the best time, the primary instruments and dawn image results are in accordance. So, when the SQM criterion value is -20° , the shadiq dawn light appears at the time of ghalas (darkness at the end of the night). The study also presents the results of the early dawn time study as authentic evidence from the dawn time re-study. Regarding the shortcomings of this study, the author's analysis has not found any shortcomings related to this study.

3) Muhammadiyah

The advantage is that the Sharia basis used is in accordance with the Quran and Hadith, and the primary and secondary instruments employed are suitable for conducting research at dawn to obtain the best results. When linking the Sharia basis for the beginning of dawn and the basis for the best time, the primary instruments and the dawn image results are appropriate. Therefore, when the SQM criterion value is -18° , the true dawn light appears at the time of ghalas (darkness at the end of the night). This is supported by the written *tanfidz* regarding the criteria for dawn time, which serves as authentic evidence of the results of the dawn time research that has been conducted.

Regarding the shortcomings of this study, there may be a lack of Standard Operating Procedures (SOP) or standard rules regarding research and of dawn as determined by the Tarjih and Tajdid Council of the Muhammadiyah Central Leadership. This is necessary so that the



results of the research conducted by the three observatories can consistent with those of the Standard Operating Procedures (SOP).

The research results from the three institutions are essentially in accordance with sharia provisions, particularly in determining the sun's altitude at the beginning of dawn. Each study has its own strengths, both in terms of methodology and the scope of its coverage. Some studies were conducted across a wider range of locations, while others were limited to specific areas. Therefore, all of these research findings can be regarded as equally valuable and reliable (ṣādiq) contributions in the effort to determine the time of dawn more accurately, although there is still room for further development through broader and more comprehensive studies in the future.

After reviewing and studying the criteria for the height of the sun at dawn from the perspective of the Indonesian Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah. There is a need to develop Standard Operating Procedures (SOPs) for research on the time of dawn prayer as at for anyone who wishes to conduct research on the time of dawn prayer at order to obtain maximum results. These SOPs for research on the time of dawn prayer can be formulated by the Indonesian Ministry of Religious Affairs and representatives from community organizations. Once formulated, it is hoped that these SOPs for dawn prayer time research can be ratified and formalized by the Indonesian Ministry of Religious Affairs as the policy maker in religious affairs in this country. After that, the SOP for research during dawn has been finalized, so it is hoped that in conducting research in the future, it will be possible to expand the coverage of areas in Indonesia that can be used as research sites in accordance with the SOP that has been formulated. This is to ensure the best results.

D. Conclusion

According to the Ministry of Religious Affairs of the Republic of Indonesia, Nahdlatul Ulama, and Muhammadiyah, the beginning of dawn (Fajr) is determined based on the Qur'an and hadith, namely the appearance of the true dawn (fajr ṣādiq) on the eastern horizon as stated in Q.S. Al-Baqarah verse 187. This dawn is preceded by the false dawn (fajr kādhib), followed by the true dawn as a sign of the start of the Fajr prayer time. The three institutions share similarities in their basic principles and general methods, but differ in the criteria for the sun's altitude, the sharia basis regarding the preferred time for performing the Fajr prayer, supporting instruments, and research approaches. The Ministry of Religious Affairs recognizes both ghalas and isfar, while Nahdlatul Ulama and Muhammadiyah place greater emphasis on ghalas. Although the research results of all three are considered valid and accountable, each has its own strengths and limitations, including in terms of the scope of research coverage. Therefore, there is a need to develop Standard Operating Procedures (SOPs) for Fajr time research, formulated by the Ministry of Religious Affairs in collaboration with community organizations, so that they can become official standards capable of improving the quality and expanding the scope of future research.

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