Karsa: Journal of Social and Islamic Culture
ISSN: 2442-3289 (p); 2442-8285 (e)
Vol. 33 No. 2, December 2025, pp. 508–535
DOI: 10.19105/karsa.v33i2.21576

Falak Manuscripts: Windows into the Intellectual and Cultural History of Southeast Asia

Arwin Juli Rakhmadi
Fakultas Agama Islam, Universitas Muhammadiyah Sumatera Utara
Medan, Indonesia
email: arwinjuli@umsu.ac.id
Muhammad Hidayat
Fakultas Agama Islam, Universitas Muhammadiyah Sumatera Utara
Medan, Indonesia
email: muhammadhidayat@umsu.ac.id

Abstract

This study examines the development and role of *falak* (Islamic astronomy) manuscripts in Southeast Asia within the context of Islamic historiography and the transmission of knowledge from the Middle East. Scholars from the archipelago studied *falak* in the Middle East before developing it in their homeland, producing repetitive works to facilitate public understanding. However, limited documentation and a lack of in-depth research hinder a comprehensive understanding of the scholars' roles in the history of *falak*. This study explored alternative sources, such as local manuscripts, travel notes, and oral traditions, using a multidisciplinary approach that includes philology, history, and the sociology of knowledge. The method used in this research is the philological method, a scholarly approach used to analyze, assess, and interpret ancient or historical texts, particularly in the context of manuscript studies. One of the research locations is the PEDIR Museum (Banda Aceh), the Manuscript Collection of Tarmidzi Abdul Hamid (Banda Aceh), and the Falak Center of Syaikh Tahir in Penang,

Received: 13 Aug 2025, Accepted: 1 Oct 2025, Published: 31 Oct 2025

Malaysia. The results show that *falak* science in Southeast Asia developed through networks of scholars connected to the Haramain and Egypt. The dissemination of *falak* manuscripts occurred through trade, missionary activity, and intellectual exchange, while adaptation to local culture preserved their relevance. The influence of the *falak* manuscripts in Southeast Asia includes strengthening religious authority, establishing local hisab-rukyat traditions, and playing a strategic role in harmonizing the Islamic calendar. This research confirms that the *falak* manuscripts are an intellectual heritage that reflects the synergy between science and the religious needs of Southeast Asian Muslim communities, while also serving as an important source for the study of the history of Islamic science in the region.

[Studi ini mengkaji perkembangan dan peran manuskrip *falak* (Astronomi Islam) di Asia Tenggara dalam konteks historiografi Islam dan transmisi ilmu pengetahuan dari Timur Tengah. Para ulama dari nusantara mempelajari ilmu *falak* di Timur Tengah sebelum mengembangkannya di tanah air mereka, dengan menghasilkan karya-karya berulang guna memudahkan pemahaman masyarakat. Namun, keterbatasan dokumentasi dan kurangnya penelitian mendalam menghambat pemahaman yang komprehensif mengenai peran para ulama dalam sejarah ilmu *falak*. Penelitian ini mengeksplorasi sumber-sumber alternatif, seperti manuskrip lokal, catatan perjalanan, dan tradisi lisan, dengan menggunakan pendekatan multidisipliner yang mencakup filologi, sejarah, dan sosiologi pengetahuan. Metode yang digunakan dalam penelitian ini adalah metode filologis, yaitu pendekatan ilmiah untuk menganalisis, menilai, dan menafsirkan teks-teks kuno atau historis, khususnya dalam konteks studi manuskrip. Salah satu lokasi penelitian adalah Museum PEDIR (Banda Aceh), Koleksi Manuskrip Tarmidzi Abdul Hamid (Banda Aceh), dan Pusat Falak Syaikh Tahir di Penang, Malaysia. Hasil penelitian menunjukkan bahwa ilmu *falak* di Asia Tenggara berkembang melalui jaringan ulama yang terhubung dengan Haramain dan Mesir. Penyebaran manuskrip *falak* terjadi melalui jalur perdagangan, aktivitas dakwah, dan pertukaran intelektual, sementara adaptasi terhadap budaya lokal menjaga relevansinya. Pengaruh manuskrip *falak* di Asia Tenggara mencakup penguatan otoritas keagamaan, pembentukan tradisi hisab-rukyat lokal, dan peran strategis dalam harmonisasi kalender Islam. Penelitian ini menegaskan bahwa manuskrip *falak* merupakan warisan intelektual yang mencerminkan sinergi antara ilmu pengetahuan dan kebutuhan religius komunitas Muslim Asia Tenggara, serta menjadi sumber penting dalam studi sejarah ilmu pengetahuan Islam di kawasan ini.]

Keywords: Falak Science, Falak Manuscripts, Southeast Asia, religious activities

Introduction

Falak science, historically, is a field of study associated with religious practices in Islam, such as determining the *qibla* direction, the beginning of lunar months, and prayer times.[1] Muslim astronomers in the medieval era made significant contributions to the advancement of *falak* science, not only in religious contexts but also in global astronomical knowledge through the development of models, theories, instruments, and more.[2] In its early phase, the translation of monumental works from Greek civilization significantly influenced the development of *falak* in the Islamic world.[3] There were also significant contributions from ancient civilizations such as Mesopotamia, Egypt, Greece, China, Persia, India, and the Arab world in laying the foundation of *falak* science. Figures such as Al-Khwarizmi, Al-Biruni, and Al-Khujandi are recognized as pioneers who further developed this field.[4]

Over time, due to the socio-religious demands within the Islamic world and the urgency felt by Muslim scholars to address the astronomical determination of worship times, *falak* science, formerly also known as *'ilm al-miqat* (focused on the timing of religious observances), continued to develop, particularly in the 13th century CE. It is believed that the main pioneer of this science was Ibn Yunus. During the medieval period, this discipline gained considerable interest because of its connection to determining the times of worship, and this study is categorized as a branch of *falak* science with a practical nature.[5]

---

[1] Arwin Juli Rakhmadi et al., "The Falak Science Observatory of University of Muhammadiyah North Sumatra (Oif UMSU) and the Contribution in Fajr Time Research," *Proceedings of the International Seminar of Islamic Studies* 2, no. 1 (2021): 851–58, https://doi.org/10.3059/insis.v2i1.6453.

[2] Jörg Matthias Determann, "History of Astronomy and Space Science in the Islamic World," *Islamic Studies*, 2019, 3–5, https://doi.org/10.1093/obo/9780195390155-0267.

[3] Alimuddin, "Sejarah Perkembangan Ilmu Falak," *Al Daulah : Jurnal Hukum Pidana Dan Ketatanegaraan* 2, no. 2 (2013): 181–94, https://doi.org/10.24252/ ad.v2i2.1475.

[4] Reza Akbar, "Sejarah Perkembangan Ilmu Falak dalam Peradaban India dan Keterkaitannya dengan Islam," *Jurnal Ilmiah Islam Futura* 17, no. 1 (2017): 50, https://doi.org/10.22373/jiif.v17i1.1511.

[5] Aris Tiono Hamdani, "Analisis Perspektif Empat Madzhab Terhadap Matla' dalam Penentuan Awal Bulan Hijriah," *AL-AFAQ: Jurnal Ilmu Falak dan Astronomi* 4, no. 1 (2022): 32–39, https://doi.org/10.20414/afaq.v4i1.4187.

Although historically, *falak* science was not limited to its practical aspect (*tathbiqy*), it also had a theoretical dimension (*nazhary*) that focused on the study of the universe, including responses to pre-Islamic astronomical ideas, particularly those from Indian, Persian, and Greek traditions. Among the Muslim astronomers who concentrated on this field were Ibn al-Haytham, Nasīr al-Dīn al-Tūsī, and Ibn Shātir, whose works included critiques, corrections, and refinements in terms of theory, observation, and philosophical foundations of pre-Islamic astronomical scholarship.[6] However, after the fall of the Abbasid Dynasty and the onset of the Renaissance (a period marking the rise of European civilization), along with the widespread use of telescopes in Europe for astronomical studies, the theoretical aspect of *falak* science in the Islamic world gradually declined. As a result, the form of *falak* science that continued to develop within the Islamic world became predominantly practical (*tathbiqy*), focusing solely on matters related to the determination of worship times.[7]

In the late 19th and early 20th centuries, the tradition of learning and teaching in Mecca and Medina flourished. Scholars came from various ethnic and cultural backgrounds across the Islamic world, including Southeast Asian scholars. They possessed expertise in various fields of Islamic knowledge, including *falak* science. At that time, scholars from *Nusantara* studied *falak* science in the Middle East for various reasons, then developed it in their homeland and produced several works in the field.[8] Although some *falak* works in Indonesia tend to be repetitive, echoing previous writings, such as *Al-Khulashah al-Wafiyah (1935), Al-Qowaid Al-Falakiyah (1933),* as well as *Al-Maksyuf and Ittifaq Dzat al-Bain (1986),* this was due to their purpose of making it easier for readers and students of knowledge. Reading classical texts directly often posed difficulties. The main motivations

[6] Muhammad Hidayat, "Aplikasi Kriteria Kalender Islam Global Muktamar Turki 2016 dan Rekomendasi Jakarta 2017," *Al-Marshad: Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 4, no. 1 (2018): 67–77, https://doi.org/10.30596/jam.v4i1.1936.
[7] Pepep Puad Muslim, Tatang Farhanul Hakim, and Suparman Jassin, "Dinamika dan Perkembangan Ilmu Falak dari Era Pra Islam Hingga Era Kontemporer," *Al-Tsaqafa : Jurnal Ilmiah Peradaban Islam* 20, no. 1 (2023): 14–28, https://doi.org/10.15575/al-tsaqafa.v20i1.27243.
[8] Arwin Juli Rakhmadi Butar-Butar, "Historiografi Ilmu Falak di Nusantara: Sejarah, Motivasi dan Tokoh Awal," *Journal of Contemporary Islam and Muslim Societies* 2, no. 2 (2018): 156–73, https://doi.org/10.30821/jcims.v2i2.2928.

behind writing *falak* literature included meeting basic needs related to prayer times, determining the beginning of lunar months, *qibla* direction, concerns about the extinction of *falak* knowledge, and addressing religious issues related to astronomical calculation (*hisab*).[9]

The limitations in documentation and the lack of in-depth research have hindered efforts to understand the role and contributions of scholars in the history of Islam in Southeast Asia. Exploring alternative sources, such as local manuscripts, travel notes, and oral traditions, enriches Southeast Asia's Islamic historiography and provides a more comprehensive picture of the scholarly networks and socio-religious dynamics that developed in the region.[10] There is a need for a comprehensive study on the development of *falak* studies in Southeast Asia, considering that the historiography and transmission of this knowledge from the Middle East to the archipelago have received limited attention in previous research.[11] A multidisciplinary approach is crucial in researching the biographies of scholars, taking into account their social, political, and intellectual contexts. Oral traditions and testimonies from local Muslim communities often serve as valuable sources of information, although they must be verified against written records.[12] Much of the historical documentation concerning scholars in this region remains fragmentary and scattered across various sources, including local manuscripts, family genealogies, as well as colonial records and travel accounts.

This study aims to provide deeper insight into *falak* manuscripts found in Southeast Asia and to reveal how these works contributed to

[9] M Basthoni, "Diferensiasi Metode Penentuan Awal Bulan Hijriyah: Kajian Perspektif Teori Evolusi Sosial Herbert Spencer," *Endogami: Jurnal Ilmiah Kajian Antropologi* 1, no. 2 (2018): 166, https://doi.org/10.14710/endogami.1.2.166-176.

[10] Haekal Fikri, Andi Intan, and Nur Cahyani, "Analisis Matlak dalam Penentuan Awal Bulan Hijriah Perspektif Ilmu Falak," *Hisabuna* 4, no. 3 (2023): 65–83, https://doi.org/10.20414/afaq.v4i1.

[11] Bashori Alwi, "Konsep Hilal Mar'i (Analisis Terhadap Pandangan Anggota TIM Hisab Rukyat Kementerian Agama RI)," *HAKAM; Jurnal Kajian Hukum Islam* 6, no. 2 (2022): 89–107, https://doi.org/10.33650/jhi.v6i1.4466.

[12] Muhammad Hidayat, "Penyebab Perbedaan Hasil Perhitungan Jadwal Waktu Salat di Sumatera Utara," *Al-Marshad: Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 4, no. 2 (2018): 204–18, https://doi.org/10.30596/jam.v4i2.2443.

the development of *falak* science in the region.[13] Alongside the growing attention to the diversity of scientific traditions in the Islamic world, especially those that developed outside the Middle East, this research addresses the need for a more comprehensive study on the role and function of *falak* manuscripts in Southeast Asian Muslim societies.[14] These manuscripts are not merely historical artifacts but also reflect the unique interplay between scientific knowledge, religion, and local culture, an aspect often overlooked in mainstream studies of Islamic science. Therefore, this study is expected to fill the existing gap in the literature, particularly concerning how *falak* manuscripts were disseminated, understood, and applied in the everyday lives of Muslims in Southeast Asia.

The main focus of this study is the in-depth exploration and analysis of the content and structure of *falak* manuscripts found in Southeast Asia, along with the historical and cultural contexts surrounding them. Through a multidisciplinary approach that includes historical studies, philology, and the sociology of knowledge, this research aims to trace how *falak* knowledge was practiced and adapted to local needs, including in matters such as determining prayer times, Islamic calendar dating, and more practical astronomical calculations. In addition, this study also focuses on identifying and mapping the most influential *falak* manuscripts in the region and exploring the relationship between the astronomical knowledge contained in these texts and the local scholarly traditions that developed in Southeast Asian countries such as Indonesia, Malaysia, and the Philippines. Thus, this research not only aims to understand *falak* manuscripts from a technical perspective but also to examine how these texts played a role in shaping and reinforcing local communities' religious and cultural identity.[15]

---

[13] Arwin Juli Rakhmadi et al., "TM. Ali Muda (w. 2005 M) Karya dan Kontribusinya dalam Bidang Ilmu Falak," *Astroislamica: Journal of Islamic Astronomy* 2, no. 2 (2023): 190–205, https://doi.org/10.47766/astroislamica.v2i2.1930.

[14] Hardiyanto Rahman, "Analisis Bibliometrik: Upaya Pemberdayaan Masyarakat di Indonesia," *Jurnal Pemerintahan dan Kebijakan (JPK)* 4, no. 2 (2023): 106–23, https://doi.org/10.18196/jpk.v4i2.18211.

[15] Abdulasi Kalupe and Arwin Juli Rakhmadi, "The Islamic Astronomy Development and Status in Thailand," *Al-Hisab: Journal of Islamic Astronomy* 2, no. 1 (2025): 56–64, https://doi.org/10.33096/jah.v2i1.23884.

By widening the understanding of *falak* manuscripts in Southeast Asia, this study is expected to make a significant contribution to the historical study of science in the Islamic world, as well as to open new horizons in understanding the role of *falak* science in the religious, educational, and cultural life of the region.[16] The history of the dissemination of *falak* manuscripts in Southeast Asia reflects the vital role of scholarly works in shaping local intellectual traditions. *Falak* manuscripts, which were generally copied manually by scholars and intellectuals, served as primary tools for transmitting *falak* knowledge to future generations. These manuscripts often contained astronomical theories, calculation tables, and practical guides for determining prayer times and the *qibla* direction, directly influencing the religious life of communities. Their dissemination was not confined to a single region or kingdom but extended across Southeast Asia through trade routes, religious outreach (*da'wah*), and inter-island and international intellectual exchanges.[17] Moreover, these *falak* manuscripts were frequently adapted and adjusted to local contexts, whether through simplified calculations or integration with existing local calendar systems.

Nevertheless, although the history of *falak* manuscripts in Southeast Asia has been widely studied, many aspects remain insufficiently explored, particularly regarding the local contexts surrounding the reception and application of *falak* knowledge. This study aims to investigate further the origins, dissemination, and roles of *falak* manuscripts within Southeast Asian societies, and to explore how these works became part of the region's intellectual and cultural traditions. By delving deeper into the history of these manuscripts, the research will offer new perspectives on the relationship between scientific knowledge, religion, and culture within the long history of Islam in Southeast Asia, as well as highlight the significant

[16] Theodorus Aries Briyan Nugraha Setiawan Kusuma and Andry Hikari Damai, "Perkembangan Kebudayaan Austronesia di Kawasan Asia Tenggara dan Sekitarnya (the Development of Austronesian Culture in Southeast Asia and Adjacent Areas)," *Naditira Widya* 13, no. 2 (2019): 75–86, https://doi.org/10.24832/nw.v13i2.320.

[17] Arifatul Anisa and Sutrisna Wibawa, "Hermeneutika Nilai Moral Jawa dalam Naskah Tashrihah al-Muhtaaj dan Relevansinya dalam Pendidikan," Aksara 33, no. 1 (2021): 57–70, https://doi.org/10.29255/aksara.v33i1.491.

contributions of these manuscripts in shaping local scholarly and cultural characteristics.[18]

The study of *falak* manuscripts in Southeast Asia remains very limited, despite the abundance of such manuscripts spread across various regional locations. There is great potential for research on these *falak* manuscripts, which would contribute significantly to the academic world and, more importantly, to everyday life. Therefore, based on the above discussion, this study will explore and analyze *falak* manuscripts in Southeast Asia, focusing on their history, content, and influence.

Methods

The method used in this study is the philological method, a scholarly approach used to analyze, evaluate, and interpret ancient or historical texts, particularly in the context of manuscript studies.[19] Philology comes from the Greek words *philos* (love) and *logos* (word, knowledge), which literally means "love of words" or "love of knowledge about texts." This method examines texts from various aspects to understand and clarify their meaning, origins, and development.[20] The philological method is essential in studying ancient manuscripts and classical literature, as it enables researchers to address the challenges posed by texts that have undergone numerous copies and changes over centuries.[21] The research problem in this study is to describe the history, content, and influence of *falak* manuscripts in Southeast Asia.[22]

One of the research locations is the PEDIR Museum (Banda Aceh), the Manuscript Collection of Tarmidzi Abdul Hamid (Banda Aceh), and the Falak Center of Shaykh Tahir in Penang, Malaysia. In

[18] Fachri Aidulsyah and Saiful Hakam, "Manuscript, Philology, and Indonesian Islam," *Tashwirul Afkar* 41, no. 1 (2022): 103–10, https://doi.org/10.51716/ta.v41i1.75.

[19] Hardani Hardani et al., *Metode Penelitian Kualitatif & Kuantitatif* (Yogyakarta: Pustaka Ilmu, 2020).

[20] Jarni Arni, *Metode Penelitian Tafsir*, 1st ed. (Pekanbaru-Riau: Daulat Riau, 2013).

[21] M. Ali Sodik Sandu Siyoto, *Dasar Metodologi Penelitian* (Yogyakarta: Literasi Media Publishing, 2015).

[22] John W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approa*ches, *Book* (Los Angeles, London, New Delhi, Singapore: Sage Publications, Inc., 2013).

addition, *falak* literature in Southeast Asia for this study also draws from libraries, manuscript collectors, and online platforms. In today's technological and communication advancement era, information can be accessed quickly and easily, including information about *falak* manuscripts.[23] There is now a growing trend among various institutions to codify and digitize their manuscript collections online, which greatly facilitates researchers in conducting their studies.[24]

Results

Based on the identification, data collection, verification, and transliteration of the manuscripts found at the research locations and from various sources, the results and discussion are presented in three aspects: History, Content, and Influence.

History

The science of astronomy (*Ilmu Falak*) in the Nusantara developed in the early 20th century, closely linked to intellectual traditions and networks between Makkah and Cairo. It is evident from the network of Indonesian scholars of *falak* science who produced numerous works in the field after returning from the holy cities of Haramain (Mecca and Madina). Notable figures and their contributions include: (1) Sheik Nuruddin ar-Raniiri (d. 1068 H/1658 M), whose contribution in the field of *falak* science was his work titled *"Kitab Bad' Khalq as-Samawat wa al-Ardh"* (The Book of the Beginning of the Creation of the Heavens and the Earth). (2) Sheik Abdurrauf as-Singkili (d. 1105 H/1693 M), with his work in Ilmu Falak titled *"Risalah fi at-Taqwim"* (A Treatise on Calendars). (3) Sheik Ahmad Dahlan Tremas (d. 1329 H/1911 M), who authored at least three works in Ilmu Falak, one of which is *"Tadzkirah al-Ikhwan fi Ba'dh Tawarikhi A'mal al-Falakiyyah"* in Semarang (A Reminder to Brothers About Some Calendrical Practices of Ilmu Falak in Semarang). (4) Sayyid Usman (d. 1331 H/1913 M), who wrote *"Tahrir Aqwa al-Adilla fi Tahsil 'Ain al-Qiblah"* (The Strongest Argument for Determining the Physical Direction of the Qiblah). (5) Sheik Ahmad Khatib Minangkabau (d. 1334 H/1915 M), who wrote *"An-Nukhbah al-Bahiyyah"* (A

[23] Burke. Johnson and Larry B. Christensen, *Educational Research Quantitative, Qualitative, and Mixed Approaches* (United Kingdom: Sage Publications, 2018).
[24] Nursapia Harahap, *Penelitian Kualitatif* (Medan: Wal Ashri Publishing, 2020).

Discussion of the Astronomical Instrument of the Rubu' Mujayyab). (6) Sheikh Muhammad Mukhtar bin 'Atharid (d. 1349/1930 M), with his work *"Taqrib al-Maqshad fi al-'Amal bi ar-Rub' al-Mujayyab."* (7) Sheikh Muhammad Faqih Maskumambang (d. 1353 H/1937 M), who authored *"al-Manzhumah ad-Daliyah fi Awa'il al-Asyhur al-Qamariyyah 'ala Thariqah al-Fuqaha' as-Sunniyah allaty Tanbany 'ala al-Ahadits an-Nabawiyyah"* (The Poetic Collection of the Lunar Months According to the Sunni Jurisprudence Based on the Prophetic Hadiths). (8) Sheik Muhammad Thahir Jalaluddin (d. 1376 H/1956 M), who wrote *"Mukhbah al-Taqrirat fi Hisab al-Auqat wa Sumut al-Qiblat bi Lugharimat"* (A Summary of Calculations for Time and the Zenith of the Qiblah Using Logarithms). (9) Sheik Muhammad Manshur Betawi, known for his monumental work in Ilmu Falak, *"Sullaman-Nayyiran fi Ma'rifah al-Ijtima' wa al-Kusufain"* (A Guide to Knowing the Conjunctions and the Eclipses).[25]

The biggest factor in the development of *falak* science in Southeast Asia is the tradition of pilgrimage and scholarly journeys (*rihlah ilmiah*) by several notable figures from the Nusantara to the centers of knowledge of the time, such as the holy cities of Haramain (Mecca and Medina), Egypt, Yemen, Syria, and others.

Content

The content and substance of the *falak* books in the Nusantara are generally practical (*tathbiqy*), focusing on issues such as determining the prayer times, *Qibla* direction, the beginning of the Islamic month, and eclipses. These topics were influenced by the needs, responses, and answers to the problems, dynamics, and debates occurring within society and among the experts in the field of *Falak*. Based on the findings of *falak* manuscripts in Southeast Asia, they can be categorized into several topics such as *Qibla* direction, *Hisab-Rukyat*, Eclipses, Prayer Times, and Other Related Issues.

Qibla Direction: Based on the research conducted, several works on Islamic astronomy specifically discuss the direction of the Qibla, including: (1) *"Mas'alah al-Qiblah fi al-Batawy"* (The Qibla Issue in Betawi) by Sheikh Muhammad Arsyad Banjar (d. 1227 H/1812 M), (2) *"Tahrir Aqwa al-Adillah fi Tahsin 'Ain al-Qiblah"* (The

[25] Kalupe and Rakhmadi, "The Islamic Astronomy Development and Status in Thailand."

Strongest Arguments on Determining the Physical Direction of the Qibla) and *"Nafa'is Nihlah fi Wasa'il al-Qiblah"* (Precious Gems on the Means of the Qibla) by Sayyid Usman (d. 1331 H/1913 M), (3) *"Al-Qiblah fi an-Nushus 'Ulama' asy-Syafi'iyah Fima Yata'allaq bi Istiqbal al-Qiblah asy-Syar'iyyah Manqulah min Ummahat Kutub al-Madzhab"* (The Qibla in the Texts of Shafi'i Scholars Related to Facing the Shari'ah Qibla as Quoted from the Foundational Books of the Madhhab) along with "Jadawil Pati Kiraan" on determining the five prayer times and *Qibla* direction with logarithms and *"Nukhbah at-Taqrirat fi Hisab al-Auqat wa Sumut al-Qiblah bi Lugharimat"* (Summary of the Calculations of Time and Zenith of the Qibla with Logarithms) by Sheikh Muhammad Thahir Jalaluddin (d. 1376 H/1956 M), and (4) *"Shurah ad-da'irah al-Mahthubah 'ala samt al-Qiblah"* (Diagram of the Perfect Circle in the Zenith of the Qibla) by Sheikh Muhammad Manshur Betawi (d. 1388 H/1968 M).

Hisab-Rukyat: Here are some literatures that specifically discuss *hisab-rukyat* (astronomical calculation and moon sighting) and the determination of the beginning of the Hijri month, written by Nusantara scholars, including: (1) *Taudhih al-Adillah 'ala Syuruth al-Hillah* (Explanation of Arguments on the Conditions of the Crescent Moon) and *Tamyiz al-Haqq Min adh-Dhalal fi Masa'il al-Hilal* (Distinguishing the Truth from Misguidance in Issues of the Crescent Moon) by Sayyid Usman (d. 1331 H/1913 M), (2) *An-Natijah al-Mardhiyyah fi Tahqiq as-sanah asy Syamsiyyah wa al-Qamariyyah* (The Accepted Conclusion on the Accuracy of the Solar and Lunar Years) by Sheikh Ahmad Khatib Minangkabau (d. 1351 H/1915 M), (3) *Risalah fi at-Taqwim* (Note on the Calendar) by Sheikh Abdurrauf as-Singkili (d. 1105 H/1693 M), and many others.

Eclipse: Here are some literatures that specifically discuss eclipse issues: (1) *Khulasah al-Jadawil li 'Amal al-ijtima' wa al-Istiqbal wa al-Khusuf wa al-Khususf 'ala Thariq Zaij as-Sulthan* (Summary Table for the Practice of Conjunction and Opposition of Solar and Lunar Eclipses According to the Sultan's Zij Method and the Method for Determining the Conjunction and Solar-Lunar Eclipses) by Muhammad Manshur Betawi (d. 1388 H/1968 M), (2) *Fath ar-Ra'uf al-Mannan li'Amal al-Kusuf bi Zaij ad-Dakhlan* (Fath ar-Ra'uf al-Mannan for the Practice of Solar Eclipses with the Dakhlan Zij) by Sheikh Abdul Jalil bin Abdul Hamid Kudus (d. 1394 H/1974 M), and others.

Prayer Times: Here are some literatures that specifically discuss the issue of prayer times: (1) *Jadwal Pati Kiraan Menentukan Waktu yang Lima dan Hala Qiblat dengan Logaritma* (Pati Table Calculations for Determining the Five Prayer Times and Qibla Direction with Logarithms) by Sheikh Muhammad Thahir Jalaluddin (d. 1376 H/1956 M), (2) *Shalat dan Puasa di Daerah Kutub dan Pedoman Waktu Shalat Sepanjang Masa* (Prayer and Fasting in the Polar Regions and Guidelines for Prayer Times Throughout the Ages) by Saadoe'ddin Djambek (d. 1397 H/1977 M), (3) *Natijah Abadiyah* (Eternal Calendar) by Sheikh Hasan Ma'shum (d. 1355 H/1937 M).

Other Issues: Works in the field of Astronomy outside the four studies mentioned above include: (1) *Kitab Bad' Khalq as-samawat wa al-Ardh* (The Book of the Beginning of the Creation of the Heavens and the Earth) by Sheikh Nuruddin ar-Raniry (d. 1068 H/1658 M), (2) Then discussions related to astrology, health, and predictions such as *Siraj azh-Zhalam fi Ma'rifah as-Sa'd wa an-Nahs fi Asy-Syuhur wa al-Ayyam* (The Lantern of Darkness on Knowing the Good and the Bad of Months and Days) and *Taj al-Muluk* by Sheikh Abbas al-Asyi (Teungku Chik Kuta Karang), and the book *Inilah Al-manaq* by Sheikh Abdul Malik Muda Balubus.

Some works of *falak* science in Southeast Asia also still combine the study of *falak* science with astrology, such as the work of Teungku Chik Kuta Karang in *Taj al-Muluk*. His thoughts were acculturated with the Acehnese culture that developed at the time, for example, in the use of *falakiyah* principles not only for determining the beginning of the Hijri month but also for predicting good days, months, and times in *Hisab Urfi*. Sheik Abbas Kuta Karang carried out all ritual activities related to worship or daily activities, such as determining wedding days, farming, and cultivating crops.[26]

In addition, based on the manuscript study, there are several typologies and styles of works in the field of *falak* science in Southeast Asia, including works on instruments, summaries and commentaries, translations, tables and diagrams, number systems, and poetry.

[26] Hasna Tuddar Putri, "Hisab Urfi Syekh Abbas Kutakarang: Kajian Etnoastronomi dalam Penentuan Awal Bulan Hijriah," *Media Syari'ah* 21, no. 1 (2019): 52–72, https://doi.org/10.22373/jms.v21i1.6476.

Influence

Falak Science has a significant impact on religious activities, particularly for Muslims in Southeast Asia, due to its connection with worship, especially prayer and fasting. It has allowed astronomy to remain relevant in the community, practiced daily, especially by the Muslim communities of the Nusantara region throughout history. The intellectual and scholarly tradition in the early history of Islam in Nusantara was very dynamic, running parallel to the process of Islamization and the development of social, cultural, economic, and political entities.[27] This had a significant impact on the formation and development of scholarly traditions, including the understanding of *falak* science. This tradition was continuously developed and maintained, becoming an intellectual and scholarly tradition passed down from generation to generation. This tradition generally refers to transmitting values, forming discourse, and religious practices.[28]

Falak Science (Islamic Astronomy) also influenced the evolution of local astronomy in Southeast Asia. In several regions of Asia, traditional astronomy has a 'multiplex structure,' consisting of indigenous local astronomical knowledge combined with influences from China, India, the Islamic world, and the West. For example, traditional Tibetan astronomy[29] and Mongolian astronomy represent a type of multiplex astronomy, consisting of local knowledge, Classical Indian astronomy, certain information from the Islamic calendar, and traditional Chinese astronomy. In the Sultanate of Mataram (Java, Indonesia), Sultan Agung, who ruled from 1613 to 1645, used a combined calendar from the traditional Javanese and Islamic calendars. Since ancient times, Muslims in Indonesia have been involved in *falak* science. Historical evidence shows the use of the Islamic calendar to

[27] Sakirman Sakirman, "Spirit Budaya Islam Nusantara dalam Konstruks "Rubu' Mujayyab," *Endogami: Jurnal Ilmiah Kajian Antropologi* 1, no. 2 (2018): 114, https://doi.org/10.14710/endogami.1.2.114-123.

[28] Annabel Teh Gallop, "Shifting Landscapes: Remapping the Writing Traditions of Islamic Southeast Asia through Digitisation," *Jurnal Humaniora* 32, no. 2 (2020): 97, https://doi.org/10.22146/jh.55487.

[29] Yukio Ohashi, "Remarks on the Origin of Castillejo-Dalitz-Dyson Poles," *Remarks on the Origin of Indo-Tibetan Astronomy* 82, no. 1 (2010): 341–42, https://doi.org/10.1103/PhysRevC.82.018201.

mark the time span of various events in Nusantara.[30] For example, the oldest Hijri calendar was found on the gravestone of Fatimah binti Maimun bin Hibatullah in Gresik, who died on 7 Rajab 475 H, and the writing in thuluth script on the gravestone of Sultan Malik as-Saleh (696 H/1297 M) in Gampong Samudra Pasai, Lhokseumawe. The use of the Hijri calendar also marks it as the official calendar. Historically, the dating system's development in Indonesia began with the Saka, Javanese-Islamic, Hijri, and even the Gregorian. Before the occurrence of cultural acculturation in a broad sense, local society recognized the Javanese-Islamic, Hijri, and, finally, the Gregorian calendar systems.[31]

Similarly, in some regions of Southeast Asia, the names of the zodiac signs are derived from Arabic. The naming of days in some areas of Thailand uses Arabic names for the days of the week.[32] If traced back, practices that became traditions of the community related to nature (the sky) are, in fact, a crucial factor in the formation of *falak* science in Southeast Asia.

Discussion

Since the Middle Ages, there have been no or not yet discovered *falak* works of a theoretical (*nazhary*) nature that focus on studying the universe or responding to astronomical ideas. The absence of *falak* works and the theoretical (*nazhary*) focus of studies by Muslim scholars after the Middle Ages led to the seeming dichotomy between *falak* science and pure astronomy that developed in modern times. In fact, historically, Muslim scholars in the Middle Ages considered *falak* science as an inseparable part of the pure astronomy studies that we recognize today.[33] Here is an excerpt from an interview with Masykur

[30] M Basithussyarop M Basithussyarop and Ahmad Izzudin, "Kajian Awal Bulan Kamariah dalam Kitab Keker Bulan Karya Sayyid Usman," *DIKTUM: Jurnal Syariah dan Hukum* 20, no. 2 (2022): 415–31, https://doi.org/10.35905/diktum.v20i2.4153.

[31] Jaenal Arifin, "Proses Penentuan Awal Ramadhan, Syawal, dan Dzulhijjah di Indonesia: Sinergi antara Independensi Ilmuwan dan Otoritas Penguasa," *Jurnal Penelitian* 13, no. 1 (2019): 37, https://doi.org/10.21043/jp.v13i1.4892.

[32] Yukio Ôhashi and Wayne Orchiston, *The Evolution of Local Southeast Asian Astronomy and the Influence of China, India, the Islamic World and the West*, 2021, https://doi.org/10.1007/978-3-030-62777-5_24.

[33] Dito Alif Pratama, "Ru'yat al-Hilāl dengan Teknologi: Telaah Pelaksanaan Ru'yat Al-Hilāl di Baitul Hilal Teluk Kemang Malaysia," *Al-Ahkam* 26, no. 2 (2016): 271, https://doi.org/10.21580/ahkam.2016.26.2.930.

Syarifuddin, the founder of PEDIR Museum, Banda Aceh, who has a large collection of *falak* manuscripts from Southeast Asia.

Interviewer: How many *falak* manuscripts are in the PEDIR Museum? Source: Up to now, there are 500 manuscripts in the PEDIR Museum. From the 500 manuscripts, we have identified at least 30 *falak* manuscripts discussing astronomy (celestial bodies) and *hisab* (calculations). Most of these *falak* manuscripts do not consist of a single specific title. They are often found as part of a collection of texts in one bundle of manuscripts that includes several titles. Usually, they are labeled on the manuscript covers. After our identification to date, we found around 30 manuscripts still in the form of handwritten copies. In addition, we also have lithographic collections (stone prints), including prints from Egypt, Cairo, Makkah, and even Singapore. So, as mentioned, there are 500 collections, with 300 lithographs.

Figure 1. Photo of the researcher at the PEDIR Museum, Banda Aceh, conducting research on *falak* science manuscripts

Interviewer: Regarding *falak* literature or manuscripts, why did they develop in Aceh? Were these manuscripts studied in the past? Or what has been the journey of these manuscripts from the past until now?

Interviewee: Actually, the people of Aceh are familiar with *falak* science because it has truly been a necessity for the community. Students of religious knowledge, and even religious figures themselves, have used it, especially during the month of Ramadhan, for determining prayer times, the direction of the *Qibla*, and so on. As a result, even to this day, in Aceh, some scholars are known as *ulama falak*. For instance, one such figure is Tengku Muhammad Ali Irsyad, whom we know and refer to as *al-falaqi*, a scholar who deeply understands *falak* science and even wrote a book on *falak*. Then there is an earlier prominent figure from the 19th century, a renowned Acehnese scholar in the field of *falak* science, Sheik Abbas bin Muhammad Kuta Karang. Interestingly, we also discovered his son in our collection. His son, Sheik Muhammad bin Abbas bin Muhammad Kuta Karang, also wrote a book in the field of *hisab* or *falak* science, and the complete manuscript is now part of the Aceh Museum's collection. So even today, *falak* science, including *hisab*, remains a field of knowledge that continues to be discussed. However, our task today is to seek out and trace the treasures of our civilization, whether in the form of *turāth* (heritage), legacy, or writings of scholars who perhaps are not widely recognized today. We still often focus our manuscript studies on fields such as *tasawwuf* (Sufism), *tawhid* (theology), or *tariqa* (Sufi orders).

Meanwhile, in scientific areas like *falak*, these are rarely discussed, and as a result, their manuscripts are rarely published, and we don't even know what works exist. It turns out, after tracing and based on reports, there are 30 manuscripts; this doesn't even include collections in other places like the Aceh Museum or private community holdings. After conducting further searches, we've found that there are actually still many manuscripts related to *falak* science.

Interviewer: So far, are there still many *falak* manuscripts circulating within the community? Interviewee: Personally, based on my frequent direct visits to locations where manuscripts are kept, I see that there are indeed many manuscripts, perhaps more than 5 complete manuscripts, still scattered throughout Aceh. There are also many *falak* science manuscripts that are found within bundled collections of texts. Sometimes, there are even manuscripts specifically focused on *falak* science. Our task today is to trace and publish them in the form of

catalogs or academic studies so they can become more widely known to the public. In just one institution alone, there are 30 manuscripts. That doesn't even include manuscripts held by other institutions, private collectors, and especially those still in the hands of the general public.

Based on the interview with Masykur Syarifuddin, founder of the PEDIR Museum in Banda Aceh, it can be concluded that the interview reveals the existence of approximately 30 *falak* science manuscripts out of a total of 500 manuscript collections housed in the museum, along with 300 lithographs originating from various regions such as Egypt, Cairo, Mecca, and Singapore. Falak science developed in Aceh due to the community's practical needs in determining prayer times and other religious observances. Several Acehnese scholars in this field, such as Tengku Muhammad Ali Irsyad and Shaykh Abbas bin Muhammad Kuta Karang, have authored significant works on *falak*. Many *falak* manuscripts are still dispersed throughout the community and require further tracing and publication so that this scholarly heritage can be more widely recognized and studied academically and historically.[34]

Beside to the PEDIR Museum, the researcher also visited the Falak Manuscript Collection of Tarmidzi Abdul Hamid in Banda Aceh. At that museum, the researcher conducted interviews, observed, and gathered data about the *falak* manuscript collection.

[34] Ohashi, "Remarks on the Origin of Castillejo-Dalitz-Dyson Poles."

Figure 2. The researcher visiting the Falak Manuscript Collection of Tarmidzi Abdul Hamid, Banda Aceh, Aceh

In addition, the researcher recently visited the Falak Center of Sheikh Tahir in Penang Island, Malaysia, to enrich the information and data related to the dissemination of *falak* manuscripts in Southeast Asia, as it is well known that Sheikh Tahir Jalaluddin was a highly influential *falak* scholar in Southeast Asia, including his research related to dawn time, namely the setting of -20 degrees below the horizon which was then used by Muslims in the Southeast Asia region at least until the year 2000.[35]

Figure 3. Photo of the researcher at the Sheik Tahir Falak Center, Penang Island, Malaysia

[35] Muhammad Qorib and Arwin Juli Rakhmadi, "The Spirit of Tolerance in Determining the Time of Dawn According to Indonesian Classical Scholars in Malay-Nusantara," *Interdisciplinary Journal and Humanity (INJURITY)* 3, no. 1 (2024): 17–23, https:// doi.org/ 10.58631/injurity.v3i1.161.

The naming of the Falak Center, located on Penang Island, Malaysia, is attributed to a Southeast Asian *falak* scholar named Sheik Tahir Jalaluddin. His full name was Muhammad Thahir bin Muhammad bin Jalaluddin Ahmad bin Abdullah. He was from Minangkabau and was born in Cangking, West Sumatra, in 1286 H/1869 CE. The Sheik Tahir Falak Center was inaugurated in 1991 with the aim of conducting in-depth research and studies related to the Islamic calendar, atmosphere, the universe, the new moon (*hilal*), and related matters.[36]

The research findings confirm that this study is not only relevant to understanding the history of Islamic science but also to addressing contemporary issues related to the Hijri calendar and astronomical observations. The tradition of astronomical manuscripts in Southeast Asia is important evidence of the interaction of Islamic scholarship with local cultures, resulting in a unique scientific style. These manuscripts spread from the 16th century through a network of scholars who studied in the Haramain, Yemen, and India, then returned to the Indonesian archipelago to teach astronomical science in Islamic boarding schools, palaces, and religious institutions. Nur Aini emphasized that the network of Indonesian scholars played a significant role in transmitting the astronomical scientific tradition, which was not merely adopted but also adapted to suit the needs of local communities.[37]

Wayne Orchiston and colleagues explain that Southeast Asian astronomy can be understood as a form of multiplex astronomy combining Chinese, Indian, Islamic, and Western elements. However, in the Malay-Indonesian archipelago, Islamic and Indian influences dominate astronomical traditions, particularly in determining prayer times.[38]

In terms of content, the astronomical manuscripts contain various aspects of practical astronomical calculations, such as

---

[36] Ôhashi and Orchiston, *The Evolution of Local Southeast Asian Astronomy and the Influence of China, India, the Islamic World and the West*.

[37] Nur Aini and Youla Afifah Azkarrula, "Pandangan Tokoh Falak tentang Elongasi Pada Penentuan Awal Syawal 1443 H dalam Kriteria Neo MABIMS di Indonesia," *Astroislamica: Journal of Islamic Astronomy* 3, no. 1 (2024): 01–28, https://doi.org/10.47766/astroislamica.v3i1.2762.

[38] Norhasnira Ibrahim and Faisal Ahmad Shah, "The Islamic Influences in Malay Manuscripts Writing: An Overview of Some Selected Manuscripts," *Sains Insani* 5, no. 1 (2020): 57–66, https://sainsinsani.usim.edu.my/index.php/sainsinsani/article/view/141

determining the beginning of the lunar month, the direction of the Qibla, prayer times, and even eclipse calculations. The majority of manuscripts use the hisab ḥaqīqī bi al-taqrīb method, a relatively simple, approximate approach. Iga Nur Ramdhan believes that this method is still the mainstay of most Islamic boarding schools and religious institutions in Indonesia, although in terms of accuracy, it requires improvement.[39] More pointed criticism came from Nida Fadilah, who examined the work of KH. Muhammad Mansur al-Batawi, Sullam al-Nayyirain. According to her, although this work is monumental, the method used needs to be calibrated with modern astronomical approaches to avoid significant differences in the practice of rukyat and hisab.[40]

The astronomy tradition alive in Islamic boarding schools also maintains continuity between religious knowledge and astronomy. Naharuddin emphasized that Islamic boarding schools in Java have successfully integrated astronomy into their curriculum, thus producing astronomy scholars who play a role at the national level.

Beyond their scientific and religious functions, *falak* manuscripts are also part of a material tradition vulnerable to damage. Hasbullah and his colleagues examined Batak and Lombok manuscript collections and emphasized the importance of community-based preservation strategies, as tropical climates accelerate manuscript deterioration.[41] Digitization programs are a crucial solution. Annabel Teh Gallop of the British Library emphasized that the digitization of Southeast Asian Islamic manuscripts could remap the region's intellectual landscape, allowing researchers to trace the interconnectedness of previously fragmented networks of scholars and texts. Arwin Juli Rakhmadi added that despite the richness of the

[39] Revianto Budi Santosa Iga Nur Ramdhani, "Pengaruh Astronomi Islam pada Masa Golden Age Terhadap Arsitektur," *Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 7, no. 1 (2021): 66–75, https://media.neliti.com/media/publications/268350-penanggalan-mesir-kuno-61e38fac.pdf.

[40] Arwin Juli Rakhmadi, Hasrian Rudi Setiawan, and Muhammad Hidayat, "Kajian Ilmu Falak Syaikh Muhammad Arsyad Banjar: Analisis Naskah Mas'alah al-Qiblah Fi l-Batawy," *Jumantara: Jurnal Manuskrip Nusantara* 13, no. 2 (2022): 149–65, https://doi.org/10.37014/jumantara.v13i2.1469.

[41] Syahrir Kila et al., "Mystical Radiance of Manuscript: A Paratextual Study of Islamic Astronomy Manuscript," *Al-Qalam Jurnal Penelitian Agama dan Sosial Budaya* 30, no. 2 (2024): 253–63, https://doi.org/10.31969/alq.v30i2.1488.

Nusantara astronomical manuscripts, philological research remains limited. He proposed the importance of critical editions and systematic annotations to connect classical textual data with the development of modern astronomical science.[42]

Recent literature shows new directions in the study of Indonesian astronomy. Nur Eka Putri Firdiniah, for example, asserts that the global Hijri calendar debate actually has its roots in Southeast Asia, where the tradition of astronomical manuscripts is a crucial foundation.[43] Meanwhile, Kustiana Arisanti highlights the significant opportunities for digital humanities in studying astronomical manuscripts through a computational approach, opening new avenues for the integration of philology, technology, and astronomy.[44] Azra shows that the network of Nusantara ulama played a major role in transmitting astronomical knowledge from the Middle East to Southeast Asia.[45] Kurniawan emphasizes that Southeast Asian astronomy results from multiple interactions, but Islamic–Indian elements were the most dominant in shaping astronomical practices in the archipelago.[46]

Izzuddin outlines the weaknesses of the classical hisab method widely used in Indonesia, necessitating a new approach based on hisab ḥaqīqī bi al-taḥqīq that is more accurate.[47] Syahrir Kila specifically critiques KH. Mansur al-Batawi's calculation method emphasizes the importance of calibration with modern astronomical data. Examines the manuscripts of Abdurrauf as-Singkili and Muhammad Arsyad al-

[42] Rakhmadi, Setiawan, and Hidayat, "Kajian Ilmu Falak Syaikh Muhammad Arsyad Banjar: Analisis Naskah Mas'alah al-Qiblah Fil-Batawy."

[43] Nur Eka Putri Firdiniah, "Telaah Pemikiran Abdurrahman Özlem dalam Menentukan Awal Bulan Kamariah: Perspektif Astronomi dan Fikih," *Azimuth: Journal of Islamic Astronomy* 5, no. 2 (2024): 108–31, https://doi.org/10.15642/azimuth.v5i2.2673.

[44] Kustiana Arisanti, "Ilmu Falak dalam Prespektif Sejarah," *Bahtsuna* 3, no. 285 (2021): 291, https://doi.org/10.55210/bahtsuna.v3i2.67.

[45] Nazaruddin, "Spirit Jaringan Ulama Timur Tengah dan Kepulauan Nusantara Abad XVII dan XVIII Karya Azyumardi Azra," in *Jaringan Ulama Timur Tengah dan Kepulauan Nusantara Abad XVII dan XVIII*, 2020, 483, https://jlka.kemenag.go.id/index.php/lektur/article/view/795.

[46] Kurniawan, "Reconstruction of Falak Science Against Astronomy," *KULMINASI: Journal of Falak and Sharia* 2, no. 2 (2024): 57–66, https://doi.org/10.22373/kulminasi.v2i2.5793.

[47] Ahmad Izzuddin, Muhammad Habibur Rahman, and Muhammad Himmatur Riza, "Teleskop Ioptron Cube II dalam Penentuan Arah Kiblat," *AL-AFAQ: Jurnal Ilmu Falak dan Astronomi* 3, no. 1 (2021): 25–40, https://doi.org/10.20414/afaq.v3i1.2776.

Banjari, showing that astronomy in the archipelago served as an instrument for strengthening the authority of ulama and the kingdom.[48]

Mahsun highlights the importance of digitizing manuscripts, which enables global access and a remapping of the intellectual landscape of Southeast Asian Islam.[49] Marataon emphasizes the role of Javanese pesantren in maintaining the continuity of the *falak* tradition by integrating it into the curriculum.[50]

Rakhmadi highlighted the weakness of the philological approach in Malay-Nusantara astronomy studies,[51] while Santoso emphasized the urgency of manuscript preservation through case studies of Batak and Lombok.[52] Furthermore, Alba emphasized that astronomy manuscripts need to be contextualized within the framework of a unified Hijri calendar in Southeast Asia.[53] An international study by Magevira discusses how the global Hijri calendar debate can be traced back to the Nusantara astronomical tradition.[54] Thus, the current literature shows that the study of astronomical manuscripts is not only a historical study, but also an important part of contemporary scientific discourse that connects philology, digitalization, and modern astronomical science.

---

[48] Kila et al., "Mystical Radiance of Manuscript: A Paratextual Study of Islamic Astronomy Manuscript."

[49] Lauhatun Nashiha and Mahsun Mahsun, "Kajian Ilmu Falak dan Astronomi dalam Sudut Pandang Filsafat Ilmu," *Astroislamica: Journal of Islamic Astronomy* 3, no. 1 (2024): 29–50, https://doi.org/10.47766/astroislamica.v3i1.2645.

[50] Marataon Ritonga et al., "Transformasi Hisab-Rukyat dalam Penentuan Awal Bulan Hijriah di Muhammadiyah Hisab-Rukyat Transformation of Hijri Month Begining Determenation in Muhammadiyah," *Jurnal Agama dan Ilmu Pengetahuan* 21, no. 1 (2024): 83–92, https://doi.org/10.25299/al-hikmah:jaip.2024.vol21(1).14676.

[51] Rakhmadi, Setiawan, and Hidayat, "Kajian Ilmu Falak Syaikh Muhammad Arsyad Banjar: Analisis Naskah Mas'alah al-Qiblah fi l-Batawy."

[52] Fattah Setiawan Santoso et al., "Facing Interdisciplinary Research in Syariah Research, Findings From Applied Falak Science," *Indonesian Journal of Islamic Jurisprudence, Economic and Legal Theory* 2, no. 2 (2024): 599–610, https://doi.org/10.62976/ijijel.v2i2.487.

[53] Alba Fedeli, "Digital Humanities and Qurʾanic Manuscript Studies: New Perspectives and Challenges for Collaborative Space and Plural Views," *Majallat Kulliyat al-Sharīʿah wa al-Dirāsāt al-Islāmiyyah* 38, no. 1 (2020): 147–58, https://doi.org/10.29117/jcsis.2020.0260.

[54] Magevira, "Problematika Astronomical Twilight dalam Penentuan," *ASTROISLAMICA Journal of Islamic Astronomy* 4, no. 1 (2025): 40–61, https://doi.org/10.47766/astroislamica.v4i1.3468.

From this description, it can be concluded that Southeast Asian *falak* manuscripts function not only as religious and scientific texts, but also have social, political, and cultural roles. As an intellectual heritage, they require serious attention regarding conservation, philology, and digitization, so they remain relevant to modern science and the development of religious practice.

Conclusion

Falak science in Southeast Asia developed rapidly thanks to the tradition of pilgrimage journeys (*hajj*) and scholarly travels (*rihlah 'ilmiyyah*) by scholars to major centers of knowledge such as the *Haramain*, Egypt, Yemen, and Syria. Falak manuscripts in the Malay Archipelago are generally practical in nature, focusing on determining the *qibla* direction, prayer times, the beginning of lunar months, and eclipses, as a response to the needs of the Muslim community. Manuscript studies reveal various typologies of *falak* works, including instrumental works, summaries, translations, tables, and poetic forms. This scholarly tradition has continued alongside social, cultural, economic, and political developments, and has also influenced the evolution of local astronomy in Southeast Asia.

Acknowledgment

The author would like to express his gratitude to the 2024 Internal Grant Program of the University of Muhammadiyah North Sumatra and the Institute for Research and Community Service (LPPM), University of Muhammadiyah North Sumatra, for their financial support in conducting this research. This assistance was instrumental in realizing the scientific output and scientific development that served as the research objective.

References

Aidulsyah, Fachri, and Saiful Hakam. “Manuscript, Philology, and Indonesian Islam.” *Tashwirul Afkar* 41, no. 1 (2022): 103–10. https://doi.org/10.51716/ta.v41i1.75.

Aini, Nur, and Youla Afifah Azkarrula. “Pandangan Tokoh Falak Tentang Elongasi pada Penentuan Awal Syawal 1443 H dalam Kriteria Neo MABIMS di Indonesia.” *Astroislamica: Journal of Islamic Astronomy* 3, no. 1 (2024): 01–28. https://doi.org/10.47766/astroislamica.v3i1.2762.

Akbar, Reza. "Sejarah Perkembangan Ilmu Falak dalam Peradaban India dan Keterkaitannya dengan Islam." *Jurnal Ilmiah Islam Futura* 17, no. 1 (2017): 50. https://doi.org/10.22373/jiif.v17i1.1511.

Alimuddin. "Sejarah Perkembangan Ilmu Falak." *Al Daulah : Jurnal Hukum Pidana dan Ketatanegaraan* 2, no. 2 (2013): 181–94. https://doi.org/10.24252/ad.v2i2.1475.

Alwi, Bashori. "Konsep Hilal Mar'i (Analisis Terhadap Pandangan Anggota TIM Hisab Rukyat Kementerian Agama RI)." *HAKAM; Jurnal Kajian Hukum Islam* 6, no. 2 (2022): 89–107. https://doi.org/10.33650/jhi.v6i1.4466.

Anisa, Arifatul, and Sutrisna Wibawa. "Hermeneutika Nilai Moral Jawa dalam Naskah Tashrihah Al- Muhtaaj dan Relevansinya dalam Pendidikan." *Aksara* 33, no. 1 (2021): 57–70. https://doi.org/10.29255/aksara.v33i1.491.

Arifin, Jaenal. "Proses Penentuan Awal Ramadhan, Syawal, dan Dzulhijjah di Indonesia: Sinergi Antara Independensi Ilmuwan dan Otoritas Penguasa." *Jurnal Penelitian* 13, no. 1 (2019): 37. https://doi.org/10.21043/jp.v13i1.4892.

Arni, Jarni. *Metode Penelitian Tafsir*. 1st ed. Pekanbaru-Riau: Daulat Riau, 2013.

Basthoni, M. "Diferensiasi Metode Penentuan Awal Bulan Hijriyah: Kajian Perspektif Teori Evolusi Sosial Herbert Spencer." *Endogami: Jurnal Ilmiah Kajian Antropologi* 1, no. 2 (2018): 166. https://doi.org/10.14710/endogami.1.2.166-176.

Creswell, John W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approa*ches. *Book*. Los Angeles, London, New Delhi, Singapore: Sage Publication Inc, 2013.

Determann, Jörg Matthias. "History of Astronomy and Space Science in the Islamic World." *Islamic Studies*, 2019, 3–5. https://doi.org/10.1093/obo/9780195390155-0267.

Fedeli, Alba. "Digital Humanities and Qurʾanic Manuscript Studies: New Perspectives and Challenges for Collaborative Space and Plural Views." *Majallat Kulliyat al-Sharīʿah wa al-Dirāsāt al-Islāmiyyah* 38, no. 1 (2020): 147–58. https://doi.org/10.29117/jcsis.2020.0260.

Fikri, Haekal, Andi Intan, and Nur Cahyani. "Analisis Matlak dalam Penentuan Awal Bulan Hijriah Perspektif Ilmu Falak." *Hisabuna* 4, no. 3 (2023): 65–83. https://doi.org/10.20414/afaq.v4i1.

Firdiniah, Nur Eka Putri. "Telaah Pemikiran Abdurrahman Özlem dalam Menentukan Awal Bulan Kamariah: Perspektif Astronomi dan Fikih." *Azimuth: Journal of Islamic Astronomy* 5, no. 2 (2024): 108–31. https://doi.org/10.15642/azimuth.v5i2.2673.

Gallop, Annabel Teh. "Shifting Landscapes: Remapping the Writing Traditions of Islamic Southeast Asia through Digitisation." *Jurnal Humaniora* 32, no. 2 (2020): 97. https://doi.org/10.22146/jh.55487.

Hamdani, Aris Tiono. "Analisis Perspektif Empat Madzhab Terhadap Matla' dalam Penentuan Awal Bulan Hijriah." *AL-AFAQ : Jurnal Ilmu Falak dan Astronomi* 4, no. 1 (2022): 32–39. https://doi.org/10.20414/afaq.v4i1.4187.

Harahap, Nursapia. *Penelitian Kualitatif*. Medan: Wal Ashri Publishing, 2020.

Hardani, Hardani, Helmina Andriani, Dhika Juliana Sukmana, and Roushandy Fardani. *Metode Penelitian Kualitatif & Kuantitatif*. Yogyakarta: Pustaka Ilmu, 2020.

Hidayat, Muhammad. "Aplikasi Kriteria Kalender Islam Global Muktamar Turki 2016 dan Rekomendasi Jakarta 2017." *Al-Marshad: Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 4, no. 1 (2018): 67–77. https://doi.org/10.30596/jam.v4i1.1936.

Hidayat, Muhammad. "Penyebab Perbedaan Hasil Perhitungan Jadwal Waktu Salat di Sumatera Utara." *Al-Marshad: Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 4, no. 2 (2018): 204–18. https://doi.org/10.30596/jam.v4i2.2443.

Ibrahim, Norhasnira, and Faisal Ahmad Shah. "The Islamic Influences in Malay Manuscripts Writing: An Overview of Some Selected Manuscripts Pengaruh Islam dalam Penulisan Manuskrip Melayu: Gambaran Daripada Manuskrip Terpilih." *Sains Insani* 5, no. 1 (2020): 57–66. https://sainsinsani.usim.edu.my/index.php/sainsinsani/article/view/141.

Izzuddin, Ahmad, Muhammad Habibur Rahman, and Muhammad Himmatur Riza. "Teleskop Ioptron Cube II dalam Penentuan Arah Kiblat." *AL-AFAQ : Jurnal Ilmu Falak dan Astronomi* 3, no. 1 (2021): 25–40. https://doi.org/10.20414/afaq.v3i1.2776.

Johnson, Burke, and Larry B.. Christensen. *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. United Kingdom: Sage Publication, 2018.

Kalupe, Abdulasi, and Arwin Juli Rakhmadi. "The Islamic Astronomy Development and Status in Thailand." *Al-Hisab: Journal of Islamic Astronomy* 2, no. 1 (2025): 56–64. https://doi.org/10.33096/jah.v2i1.23884.

Kila, Syahrir, Wardiah Hamid, Abd Rahman Arsyad, Muhammad Nur, Wan Shahrazad, and Wan Sulaiman. "Mystical Radiance of Manuscript: A Paratextual Study of Islamic Astronomy Manuscript." *Al-Qalam Jurnal Penelitian Agama dan Sosial Budaya* 30, no. 2 (2024): 253–63. https://doi.org/10.31969/alq.v30i2.1488.

Kurniawan. "Reconstruction of Falak Science Against Astronomy." *KULMINASI: Journal of Falak and Sharia* 2, no. 2 (2024): 57–66. https://doi.org/10.22373/kulminasi.v2i2.5793.

Kustiana Arisanti. "Ilmu Falak dalam Prespektif Sejarah." *Bahtsuna* 3, no. 285 (2021): 291. https://doi.org/10.55210/bahtsuna.v3i2.67.

Kusuma, Theodorus Aries Briyan Nugraha Setiawan, and Andry Hikari Damai. "Perkembangan Kebudayaan Austronesia di Kawasan Asia Tenggara dan Sekitarnya (the Development of Austronesian Culture in Southeast Asia and Adjacent Areas)." *Naditira Widya* 13, no. 2 (2019): 75–86. https://doi.org/10.24832/nw.v13i2.320.

M Basithussyarop, M Basithussyarop, and Ahmad Izzudin. "Kajian Awal Bulan Kamariah dalam Kitab Keker Bulan Karya Sayyid Usman." *DIKTUM: Jurnal Syariah dan Hukum* 20, no. 2 (2022): 415–31. https://doi.org/10.35905/diktum.v20i2.4153.

Magevira. "Problematika Astronomical Twilight dalam Penentuan." *ASTROISLAMICA Journal of Islamic Astronomy* 4, no. 1 (2025): 40–61. https://doi.org/10.47766/astroislamica.v4i1.3468.

Muslim, Pepep Puad, Tatang Farhanul Hakim, and Suparman Jassin. "Dinamika dan Perkembangan Ilmu Falak dari Era Pra Islam Hingga Era Kontemporer." *Al-Tsaqafa : Jurnal Ilmiah Peradaban Islam* 20, no. 1 (2023): 14–28. https://doi.org/10.15575/al-tsaqafa.v20i1.27243.

Nashiha, Lauhatun, and Mahsun Mahsun. "Kajian Ilmu Falak dan Astronomi dalam Sudut Pandang Filsafat Ilmu." *Astroislamica: Journal of Islamic Astronomy* 3, no. 1 (2024): 29–50. https://doi.org/10.47766/astroislamica.v3i1.2645.

Nazaruddin. "Spirit Jaringan Ulama Timur Tengah dan Kepulauan Nusantara Abad XVII dan XVIII Karya Azyumardi Azra." In *Jaringan Ulama Timur Tengah dan Kepulauan Nusantara Abad*

XVII dan XVIII, 483, 2020. https://jlka.kemenag.go.id/index.php/lektur/article/view/795.

Ohashi, Yukio. "Remarks on the Origin of Castillejo-Dalitz-Dyson Poles." *Remarks on the Origin of Indo-Tibetan Astronomy* 82, no. 1 (2010): 341–42. https://doi.org/10.1103/PhysRevC.82.018201.

Ôhashi, Yukio, and Wayne Orchiston. *The Evolution of Local Southeast Asian Astronomy and the Influence of China, India, the Islamic World and the West*, 2021. https://doi.org/10.1007/978-3-030-62777-5_24.

Pratama, Dito Alif. "Ru'yat Al-Hilāl dengan Teknologi : Telaah Pelaksanaan Ru'yat Al-Hilāl di Baitul Hilal Teluk Kemang Malaysia." *Al-Ahkam* 26, no. 2 (2016): 271. https://doi.org/10.21580/ahkam.2016.26.2.930.

Putri, Hasna Tuddar. "Hisab Urfi Syekh Abbas Kutakarang: Kajian Etnoastronomi dalam Penentuan Awal Bulan Hijriah." *Media Syari'ah* 21, no. 1 (2019): 52–72. https://doi.org/10.22373/jms.v21i1.6476.

Qorib, Muhammad, and Arwin Juli Rakhmadi. "The Spirit of Tolerance in Determining the Time of Dawn According to Indonesian Classical Scholars in Malay-Nusantara." *Interdisciplinary Journal and Humanity (INJURITY)* 3, no. 1 (2024): 17–23. https://doi.org/10.58631/injurity.v3i1.161.

Rahman, Hardiyanto. "Analisis Bibliometrik: Upaya Pemberdayaan Masyarakat di Indonesia." *Jurnal Pemerintahan dan Kebijakan (JPK)* 4, no. 2 (2023): 106–23. https://doi.org/10.18196/jpk.v4i2.18211.

Rakhmadi, Arwin Juli, Mario Kasduri, Muhammad Qorib, Habibullah Ritonga, Robie Fanreza, and Abdul Rahman Cemda. "TM. Ali Muda (w. 2005 M) Karya dan Kontribusinya dalam Bidang Ilmu Falak." *Astroislamica: Journal of Islamic Astronomy* 2, no. 2 (2023): 190–205. https://doi.org/10.47766/astroislamica.v2i2.1930.

Rakhmadi, Arwin Juli, Abu Yazid Raisal, Muhammad Hidayat, Hariyadi Putraga, and Isra Hayati. "The Falak Science Observatory of University of Muhammadiyah North Sumatra (Oif Umsu) and the Contribution in Fajr Time Research." *Proceedings International Seminar of Islamic Studies* 2, no. 1 (2021): 851–58. https://doi.org/10.3059/insis.v2i1.6453.

Rakhmadi, Arwin Juli, Hasrian Rudi Setiawan, and Muhammad

Hidayat. “Kajian Ilmu Falak Syaikh Muhammad Arsyad Banjar: Analisis Naskah Mas’alah al-Qiblah fi l-Batawy.” *Jumantara: Jurnal Manuskrip Nusantara* 13, no. 2 (2022): 149–65. https://doi.org/10.37014/jumantara.v13i2.1469.

Rakhmadi Butar-Butar, Arwin Juli. “Historiografi Ilmu Falak di Nusantara: Sejarah, Motivasi dan Tokoh Awal.” *Journal of Contemporary Islam and Muslim Societies* 2, no. 2 (2018): 156–73. https://doi.org/10.30821/jcims.v2i2.2928.

Ramdhani, Iga Nur and Revianto Budi Santosa. “Pengaruh Astronomi Islam pada Masa Golden Age Terhadap Arsitektur.” *Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 7, no. 1 (2021): 66–75. https://media.neliti.com/media/publications/268350-penanggalan-mesir-kuno-61e38fac.pdf.

Ritonga, Marataon, Arwin Juli Rakhmadi, Muhammad Hidayat, Hariyadi Putraga. “Transformasi Hisab-Rukyat dalam Penentuan Awal Bulan Hijriah di Muhammadiyah Hisab-Rukyat Transformation of Hijri Month Begining Determenation in Muhammadiyah.” *Jurnal Agama dan Ilmu Pengetahuan* 21, no. 1 (2024): 83–92. https://doi.org/10.25299/al-hikmah:jaip.2024.vol21(1).14676.

Sakirman, Sakirman. “Spirit Budaya Islam Nusantara dalam Konstruks “Rubu’ Mujayyab.” *Endogami: Jurnal Ilmiah Kajian Antropologi* 1, no. 2 (2018): 114. https://doi.org/10.14710/endogami.1.2.114-123.

Santoso, Fattah Setiawan, Muthmainnah Muthmainnah, Cipto Sembodo, Subary Subary, Muhammad Nur Kholis Al Amin, Nur Alfan Baheem, and Paseeyah Baka. "Facing Interdisciplinary Research In Syariah Research, Findings from Applied Falak Science." *Indonesian Journal of Islamic Jurisprudence, Economic and Legal Theory* 2, no. 2 (2024): 599–610. https://doi.org/10.62976/ijijel.v2i2.487.

Siyoto, Sandu and M. Ali Sodik. *Dasar Metodologi Penelitian*. Yogyakarta: Literasi Media Publishing, 2015.