Justicia Islamica: Jurnal Kajian Hukum dan Sosial
Vol. 19 No. 1 June 2022 (pp.113-131)

A DISCOURSE OF MABIMS NEW CRITERIA: READING DIFFERENCE FREQUENCY BETWEEN *WUJUD AL-HILAL* AND *IMKAN AR-RUKYAT*

Shofwatul Aini*
Faculty of Sharia, Institut Agama Islam Negeri Ponorogo, Indonesia
Email: shofwatulaini79@gmail.com

**Corresponding author*

DOI: 10.21154/justicia.v19i1.3394

Received: Oct 18, 2021 *Revised: May 18, 2022* *Approved: June 23, 2022*

Abstract: In determining the beginning of the month of the Hijri calendar, the Indonesian government has used the criterion of crescent visibility (*Imkan ar-Rukyat*) adopted from the MABIMS agreement. This criterion has three conditions. Namely, the crescent should be at least at 2^0; the elongation is minimum at 3^0; the age of the crescent must be more than eight hours after conjunction. In August 2016, MABIMS made a great deal to revise this criterion. The new criterion has two conditions. Namely, the crescent should be at least 3^0, and the elongation is minimum at $6{,}4^0$. This new criterion is planned to apply in Indonesia for the next few years and is wished to be accepted by all communities. The emergence of this new criterion leads to two main questions. *First,* how many frequencies of differences between this new criterion compared to the *Wujud al-Hilal* criterion, and the second is how if this new criterion is applied in Indonesia. This research used the elevation of the crescent to determine the frequency of differences between the new criterion compared to the Wujud al-Hilal criterion. It then analyzed it based on the former and the new criterion of the *Imkan ar-Rukyat* and the *Wujud al-Hilal*. The result shows significant differences between the new and Wujud al-Hilal criterion. If this new criterion is used in Indonesia, the togetherness of the beginning of the month of the Hijri calendar will decrease.

Dalam menentukan awal bulan hijriyah, pemerintah Indonesia telah lama menggunakan kriteria *Imkan ar-Rukyat* yang diadopsi dari MABIMS yaitu syarat minimal tinggi hilal 2^0, sudut elongasi minimal 3^0, dan umur hilal minimal 8 jam setelah ijtimak. Pada bulan Agustus 2016 MABIMS telah menyepakati kriteria tersebut untuk direvisi dengan kriteria yang baru yaitu syarat awal bulan adalah tinggi hilal minimal 3^0, dan elongasi minimal $6{,}4^0$. Kriteria yang baru ini rencananya akan diberlakukan di Indonesia dan diharapkan dapat diterima oleh semua pihak. Dengan adanya kriteria baru ini, ada dua rumusan masalah yang ingin diteliti lebih lanjut yaitu yang pertama adalah bagaimana frekuensi perbedaan kriteria baru ini dengan kriteria *Wujud al-Hilal*, dan yang kedua adalah bagaimana kriteria baru ini jika diterapkan di Indonesia. Untuk mengetahui frekuensi perbedaan kriteria baru ini dengan kriteria *Wujud al-Hila*l, penelitian ini menganalisisnya

berdasarkan data timggi hilal dengan menggunakan acuan tiga kriteria yaitu *Wujud al-Hilal*, *Imkan ar-Rukyat* MABIMS yang lama, dan *Imkan ar-Rukyat* MABIMS yang baru. Dari hasil penelitian menunjukkan bahwa frekuensi perbedaan kriteria *Imkan ar-Rukyat* yang baru dengan kriteria *Wujud al-Hilal* semakin banyak. Selanjutnya jika kriteria *Imkan ar-Rukyat* MABIMS yang baru ini diterapkan di Indonesia, maka potensi kebersamaan dalam awal bulan hijriyah di Indonesia akan semakin berkurang.

Keywords: New Month of Hijri Calendar; *Wujud al-Hilal; Imkan ar-Rukyat*; New Criterion.

INTRODUCTION

One of the issues often faced by Muslims in Indonesia, especially before Ramadan, Shawwal, and Zulhijah is the difference in determining the first day or the beginning of those months.[1] Many assume this issue arises because of the different methods adopted to determine the month's beginning. On the one hand, some parties use *rukyat* to determine the beginning of the Hijriyah month, while others use reckoning.[2] This problem has existed for a long time, and to this day, Muslims in Indonesia are always trying to find a way to diminish the differences at the beginning of the *Hijriyah* month.[3]

Based on history, the *rukyat* method is used by the most prominent Islamic religious organization, Nahdlatul Ulama, to determine the beginning of the month.[4] At the same time, the reckoning method is used by the second largest religious organization, namely Muhammadiyah.[5] These two methods are usually considered a source of problems in determining the beginning of the *Hijri* month.[6] However, the fundamental problem is not the different methods since

---

1 Maskufa, "Global Hijriyah Calendar As Challenges Fikih Astronomy" (1st International Conference of Law and Justice - Good Governance and Human Rights in Muslim Countries: Experiences and Challenges (ICLJ 2017), Atlantis Press, 2017), 188–92, https://doi.org/10.2991/iclj-17.2018.39.

2 In the Rukyat method, the determination of the beginning of the month is by looking at the new moon on the 29th of the current month. If the new moon is invisible or covered by clouds, then the next morning is considered the 30th because the number is fulfilled. The second interpretation prefers to interpret the sight of the *hilal* with the *hilal* already existing. Based on this interpretation, the word *ra'a* can be interpreted as seeing with knowledge or understanding *ru'yat bil 'ilmi*, and does not always have to be interpreted by seeing with the eyes. The followers of the *Hisab* method called the *Hisab* schoolars interpret the word estimate by counting. So, they conclude that the determination of the beginning of the *Hijri* month can also be done using the *Hisab* or calculation method. Ahmad Izzuddin, *Fiqih Hisab Rukyat; Menyatukan NU Dan Muhammadiyah Dalam Penentuan Awal Ramadan, Idul Fitri, Dan Idul Adha* (Jakarta: Erlangga, 2007).

3 Arbisora Angkat, "Kalender Hijriah Global Dalam Perspektif Fikih," *Al-Marshad: Jurnal Astronomi Islam Dan Ilmu-Ilmu Berkaitan* 3, no. 2 (December 30, 2017), https://doi.org/10.30596/jam.v3i2.1524.

4 Ahmad Ghazalie Masroeri, "LEMBAGA FALAKIYAH PBNU," accessed June 8, 2022, http://falakiyah.nu.or.id/PedomanRukyatNU.aspx; Abdul Mufid, "Unifikasi Kalender Hijriah Internasional Dalam Perspektif Yusuf Al-Qaradawi," *HIKMATUNA* 5, no. 1 (June 26, 2019): 71–83, https://doi.org/10.28918/hikmatuna.v5i1.1856.

5 PP Muhammadiyah Majlis Tarjih and Tajdid Team, *Muhammadiyah Hisab Guidelines* (Yogyakarta: PP Muhammadiyah Majlis Tarjih and Tajdid, 2009), 73.

6 The term Qamariyah month means a calendar made based on the circulation of the moon. While the beginning of the *Hijri* month is a calendar set by the caliph Umar Ibn Khattab and owned by Muslims whose determination of the beginning of the month is based on the circulation of the month. Therefore, in this case, the researcher thinks that the terms the beginning of the month of *Qamariyah* and the beginning of the month of *Hijriyah* are considered to have the same meaning for practical purposes in this study.

the determination of the beginning of the *Hijri* month is more directed to specific terms or conditions in which the condition is considered the beginning of a new month. These terms or conditions are usually referred to in the early *hijriyah* discourse with criteria.[7]

As mentioned earlier, in determining the beginning of the *Hijriyah* month, especially Ramadan, Shawwal, and Zulhijah, NU uses the *rukyat* method, while reckoning is the supporter. To realize a quality *rukyat*, NU uses the science of reckoning and accepts the *Imkan ar-Rukyat* criteria as a supporter of the *rukyat* implementation process. The *Imkan ar-Rukyat* criterion is only an instrument to reject reports of success in seeing the new moon. Experts have agreed that the new moon is still below or above the horizon, but *ghairu imkan ar-rukyat*. Thus, the *Imkan ar-Rukyat* criteria are not used to determine the beginning of the *Qamariyah* month. In other words, if it is following the reckoning of the new moon, it is already *Imkan ar-Rukyat*.[8] However, in reality, the new moon may not be successful in *rukyat*. The determination of the beginning of the *Hijriyah* month, especially Ramadan, Shawwal, and Zulhijah, is based on *istikmal*.[9] However, NU and the government have also differed in determining the start of the month. Since the formation of the *Lajnah Falakiyah* of NU in 1984, at least NU has differed from the government in determining the beginning of the month about four times.[10]

---

7 Taufiqurrahman Kurniawan, "Penyatuan Kalender Islam," *YUDISIA : Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 2 (January 20, 2016), https://doi.org/10.21043/yudisia.v5i2.711.the practitioners of astronomy attempt to unify the dispute by trying to make the world dating guidelines. This step is one of Muslims' efforts to respond the never ending disagreement. So the author felt it is important to examine the International Islamic calendar as a concrete step in achieving similarity and equality of International Islamic calendar.In this study, the author uses library research by using secondary and descriptive data. Data analysis technique is historical normative qualitative analysis. This has the reason that the observation of astronomical theories, especially the Islamic calendar needs to be observed through history since classical Islamic era until modern Islamic era, the era of classical Islam is observed through texts while modern Islamic era is observed by experiment so it can be found astronomically accurate research results.Keywords: Islamic calendar, classical Islam, modern Islam.","container-title":"YUDISIA : Jurnal Pemikiran Hukum dan Hukum Islam","DOI":"10.21043/yudisia.v5i2.711","ISSN":"2477-5339","issue":"2","language":"en","note":"number: 2","source":"journal.iainkudus.ac.id","title":"Penyatuan Kalender Islam","URL":"https://journal.iainkudus.ac.id/index.php/Yudisia/article/view/711","volume":"5","author":[{"family":"Kurniawan","given":"Taufiqurrahman"}],"accessed":{"date-parts":[["2022",6,25]]},"issued":{"date-parts":[["2016",1,20]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}

8 Ahmad Wahidi, "Menyatukan Penetapan 1 Ramadlan, Syawal Dan Dzulhijjah Di Indonesia," *Jurisdictie: Jurnal Hukum Dan Syariah* 2, no. 2 (2011): 85–91, https://doi.org/10.18860/j.v0i0.2162.

9 Ahmad Ghazalie Masroeri, "LEMBAGA FALAKIYAH PBNU"; Novi Sopwan and Abu Dzarrin Al-Hamidy, "Implikasi Kriteria Visibilitas Hilal Rekomendasi Jakarta 2017 Terhadap Penanggalan Hijriah Di Indonesia," *Azimuth: Journal of Islamic Astronomy* 1, no. 1 (January 30, 2020): 52–73.

10 First, the differences between Eid al-Fitr 1 Syawal 1412 H, the second Eid, 1 Shawwal 1413 H, the third Eid Al-Fitr in 1414 H, the fourth Eid Al Adha in 1420 H. Differences between NU and the government at the beginning of this month were also discussed in Susiknan Azhari's Use of the *Hisab* System and *Rukyat* in Indonesia (Studi tentang Interaksi NU dan Muhammadiyah), *Dissertation*, (Yogyakarta: Program Pascasarjana UIN Yogyakarta, 2006), 124. Muhammad Syakir NF, "Ketika NU Dan Pemerintah Berbeda Dalam Penentuan Awal Hijriah," accessed June 8, 2022, https://www.nu.or.id/fragmen/ketika-nu-dan-pemerintah-berbeda-dalam-penentuan-awal-hijriah-7seId.

Meanwhile, the Muhammadiyah Islamic organization has long used the *Hisab* method to determine the month's beginning. Thus, Muhammadiyah does not use *rukyat*.[11] The criteria that they use is *Wujud al-Hilal*.[12]

The *Indonesian government uses the Imkan ar-Rukyat criteria*. These criteria are agreed based on the Ministers of Religion of Brunei Darussalam, Indonesia, Malaysia, and Singapore (MABIMS).[13] Therefore, this criterion is used not only in Indonesia but also in other Asian countries. Meanwhile, the Indonesian government, since 1992[14], has used the *Imkan ar-Rukyat*[15] by adopting the MABIMS criteria in determining the beginning of the month.[16] The criteria used here have three terms or conditions that must be met to be categorized as a new month or the beginning of the month. The first requirement is that the height of the moon should be at least two degrees at *maghrib*; then, the second condition is that at *maghrib*, the distance from the moon to the sun (elongation angle) is at least three degrees; the third is at *maghrib*, the age of the moon is at least eight hours after *ijtima*.[17]

Then, the *Imkan ar-Rukyat* of MABIMS criteria are referred to as the old MABIMS criteria. Thus, the *Imkan ar-Rukyat* of *the* MABIMS version provides three conditions so that the *eye can see the hilal at the beginning of the month*. In astronomy, *Imkan ar-Rukyat* has usually termed the visibility of the new moon. To be visible, according to *Imkan ar-Rukyat* of MABIMS, the height of the new moon is at least 2^0. Therefore, if the height of the new moon has not reached 2^0, then the requirements for the beginning of the month have not been fulfilled. This criterion has been applied in Indonesia for quite a long time. However, the unification of the criteria for the beginning of the month in Indonesia is still hard to realize.

In general, it can be argued that in every determination of the beginning of the month, whether Ramadan, Shawwal, or Zulhijah, when there is a difference at the beginning of the month, the government and Muhammadiyah are different.[18] This

---

[11] Syamsul Anwar, *Qomariyah Month Reckoning; Syar'i Review on Determining the Beginning of Ramadan, Shawwal, and Zulhijah* (Yogyakarta: Muhammadiyah Voice, 2008).

[12] Muhammadiyah in determining, the beginning of the *hijriyah* month, seen from history, has actually often changed the criteria adopted. At first, Muhammadiyah used the *Qoblal Ghurub ijtima* criteria, then it changed to the *Imkan ar-Rukyat* criteria, and the last one, it used the manifestulul *hilal* criteria still used as a guideline Team, *Muhammadiyah Hisab Guidelines*, 78.

[13] "MABIMS - Pengenalan," accessed June 8, 2022, http://www.mabims.gov.bn/SitePages/Pengenalan.aspx.

[14] Thomas Djamaluddin, *Initiating Astronomical Fiqh* (Bandung: Kaki Langit, 2005), 82.

[15] Imkan ar-Rukyat means "the possibility of the new moon being seen" or "the minimum limit of the *hilal* being visible". Thus, the *Imkan ar-Rukyat* can also be interpreted as the phenomenon of the height of the new moon under certain conditions which according to experience in the visible new moon field. This term in astronomy is known as the visibility of the new moon. . *Imkan ar-Rukyat* is a method for determining the beginning of the *Hijri* month using *Hisab* supported by the *Rukyat*. This method is also considered a compromized way between the *Hisab* method and the *Hisab Rukyat* method. Muhyiddin Khazin, *Dictionary of Astronomy* (Yogyakarta: Buana Pustaka, 2005), 35.

[16] "MABIMS - Pengenalan."

[17] Hosen Hosen, "Kilas Balik Kalender Hijriyah Indonesia Perjalanan Menuju Penyatuan Kalender Nasional," *Islamuna: Jurnal Studi Islam* 4, no. 1 (July 1, 2017): 81–111, https://doi.org/10.19105/islamuna.v4i1.1352.

[18] Tono Saksono, "Kalender Islam Global: Perspektif Syariah, Ekonomi, dan Politik," *JURIS (Jurnal Ilmiah*

is because the criteria used by Muhammadiyah are still different from those used by the government.[19] In addition, Muhammadiyah, the second-largest religious organization in Indonesia, has many followers. Thus, it will be evident if there is a difference in date one. Muhammadiyah, as mentioned above, to this day, still uses the criteria of the *Wujud al-Hilal,*[20] where this criterion sometimes causes differences from the government in terms of the beginning of the month. The criteria for the form of *al-Hilal* have the following conditions: 1) Conjunctions or *Ijtima',* meaning the meeting of the sun, earth, and moon in the same line in a synodic month (± 29 days) has occurred before sunset; 2) The moon sets after the sun.[21]

The aim of the first condition is that on the 29th of the current month, the *ijtima'* or conjunction occurs before sunset. In other words, if *ijtima'* occurs before sunset, then the conditions for the beginning of the month have not been met. The second condition is that the moon must set later than the sun. In other words, if on the afternoon of the 29th of the current month, it turns out that the new moon sets before the sun, then the beginning of the month has not yet entered. The moon that must set later than the sun if it is interpreted astronomically means that on the 29th, the height of the new moon is positive, namely at least 0°. Thus, for the *Wujud al-Hilal*, if the minimum height of the new moon is positive or 0^0 or even more, then the next day is considered a new month or the first day of the new month.

At the end of May 2016, the International Hijri Calendar Unity Congress held a meeting in Istanbul, Turkey, to discuss the global Hijri calendar. Nearly 50 countries attended the congress. Indonesia sent its delegation, namely Prof. Syamsul Anwar (from the *PP* Muhammadiyah *Tarjih* Council), Hendro Sentyanto, MSi, (an astronomer from *Lajnah Falakiyah* of *PBNU*), and KH Mahyudin Junaedi, MA (from MUI). At the end of the meeting, the participants agreed on one criterion so that the Hijri calendar can be realized with the following conditions: "The beginning of the month begins if at sunset anywhere the elongation of the moon (the distance from the moon to the sun) is more than eight degrees and the height of the moon is more than five degrees."[22]

Syariah) 15, no. 2 (March 18, 2017): 143–52, https://doi.org/10.31958/juris.v15i2.495.Muslims seem to be trapped in zakat debts that keep getting more and more reaching US$ 10 bn. This will immediately become civilization debt and burden of the upcoming Muslim generation if it is not immediately solved.","container-title":"JURIS (Jurnal Ilmiah Syariah

19 Ahmad Fadholi, "Pandangan Ormas Islam Terhadap Draf Kriteria Baru Penentuan Kalender Hijriah Di Indonesia," *Istinbath* 17, no. 1 (June 29, 2018): 198–220, https://doi.org/10.20414/ijhi.v17i1.41.

20 The mass organization in Indonesia that uses this criterion is Muhammadiyah. Meanwhile, NU as the largest mass organization in Indonesia has mostly used the *Imkan ar-Rukyat* criteria used by the government so far. Khazin, *Dictionary of Astronomy*.

21 Ahmad Junaidi, "Wujud Al-Hilal Antara Teori Dan Aplikasi," *Justicia Islamica* 10, no. 2 (December 1, 2013), https://doi.org/10.21154/justicia.v10i2.149.

22 Thomas Djamaluddin, "Kongres Kesatuan Kalender Hijri Internasional Di Turki 2016: Kalender Tunggal," accessed June 8, 2022, https://tdjamaluddin.wordpress.com/2016/06/02/kongres-kesatuan-kalender-hijri-internasional-di-turki-2016-kalender-tunggal/.

It did not take long after the Congress held in Turkey, on August 2-4, 2016, *Muzakarah Rukyat* and Islamic *Takwim* member countries of MABIMS (Forum of Ministers of Religion Brunei Darussalam, Indonesia, Malaysia, and Singapore) held a meeting as a follow-up to the previous meeting. International Hijri Calendar Unity Congress was held in Turkey. At this meeting, the participants reached an agreement to change the old criteria with the new ones. The old criteria that have been used by MABIMS above are replaced with the new ones, namely:

1. The height of the new moon is at least 3^o.
2. The minimum of elongation is 6.4^o.

This new criterion requires the height of the new moon to be visible. Suppose the new moon is at a minimum height of three degrees with an elongation angle or a minimum distance of 6.4 degrees from the moon and sun. This means that the height of the new moon, initially required to be at least 2^0 becomes 3^0. Alternatively, the new criteria add to the height of the new moon by 1^0 from the old criteria.[23]

The proposed new MABIMS criteria have been studied in several studies, including the research by Ahmad Fadholi, "Acceptability of the Draft New Criteria for Determining the Hijri Calendar according to Astrology Experts in Indonesia." This study concluded that the new MABIMS criteria received a positive response from several religious organizations, both those adhering to the *rukyat* school and the reckoning school. Both schools tend to accept positively. This means there is a sufficient opportunity to submit the proposed new draft criteria. This opportunity is strengthened by the presence of respondents in the high category.

Meanwhile, Nursodik reviewed the new MABIMS criteria, compared them to the Turkish Global Hisab criteria, and stated the results in his research entitled "*The Study of Turkey's Global Hisab Criteria and Proposed New MABIMS Criteria Using the Jean Meeus Algorithm.*" This study concluded that when compared to the Turkish Global Hisab criteria, the New MABIMS criteria are more implementable because they are considered to unite Islamic organizations with different criteria. In addition, the new criteria for MABIMS accommodate *rukyat* practitioners since they are based on valid *rukyat* data and can be used as a reference for *rukyat* activities worldwide.[24]

---

[23] This new criterion is based on several scientific considerations. For a more extensive review of scientific considerations, see Thomas Djamuluddin, "Menuju Kriteria Baru MABIMS Berbasis Astronomi ," accessed June 8, 2022, https://tdjamaluddin.wordpress.com/2016/10/05/menuju-kriteria-baru-mabims-berbasis-astronomi/.

[24] Nursodik Nursodik, "Kajian Kriteria Hisab Global Turki Dan Usulan Kriteria Baru MABIMS Dengan Menggunakan Algoritma Jean Meeus," *Al-Ahkam* 28, no. 1 (April 10, 2018): 119–40, https://doi.org/10.21580/AHKAM.2018.18.1.2353.the issue of the beginning of the month always invites polemic differences in the beginning of the month. Especially those related to fasting, Idul Fitri, and Arafah days. Because, many criteria for determining the beginning of the month. And have the disagreement to unite the calendar in an integrated way. This paper examines global criteria Turkey 2016 and has compared them with the New-MABIMS criteria that use astronomical algorithms Jean Meeus. How suitability of both criteria and Implementation to serve as an integrated Islamic calendar reference. The problems were discussed trough comparative study by testing some parameters on cities in the world. In this paper was

Even though this research has the same object of study as the research of the new MABIMS criteria mentioned above, there is a difference in the analysis media, namely by using data on the height of the *hilal* at the beginning of the hijriyah month. For example, look at the new moon data using ephemeris data. We take data on the height of the new moon at the beginning of the month of Ramadan, Shawwal, and Zulhijah from 1441 H/2020 AD to 1444 H/2023 AD, then we analyze it using the old MABIMS criteria. Consequently, muslims in Indonesia will have uniformity with the criteria of *Wujud al-Hilal***.**[25] Therefore, the new MABIMS criteria, where the requirement for the height of the visible *hilal* is 1^0 higher than the old criteria, will affect the togetherness of the first date between the *Imkan ar-Rukyat* and *Wujud al-Hilal* criteria or vice versa. This problem will be discussed further. Hence, the problem is more focused. In this case, the author will look at the frequency of differences between the new *Imkan ar-Rukyat* and *Wujud al-Hilal* by analyzing data on the height of the new *hilal* in the early months of Ramadan, Shawwal, and Zulhijah from 1441 to 1450 H. The new *Imkan ar-Rukyat* of MABIMS criteria is called the new MABIMS criteria.

ANALYSIS OF HILAL HEIGHT DATA USING THE CRITERIA *WUJUD AL-HILAL*

To find out the frequency of differences between the new MABIMS criteria and the Wujud al-Hilal, data analysis will be carried out on the height of the hilal at the beginning of Ramadan, Shawwal, and Zulhijah from 1441 H / 2020 AD to 1450 H / 2029 AD.[26] After obtaining the data, the next step is to analyze the data on the height of the hilal using the reference criteria for *Wujud al-Hilal*, the old *Imkan ar-Rukyat* MABIMS, and the new *Imkan ar- Rukyat* MABIMS. Based on data on the height of the new moon taken from the Winhisab program[27], then in general, we can categorize the data as shown in the table below: [28]

---

presented that frequency of conformity values within 100 years in the New-MABIMS criteria is better than Turkey criteria to be made Unified Islamic calendars references. As for Turkey criteria, there are many cases, if implemented in Indonesia. [] Di Indonesia, persoalan penentuan awal bulan selalu mengundang polemik perbedaan dalam mengawali bulan. Khususnya yang berhubungan penentuan awal puasa, hari raya, dan hari arafah. Salah satu penyebabnya karena banyaknya kriteria penentuan awal bulan dan tidak adanya kesepakatan untuk menyatukan kalender secara terpadu. Artikel ini dimaksud untuk mengkaji kriteria hisab global dan perbandingannya dengan usulan Kriteria Baru MABIMS (KBM

[25] Djamuluddin Thomas, "Penyatuan Kalender Islam," accessed June 8, 2022, https://tdjamaluddin.wordpress.com/2017/05/29/penyatuan-kalender-Islam/.

[26] Fika Afhamul Fuscha, "Verification of The Hisab Ephemeris System Against The Hijri Calendar Leap Year Pattern With Criteria Imkan Al-Rukyah Mabims (Case Study in Kudus District)," *Al-Hilal: Journal of Islamic Astronomy* 3, no. 1 (May 19, 2021): 107–28.

[27] The Winhisab program is the creation of the Hisab and Rukyat Agency of the Ministry of Religion of the Republic of Indonesia, which was pioneered by Drs. H. Taufik, S.H. The Winhisab program was published in 1996. This Winhisab program contains ephemeris data of the moon and the sun, early lunar taqwim, eclipses, calendar conversions, Qibla direction, height of the new moon at the beginning of all cities in Indonesia, and others. (Susiknan Azhari, *Ilmu Falak: Perjumpaan Khazanah Islam dan Sains Modern*, (Yogyakarta: Suara Muhammadiyah, 2007), 165.

[28] The data on the height of the new moon, the time of ijtimak, and the age of the new moon were taken

Figure 1. Data of hilal height, ijtimak time, hilal age, and elongation of sun month for the beginning of Ramadhan, Syawal, and Zulhijah from year 1441H/2020 M until 1450 H/2029 M

Number	Year	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3° 46' 06"	09:27:22 WIB	8j 1m 31d	5° 16' 6,32"
2	1441	Syawal	6° 36' 49"	00:40:04 WIB	16j 42m 40d	7° 50' 51,77"
3	1441	Dzulhijjah	7° 46' 18"	00:33:25 WIB	16j 59m 16d	9° 19' 17,96"
4	1442/ 2021	Ramadhan	3° 37' 14"	09:33:19 WIB	8j 0m 17d	4° 57' 24,25"
5	1442	Syawal	5° 23' 59"	02:01:49 WIB	15j 21m 58d	6° 45' 58,1"
6	1442	Dzulhijjah	3° 0' 7"	08:17:33 WIB	9j 12m 57d	5° 26' 55,56"
7	1443/2022	Ramadhan	2° 9' 48"	13:28:03 WIB	4j 11m 1d	3° 43' 51,73"
8	1443	Syawal	4° 43' 2"	03:31:03 WIB	13j 55m 20d	6° 22' 28,11"
9	1443	Dzulhijjah	1° 49' 4"	09:53:18 WIB	7j 34m 36d	5° 7' 21,79"
10	1444/2023	Ramadhan	7° 50' 8"	00:27:09 WIB	17j 17m 11d	9° 34' 16,99"
11	1444	Syawal	1° 38' 26"	11:16:11 WIB	6j 14m 9d	3° 11' 2,97"
12	1444	Dzulhijjah	0° 50' 2"	11:39:08 WIB	5j 46m 15d	-
13	1445/2024	Ramadhan	0° 46' 58"	16:03:08 WIB	1j 46m 48d	-
14	1445	Syawal	5° 59' 59"	01:23:46 WIB	16j 11m 6d	9° 13' 16,28"
15	1445	Dzulhijjah	-3° 30' 7"	19:40:08 WIB	0 jam	-
16	1446/2025	Ramadhan	4° 4' 58"	07:47:01 WIB	10j 7m 25d	5° 35' 50,77"
17	1446	Syawal	-1° 24' 16"	18:00:30 WIB	0 jam	-
18	1446	Dzulhijjah	1° 15' 48"	10:04:37 WIB	7j 18m 7d	-
19	1447/ 2026	Ramadhan	-0° 45' 47"	19:03:15 WIB	0 jam	-
20	1447	Syawal	1° 50' 21"	08:26:21 WIB	9j 19m 23d	5° 25' 41,65"
21	1447	Dzulhijjah	4° 35' 4"	03:03:22 WIB	14j 19m 48d	9° 40' 52,81"
22	1448/2027	Ramadhan	-0° 42' 0"	22:57:13 WIB	0 jam	-
23	1448	Syawal	-2° 42' 0"	16:31:33 WIB	0 jam	-
24	1448	Dzulhijjah	-3° 42' 24"	18:00:38 WIB	0 jam	-

In the Rukyat and Hisab methods, when determining the beginning of the month is agreed upon, the next step is whether the believed start of the month applies to all regions or only specific areas.[29] Alternatively, in other words, to what extent did the success of seeing the new moon or the embodiment of the new moon apply. The geographical limit of the validity of rukyat in the discourse of Hisab Rukyat is called *matlak*, while matlak itself has two types, namely local matlak and global matlak. The definition of local *matlak* is the sighting of the new moon (both with reckoning and rukyat) which only applies to one area. Meanwhile, global matlak is the sighting of the new moon in one area and applies to all areas of the earth's surface. For Indonesia, the majority conforms to local matlak, or one country is considered *wilayatul hukmi*.[30] This means that if one region of Indonesia sees the new moon, it applies to all regions of Indonesia. Alternatively, it could

from the Ponorogo Ministry of Religion's rukyat reckoning application. Meanwhile, the researchers calculated the solar moon elongation data manually. This is because in the application of the rukyat reckoning of the Ministry of Religion, Ponorogo, it has not been equipped with solar moon elongation data. The formula for calculating elongation can be seen in Slamet Hambali, "*Hisab Awal Ramadhan dan Syawal 1437 H (2016 M) dengan Sistem Al-Khulasah Al-Wafiyah*", (Semarang: LPPM UIN Walisongo, 2016), 12

[29] Watni Marpaung, "Hisab Imkan Rukyat An Effort Unification In Determining of The Beginning of Months of Qamariah," *MIQOT: Jurnal Ilmu-Ilmu Keislaman* 39, no. 2 (December 9, 2015), https://doi.org/10.30821/miqot.v39i2.70.

[30] There are several reasons why local or regional matlaks are preferred over global matlaks. For further explanation about this. Arwin Juli Rakhmadi Butar-Butar, *Problems of Determining the Beginning of the Month: Discourse between Hisab and Rukyat* (Malang: Madani, 2014), 129–36.

be that the data for the hilal height is close to 2^0 in one region but already 2^0 in another, in which case locations with a hilal height of less than 2^0 may trail other areas with a high hilal level of 2^0. This also applies to the *Wujud al-Hilal* criterion. There may be one region in Indonesia where the hilal is close to 0^0 (still minus), but the average for other areas is 0^0, so the same applies.

Another point worth mentioning is the elongation or angle of the distance between the moon and the sun. The *Wujud al-Hilal* criterion, as previously stated, does not need elongation. As a result, based on data from Winhisab, the researcher finds that if the height of the new moon does not match the standards of *Imkan ar-Rukyat*, then elongation does not need to be specified. This is because only the old and new *Imkan ar-Rukyat* criteria require elongation for new moon visibility. Thus, it can be said that if the height of the hilal meets the criteria of *Wujud al-Hilal* but does not meet the criteria of *Imkan ar-Rukyat*, then the elongation data does not need to be entered.

Next, for the first part, we first analyze the data on the height of the hilal in the table above using the criteria of *Wujud al-Hilal*. To do this, we need to mention here again the requirements of the criteria for *Wujud al-Hilal*, namely:

1. Conjunction or *ijtimak*[31] has occurred before sunset
2. The moon sets after the sun, then the next day is declared the beginning of the hijri month.

Based on the criteria mentioned above, we may see how many early months fit this condition during 10 years (particularly the beginning of the months of Ramadan, Shawwal, and Zulhijah) from 1441 H to 1450 H. The table below shows the month and year *Wujud al-Hilal* will commence at the beginning of the month:

Figure 2. Data of hilal height fulfills the requirement of *Wujud al-Hilal* criteria. The bold number shows Hilal Height which fulfills the requirement of *Wujud al-Hilal* criteria but does not fulfill the requirement of the new MABIMS criteria

No	Year	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3^0 46′ 06″	09:27:22 WIB	8^j 1^m 31^d	5^0 16′ 6,32″
2	1441	Syawal	6^0 36′ 49″	00:40:04 WIB	16^j 42^m 40^d	7^0 50′ 51,77″
3	1441	Dzulhijjah	7^0 46′ 18″	00:33:25 WIB	16^j 59^m 16^d	9^0 19′ 17,96″
4	1442/ 2021	Ramadhan	3^0 37′ 14″	09:33:19 WIB	8^j 0^m 17^d	4^0 57′ 24,25″
5	1442	Syawal	5^0 23′ 59″	02:01:49 WIB	15^j 21^m 58^d	6^0 45′ 58,1″
6	1442	Dzulhijjah	3^0 0′ 7″	08:17:33 WIB	9^j 12^m 57^d	5^0 26′ 55,56″
7	1443/2022	Ramadhan	**2^0 9′ 48″**	13:28:03 WIB	4^j 11^m 1^d	3^0 43′ 51,73″

[31] Ijtima (*conjunction*): the meeting of the sun, earth, and moon in the same line in a synodic month (± 29 days). Susiknan Azhari, *Hisab Rukyat Encyclopedia* (Yogyakarta: Pustaka Pelajar, 2008), 93.

8	1443	Syawal	4^0 43′ 2″	03:31:03 WIB	13^j 55^m 20^d	6^0 22′ 28,11″
9	1443	Dzulhijjah	**1^0 49′ 4″**	09:53:18 WIB	7^j 34^m 36^d	5^0 7′ 21,79″
10	1444/2023	Ramadhan	7^0 50′ 8″	00:27:09 WIB	17^j 17^m 11^d	9^0 34′ 16,99″
11	1444	Syawal	**1^0 38′ 26″**	11:16:11 WIB	6^j 14^m 9^d	3^0 11′ 2,97″
12	1444	Dzulhijjah	**0^0 50′ 2″**	11:39:08 WIB	5^j 46^m 15^d	-
13	1445/2024	Ramadhan	**0^0 46′ 58″**	16:03:08 WIB	1^j 46^m 48^d	-
14	1445	Syawal	5^0 59′ 59″	01:23:46 WIB	16^j 11^m 6^d	9^0 13′ 16,28″
15	1446/2025	Ramadhan	4^0 4′ 58″	07:47:01 WIB	10^j 7^m 25^d	5^0 35′ 50,77″
16	1446	Dzulhijjah	**1^0 15′ 48″**	10:04:37 WIB	7^j 18^m 7^d	-
17	1447	Syawal	**1^0 50′ 21″**	08:26:21 WIB	9^j 19^m 23^d	5^0 25′ 41,65″
18	1447	Dzulhijjah	4^0 35′ 4″	03:03:22 WIB	14^j 19^m 48^d	9^0 40′ 52,81″
19	1449	Dzulhijjah	2^0 46′ 59″	02:49:16 WIB	14^j 38^m 53^d	8^0 31′ 20,51″
20	1450/2029	Ramadhan	6^0 5′ 40″	00:25:54 WIB	17^j 33^m 32^d	8^0 34′ 14,07″
21	1450	Dzulhijjah	**1^0 33′ 35″**	04:42:13 WIB	12^j 50^m 27^d	-

According to the data above, approximately 21 months within 30 months fit the conditions for *Wujud al-Hilal* because it just requires a minimum height of 0^0, and ijtima happens before sunset. However, elongation is not required for this condition. Thus, we can conclude that the percentage of the realization of the new moon is quite large, or around 70 percent.

ANALYSIS OF HILAL HEIGHT DATA USING THE OLD MABIMS CRITERIA

Analyzed using the old MABIMS criteria to know how often the beginning of the month is compared to the *Wujud al-Hilal* criteria.[32] Therefore, it is necessary to include the criteria for the old *Imkan ar-Rukyat*, namely:

1. The minimum height[33] of the moon is 2 degrees at sunset
2. Moon-sun distance or minimum elongation of 3 degrees
3. The age of the month at maghrib is at least 8 hours after ijtima

[32] Susiknan Azhari, "Penyatuan Kalender Islam: Mendialogkan Wujûd al-Hilâl Dan Visibilitas Hilal," *AHKAM : Jurnal Ilmu Syariah* 13, no. 2 (August 7, 2013), https://journal.uinjkt.ac.id/index.php/ahkam/article/view/931."plainCitation":"Susiknan Azhari, "Penyatuan Kalender Islam: Mendialogkan Wujûd al-Hilâl Dan Visibilitas Hilal," AHKAM : Jurnal Ilmu Syariah 13, no. 2 (August 7, 2013

[33] The height of the hilal above the horizon is the position of the hilal above the horizon that can be observed or seen by the eye. There are various types of horizons: the ultimate horizon, the mar'i horizon, and the hissi horizon. The horizon used here is the mar'i horizon or the horizon that can be seen by the eye. The true horizon (True Horizon) is a flat plane drawn from the center of the Earth perpendicular to a vertical line, so that it divides the earth and the celestial sphere into two equal parts, the top, and the bottom. The Hissi horizon / apparent horizon (Astronomical horizon) is a flat plane drawn from the earth's surface perpendicular to a vertical line. The mar'i horizon (visible horizon) is the horizon that is visible to the eye, that is, when someone is on the beach or a very wide plain, it will appear that there is a kind of meeting line between the sky and the earth. This line of meeting is what is meant by the mar'i horizon. Muhyiddin Khazin, *Kamus Ilmu Falak*, 86.

With the above conditions, the beginning of the month using the old MABIMS criteria is shown in the table below:

Figure 3. Data of hilal height fulfills the requirement of old MABIMS Criteria. The bold number shows Hilal Height which fulfills the requirement of old MABIMS criteria but does not fulfill the requirement of new MABIMS criteria

No	Date	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3^0 46′ 06″	09: 27 WIB	8^j 1^m 31^d	5^0 16′ 6,32″
2	1441	Syawal	6^0 36′ 49″	00:40 WIB	16^j 42^m 40^d	7^0 50′ 51,77″
3	1441	Dzulhijjah	7^0 46′ 18″	00:33 WIB	16^j 59^m 16^d	9^0 19′ 17,96″
4	1442/2021	Ramadhan	3^0 37′ 14″	09: 33 WIB	8 j 0^m 17^d	4^0 57′ 24,25″
5	1442	Syawal	5^0 23′ 59″	02:01 WIB	15^j 21^m 58^d	6^0 45′ 58,1″
6	1442	Dzulhijjah	3^0 0′ 7″	08:17 WIB	9^j 12^m 57^d	5^0 26′ 55,56″
7	1443/2022	Ramadhan	**2^0 9′ 48″**	13:28 WIB	4^j 11^m 1^d	3^0 43′ 51,73″
8	1443	Syawal	4^0 43′ 2″	03:31 WIB	13^j 55^m 20^d	6^0 22′ 28,11″
9	1443	Dzulhijjah	**1^0 49′ 4″**	09: 53 WIB	7^j 34^m 36^d	5^0 7′ 21,79″
10	1444/2023	Ramadhan	7^0 50′ 8″	00: 27 WIB	17^j 17^m 11^d	9^0 34′ 16,99″
11	1444	Syawal	**1^0 38′ 26″**	11:16 WIB	6^j 14^m 9^d	3^0 11′ 2,97″
12	1445/2024	Syawal	5^0 59′ 59″	01: 23 WIB	16^j 11^m 6^d	9^0 13′ 16,28″
13	1446/2025	Ramadhan	4^0 4′ 58″	07: 47 WIB	10^j 7^m 25^d	5^0 35′ 50,77″
14	1447/2026	Syawal	**1^0 50′ 21″**	08:26 WIB	9^j 19^m 23^d	5^0 25′ 41,65″
15	1447	Dzulhijjah	4^0 35′ 4″	03:03 WIB	14^j 19^m 48^d	9^0 40′ 52,81″
16	1449/2028	Dzulhijjah	2^0 46′ 59″	02:49 WIB	14^j 38^m 53^d	8^0 31′ 20,51″
17	1450/2029	Ramadhan	6^0 5′ 40″	00: 25 WIB	17^j 33^m 32^d	8^0 34′ 14,07″

The table above shows that the data on the height of the *hilal* at the beginning of Ramadan, Shawwal, and Zulhijah were analyzed concerning the old MABIMS criteria. Meanwhile, in the period from 1441 H to 1450 H, 17 months (from 30 months) would meet these criteria. This amount is not as many as if using the criteria of *Wujud al-Hilal*.

We can also observe from the table above that there are specific statistics on the height of the new moon that are less than 2^0, such as numbers 9, 11, and 14. Although the height of the new moon in the area being studied is less than 2^0, because the average height in other areas is already 2^0, the area with a height of less than 2^0 hilal can still follow the first day because it is still in one legal entity or *wilayatul hukmi*, and this applies to all regions in Indonesia. This result is presented in the table below, where the researcher takes the example of number 11 or the beginning of the month of Shawwal 1444 H, in which the data shows the height of

the new moon is 1^0 38′ 26″. Meanwhile, in other areas, a hilal height is already at an altitude of 2^0. On 29 Ramadan 1444 H, ijtima took place on April 20, 2023 AD at 11^h 16^m 11^d, the height of the mar'i hilal is 1^0 38′ 26″. By using the old MABIMS criteria, we can see that the beginning of the month of Shawwal 1444 H falls on April 21, 2023. This means that even though the height of the new moon in Ponorogo city is below 20, in other areas, it is already two degrees, and it can follow another region.

TAQWIM AWAL BULAN QAMARIYAH
KRITERIA MABIMS/Departemen Agama RI.
TAHUN 1444 HIJRIYAH

Markas : PONOROGO Lintang : 7° 53' LS Bujur : 111° 29' BT Tinggi tempat : 0 m

No.	Bulan	Ijtima'				Terbenam		Azimut		Tinggi Hilal		Lama Hilal	Besar Cahaya	Awal Bulan		
		Hari	Pasaran	Tanggal	Jam	Matahari	Bulan	Matahari	Bulan	Hakiki	Mar'iy			Hari	Pasaran	Tanggal
1	Muharram	Jum'at	Legi	29/7/2022	00:55:04	17:33:42	18:05:42	288° 44' 54"	292° 53' 09"	07° 15' 00"	06° 43' 06"	00:31:59	0.64 %	Sabtu	Pahing	30/7/2022
2	Shafar	Sabtu	Kliwon	27/8/2022	15:16:22	17:33:46	17:38:48	279° 57' 14"	284° 19' 04"	01° 14' 25"	00° 56' 54"	00:05:02	0.18 %	Senin	Pahing	29/8/2022
3	Rabiul I	Senin	Kliwon	26/9/2022	04:53:28	17:29:49	17:54:14	268° 32' 13"	269° 39' 37"	05° 57' 35"	05° 25' 06"	00:24:25	0.37 %	Selasa	Legi	27/9/2022
4	Rabiul II	Selasa	Wage	25/10/2022	17:47:46	17:28:44	17:24:36	257° 35' 07"	258° 39' 43"	00° -52' 23"	00° -46' 54"	00:-04:08	0.01 %	Kamis	Legi	27/10/2022
5	Jumadal I	Kamis	Wage	24/11/2022	05:56:58	17:36:34	18:01:27	249° 04' 18"	246° 30' 18"	05° 32' 30"	04° 58' 09"	00:24:52	0.37 %	Jum'at	Kliwon	25/11/2022
6	Jumadal II	Jum'at	Pon	23/12/2022	17:17:47	17:50:45	17:50:42	246° 11' 48"	242° 24' 37"	00° 04' 42"	00° -06' 10"	00:00:-03	0.12 %	Ahad	Kliwon	25/12/2022
7	Rajab	Ahad	Pon	22/1/2023	03:55:36	18:00:32	18:39:41	249° 59' 49"	248° 25' 43"	08° 49' 02"	08° 11' 08"	00:39:09	0.73 %	Senin	Wage	23/1/2023
8	Sya'ban	Senin	Pahing	20/2/2023	14:09:24	17:57:28	18:10:50	258° 50' 36"	256° 01' 27"	03° 16' 37"	02° 45' 53"	00:13:22	0.19 %	Selasa	Pon	21/2/2023
9	Ramadhan	Rabu	Pahing	22/3/2023	00:27:09	17:44:20	18:18:45	270° 29' 54"	273° 48' 37"	08° 26' 28"	07° 50' 08"	00:34:25	0.75 %	Kamis	Pon	23/3/2023
10	Syawal	Kamis	Legi	20/4/2023	11:16:11	17:30:20	17:38:46	281° 29' 28"	283° 01' 43"	02° 02' 41"	01° 38' 26"	00:08:25	0.08 %	Jum'at	Pahing	21/4/2023
11	Dzul Qa'dah	Jum'at	Kliwon	19/5/2023	22:56:10	17:23:00	17:03:46	289° 49' 40"	290° 37' 32"	-04° 10' 51"	-04° 50' 14"	00:-19:13	0.09 %	Ahad	Pahing	21/5/2023
12	Dzul Hijjah	Ahad	Kliwon	18/6/2023	11:39:08	17:25:23	17:30:12	293° 30' 28"	298° 10' 14"	01° 06' 36"	00° 50' 02"	00:04:49	0.20 %	Selasa	Pahing	20/6/2023

Keterangan :
Jam Ijtima' adalah waktu standar.

Ponorogo, 10 September

DATA ANALYSIS OF HILAL HEIGHT USING NEW MABIMS CRITERIA

We analyze the data on the height of the hilal by using the new MABIMS criteria, which have the following conditions:

1. The height of the new moon is at least $3^{o.}$
2. The minimum elongation is 6.4^o.

The criteria above no longer require the age of the new moon after ijtima. However, the height of the new moon increases by 1^0, and the elongation also increases. The following table contains the analysis of the hilal height data using the new MABIMS criteria:

Figure 4. Data of hilal height fulfills the requirement of new MABIMS criteria. The bold number shows the elongation value, which does not fulfill the requirement of the new MABIMS criteria

No	Year	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3^0 46′ 06″	09: 27 WIB	8^j 1^m 31^d	**5^0 16′ 6,32″**
2	1441	Syawal	6^0 36′ 49″	00:40 WIB	16^j 42^m 40^d	7^0 50′ 51,77″

3	1441	Dzulhijjah	7^0 46′ 18″	00:33 WIB	16^j 59^m 16^d	9^0 19′ 17,96″
4	1442/2021	Ramadhan	3^0 37′ 14″	09: 33 WIB	8 j 0^m 17^d	**4^0 57′ 24,25″**
5	1442	Syawal	5^0 23′ 59″	02:01 WIB	15^j 21^m 58^d	6^0 45′ 58,1″
6	1442	Dzulhijjah	3^0 0′ 7″	08:17 WIB	9^j 12^m 57^d	**5^0 26′ 55,56″**
7	1443/2022	Syawal	4^0 43′ 2″	03:31 WIB	13^j 55^m 20^d	6^0 22′ 28,11″
8	1444/2023	Ramadhan	7^0 50′ 8″	00: 27 WIB	17^j 17^m 11^d	9^0 34′ 16,99″
9	1445/2024	Syawal	5^0 59′ 59″	01: 23 WIB	16^j 11^m 6^d	9^0 13′ 16,28″
10	1446/2025	Ramadhan	4^0 4′ 58″	07: 47 WIB	10^j 7^m 25^d	**5^0 35′ 50,77″**
11	1447/2026	Dzulhijjah	4^0 35′ 4″	03:03 WIB	14^j 19^m 48^d	9^0 40′ 52,81″
12	1450/2029	Ramadhan	6^0 5′ 40″	00: 25 WIB	17^j 33^m 32^d	8^0 34′ 14,07″

If we look at the table above, we can see that when the data on the height of the new moon is analyzed using the new MABIMS criteria where the number of the beginning of the month or the first day of the month gets smaller. It can even be said to be the smallest in number compared to the old MABIMS criteria and criteria for the *Wujud al-Hilal*. According to the table, the beginning of the month that satisfied the MABIMS criterion was only around 12 months. However, according to the elongation data, this number will decrease, namely at the beginning of the month of Ramadan 1441 H, the beginning of the month of Ramadan 1442 H, the beginning of the month of Zulhijah 1442 H, and the beginning of the month of Ramadan 1446 H which did not reach 6^0. Even though the requirements for the new MABIMS criteria, the minimum elongation angle is $6{,}4^{0.}$ If this is also considered, the initial number of months meeting this criterion's requirements is only 8 months. Thus, the data analysis of the hilal height at the beginning of the hijriyah month is carried out using the *Wujud al-Hilal* criteria, the old MABIMS criteria, and the new MABIMS criteria.[34]

Essentially, the beginning of the month can also overlap between these three conditions when the hilal's height is less than 0^0 or minus (-). This is because when the new moon's height is negative, it does not match the requirements for the three criteria listed above. Therefore each criterion determines that the next day is the 30th and has not yet begun the first day. In other words, an istikmal happens when the new moon conditions do not fit the three criteria or when the number of days in the hijri month is not equal to 30. As a result, the month begins on the

[34] Fuscha, "Verification of The Hisab Ephemeris System Against The Hijri Calendar Leap Year Pattern With Criteria Imkan Al-Rukyah Mabims (Case Study in Kudus District)"; Ahmad Wahidi et al., "Implementation of the Mabims Criteria in Determining the Beginning of Islamic Month in Indonesia and Brunei Darussalam" (International Conference on Engineering, Technology and Social Science (ICONETOS 2020), Atlantis Press, 2021), 96–108, https://doi.org/10.2991/assehr.k.210421.016; Arino Bemi Sado, "Imkan Al-Rukyat Mabims Solusi Penyeragaman Kelender Hijriyah," *Istinbath* 12, no. 2 (2014): 22–36.

same day for everyone. Conditions like this can be called "safe" conditions. The following table contains the height of the new moon in the position.

The criteria for the beginning of the month, according to *Wujud al-Hilal,* will be met if the height of the new moon is at least 0^0. Meanwhile, according to the old MABIMS criteria, the requirements for the beginning of the month will be fulfilled if the height of the new moon is at least 2^0. As a result, if the height of the new moon is more than 2^0, both *Wujud al-Hilal* and the previous MABIMS criteria indicate that the beginning of the month or the first day has been entered. According to *Wujud al-Hilal* and *Imkan ar-Rukyat* MABIMS, if the height of the new moon is less than 0^0 or minus(-), the prerequisites for the beginning of the month have not been met. A "safe" hilal position means conditions like this, i.e., those who use the *Wujud al-Hilal* and *Imkan ar-Rukyat* MABIMS will set the first date on the same day. This "safe" position will occur in the month of Ramadan (all years except 1445), the month of Shawwal (all years), and the month of Zulhijah (all years except 1444, 1446, and 1450).

In addition to the "safe" position of the new moon, there is also a position of the new moon that is considered "vulnerable." This happens when the moon's height ranges from 0^0 to nearly 2^0. This position is stated to be "vulnerable" since the prerequisites for the beginning of the month, namely the minimum height of the new moon, have been reached according to *Wujud al-Hilal*, therefore for those who adopt this criterion, the next day has been claimed to enter the first day. Meanwhile, those who use *Imkan ar-Rukyat* MABIMS (both old and new) will determine that the next day is the 30^{th}. Therefore, the beginning of the month or the first day falls on the next day for them. As a result, communities that utilize the *Wujud al-Hilal* criteria and those that employ the old and new MABIMS criteria will identify the start of the month or the first day on a different day. The new moon will be in a "vulnerable" position in the month of Ramadan in 1445 and Zulhijah in 1444, 1446, and 1450.

FREQUENCY OF DIFFERENCES IN NEW MABIMS CRITERIA AND *WUJUD AL-HILAL*

Looking at the table above, we can observe that the height of the new moon varies. There are people whose hilal height is negative, those whose hilal height is zero, and some whose hilal height is more significant than three degrees. These varied heights of the new moon can be divided into two categories: the "vulnerable" position and the "safe" position of the new moon. The prone hilal, as defined by the researcher, is the height of the hilal that results in a discrepancy in the determination of the beginning of the month that is between 0^0 and 2^0 or

less. Vulnerable means that there is the possibility of setting a different first date because the height of the new moon, according to the criteria of *Wujud al-Hilal* has met the requirements for the beginning of the month, but according to the criteria of *Imkan ar-Rukyat* MABIMS, the old ones have not met the requirements for the beginning of the month. A further consequence is that the beginning of the month must be different. Thus, the government, NU, and Muhammadiyah will set the beginning of the month not on the same date.

Meanwhile, what is meant by the "safe" position of the hilal height is when the hilal height, both according to the criteria of *Wujud al-Hilal* and *Imkan ar-Rukyat* MABIMS (old and new), both meet the requirements at the beginning of the month and also both does not meet the requirements of the beginning of the month. We can understand this from the description in the table above.

To see the frequency of differences between the new MABIMS criteria and the *Wujud al-Hilal* criteria, the hilal data described above can be used for further analysis using the new MABIMS criteria. This has been described above, more precisely in the hilal data table, which was analyzed using the new MABIMS criteria. For this purpose, we use the table above again at this stage as follows:

Figure 5. Data of hilal height that fulfills the requirement of new MABIMS criteria. The bold numbers show the Elongation value that does not fulfill the requirement of the new MABIMS criteria.

No	Year	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3^0 46′ 06″	09: 27 WIB	8^j 1^m 31^d	**5^0 16′ 6,32″**
2	1441	Syawal	6^0 36′ 49″	00:40 WIB	16^j 42^m 40^d	7^0 50′ 51,77″
3	1441	Dzulhijjah	7^0 46′ 18″	00:33 WIB	16^j 59^m 16^d	9^0 19′ 17,96″
4	1442/2021	Ramadhan	3^0 37′ 14″	09: 33 WIB	8 j 0^m 17^d	**4^0 57′ 24,25″**
5	1442	Syawal	5^0 23′ 59″	02:01 WIB	15^j 21^m 58^d	6^0 45′ 58,1″
6	1442	Dzulhijjah	3^0 0′ 7″	08:17 WIB	9^j 12^m 57^d	**5^0 26′ 55,56″**
7	1443/2022	Syawal	4^0 43′ 2″	03:31 WIB	13^j 55^m 20^d	6^0 22′ 28,11″
8	1444/2023	Ramadhan	7^0 50′ 8″	00: 27 WIB	17^j 17^m 11^d	9^0 34′ 16,99″
9	1445/2024	Syawal	5^0 59′ 59″	01: 23 WIB	16^j 11^m 6^d	9^0 13′ 16,28″
10	1446/2025	Ramadhan	4^0 4′ 58″	07: 47 WIB	10^j 7^m 25^d	**5^0 35′ 50,77″**
11	1447/2026	Dzulhijjah	4^0 35′ 4″	03:03 WIB	14^j 19^m 48^d	9^0 40′ 52,81″
12	1450/2029	Ramadhan	6^0 5′ 40″	00: 25 WIB	17^j 33^m 32^d	8^0 34′ 14,07″

The new moon height in the table above is the new moon height that fits the criterion for the start of the new MABIMS month. Around twelve early months fit

this condition between the years 1441 and 1450. In other words, out of 30 months (just Ramadan, Shawwal, and Zulhijah) during 10 years, almost one-third of the months match the requirements of the new MABIMS criterion. If elongation is also considered, this togetherness will decrease because among the twelve months, whose height of the new moon fulfills these requirements. It turns out that there are about 4 months with elongation below 6 degrees. In other words, if elongation is also considered, then the equation between the new MABIMS criteria and the Hilal Wujudul criteria is only 8 months on the first day or the beginning of the month. If we use the old criteria, we can see from the following table:

Figure 6. Data of hilal height fulfills the requirement of old MABIMS criteria. The bold numbers show Hilal Height which does not fulfill the requirement of old MABIMS criteria but does not fulfill the requirement of new MABIMS criteria.

No	Date	Month	Hilal Height	Ijtimak Time	Hilal Age	Elongation
1	1441/ 2020	Ramadhan	3^0 46′ 06″	09: 27 WIB	8^j 1^m 31^d	5^0 16′ 6,32″
2	1441	Syawal	6^0 36′ 49″	00:40 WIB	16^j 42^m 40^d	7^0 50′ 51,77″
3	1441	Dzulhijjah	7^0 46′ 18″	00:33 WIB	16^j 59^m 16^d	9^0 19′ 17,96″
4	1442/2021	Ramadhan	3^0 37′ 14″	09: 33 WIB	8 j 0^m 17^d	4^0 57′ 24,25″
5	1442	Syawal	5^0 23′ 59″	02:01 WIB	15^j 21^m 58^d	6^0 45′ 58,1″
6	1442	Dzulhijjah	3^0 0′ 7″	08:17 WIB	9^j 12^m 57^d	5^0 26′ 55,56″
7	1443/2022	Ramadhan	**2^0 9′ 48″**	13:28 WIB	4^j 11^m 1^d	3^0 43′ 51,73″
8	1443	Syawal	4^0 43′ 2″	03:31 WIB	13^j 55^m 20^d	6^0 22′ 28,11″
9	1443	Dzulhijjah	**1^0 49′ 4″**	09: 53 WIB	7^j 34^m 36^d	5^0 7′ 21,79″
10	1444/2023	Ramadhan	7^0 50′ 8″	00: 27 WIB	17^j 17^m 11^d	9^0 34′ 16,99″
11	1444	Syawal	**1^0 38′ 26″**	11:16 WIB	6^j 14^m 9^d	3^0 11′ 2,97″
12	1445/2024	Syawal	5^0 59′ 59″	01: 23 WIB	16^j 11^m 6^d	9^0 13′ 16,28″
13	1446/2025	Ramadhan	4^0 4′ 58″	07: 47 WIB	10^j 7^m 25^d	5^0 35′ 50,77″
14	1447/2026	Syawal	1^0 50′ 21″	08:26 WIB	9^j 19^m 23^d	5^0 25′ 41,65″
15	1447	Dzulhijjah	4^0 35′ 4″	03:03 WIB	14^j 19^m 48^d	9^0 40′ 52,81″
16	1449/2028	Dzulhijjah	2^0 46′ 59″	02:49 WIB	14^j 38^m 53^d	8^0 31′ 20,51″
17	1450/2029	Ramadhan	6^0 5′ 40″	00: 25 WIB	17^j 33^m 32^d	8^0 34′ 14,07″

When we utilize the previous MABIMS criteria, we have better chances of starting the month on the same day as the *Wujud al-Hilal* criteria. According to the table above, if the previous MABIMS standards are used, there will be 17 months

that match the requirements.[35] In other words, almost half of the total number of 30 months indicated above meet the month's beginning requirements.

Based on the data above, it can be concluded that if you use the new MABIMS criteria, the determination of the first date or the beginning of the month is getting more and more different. If using the new MABIMS criteria, the determination of the first date, which will be the same as or at the same time as the *Wujud al-Hilal* criteria, will only amount to 12. If elongation is also considered, then there are only about 8 similarities between the *Wujud al-Hilal* and the new MABIMS criteria. However, using the old MABIMS criteria, the determination of the first date or the beginning of the month will be the same for 17 months. The fall of the first day simultaneously is only based on the fulfillment of the conditions at the beginning of the month by the two criteria, namely *Wujud al-Hilal* and *Imkan ar-Rukyat*. In this case, the height of the hilal is not considered, which has a minus value where this position also causes the determination of the first date or the beginning of the month to be unified.

With the frequency of variances indicated above, if the new MABIMS criteria are applied in Indonesia, the result will be more significant variations in determining the beginning of the month.

Changes in the following criteria are likely to bring us closer to the truth of the astronomical height of the hilal. If this is proved, certain parties may reject the *Imkan ar-Rukyat* MABIMS criteria because the height of the hilal does not correspond to the visibility of the hilal according to astronomy, so it is hoped that this hilal height will be closer to the truth.

CONCLUSION

This research takes some following conclusions. *First,* based on data analysis on the height of the *hilal* at the beginning of the months of Ramadan, Syawal, and Zulhijah from 1441 to 1450 H, the Indonesian government still uses the old MABIMS criteria. The togetherness at the beginning of the month is within a 10-year (30-month) span, with the *Wujud al-Hilal* criteria has appeared 17 times. If the revised MABIMS criteria are utilized, the first day will coincide with the Wujud al-Hilal eight times. As a result, the frequency of disparities in determining the start of the month between the new MABIMS criteria and the *Wujud al-Hilal* is increasing. *Second,* if the new MABIMS criteria are applied in Indonesia, the inequality at the beginning of the month will become more frequent due to the increase in the frequency of the difference at the beginning of the month.

[35] Wahidi et al., "Implementation of the Mabims Criteria in Determining the Beginning of Islamic Month in Indonesia and Brunei Darussalam."

REFERENCES

Angkat, Arbisora. "Kalender Hijriah Global Dalam Perspektif Fikih." *Al-Marshad: Jurnal Astronomi Islam Dan Ilmu-Ilmu Berkaitan* 3, no. 2 (December 30, 2017). https://doi.org/10.30596/jam.v3i2.1524.

Anwar, Syamsul. *Qomariyah Month Reckoning; Syar'i Review on Determining the Beginning of Ramadan, Shawwal, and Zulhijah*. Yogyakarta: Muhammadiyah Voice, 2008.

Azhari, Susiknan. *Hisab Rukyat Encyclopedia*. Yogyakarta: Pustaka Pelajar, 2008.

_____. "Penyatuan Kalender Islam: Mendialogkan Wujûd al-Hilâl Dan Visibilitas Hilal." *AHKAM: Jurnal Ilmu Syariah* 13, no. 2 (August 7, 2013). https://journal.uinjkt.ac.id/index.php/ahkam/article/view/931.

Butar-Butar, Arwin Juli Rakhmadi. *Problems of Determining the Beginning of the Month: Discourse between Hisab and Rukyat*. Malang: Madani, 2014.

Djamaluddin, Thomas. *Initiating Astronomical Fiqh*. Bandung: Kaki Langit, 2005.

Djamaluddin, Thomas. "Kongres Kesatuan Kalender Hijri Internasional Di Turki 2016: Kalender Tunggal." Accessed June 8, 2022. https://tdjamaluddin.wordpress.com/2016/06/02/kongres-kesatuan-kalender-hijri-internasional-di-turki-2016-kalender-tunggal/.

Djamuluddin, Thomas. "Menuju Kriteria Baru MABIMS Berbasis Astronomi ." Accessed June 8, 2022. https://tdjamaluddin.wordpress.com/2016/10/05/menuju-kriteria-baru-mabims-berbasis-astronomi/.

Djamuluddin, Thomas. "Penyatuan Kalender Islam." Accessed June 8, 2022. https://tdjamaluddin.wordpress.com/2017/05/29/penyatuan-kalender-Islam/.

Fadholi, Ahmad. "Pandangan Ormas Islam Terhadap Draf Kriteria Baru Penentuan Kalender Hijriah Di Indonesia." *Istinbath* 17, no. 1 (June 29, 2018): 198–220. https://doi.org/10.20414/ijhi.v17i1.41.

_____. "Akseptabilitas Draf Kriteria Baru Penentuan Kalender Hijriah Menurut Ahli Falak Di Indonesia." *Edugama: Jurnal Kependidikan Dan Sosial Keagamaan* 5, no. 1 (July 1, 2019): 101–14. https://doi.org/10.32923/edugama.v5i1.961.

Fuscha, Fika Afhamul. "Verification of The Hisab Ephemeris System Against The Hijri Calendar Leap Year Pattern With Criteria Imkan Al-Rukyah Mabims (Case Study in Kudus District)." *Al-Hilal: Journal of Islamic Astronomy* 3, no. 1 (May 19, 2021): 107–28.

Hosen, Hosen. "Kilas Balik Kalender Hijriyah Indonesia Perjalanan Menuju Penyatuan Kalender Nasional." *Islamuna: Jurnal Studi Islam* 4, no. 1 (July 1, 2017): 81–111. https://doi.org/10.19105/islamuna.v4i1.1352.

Izzuddin, Ahmad. *Fiqih Hisab Rukyat; Menyatukan NU Dan Muhammadiyah Dalam Penentuan Awal Ramadan, Idul Fitri, Dan Idul Adha*. Jakarta: Erlangga, 2007.

Junaidi, Ahmad. "Wujud Al-Hilal Antara Teori Dan Aplikasi." *Justicia Islamica* 10, no. 2 (December 1, 2013). https://doi.org/10.21154/justicia.v10i2.149.

Khazin, Muhyiddin. *Dictionary of Astronomy*. Yogyakarta: Buana Pustaka, 2005.

Kurniawan, Taufiqurrahman. "Penyatuan Kalender Islam." *YUDISIA : Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 2 (January 20, 2016). https://doi.org/10.21043/yudisia.v5i2.711.

"MABIMS - Pengenalan." Accessed June 8, 2022. http://www.mabims.gov.bn/SitePages/Pengenalan.aspx.

Marpaung, Watni. "Hisab Imkan Rukyat An Effort Unification In Determining of The Beginning of Months of Qamariah." *MIQOT: Jurnal Ilmu-Ilmu Keislaman* 39, no. 2 (December 9, 2015). https://doi.org/10.30821/miqot.v39i2.70.

Maskufa. "Global Hijriyah Calendar As Challenges Fikih Astronomy," 188–92. Atlantis Press, 2017. https://doi.org/10.2991/iclj-17.2018.39.

Masroeri, Ahmad Ghazalie. "Lembaga Falakiyah PBNU." Accessed June 8, 2022. http://falakiyah.nu.or.id/PedomanRukyatNU.aspx.

Mufid, Abdul. "Unifikasi Kalender Hijriah Internasional Dalam Perspektif Yusuf Al-Qaradawi." *HIKMATUNA* 5, no. 1 (June 26, 2019): 71–83. https://doi.org/10.28918/hikmatuna.v5i1.1856.

Nursodik, Nursodik. "Kajian Kriteria Hisab Global Turki Dan Usulan Kriteria Baru MABIMS Dengan Menggunakan Algoritma Jean Meeus." *Al-Ahkam* 28, no. 1 (April 10, 2018): 119–40. https://doi.org/10.21580/AHKAM.2018.18.1.2353.

Sado, Arino Bemi. "Imkan Al-Rukyat Mabims Solusi Penyeragaman Kelender Hijriyah." *Istinbath* 12, no. 2 (2014): 22–36.

Saksono, Tono. "Kalender Islam Global: Perspektif Syariah, Ekonomi, dan Politik." *JURIS (Jurnal Ilmiah Syariah)* 15, no. 2 (March 18, 2017): 143–52. https://doi.org/10.31958/juris.v15i2.495.

Sopwan, Novi, and Abu Dzarrin Al-Hamidy. "Implikasi Kriteria Visibilitas Hilal Rekomendasi Jakarta 2017 Terhadap Penanggalan Hijriah Di Indonesia." *Azimuth: Journal of Islamic Astronomy* 1, no. 1 (January 30, 2020): 52–73.

Syakir NF, Muhammad. "Ketika NU Dan Pemerintah Berbeda Dalam Penentuan Awal Hijriah." Accessed June 8, 2022. https://www.nu.or.id/fragmen/ketika-nu-dan-pemerintah-berbeda-dalam-penentuan-awal-hijriah-7seId.

Team, PP Muhammadiyah Majlis Tarjih and Tajdid. *Muhammadiyah Hisab Guidelines*. Yogyakarta: PP Muhammadiyah Majlis Tarjih and Tajdid, 2009.

Wahidi, Ahmad. "Menyatukan Penetapan 1 Ramadlan, Syawal Dan Dzulhijjah Di Indonesia." *Jurisdictie: Jurnal Hukum Dan Syariah* 2, no. 2 (2011): 85–91. https://doi.org/10.18860/j.v0i0.2162.

Wahidi, Ahmad, Noer Yasin, Abdul Kadir, Abd Rouf, and Saiful Haq. "Implementation of the Mabims Criteria in Determining the Beginning of Islamic Month in Indonesia and Brunei Darussalam," 96–108. Atlantis Press, 2021. https://doi.org/10.2991/assehr.k.210421.016.