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Investigating the Variances of Maghrib Prayer Time in Indonesia and Malaysia

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Abstract

The determination of the beginning of Maghrib prayer time is crucial, as it is directly related to the position of the Sun on the western horizon. Indonesia sets the Maghrib time when the Sun is at the proper position of -1 degree or -0° 50', along with elevation and atmospheric refraction corrections. In contrast, Malaysia adds approximately two minutes after sunset without defining a specific angular position, considering local elevation and atmospheric factors. This study aims to comparatively analyze the methodologies used by Indonesia's Ministry of Religious Affairs and Malaysia's JAKIM through a library research approach, employing both philosophical-normative and astronomical perspectives. Data were collected from interviews and Islamic astronomy documents. The findings show that while both countries agree on the Islamic legal principle that Maghrib begins when the Sun has fully set, technical differences in calculation methods reflect their respective approaches to integrating religious texts with astronomical precision.

Keywords: Maghrib prayer time, Indonesia, Malaysia.

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Penentuan awal waktu salat Maghrib sangat penting karena berkaitan langsung dengan posisi Matahari di ufuk barat. Indonesia menetapkan waktu Maghrib saat Matahari berada pada posisi hakiki -1 derajat atau -0° 50', disertai koreksi ketinggian tempat dan refraksi. Sebaliknya, Malaysia menambahkan sekitar dua menit dari waktu terbenam hakiki tanpa menetapkan posisi sudut tertentu, dengan mempertimbangkan tinggi lokasi dan faktor atmosferis. Penelitian ini bertujuan menganalisis secara komparatif metodologi yang digunakan Kementerian Agama RI dan JAKIM Malaysia melalui studi pustaka dengan pendekatan filosofis-normatif dan astronomis. Data dikumpulkan dari wawancara serta dokumen falak dan astronomi. Hasilnya menunjukkan bahwa meskipun kedua negara sepakat dalam prinsip *syar'*i bahwa Maghrib dimulai saat Matahari benar-benar terbenam, perbedaan teknis dalam metode perhitungan menunjukkan pendekatan masing-masing terhadap integrasi dalil agama dan ketepatan astronomis.

Kata Kunci: waktu Maghrib, Indonesia, Malaysia.

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A. Introduction

One of the essential conditions for the validity of performing the five daily prayers is that the prayer must be performed within its prescribed time. Entering the proper time is a prerequisite for the validity of each prayer, and any prayer performed outside its allotted time is considered invalid. The general determination of prayer times has been outlined in the Qur'an and explained in detail in the Hadiths of the Prophet Muhammad. One of the obligatory prayers prescribed by Allah is the Maghrib prayer, which begins at sunset and lasts until the red twilight disappears.

In addition to marking the permissible time to perform the Maghrib prayer, the Maghrib time also signifies the moment to break the fast. If someone deliberately breaks their fast before the Maghrib time begins, the fast becomes invalid, even slightly. If someone is uncertain whether Maghrib has already started and still decides to break their fast, they must make up for that day unless they can confirm that the time has entered. Essentially, the Maghrib time begins when the upper disk of the Sun has completely set, as emphasized by the Prophet (PBUH), who warned against praying. In contrast, the upper rim of the Sun is still visible since sunrise and sunset occur between the horns of *Satan*.[1]

From an astronomical perspective, Maghrib begins when the true solar position reaches approximately -1° below the horizon, in a generalized explanation. In Indonesia, the Maghrib prayer schedule uses the actual solar position of -1° or -0° 50' or applies correction formulas for the Sun's rising and setting altitude. However, in other countries such as Malaysia, the approach differs; Malaysia does not use the exact -1° position but instead adds approximately 2 minutes to the time when the Sun is observed to set, which is when the solar position lies between 0° and -1°.[2]

This discrepancy raises questions regarding the methodologies adopted by the two countries and the basis for their application. For example, on May 18, 2025, the Maghrib prayer time in Kuala Lumpur, Malaysia, is scheduled for 19:20 local time, at which point the Sun's actual position is between 0° and -1°, meaning it has not yet reached -1° as applied in Indonesia. The methodology for determining Maghrib time in Malaysia differs from that used in Indonesia. Such methodological differences in determining Maghrib time are directly related to the permissibility of performing the Maghrib prayer and breaking the fast. These are significant matters in a Muslim's worship and can affect the validity of prayer and fasting.

This research is particularly urgent due to the large number of Indonesian residents living in Malaysia, either for educational or work purposes. These individuals require accurate time calculations for prayer, *saḥūr*, and *iftar*. Approximately 2.5 million Indonesians reside in Malaysia. Indonesians and Malaysians share common cultural roots and follow the same school of Islamic jurisprudence. Both countries are members of MABIMS (Ministers of Religious Affairs of Brunei, Indonesia, Malaysia, and Singapore) and are responsible for determining the Islamic calendar. Indonesia and Malaysia are both Muslim-majority countries. This study further investigates the differences between the two nations in terms of *fiqh* and astronomy. The researcher seeks to gather data and religious evidence to explain why such methodological differences exist and to evaluate

[1] Moch. Riza Fahmi, "Studi Komparasi Jadwal Salat Sepanjang Masa H . Abdurrani Mahmud Dengan Hisab Kontemporer," *Jurnal Bimas Islam* 10, no. 3 (2017): 565–90.

[2] Fitriyani & Syaifur Rizal Fahmy, "Program Digital Prayer Time Dalam Penentuan Waktu Salat," *Ulul Albab: Jurnal Studi Dan Penelitian Hukum Islam* 2, no. 2 (2019): 59–79.

which methodology is stronger and closer to accuracy based on each country's foundational approach.

B. Method

This research falls under the category of library research, in which the author utilizes books, archives, documents, and records.[3] It is a qualitative study employing a philosophical-normative and astronomical approach. The research focuses on examining the object of study, namely the determination of the beginning time of Maghrib prayer in Indonesia and Malaysia. The primary data consists of interview documents from relevant parties, including experts in Islamic astronomy in both Indonesia and Malaysia, namely Thomas Djamaluddin (member of Hisab Rukyat Kementerian Agama RI) and Roslan Umar (member of Jabatan Kemajuan Islam Malaysia-JAKIM). Secondary data is derived from various writings, documents, and literature on the research subject.[4] In this study, the data collection techniques used are interviews and documentation.[5] The data analysis method involves a philosophical-normative approach to understanding the meaning, essence, or core of the Islamic legal provisions. Meanwhile, the astronomical approach is applied not only to comprehend matters related to the apparent daily motion of the Sun but also to serve as a foundation, particularly in translating those legal provisions into calculation formulas.

C. Result and Discussion

1. The Beginning of Maghrib Prayer Time: Insights from Islamic Jurisprudence

The *fuqahā'* (Islamic jurists) determined the prayer schedule based on verses from the Qur'an and the Hadiths of Prophet Muhammad, thus formulating prayer times by the textual evidence found in these sources using methods that are practical and easy to apply. As indicated in the Hadith texts, the *fuqahā'* established prayer times by directly observing the Sun's movement with the aid of a gnomon (*istiwā'* stick). Although the Qur'an does not explicitly outline the exact times of prayer, it implicitly indicates them. The details of prayer times are clarified through Hadiths, which are in line with one of the functions of the Hadith—to explain the meanings contained in the Qur'an.[6]

The following Qur'anic verses contain implicit meanings related to the prayer schedule: al-Qur'an, Surah *Hūd*, (11/114):

> *"And establish prayer at the two ends of the day and at the approach of the night. Indeed, good deeds do away with misdeeds. That is a reminder for those who remember."* (QS. Hūd/11:114).[7]

There are differing interpretations among exegetes (*mufassirīn*) regarding the phrase *"wa aqimiṣ-ṣalāta ṭarafayi an-nahār"* (establish prayer at the two ends of the day). Some say it refers to the evening (Maghrib) and morning (Fajr) prayers. Others interpret the two ends of the day as Zuhr

[3] Bungaran Antonius Simanjuntak dan Soedjito Sosrodihardjo, *Metode Penelitian Sosial* (Jakarta: Yayasan Pustaka Obor Indonesia, 2009), h. 38; Jusuf Soewadji, *Pengantar Metodologi Penelitian* (Jakarta: Mitra Wacana Media, 2012), h. 34.

[4] Saifuddin Azwar, *Metode Penelitian* (Yogyakarta: Pustaka Pelajar, 2014), h. 91.

[5] M. Djunaidi Ghony & Fauzan Almanshur, *Metodologi Penelitian Kualitatif*, ed. Ar-Ruzz Media (Yogyakarta: Ar-Ruzz Media, 2016), 199.

[6] Ahmad Izzuddin, *Ilmu Falak Praktis* (Semarang: Pustaka Rizki Putra, 2012), h. 80-81.

[7] Kementerian Agama RI, *Al-Qur'an Dan Tafsirnya Jilid 4* (Jakarta: Kementerian Agama RI, 2012), h. 483.

and ʿAsr, as they are related to the phrase *"wa zulafan mina al-layl"* (and at the approach of the night), which includes Maghrib, ʿIshāʾ, and Fajr. However, according to al-Ṭabarī, the correct interpretation is that *"ṭarafayi an-nahār"* refers to Maghrib prayer. The phrase *"wa zulafan mina al-layl"* is understood by al-Ṭabarī to refer to the ʿIshāʾ prayer, as it is the last prayer performed after the beginning of the night.[8]

Regarding Maghrib, Jibril's guidance was clear: "*When the Sun had set, he said, 'Stand and pray, Maghrib.' The Prophet prayed it as soon as the Sun had fully set*." This Hadith highlights the precise moment for Maghrib prayer—immediately after the sun has completely set, marking the transition from day to night. It serves as a clarification of the Qur'anic injunction by indicating that Maghrib begins right after sunset and continues until the twilight disappears. Moreover, Jibril's statement at the end of this narration—"The" *time for each prayer is between the two times that I showed" you"*—confirms the flexibility within the permissible timeframes for each prayer, including Maghrib. This integration of Qur'anic guidance with the Prophetic tradition (Sunnah) forms a comprehensive understanding of prayer times in Islamic law, ensuring both accuracy and clarity for believers. This verse highlights the importance of observing the various prayer times throughout the day, including the prayer at sunset, which is known as Maghrib.[9]

Based on these Hadiths, the *fuqahā* concluded that the times for obligatory prayers follow continuously from the arrival of Zuhr until the end of Fajr, which is marked by the rising of the Sun. The obligation to perform the prayers within the designated period is considered a *wājib muwassa'an*—the obligation is fulfilled as long as the prayer is performed within that time frame.

As for the statement of the Prophet, "*fainnaha tathlu'u baina qornai syaithanin,"* some interpret "horns" metaphorically as referring to his followers or sects. Others take it literally, referring to actual horns on Satan's head. The idea is that at that moment, Satan draws close to the Sun so that those among the disbelievers who bow to it appear to be bowing to him. During this time, Satan and his followers are believed to have the power to disturb the worship of others. For this reason, prayer at that time was discouraged, just as it was discouraged to pray in places inhabited by devils.[10]

Abdurrahman al-Jazīrī, in his book *al-Fiqh ʿalā al-Madhāhib al-Arbaʿah*,[11] explains that prayer times can be determined through five methods. Firstly, the use of astronomical calculations, which rely on established and accurate methods, allows for the identification of *sharīʿah*-compliant prayer times, and these calculations are widely used in both cities and villages. Secondly, the observation of the Sun's decline from its zenith, marked by the appearance of shadows, signals the beginning of Zuhr and, subsequently, ʿAsr. Thirdly, the setting of the Sun marks the commencement of Maghrib. Fourthly, the disappearance of the red twilight (*shafaq*) indicates the start of ʿIshāʾ. Lastly, Fajr begins with the appearance of the white dawn light on the eastern horizon. This holistic approach combines natural observation and scientific calculation for precise prayer timing.

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[8] Abu Ja'far Muhammad bin Jarir Al-Thabari, *Tafsir Al-Thabari*, Jilid 4 (Beirut: Muassasah al-Risalah, 1994), h. 317-318.

[9] Al-Hafiz Jalal al-Din Al-Suyuthi, *Sunan Al-Nasa'i Bi Syarhi Al-Hafidz Jalalu Al-Din Al-Suyuthi Wa Hasyiyatu Al-Imam Al-Sindi*, Juz 1 (Halab: Maktab al-Mathbu'at al-Islamiyyah, n.d.), h. 263.

[10] Muhyiddin Yahya bin Syaraf An-Nawawi, *Shahih Muslim Bi Syarhi An-Nawawi*, Jilid 5 (Muassasah Qarthabah, 1994), h. 157-158.

[11] Abdurrahman Al-Jazairī, *Al-Fiqh 'Alā Al-Mazahib Al-Arba'Ah*, 1st ed. (Beirut-Libanon: Dar al-Kutub al-Ilmiyah, 2003), h. 166.

From the perspective of the *fuqahā*, the beginning of prayer times still adheres to the tradition of *rukyat* (direct observation). This statement means the time is determined when the natural signs mentioned in the Hadiths become visible. Zuhr time begins when the Sun has passed its zenith until the shadow of an object is equal to its length, or until ʿAsr begins. This happens when the latitude of a location differs from the Sun's declination so that at Zuhr, a vertical object already casts a shadow. To know that the Sun has passed its zenith, one must observe the shadow of a vertical object. When the shadow shortens to its minimum (on days when it doesn't vanish completely) or reappears after disappearing, then Zuhr time has begun.[12] As for ʿAsr, it is determined by the length of the shadow. The majority of scholars (Shāfiʿīs, Mālikīs, Hanbalīs) agree that ʿAsr begins when a vertical object's shadow equals its length—provided that no shadow existed at zenith. However, Ḥanafī scholars hold that ʿAsr time starts when the shadow is twice the object's length. The majority also holds that ʿAsr ends at sunset.[13]

Maghrib time is determined by observing the Sun when its entire disk has set below the western horizon. This marks the beginning of Maghrib and continues until the red twilight disappears. The disappearance of the red twilight, caused by sunlight scattering through particles in the Earth's atmosphere, signifies the end of Maghrib and the beginning of 'Ishā'. This twilight is clearly visible in the western sky. On the other hand, Fajr begins with the appearance of white light that spreads horizontally along the eastern horizon. This white dawn light indicates the start of the pre-dawn prayer and is distinctly different from the vertical column of light seen before true dawn. These natural phenomena guide the determination of precise prayer times.[14]

In summary, the limits of prayer times within Islamic jurisprudence are fundamentally tied to observable solar events throughout the day, including the Sun's shadow, the complete disappearance of its disk, and the effects of light refraction in the atmosphere. The classical scholars (*fuqahā*) have offered a range of interpretations concerning the evidence for these prayer time boundaries, especially regarding ʿAsr and 'Ishā' prayers. These interpretative differences reflect the diversity of scholarly thought and the dynamic nature of *ijtihād* (independent legal reasoning) that has evolved across generations. Rather than being viewed as contradictions, these differences should be embraced as an intellectual heritage of the Muslim community, showcasing the depth and flexibility of Islamic legal scholarship. This broad spectrum of understanding underscores the importance of continuous learning and mutual respect for varying interpretations in the ongoing development of Islamic jurisprudence.

2. Astronomical View on Maghrib Prayer Time

In determining the commencement of prayer times, the fundamental basis of calculation is the Sun's orbit or its apparent movement relative to the Earth and the Sun's position within the horizon coordinate system—particularly its altitude or zenith distance during sunrise, solar culmination (when the Sun crosses the meridian), sunset, the end of twilight, and the appearance of dawn (morning twilight).[15] Determining the start of prayer times is a crucial aspect of religious

[12] Teungku Mustafa Muhammad Isa Pulo, *Fiqih Falakiyah* (Yogyakarta: Deepublish, 2016), h. 33-36.

[13] Arwin Juli Rakhmadi Butar-Butar, *Pengantar Ilmu Falak Teori Dan Praktik* (Medan: LPPM UISU, 2016), h. 38; .

[14] Butar-Butar. h. 38-41.

[15] Thomas Djamaluddin, "Hisab Waktu Salat Dalam Kajian Astronomi," in *Lokakarya Imsakiyah Ramadhan 1432 H* (Semarang: PPM IAIN Walisongo Semarang, 2011); Frengky Suleman, "Penentuan Awal

practice for Muslims. Among the five obligatory prayer times, the Maghrib prayer holds a distinct position because it is marked by the setting of the Sun. From an astronomical perspective, the determination of Maghrib time is made by observing the geometric position of the Sun relative to the horizon. This approach enables precise determination of Maghrib time and can be universally applied across different regions of the Earth, regardless of weather conditions or visual obstructions.[16]

The beginning of Maghrib prayer time is marked by the setting of the Sun. The Sun is considered to have set when the upper edge of its disc is aligned with the visible horizon. At that moment, the Sun's center is located at a distance equal to its semi-diameter (SD) below the horizon. Since the average solar semi-diameter is approximately 32 arcminutes, the distance from the horizon to the Sun's center at this point is ½ × 32' = 16'.[17] Furthermore, due to atmospheric refraction—the bending of light—when the upper edge of the solar disc appears to touch the horizon, its actual position is even lower—celestial objects located near the horizon experience the most significant amount of refraction, approximately 34.5 arcminutes. Consequently, at sunset, the upper edge of the solar disc is 34.5' below the horizon, and the center of the Sun is 34.5' + 16' = 50.5' below the horizon.[18]

In conclusion, determining the commencement of Maghrib prayer time holds great importance in Muslim religious practice and is deeply rooted in astronomical principles. The setting of the Sun, as observed when its upper limb aligns with the visible horizon, signifies the beginning of Maghrib. However, factors such as the Sun's semi-diameter and atmospheric refraction add complexity to this seemingly straightforward event. Astronomical analysis reveals that the Sun's center is positioned at 50.5 arcminutes below the horizon at the moment of sunset, accounting for both the semi-diameter and the significant atmospheric refraction that affects celestial objects near the horizon. This careful consideration ensures precise determination of prayer times regardless of geographical location, weather, or visibility. By applying this universal, scientifically grounded approach, Muslims around the world can observe Maghrib prayer at the correct time, upholding the importance of consistency and accuracy in religious observance. Thus, astronomical calculations play an essential role in integrating science into Islamic practice.

Waktu Shalat," *Jurnal Ilmiah Al-Syir'ah* 9, no. 2 (2011): 1–14, https://doi.org/http://dx.doi.org/10.30984/as.v9i2.31..

[16] Moh Yusuf Faizin, Muhammad Himmatur Riza, and Muhammad Habibur Rahman, "Dinamika Waktu Imsak Pada Jadwal Imsakiyah Ramadan," *Al-Marshad: Jurnal Astronomi Islam Dan Ilmu-Ilmu Berkaitan* 7, no. 2 (2021): 151–61; Nailur Rahmi dan Firdaus, "An Analysist Of Sa'adudin Djambek's Hisab Method About All The Time Of Praying Schedule," *Al-Hilal: Journal of Islamic Astronomy* 2, no. 1 (2020): 15–38.

[17] Ahmad Musonnif, *Ilmu Falak* (Yogyakarta: Teras, 2011), h. 73; Ismail, "Akurasi Waktu Jam Masjid Di Kota Lhokseumawe," *Jurnal Al-Ijtimaiyyah* 6, no. 1 (2020): 75–90; Ismail, "Dinamika Jadwal Waktu Salat Di Indonesia" (UIN Walisongo Semarang, 2021); Ismail & Husnaini, "Aktualisasi Jadwal Salat Sepanjang Masa Abu Muhammad Isa Mulieng Aceh," *Islamic Review: Jurnal Riset Dan Kajian Keislaman* 10, no. 1 (2021): 93–110, https://doi.org/10.35878/islamicreview.v10i1.245..

[18] Musonnif, *Ilmu Falak;*Riza Afrian Mustaqim, "Relevansi Jadwal Waktu Salat Sepanjang Masa," *Jurnal Alwatzikhoebillah : Kajian Islam, Pendidikan, Ekonomi, Humaniora* 6, no. 2 (2020): 22–34; Muhammad Himmatur Riza, Thomas Djamaluddin, and Ahmad Izzuddin, "Transformation of Prayer Time Schedules: From A Static-Passive to A Dynamic-Variative Perspective," *Ulul Albab: Jurnal Studi Dan Penelitian Hukum Islam* 6, no. 1 (2024): 39, https://doi.org/10.30659/jua.v6i1.22826..

3. Approaches to Defining Maghrib Time in Indonesia and Malaysia

Determining the beginning time for prayer is an essential part of Islamic worship that must comply with Shariah requirements and be scientifically verifiable through astronomical approaches. The Maghrib prayer, in particular, has a relatively short time window, making it essential to establish its timing accurately. In Indonesia and Malaysia, the methodology for determining the start of Maghrib prayer shows similarities in basic principles but differs in technical approaches and the implementing authorities. According to Islamic law, the Maghrib prayer begins when the Sun sets below the horizon. This definition is universally upheld in the Islamic jurisprudence schools, including the Shafi'i school, which is dominant in Indonesia and Malaysia. The Prophet Muhammad said, "*When the night comes from this direction and the day has passed from that direction, and the Sun has set, then the fasting person may break the fast*". This Hadith serves as the primary evidence for determining Maghrib's start time.

From an astronomical perspective, sunset occurs when the upper limb of the Sun's disk has fully passed below the observable horizon line. The Ministry of Religious Affairs of the Republic of Indonesia and the Department of Islamic Development Malaysia (JAKIM) use this parameter as the starting point for calculating Maghrib time.[19] Indonesian The Ministry of Religious Affairs, through the Directorate General of Islamic Community Guidance, sets prayer time criteria by utilizing astronomical data from contemporary true calculations. The calculations are based on the Sun's ephemeris, geographic position, and local time converted according to the regional time zone.[20] Meanwhile, JAKIM Malaysia refers to calculation methods using software such as Falak Online and astronomical data sources from the Department of Survey and Mapping Malaysia (JUPEM)[21]. Both countries adopt the contemporary proper calculation approach (*ḥisāb ḥaqīqī*), which uses astronomical data verified by observations (*rukyat*). However, *rukyat* is mainly applied to determine the start of Ramadan and Shawwal. Calculations of prayer times are considered sufficient for mass and systematic use.[22]

Regarding astronomical criteria, in Indonesia, the Ministry of Religious Affairs relies on contemporary accurate calculation, utilizing modern astronomical data such as ephemeris and astronomical software in determining prayer times.[23] The Maghrib criteria in Indonesia begin when the Sun is precisely at sunset azimuth and its altitude is 0° with a refraction correction of approximately -0°50'. This methodology has been formalized in guidelines issued by the Directorate General of Islamic Community Guidance, including parameters for specific locations and elevations. The determination is predictive and based on highly accurate data from national astronomical agencies such as LAPAN (National Institute of Aeronautics and Space) and BMKG (Meteorology, Climatology, and Geophysical Agency).[24]

On the other hand, Malaysia, through JAKIM, also applies calculation methods oriented to astronomical data. However, in setting Maghrib time, JAKIM uses a standard solar altitude value of

[19] M. Hisyam, *Ilmu Falak: Teori Dan Praktik* (Jakarta: Rajagrafindo, 2018)h. 122.
[20] Kementerian Agama RI, *Pedoman Hisab Rukyat Indonesia* (Jakarta: Ditjen Bimas Islam, 2020).
[21] JAKIM, *Manual Penentuan Waktu Solat Malaysia* (Putrajaya: Bahagian Falak JAKIM, 2019).
[22] Lajnah Falakiyah NU, *Modul Pelatihan Hisab Rukyat* (Surabaya: LFNU, 2021).
[23] Kementerian Agama RI, *Pedoman Hisab Rukyat Indonesia*.
[24] Badan Meteorologi Klimatologi dan Geofisika, *Almanak 2022* (Jakarta: BMKG, 2021); Thomas Djamaluddin, "Metodologi Penentuan Awal Maghrib Di Indonesia."

0°50' below the horizon without applying complex corrections for each location.[25] Malaysia only uses a reference of 300 meters above sea level elevation, plus an additional one minute.[26] Although there are technical differences, from a Shariah perspective, both refer to the same principle: the setting of the Sun. These differences mainly relate to the accuracy of data and differing astronomical interpretations of the sunset phenomenon.

Regarding accuracy, Indonesia's approach can be considered more complex as it accounts for many local factors such as elevation, refraction, and terrain contours. Meanwhile, Malaysia's approach uses a simpler, standardized national reference that is easier to apply widely.[27] Indonesia has prayer time standards implemented in the Indonesian Ministry of Religious Affairs' prayer schedule software, which is regularly updated using astronomical formulas such as the equation of time, solar declination, and latitude corrections. [28] Conversely, through JAKIM, Malaysia also establishes fixed schedules based on place coordinates, compiled through collaboration between state muftis and Islamic astronomy institutions like the University of Malaya and USIM.[29]

One notable difference is in field validation methods. In Indonesia, field observations for Maghrib prayer times are generally conducted in training and research contexts but have not yet become a national standard. In contrast, in Malaysia, JAKIM cooperates with the State Mufti Council to periodically validate prayer times through field observations (*rukyah* of prayer times).[30]

To identify the differences in the beginning time of Maghrib in Indonesia and Malaysia, the author presents them in table form on several selected days:

Table 1. Comparison of Maghrib Prayer Time

Date/Country	Indonesia (GMT+7)	Malaysia (GMT+8)
August 08, 2024	17:58	19:17
September 09, 2024	17:54	19:07
October 10, 2024	17:49	18:56
November 11, 2024	17:51	18:52
December 12, 2024	18:04	19:01
January 1, 2025	18:14	19:11
February 2, 2025	18:20	19:21
March 3, 2025	18:14	19:21
April 4, 2025	18:00	19:13
May 5, 2025	17:49	19:09

[25] JAKIM, *Garis Panduan Penentuan Waktu Solat Di Malaysia* (Putrajaya: JAKIM, 2017).
[26] Roslan Umar, "Penentuan Awal Waktu Maghrib Di Malaysia" (Malaysia, 2025).
[27] M. H. Musa, *Ilmu Falak Dan Aplikasinya* (Kuala Lumpur: Penerbit UM, 2015).
[28] Kementerian Agama RI, "Software Jadwal Shalat Kemenag," n.d., https://bimasislam.kemenag.go.id/jadwalshalat.
[29] Zaini Ujang et al., *Aplikasi Ilmu Falak Dalam Penentuan Waktu Solat Di Malaysia* (Malaysia: Universiti Teknologi Malaysia, 2016).
[30] JAKIM, "Hasil Observasi Falak Jakim," 2022, https://falak.jakim.gov.my.

The table above utilizes the coordinates of Jakarta, Indonesia, and Johor, Malaysia, as both cities share similar longitudes. The data for the beginning of Maghrib prayer in Indonesia is sourced from the official Indonesian Ministry of Religious Affairs' prayer schedule website, while the corresponding data for Malaysia comes from the E-Solat website. Interestingly, despite the one-hour time zone difference between the two locations, the start of Maghrib prayer in Indonesia occurs earlier than in Malaysia. This discrepancy arises from the differing methodologies employed in determining the beginning of Maghrib prayer in the two countries. In Indonesia, the Maghrib time is calculated based on the moment the solar disk completely sets below the horizon, with an additional precautionary interval (*iḥtiyāṭ*) to ensure accuracy. Conversely, Malaysia adopts a method that delays the Maghrib time until the sun has fully descended below the horizon, creating a longer interval after sunset. This methodological divergence accounts for the variation in Maghrib prayer timings between Indonesia and Malaysia.

From a Shariah perspective, most contemporary scholars have accepted using *ḥisāb* for prayer times because modern tools and methods can provide high accuracy comparable to or exceeding direct observations.[31] Official fatwas in both countries recognize the validity of using *ḥisāb* in determining prayer times.[32] However, local differences sometimes cause time discrepancies between the two countries' prayer schedules at border areas, such as between West Kalimantan and Sarawak. This is due to differences in coordinate reference points and technical criteria such as refraction and elevation.[33]

Within the framework of *Maqāṣid al-Sharī'ah* (objectives of Islamic law), accurate prayer times are part of the protection of religion (*Ḥifẓ al-Dīn*). Therefore, the use of science and technology to achieve this goal is permitted and encouraged.[34] The modern astronomical approach serves as a means to achieve Shariah-compliant accuracy. The methodologies used by the Indonesian Ministry of Religious Affairs and JAKIM can be categorized as integrative because they combine Shariah and scientific methods in a standardized system. This aligns with the principle of *Fiqh al-Wāqi'*—the adaptation of Islamic law to contemporary realities supported by empirical knowledge.[35]

Both countries also actively participate in international forums such as MABIMS (the Ministerial Forum of Brunei, Indonesia, Malaysia, and Singapore Religious Affairs), which serve as a platform for harmonizing *Falak* (astronomical) methods. Data exchange, criteria standardization, and discussions about celestial phenomena affecting prayer times occur in this forum.[36] Although there is a shared principle, challenges remain in public education. Many laypeople do not understand the scientific and Shariah basis behind differences in prayer times across regions or countries, so outreach regarding the scientific and religious foundations is necessary.[37] This is important to avoid unnecessary controversies.

From the viewpoint of Islamic epistemology, the scientific approach to determining worship times demonstrates the integration of revelation and reason. Allah's command to "observe how the Sun and Moon move" (QS. Yunus: 5) indicates that observation and calculation are part of obedience.

[31] Yusuf Al-Qaradawi, *Fiqh Al-Mu'Āṣir* (Kairo: Dar al-Shuruq, 2002).
[32] Majelis Ulama Indonesia, Fatwa tentang Penetapan Waktu Salat (Indonesia, issued 2004).
[33] Ahmad Zaki Yamani, *Astronomi Islam Kontemporer* (Kuala Lumpur: IIUM Press, 2015).
[34] Jasser Auda, *Maqasid Al-Shariah as Philosophy of Islamic Law* (London: IIIT, 2008).
[35] Wahbah Al-Zuhaili, *Ushul Al-Fiqh Al-Islami* (Damaskus: Dar al-Fikr, 1998).
[36] "Laporan MABIMS, Pertemuan Ahli Falak MABIMS Ke-12," 2012.
[37] R. Maulana, "Literasi Astronomi Dalam Masyarakat Islam," *Jurnal Falak* 3, no. 2 (2021).

Astronomical software such as Accurate Times and Winstars, or local applications like Kemenag's Prayer Schedule and Muslim Pro in Malaysia, facilitates quick and precise access to prayer times. This shows how technological advances strongly support implementing Islamic law in daily life.

In summary, the methodologies for determining the beginning of Maghrib prayer in Indonesia and Malaysia demonstrate a synergy between modern science and Shariah principles. This integrated approach ensures precise determination of prayer times while adhering to established jurisprudential frameworks. The implementation of this model exemplifies how religious obligations and scientific advancements can harmoniously work together. By combining astronomical calculations with Islamic legal guidelines, both countries manage to uphold accuracy without compromising on the integrity of religious practices. This balance illustrates the potential of integrating contemporary scientific methods with the timeless wisdom of Shariah in the realm of worship.

4. Sunset Altitude Correction's Role in Determining Maghrib Time

The determination of prayer times is a crucial aspect of Islamic astronomy (*'ilm al-Falak*) that directly affects the validity of worship. According to Islamic law, the time for Maghrib prayer begins when the Sun has completely set below the observer's visible horizon (*ufuq mar'i*). However, geographical factors—particularly the altitude of the observation point—significantly affect the astronomical timing of sunset. Therefore, altitude correction becomes essential to ensure the accuracy of prayer times, especially Maghrib, which relies heavily on the Sun's setting time. Altitude correction is a time adjustment made due to the elevation of a location above sea level. Because the Earth is spherical, someone at a higher elevation can observe the Sun longer than those at lower elevations or coastal areas. Although this time difference usually ranges from just a few seconds to several minutes, it has profound implications for the validity of prayer times. Indonesia and Malaysia, the countries with the largest Muslim populations in Southeast Asia, employ relatively similar approaches but differ in technical details regarding astronomical adjustments. This study aims to analyze how sunset altitude correction is applied in determining the start time of Maghrib in both countries, along with its astronomical and fiqh (Islamic jurisprudence) implications.

In astronomical perspective, altitude correction is called the "dip of the horizon." This dip represents the apparent shift of the horizon due to the observer's altitude. Generally, the higher a location is above sea level, the later the Sun appears to set. This is because observers at higher positions have a broader viewing angle of the horizon, enabling them to see the Sun for longer before it completely sets. Therefore, a time correction based on altitude is necessary so that Maghrib prayer is not delayed beyond the actual *shar'*i sunset.[38] The commonly used formula for time correction based on altitude is:

$$KU = 0°1.76' \times \sqrt{h},$$

Where *h* is the elevation in meters, and *KU* is the correction in minutes. This means that for every 100-meter increase in elevation, sunset is delayed by approximately 0.58 minutes or about 35 seconds. In addition to the dip of the horizon, other factors considered in calculating Maghrib time include atmospheric refraction (the bending of sunlight by the Earth's atmosphere) and the Sun's

[38] Ahmad Syalabi, *Ilmu Falak Dalam Islam* (Jakarta: Bulan Bintang, 1990); Yunus Muhammad Encep Abdul Rojak, Amrullah Hayatudin, "Koreksi Ketinggian Tempat Terhadap Fikih Waktu Salat: Analisis Jadwal Waktu Sholat Kota Bandung," *Al-Ahkam* 27, no. 2 (2017): 241–66.

semi-diameter. Islamic astronomers combine these three components to determine the Sun's elevation at Maghrib, generally set at -0°50'.

Indonesia is an archipelagic country with highly diverse topography, ranging from lowland areas like Jakarta and Surabaya to highland areas like Bandung and Bukittinggi and mountainous regions like Wamena. This variation necessitates a serious application of altitude correction in determining prayer times. The Ministry of Religious Affairs of the Republic of Indonesia, through the Directorate of Islamic Affairs and Sharia Guidance, has developed a *Hisāb Rukyat* guideline, which includes the Sun's elevation at Maghrib as -0°50', incorporating corrections for the Sun's semi-diameter, atmospheric refraction, and the dip of the horizon due to altitude using the formula above.[39] This correction is applied in calculation software such as Winhisab and Accurate Times, which Indonesian Islamic astronomy experts widely use.[40]

Locally, government or private institutions and religious organizations such as the NU's *Lembaga Falakiyah* and Muhammadiyah's *Majelis Tarjih* often apply their corrections based on topographic data and local moon sighting results. This reflects a growing awareness of the importance of accurate timing based on geographical position.

Despite being less topographically complex than Indonesia, Malaysia still has elevation variations in regions like the Genting Highlands, Cameron Highlands, and hilly areas in Sabah and Sarawak. As the central authority, JAKIM (Department of Islamic Development Malaysia) has established a national prayer time system through the *Manual for the Determination of Prayer Times in Malaysia*, including astronomical parameters such as altitude correction.[41] Unlike Indonesia, Malaysia adopts a zonal approach, which allows for local flexibility. Each state or zone has pre-determined prayer times based on the average elevation and location of the region. These adjustments are made using topographic data from the Department of Survey and Mapping Malaysia (JUPEM).

The comparison between the two countries indicates that the level of accuracy in applying altitude correction depends on both topographical factors and the methodological approach of the respective institutions. In Indonesia, given its geographical diversity—from coastal regions to highlands like Bandung, Bukittinggi, and Malang—altitude correction is vital and must be explicitly calculated. In contrast, in Malaysia, since most population centers are located in low-lying areas, altitude variation and its correction are relatively minor.

From a fiqh perspective, prayer times are part of *ta'abbudi* (ritual worship), which cannot be based solely on estimates but must rely on clear syar'i signs. The Shafi'i school, the primary reference in Indonesia and Malaysia, stipulates that Maghrib prayer is only valid after the Sun has completely set from the horizon of the location where the person stands.[42] Therefore, if someone lives in a highland area and follows a prayer schedule based on sea-level altitude without correction, they may end up praying before its actual time, affecting the validity of the prayer and potentially requiring it to be repeated.

[39] Kementerian Agama RI, *Pedoman Hisab Rukyat Indonesia*.
[40] M. Misbah Zainul dan Ahmad Izzuddin, *Ilmu Falak Praktis* (Semarang: Walisongo Press, 2006), h. 85.
[41] JAKIM, *Manual Penentuan Waktu Solat Malaysia.* h. 60.
[42] Wahbah Zuhaily, *Al-Fiqh Islami Wa Adillatuhu* (Damaskus: Dar al-Fikr, 2004), h. 655.

To understand the practical impact of altitude correction on Maghrib prayer time, let us consider specific calculations from different locations. Bandung, situated at an altitude of about 700 meters, requires a sunset correction of approximately 4.6 minutes. In contrast, Lembang, located at around 1,200 meters above sea level, needs a correction of about 6.1 minutes. These adjustments indicate that without applying altitude correction, the timing of Maghrib prayer in Lembang would be approximately 6 minutes later than that in lower-altitude areas such as Jakarta. This discrepancy highlights the importance of applying accurate altitude corrections in prayer time calculations, ensuring both precision and alignment with Shariah principles. By accounting for altitude variations, the determination of Maghrib prayer time in diverse locations can be harmonized, reflecting a balance between astronomical calculations and jurisprudential requirements.

Modern *ḥisāb* applications such as Accurate Times, Winhisab, Muslim Pro, and e-Solat help users calculate prayer times while factoring in altitude. However, many popular apps the general public uses do not automatically or accurately apply this correction, resulting in inaccurate prayer schedules, especially in mountainous regions.

This becomes especially important in the context of technological advancements, as many mosques and Muslims now rely on apps or automated clocks for prayer times. If altitude data is not correctly input into these systems, the accuracy of the prayer schedule is compromised. This presents a significant challenge, as there is a general lack of public awareness about the importance of altitude correction, leading to potential errors in Maghrib timing. Moreover, not all software explicitly states whether or not altitude correction has been included in its calculations.

Technically, the difference in approach between Indonesia and Malaysia lies in the degree of local precision and flexibility in altitude data adjustments:

Table 2. Comparison of Altitude Correction in Maghrib Time Determination

Aspects	Indonesia	Malaysia
Authority	Ministry of Religious Affairs (Kemenag RI)	JAKIM and State Muftis
Software	Accurate Times, Stellarium, Winstars	e-Solat, Sky View, standard formulae
Altitude Correction	Adjusted based on actual elevation	Uses average values or standard zoning
Approach Nature	Locally specific	Fixed zoning system
Time Implication	More accurate by place and time	Practical and efficient on a national scale

The table above presents a comparative overview of how altitude correction is applied in determining Maghrib prayer times in Indonesia and Malaysia. In both countries, adjustments are made based on the elevation of specific locations, which affects the timing of sunset and, consequently, the start of Maghrib. However, the extent and methodology of altitude correction differ between the two nations. While Indonesia often applies a more direct correction based on astronomical data, Malaysia tends to incorporate additional jurisprudential considerations. This

comparison highlights the significance of altitude corrections in achieving precise Maghrib timings, reflecting the integration of scientific calculations with Shariah principles in both contexts.

From the *fiqh* perspective, Maghrib time begins when the Sun has fully set below the horizon. Thus, altitude correction is not a change to Islamic law but a tool to ensure that the *shar'i* sign has truly occurred from the observer's location. Imam Nawawi in Al-Majmu' states that Maghrib time begins only after the Sun is set, with direct observation being the primary basis. However, in modern times, astronomical calculation and correction serve as the main alternative due to the limitations of direct observation, especially in urban areas with obstructed horizons. From the perspective of *usul al-fiqh*, altitude correction is a manifestation of the *maqāṣid* (objectives) of maintaining accurate prayer times. Under *Maqāṣid al-Sharī'ah*, accurate timing falls under *Ḥifẓ al-dīn* (preservation of religion).[43]

The principles of *fiqh* state that *al-iḥtiyāṭ fī al-'ibādah* (precaution in worship) is preferable. Applying altitude correction is part of that precaution. As is known, praying before its proper time is invalid and must be repeated. Therefore, including altitude correction in Maghrib time calculations is not merely a technical astronomical issue but an integral part of safeguarding the validity of worship. Sunset altitude correction is critical in accurately determining the start of the Maghrib prayer. Indonesia and Malaysia recognize the importance of prayer scheduling, although implementation still faces technical and educational challenges. With advances in geospatial and astronomical technologies, such corrections can be better integrated into prayer time systems. This ensures that Muslim worship is conducted at the precise time, astronomically, and according to Islamic law.

D. Conclusion

The methodology for determining the beginning of Maghrib prayer time in Indonesia and Malaysia shares the same *shar'*i principle—that Maghrib begins when the Sun has completely set below the western horizon—based on the Qur'an, Hadith, and scholarly consensus. However, the two countries differ in their technical astronomical approaches, particularly in applying the correction for horizon depression: Indonesia employs a specific formula, while Malaysia adds one minute for every 300 meters above sea level. This reflects an integration of religious evidence with contemporary astronomical methods, demonstrating both countries' commitment to precision and accuracy in establishing prayer times.

An analysis of altitude corrections for sunrise and sunset reveals that this factor is highly significant in determining the beginning of Maghrib prayer time in Indonesia and Malaysia. Adjustments are required to account for real-world conditions, such as the observer's elevation, atmospheric refraction, and the Sun's semi-diameter, to ensure the designated time reflects the Sun's complete setting. Although the two countries use different technical values for these corrections, both apply the same principles of Islamic astronomy to uphold the accuracy of prayer times. This reflects a synergy between *shar'i* rulings and scientific precision.

[43] Imam Nawawi, *Al-Majmu' Syarh Al-Muhadzdzab*, Jilid 3 (Beirut: Dar al-Fikr, 1996), h. 201.

BIBLIOGRAPHY

Auda, Jasser. *Maqasid Al-Shariah as Philosophy of Islamic Law*. London: IIIT, 2008.

Azwar, Saifuddin. *Metode Penelitian*. Yogyakarta: Pustaka Pelajar, 2014.

Badan Meteorologi Klimatologi dan Geofisika. *Almanak 2022*. Jakarta: BMKG, 2021.

Butar-Butar, Arwin Juli Rakhmadi. *Pengantar Ilmu Falak Teori Dan Praktik*. Medan: LPPM UISU, 2016.

Djamaluddin, Thomas. "Hisab Waktu Salat Dalam Kajian Astronomi." In *Lokakarya Imsakiyah Ramadhan 1432 H*. Semarang: PPM IAIN Walisongo Semarang, 2011.

———. "Metodologi Penentuan Awal Maghrib Di Indonesia." 2025.

Encep Abdul Rojak, Amrullah Hayatudin, Yunus Muhammad. "Koreksi Ketinggian Tempat Terhadap Fikih Waktu Salat: Analisis Jadwal Waktu Sholat Kota Bandung." *Al-Ahkam* 27, no. 2 (2017): 241–66.

Fahmi, Moch. Riza. "Studi Komparasi Jadwal Salat Sepanjang Masa H . Abdurrani Mahmud Dengan Hisab Kontemporer." *Jurnal Bimas Islam* 10, no. 3 (2017): 565–90.

Fahmy, Fitriyani & Syaifur Rizal. "Program Di9ital Prayer Time Dalam Penentuan Waktu Salat." *Ulul Albab: Jurnal Studi Dan Penelitian Hukum Islam* 2, no. 2 (2019): 59–79.

Faizin, Moh Yusuf, Muhammad Himmatur Riza, and Muhammad Habibur Rahman. "Dinamika Waktu Imsak Pada Jadwal Imsakiyah Ramadan." *Al-Marshad: Jurnal Astronomi Islam Dan Ilmu-Ilmu Berkaitan* 7, no. 2 (2021): 151–61.

Firdaus, Nailur Rahmi dan. "An Analysist Of Sa'adudin Djambek's Hisab Method About All The Time Of Praying Schedule." *Al-Hilal: Journal of Islamic Astronomy* 2, no. 1 (2020): 15–38.

Hisyam, M. *Ilmu Falak: Teori Dan Praktik*. Jakarta: Rajagrafindo, 2018.

Imam Nawawi. *Al-Majmu' Syarh Al-Muhadzdzab*. Jilid 3. Beirut: Dar al-Fikr, 1996.

Ismail. "Akurasi Waktu Jam Masjid Di Kota Lhokseumawe." *Jurnal Al-Ijtimaiyyah* 6, no. 1 (2020): 75–90.

———. "Dinamika Jadwal Waktu Salat Di Indonesia." UIN Walisongo Semarang, 2021.

Ismail & Husnaini. "Aktualisasi Jadwal Salat Sepanjang Masa Abu Muhammad Isa Mulieng Aceh." *Islamic Review: Jurnal Riset Dan Kajian Keislaman* 10, no. 1 (2021): 93–110. https://doi.org/10.35878/islamicreview.v10i1.245.

Izzuddin, Ahmad. *Ilmu Falak Praktis*. Semarang: Pustaka Rizki Putra, 2012.

Izzuddin, M. Misbah Zainul dan Ahmad. *Ilmu Falak Praktis*. Semarang: Walisongo Press, 2006.

JAKIM. *Garis Panduan Penentuan Waktu Solat Di Malaysia*. Putrajaya: JAKIM, 2017.

———. "Hasil Observasi Falak Jakim," 2022. https://falak.jakim.gov.my.

———. *Manual Penentuan Waktu Solat Malaysia*. Putrajaya: Bahagian Falak JAKIM, 2019.

Al-Jazairī, Abdurrahman. *Al-Fiqh 'Alā Al-Mazahib Al-Arba'Ah*. 1st ed. Beirut-Libanon: Dar al-Kutub al-Ilmiyah, 2003.

Kementerian Agama RI. *Al-Qur'an Dan Tafsirnya Jilid 4*. Jakarta: Kementerian Agama RI, 2012.

———. *Pedoman Hisab Rukyat Indonesia*. Jakarta: Ditjen Bimas Islam, 2020.

———. "Software Jadwal Shalat Kemenag," n.d. https://bimasislam.kemenag.go.id/jadwalshalat.

Lajnah Falakiyah NU. *Modul Pelatihan Hisab Rukyat*. Surabaya: LFNU, 2021.

"Laporan MABIMS, Pertemuan Ahli Falak MABIMS Ke-12," 2012.

Majelis Ulama Indonesia. Fatwa tentang Penetapan Waktu Salat. Indonesia, issued 2004.

Almanshur, M. Djunaidi Ghony & Fauzan. *Metodologi Penelitian Kualitatif*. Edited by Ar-Ruzz Media. Yogyakarta: Ar-Ruzz Media, 2016.

Maulana, R. "Literasi Astronomi Dalam Masyarakat Islam." *Jurnal Falak* 3, no. 2 (2021).

Musa, M. H. *Ilmu Falak Dan Aplikasinya*. Kuala Lumpur: Penerbit UM, 2015.

Musonnif, Ahmad. *Ilmu Falak*. Yogyakarta: Teras, 2011.

An-Nawawi, Muhyiddin Yahya bin Syaraf. *Shahih Muslim Bi Syarhi An-Nawawi*. Jilid 5. Muassasah Qarthabah, 1994.

Pulo, Teungku Mustafa Muhammad Isa. *Fiqih Falakiyah*. Yogyakarta: Deepublish, 2016.

Al-Qaradawi, Yusuf. *Fiqh Al-Mu'Āṣir*. Kairo: Dar al-Shuruq, 2002.

Riza Afrian Mustaqim. "Relevansi Jadwal Waktu Salat Sepanjang Masa." *Jurnal Alwatzikhoebillah : Kajian Islam, Pendidikan, Ekonomi, Humaniora* 6, no. 2 (2020): 22–34.

Riza, Muhammad Himmatur, Thomas Djamaluddin, and Ahmad Izzuddin. "Transformation of Prayer Time Schedules: From A Static-Passive to A Dynamic-Variative Perspective." *Ulul Albab: Jurnal Studi Dan Penelitian Hukum Islam* 6, no. 1 (2024): 39. https://doi.org/10.30659/jua.v6i1.22826.

Soewadji, Jusuf. *Pengantar Metodologi Penelitian*. Jakarta: Mitra Wacana Media, 2012.

Sosrodihardjo, Bungaran Antonius Simanjuntak dan Soedjito. *Metode Penelitian Sosial*. Jakarta: Yayasan Pustaka Obor Indonesia, 2009.

Suleman, Frengky. "Penentuan Awal Waktu Shalat." *Jurnal Ilmiah Al-Syir'ah* 9, no. 2 (2011): 1–14. https://doi.org/http://dx.doi.org/10.30984/as.v9i2.31.

Al-Suyuthi, Al-Hafiz Jalal al-Din. *Sunan Al-Nasa'i Bi Syarhi Al-Hafidz Jalalu Al-Din Al-Suyuthi Wa Hasyiyatu Al-Imam Al-Sindi*. Juz 1. Halab: Maktab al-Mathbu'at al-Islamiyyah, n.d.

Syalabi, Ahmad. *Ilmu Falak Dalam Islam*. Jakarta: Bulan Bintang, 1990.

Al-Thabari, Abu Ja'far Muhammad bin Jarir. *Tafsir Al-Thabari*. Jilid 4. Beirut: Muassasah al-Risalah, 1994.

Umar, Roslan. "Penentuan Awal Waktu Maghrib Di Malaysia." Malaysia, 2025.

Yamani, Ahmad Zaki. *Astronomi Islam Kontemporer*. Kuala Lumpur: IIUM Press, 2015.

Zaini Ujang et al. *Aplikasi Ilmu Falak Dalam Penentuan Waktu Solat Di Malaysia*. Malaysia: Universiti Teknologi Malaysia, 2016.

Al-Zuhaili, Wahbah. *Ushul Al-Fiqh Al-Islami*. Damaskus: Dar al-Fikr, 1998.

Al-Zuhaily, Wahbah. *Al-Fiqh Islami Wa Adillatuhu*. Damaskus: Dar al-Fikr, 2004.

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