AL – AFAQ
Jurnal Ilmu Falak dan Astronomi
Fakultas Syariah Universitas Islam Negeri (UIN) Mataram
P-ISSN: 2685-0176. E-ISSN: 2722-0176 Vol. 6, No. 2 Desember 2024

# The Accuracy of Qibla Direction of the Historical Mosque in Pekalongan City

'Alamul Yaqin[a,1,*], Iqbal Kamalludin [b,2]
[a,b] K.H. Abdurrahman Wahid State Islamic University Pekalongan, 51161, Indonesia
[1]alamul.yaqin@uingusdur.ac.id*; [2]iqbal.kamalludin@uingsudur.ac.id

**Abstract:** *The problem of the Qibla direction of the mosque is still one of the things that often occurs in society. In the modern era that has been equipped with sophisticated tools in determining the Qibla direction, there are still mosques and musala that are not facing the Qibla, moreover mosques that are hundreds of years old with traditional equipment. Pekalongan has three historical mosques: Aulia Sapuro Mosque, Jami' Mosque of Pekalongan City and Wakaf Mosque, which was the beginning of the spread of Islam in Pekalongan. This article aims to find out the history of the oldest mosque in Pekalongan and determine the accuracy and tolerance of its Qibla direction and compare the results of the accuracy of the direction of the Qibla with other historic mosques. This research is a qualitative research and data collection uses the field through interviews and observations. The data analysis technique uses comparative descriptive. The results of this article are as follows: The determination of the Qibla direction by 3 methods (Compass, Compass and magnetic declination, Local Raṣdu Qiblah) shows the largest inclination in the Qibla direction of the Aulia Sapuro Mosque used the Local Raṣdu Qiblah method and the smallest inclination in the Qibla direction of the Wakaf Mosque used the compass method. The inclination of the Qibla direction of the 3 mosques is still included in the category of Qibla direction tolerance, so it is valid to pray in the mosque. There is a pattern of Qibla Inclination of the ancient mosques of Pekalongan found in 3 ancient mosques in Lombok.*
**Keywords:** *Accuracy, Historical Mosques, Qibla Direction, Qibla Direction Tolerance*

**Abstrak:** *Permasalahan arah kiblat masjid masih menjadi salah satu hal yang sering terjadi di masyarakat. Pada era modern yang sudah dibekali alat-alat canggih dalam penentuan arah kiblat, masih terdapat arah kiblat masjid dan musala yang tidak tepat menghadap kiblat, apalagi masjid-masjid yang berusia ratusan tahun yang menggunakan alat-alat zaman dahulu. Pekalongan memiliki 3 masjid bersejarah yaitu Masjid Aulia Sapuro, Masjid Jami' Kota Pekalongan dan Masjid Wakaf yang menjadi awal mula penyebaran agama Islam di Pekalongan. Artikel ini bertujuan untuk mengetahui sejarah masjid tertua di Pekalongan dan mengetahui akurasi dan toleransi arah kiblatnya serta melakukan komparasi hasil akurasi arah kiblat dengan masjid bersejarah lainnya. Penelitian ini merupakan penelitian kualitatif dan dalam pengumpulan data dilakukan dilapangan melalui wawancara dan observasi. Teknik analisis data menggunakan deskriptif komparatif. Hasil dari artikel ini sebagai berikut: Hasil pengukuran arah kiblat dengan beberapa 3 metode (Kompas, Kompas dan deklinasi magnetik, Raṣdu Qiblah Lokal) menunjukkan kemiringan arah kiblat terbesar pada arah kiblat Masjid Aulia Sapuro menggunakan metode rashdul kiblat lokal dan kemiringan terkecil pada arah kiblat Masjid Wakaf dengan metode kompas. Kemiringan arah kiblat 3 masjid tersebut dengan menggunakan berbagai macam metode masih masuk dalam kategori tolerasi arah kiblat, sehingga sah jika salat di masjid tersebut. Terdapat pola kasus kemiringan kiblat masjid kuno Pekalongan ditemukan di 3 masjid kuno Lombok.*
**Kata Kunci:** *Akurasi, Arah Kiblat, Masjid Bersejarah, Toleransi Arah Kiblat*

## A. Introduction

Mosques as places of worship for Muslims have an important role in Islamic civilization. In addition, several mosques also have important historical value[1] because they were the beginning

[1]Sulaiman Sulaiman, "Pertautan Emosi Sejarah, Magis Dan Penjaga Madzhab: Analisis Terhadapn Masjid Agung Kyai Gede Di Kota Waringin Barat, Kalimantan Tengah," *Ibda': Jurnal Kebudayaan Islam* 12, no. 1 (2014): 86, https://doi.org/https://doi.org/10.24090/ibda.v12i1.438.

of the spread of Islam in an area such as the 3 oldest mosques in Pekalongan, including the Aulia Sapuro Mosque which is estimated to have been established in 1035 H or 1614 AD by envoys from the Demak kingdom, namely Kyai Maksum, Kyai Sulaiman, Kyai Lukman, and Kyai Kudung[2], the Wakaf Mosque which is built by Sayyid Husein bin Salim bin Abu Bakar bin Ahmad bin Husein bin Umar bin Abdurahman Alatas[3] and the Jami' Kauman Mosque which was built in 1852 AD by Raden Arjo Wiryo Tumenggung Adinegoro Al-Amir (Regent) of Pekalongan at that time[4].The three historic mosques certainly have a long history including in the aspect of determining the direction of the qibla.

The qibla direction of these 3 historic mosques has never changed.[5] The facts are that there are mosques built in the modern era that do not face the Qibla precisely, even though they are measured with sophisticated tools in determining the direction of the Qibla. How accurate is the direction of the Qibla of ancient mosques that are hundreds of years old with the limitations of the tools of their era, so that the reality cannot be denied that most of the historical mosques do not face the Ka'bah precisely.[6] So that, this paper aims to know the qibla direction accuracy from Aulia Sapuro, Jami' Kauman, and Wakaf mosques and is the inclination of the direction of the Qibla in historic mosques still within the limits of legal tolerance so that they remain valid for use in prayer? and compare the result accuracy of 6 other ancient mosques' qibla inclinations.

## B. Method

This research is a field research conducted in three historic mosques in Pekalongan: The Jami' Aulia Sapuro Mosque, the Jami' Kauman Mosque, and the Wakaf Mosque. This research uses a qualitative research approach that uses a natural approach to understanding specific phenomena.[7] The primary data sources of this research are field data includes results from interviews and measurements of the Qibla direction and secondary data sources obtained from books and articles related to the direction of the Qibla. The tools used in measuring the direction of the Qibla are the Suunto KB-14/360R compass, stick, and bow. The data collection technique used interviews interviewees: the chairman of the mosque foundation, the mosque administrator, the mosque elders, and observations on the research objects: Aulia Sapuro, Jami' Kauman, and Wakaf mosques. The data analysis technique used is comparative. The Comparative analysis uses the compass method, the compass with magnetic declination correction, and the *Local Raṣdu Qiblah* for each mosque. The results of this comparison are used to assess the accuracy and tolerance of

[2]Arif Dirhamsyah, "Masjid Aulia Sapuro Pekalongan Yang Terlupakan," 2020.
[3]Muhammad Nurkhofi, "Sepenggal Kisah Tempat Ibadah Masjid Wakaf Pekalongan," 2016.
[4]Muhammad Subarkah, "Napak Tilas Masjid Al Jami' Pekalongan Dari Dosen UGM," 2020.
[5]Based on three interviews: Dananir, Interview by author, Pekalongan, March 1, 2023., Yasran, Abdul Fatah, interview by author, Pekalongan, July 6, 2023., Mulahela, interview by author, Pekalongan, July 12, 2023.
[6]Muhammad Awaludin, "Re-Interpretasi Keabsahan Arah Kiblat Masjid Kuno," *Elfalaky* 5, no. 2 (2021): 139, https://doi.org/10.24252/ifk.v5i2.22949.
[7]Lexy J. Moleong, Metodologi Penelitian Kualitatif, 35th ed. (Bandung: Remaja Rosdakarya, 2016), p.217.

the inclination of the direction of the Qibla of 3 historic mosques in Pekalongan City and compare the inclination with other ancient mosques' qibla direction inclination.

## C. Result and Discussion

### 1. Determining the Direction of Qibla with Compass and the Local *Raṣdu Qiblah*

Determining the direction of the Qibla has several methods of determination. Researchers chose the compass and the *Local Raṣdu Qiblah* to be used to check and approach the method used in determining the direction of the Qibla of the historic mosque of Pekalongan city, as follows:

#### a. Determining the Direction of the Qibla with a Compass

A compass is a tool used to determine direction because it contains a magnetic needle that always points north and south. However, the north and south directions indicated by the compass needle are not the true north or the true north pole, but rather the magnetic north. People often use a compass to measure the direction of the Qibla, which causes many problems. The compass has been used to determine the direction of the Qibla since the 13th century, at least in Yemen, Cairo, Iran, and Central Asia. At least from the 13th century to the 19th century AD, the magnetic compass became a scientific instrument, as evidenced by the many findings of Qibla direction instruments that use the compass as a direction indicator. One example is Sultan al-Ashraf of Yemen, who died in 1295, who told about how to use a compass bowl (also known as "tasa") along with a picture showing the direction of the Qibla. Al-Ashraf used the magnetic compass he made to determine the direction of the Qibla in Aden and Taiz. In addition, this Qibla compass has developed into the Ceramic Qibla-Bowl, a ceramic bowl filled with water with a magnet floating in it to indicate the cardinal directions. Its shape resembles a compass. Thabit was the inventor of this tool, originally from Damascus, who died in 1516/1520 AD.[8]

The steps for determining Qibla direction using a compass are as follows: 1) Keep away magnetic objects such as cellphones, televisions, etc.; 2) Place it on a flat surface, to check a flat surface using a waterpass. However, some compasses already have a waterpass. 3) Read the needle tip of the compass after the needle tip of the compass is still. 4) The direction of the Qibla is indicated based on the results of the Qibla azimuth calculation.[9]

#### b. Determining the Direction of the Qibla with Compass

The use of a compass to determine the direction of the Qibla has the following weaknesses: the compass points to magnetic north, not to true north. It turns out that magnetic north is not really the same as true north. Magnetic declination is a term used to describe the difference between the

[8]Muhammad Thoyfur, "PERKEMBANGAN METODE DAN INSTRUMEN ARAH KIBLAT ABAD PERTENGAHAN: STUDI KAJIAN HISTORIS PERSPEKTIF DAVID A KING," *AL - AFAQ : Jurnal Ilmu Falak Dan Astronomi* 3, no. 1 SE-Articles (July 19, 2021): 52–53, https://doi.org/10.20414/afaq.v3i1.2879.

[9]Ahmad Izzuddin, *Ilmu Falak Praktis: Metode Hisab Rukyat Praktis Dan Solusi Permasalahannya* (Semarang: Pustaka Rzki Putra, 2012), 66.

true magnetic north direction.[10] It should be noted that the Earth's magnetic north and south poles are not located near the Earth's north and south poles. As a result, there is an angle between true north (the direction towards the north pole) and magnetic north (the direction towards the south pole). The azimuth of the Qibla (Q) of a location must be corrected with the magnetic declination of the place being measured. The value of the magnetic Qibla direction = Q-1, for example in Central Java and East Java with a magnetic declination value of ≈ +1°. Magnetic declination corrections that have values below one degree or more have a significant effect on the accuracy of the Qibla direction.[11]

The steps for determining Qibla direction using a compass are as follows: 1) Keep away magnetic objects such as cellphones, televisions, etc.; 2) Place it on a flat surface, to check a flat surface using a waterpass. However, some compasses already have a waterpass; 3) Read the needle tip of the compass after the needle tip of the compass is still; 4) Pay attention to the magnetic declination in the measured area. The magnetic declination of an area can be seen at https://www.magnetic-declination.com/; 5) Calculate the correction to the azimuth of the qibla of the measured place with the magnetic declination of the place. If the magnetic declination value is East, then the azimuth of the qibla - magnetic declination. If the magnetic declination value is West, then the azimuth of the qibla + magnetic declination. 6) The direction of the qibla is shown based on the results of the calculation of the azimuth of the qibla that has been corrected with magnetic declination.

Although the accuracy of determining the direction of the Qibla using a compass is more accurate using the sun with aids such as mizwala, istiwaaini, theodolite, etc. The use of a compass to test the accuracy of the direction of the Qibla of ancient or historic mosques is to find out the comparison of the results between the old method of determining the direction of the Qibla such as a compass with contemporary methods such as local Rashdul Qibla.

**c. Determining the Direction of Qibla with the *Raṣdu Qibla***

Determining the direction of the Qibla in addition to using a compass, also uses the Sun. Among the methods used is *Raṣdu Qiblah*. Currently there are various ways to determine the direction of the Qibla, the concept that is often used to determine the direction of the Qibla is by using a spherical triangle assisted by the coordinates of the earth, namely latitude and longitude, this concept is found in various astronomical literature that already has the concept of a spherical triangle with the assumption that the Earth is a giant ball that has the same size at each corner or in other words, the shape of the Earth in the calculation of a spherical triangle or spherical

[10]Arino Bemi Sado, "PENGARUH DEKLINASI MAGNETIK PADA KOMPAS DAN KOORDINAT GEOGRAFIS BUMI TERHADAP AKURASI ARAH KIBLAT," *AL - AFAQ : Jurnal Ilmu Falak Dan Astronomi* 1, no. 1 SE-Articles (June 19, 2019): 2, https://doi.org/10.20414/afaq.v1i1.1843.

[11]Sado, 3.

trigonometry is a perfect circle.[12] Therefore, the direction of the Qibla can be found with the concept of a triangle placed on the surface of the earth with the main coordinates of the latitude and longitude of the Ka'bah. Then the peak point is located at the coordinates of the north pole and the third point is located at the coordinates of the place to be calculated. The concept of a spherical triangle or spherical trigonometry is slightly different from the usual trigonometry formula because the surface in ordinary trigonometry is a flat plane, while in the calculation of spherical trigonometry the surface is curved to form a ball. The concept of determining the direction of the Qibla using the Sun as a reference is actually developed with various methods, one of the basic aspects of using the Sun as an object to determine the direction of the Qibla is the shadow of the Qibla which is also an object that is easy to use to determine the direction, which in this case is determining the direction of the Qibla.[13]

The concept of *Raṣdu Qiblah* is a practical direction of the Qibla, by using the shadow of the Qibla directly without predicting the direction in advance like other methods of determining the direction of the Qibla. The shadow of an object at a certain time in a place will indicate the direction of the Qibla, this is because the azimuth of the Sun and the azimuth of the Qibla have the same value or opposite directions, besides that *Raṣdu Qiblah* can also be caused because the position of the Sun is directly above the Ka'bah, then at that time it will indicate the direction of the Qibla.[14]

*Raṣdu Qiblah* is divided into two: *Global Raṣdu Qiblah* and *Local Raṣdu Qiblah*. *Raṣdu Global Qiblah* occurs when the position of the Sun is on the latitude of the Ka'bah which occurs twice a year: May 27/28 and July 15/16. While *Local Raṣdu Qiblah* is an event when the azimuth of the Sun is the same as the azimuth of the Qibla or the azimuth of the Sun has a direction of 180 degrees from the azimuth of the Qibla. In the case of *Local Raṣdu Qiblah*, a certain hour is needed so that every day there is a certain time that can be used to determine the direction of the Qibla that this method passes through. *Local Raṣdu Qiblah* is a method for measuring the direction of the Qibla by utilizing the position of the Sun when it intersects the circle of the Qibla of a place, so that all upright objects at that time have shadows that indicate the direction of the Qibla in that place, with the provision that the position of the Sun is on the east side (morning) Indonesian time. This is because the direction of the Qibla in Indonesia is north-west, if the shadow of the Qibla is in the east (afternoon) then the *Raṣdu Qiblah* is the opposite direction of the shadow.[15] The steps to determine the direction of the qibla using the local *Raṣdu Qiblah* are as follows: 1) Place a stick or something similar on a flat place; 2) Wait according to the calculated *Raṣdu Qiblah* clock; 3)

[12]Anisah Budiwati, "TONGKAT ISTIWA', GLOBAL POSITIONING SYSTEM (GPS) DAN GOOGLE EARTH UNTUK MENENTUKAN TITIK KOORDINAT BUMI DAN APLIKASINYA DALAM PENENTUAN ARAH KIBLAT," *Al-Ahkam* 26, no. 1 (2016): 65, https://doi.org/10.21580/ahkam.2016.26.1.808.

[13]Muhammad Thoyfur, "DIGITALIZATION OF LOCAL RASHDUL QIBLA BY QIBLA DIAGRAM," *Al-Hilal: Journal of Islamic Astronomy* 3, no. 1 (2021), https://doi.org/10.21580/al-hilal.2021.3.1.7697.

[14]Thoyfur.

[15]Sayful Mujab, "QIBLAT TIAP SAAT SEBAGAI JEMBATAN PENENTU ARAH QIBLAT," *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 6, no. 1 (2015): 160–80, https://doi.org/10.21043/yudisia.v6i1.1486.

The direction of the qibla is indicated by the shadow of the stick when the local *Raṣdu Qiblah* occurs before the *zawal* (the time when the sun leans towards the west during the day), then the direction of the qibla is indicated by the shadow of the object, conversely if the local *Raṣdu Qiblah* occurs after the *zawal*, then the direction of the qibla is indicated in the opposite direction from the shadow of the stick.[16]

**2. History of the Historic Mosque of Pekalongan City**

**a. Aulia Sapuro Mosque**

The Aulia Sapuro Mosque in Pekalongan was built in 1035 H or 1614 AD by four envoys from Demak, namely Kiai Maksum, Kiai Sulaiman, Kiai Lukman, and Nyai Kudung. If the year of its establishment is correct, then Demak at that time had the status of a duchy and became part of the Mataram Sultanate under Sultan Agung who ruled in the period 1613 - 1645 AD. So the age of this Aulia Grand Mosque is very old, almost equivalent to the establishment of Pekalongan.[17]

This mosque is full of important historical value for the people of Pekalongan. In fact, it is believed that this mosque was one of the starting points for the development of Islam in Pekalongan which was brought by 4 envoys from the Demak Bintoro Kingdom. At first, the name of this mosque was not the Aulia Grand Mosque as it is now, but the Galuh Rantai Mosque. Therefore, around the mosque there are tombs of a number of scholars, officials, community leaders, and the founders of this mosque. In short, the tomb of the Aulia, then in the 1980s this mosque officially changed its name to the Jami Aulia Mosque which continues to be used until now. Aulia Sapuro Mosqueis believed to be related to the Great Mosque of Demak. The reason is, the wood of the Aulia Sapuro Mosque turned out to be the remains of the construction of the Great Mosque of Demak which was previously built in 1479 AD by Walisongo.[18]

**b. Jami' Kauman Mosque Pekalongan**

Jami' Kauman Mosque Pekalongan has a wide sized building and tower that began construction on December 26, 1862 AD. This coincides with the year 1270 in the Hijri calendar and 1782 in the Javanese almanac. This means that it is more than 150 years old.[19] This mosque was built by Raden Tumenggung Aryo Wiryo in 1852. From the statement of one of the supervisors of this grand al-jami mosque named Ustadz Mahmud Masjkur, he said that the mosque was built on land with an area of 1255 square meters.[20]

**c. Wakaf Mosque**

Habib Abdullah bin Hud, one of the administrators of the waqf mosque named, said that this waqf mosque was originally established because of the arrival of a merchant from Hadramaut, South

[16]Thoyfur, "DIGITALIZATION OF LOCAL RASHDUL QIBLA BY QIBLA DIAGRAM," 84–85.
[17]Arif Dirhamsyah, "Masjid Aulia Sapuro Pekalongan Yang Terlupakan."
[18]Arif Dirhamsyah.
[19]Subarkah, "Napak Tilas Masjid Al Jami' Pekalongan Dari Dosen UGM."
[20]Nurkhofi, "Sepenggal Kisah Tempat Ibadah Masjid Wakaf Pekalongan."

Yemen Region named Sayied Husein bin Salim bin Abu Bakar bin Achmad bin Husein bin Umar bin Abdurahman Alatas to the city of Pekalongan to spread the teachings of Islam together with his students. With the aim of spreading Islam, in 1854 Sayied Husein, who had abundant wealth, bought a plot of land in the middle of the forest which is now located on Jalan Surabaya, which is registered with the notary Van Huyzen. The purpose of purchasing this land was to be used as a place of worship for Muslims called the wakaf mosque. Every time Sayied Husein migrated to a place to teach the teachings of Islam, the first thing he did was establish a mosque as a place of worship for Muslims. With the existence of a mosque, people will be motivated to carry out worship and this is the beginning of social interaction with every community in the area around the mosque.

The history of the construction of the wakaf mosque which turned out that the land for the construction of this mosque was a cemetery in ancient times which was still in the forest area, this land used to be the tomb of traders who died while traveling to the city of Pekalongan. According to Habib Abdullah bin Hud, before this mosque was built there was already a small building which was then leveled to the ground and Sayied Husein and his students held the first prayer which coincided with the time of the Asr prayer, and once the prayer was finished and said greetings it turned out that many people followed without knowing where they came from and when they found out many people followed the prayer. Sayied Husein was confused whether it was an angel or a genie or something else but after that the people who followed the prayer quickly and suddenly disappeared.[21]

The establishment of a mosque in the middle of the forest had raised questions from some of the surrounding communities, but Sayied Husein still built a mosque in the middle of the forest because he had received instructions that later the area around this mosque would become a center of trade, and this was proven around 1955 to 1970 the location around this mosque developed and grew into a central place of trade which on average used to be many traders of batik, mori cloth, looms, sarongs and threads and others and until now around this place has become a center of shops for all kinds of products, batik, woven cloth, electronics, food and so on. The specialty of this wakaf mosque which is its symbol is a towering tower, this mosque tower was built by Arabs who are purely authentic from an Arab work of art. For the construction of this waqf mosque, when exactly it was founded, there is no record that can confirm the exact date and year of the initial establishment of this mosque, what is clear is that this mosque has undergone repairs that do not change the original form, moreover, the shape of the tower has not been changed at all, only repairs and maintenance in 1992 so that this mosque remains standing strong with a long life. Address of the Pekalongan Waqf Mosque: Jalan Surabaya, Pekalongan Timur District, Pekalongan City.[22]

[21]Nurkhofi.
[22]Nurkhofi.

AL – AFAQ
Jurnal Ilmu Falak dan Astronomi
Fakultas Syariah Universitas Islam Negeri (UIN) Mataram
P-ISSN: 2685-0176. E-ISSN: 2722-0176 Vol. 6, No. 2 Desember 2024

### 3. Accuracy of the Qibla Direction of the Historical Mosque in Pekalongan City

The results of measuring the direction of the Qibla of the historic mosques of Pekalongan city using the Compass, Compass with magnetic declination, and *Local Raṣdu Qiblah* method are as follows:

#### a. Compass

Qibla direction measurement using a compass with magnetic declination correction and without magnetic declination. The compass used is Suunto KB-14/360R. Magnetic declination is the angle between Magnetic North and True North. Based on data from Magnetic-Declination.com, the magnetic declination of Pekalongan city is 0º 39' (Positive)[23].

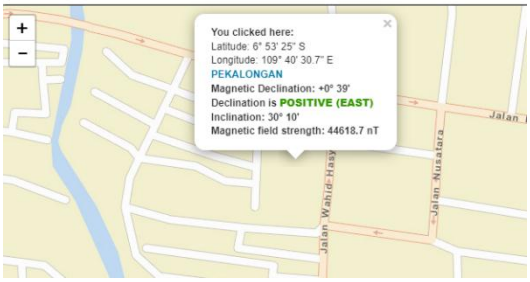


**Image 3.1 Magnetic Declination of Pekalongan City**

Data calculation for qibla determination using compass and compass with magnetic declination

1) Aulia Sapuro Mosque

| | |
|---|---|
| Latitude | : 6º53'48' S |
| Longitude | : 109º40'32" E |
| Ka'bah Latitude | : 21º25'21" N |
| Ka'bah Longitude | : 39º49'34" E |
| Azimuth Qibla | : 294º39'13" |
| Azimuth Qibla with magnetic declination | : 294º0'13" |

2) Jami' Kauman Mosque Pekalongan

| | |
|---|---|
| Latitude | : 6º53'24" S |
| Longitude | : 109º40'30" E |
| Ka'bah Latitude | : 21º25'21" N |
| Ka'bah Longitude | : 39º49'34" E |
| Azimuth Qibla | : 294º39'07" |
| Azimuth Qibla with magnetic declination | : 294º00'7" |

[23]Magnetic-Declination.com, "What Is Magnetic Declination?," Magnetic-Declination.com, 2023, https://www.magnetic-declination.com/what-is-magnetic-declination.php.

3) Wakaf Mosque

| | |
|---|---|
| Latitude | : 6º53’ S |
| Longitude | : 109º40’37” E |
| Ka’bah Latitude | : 21º25’21” N |
| Ka’bah Longitude | : 39º49’34” E |
| Azimuth Qibla | : 294º38’59” |
| Azimuth Qibla with magnetic declination | : 293º59’59” |

The results of measuring the direction of the Qibla using the Compass method, both using and not using magnetic declination:

**Table 3.1 Measuring the Qibla Direction of the Historic Mosque of Pekalongan City with a Compass**

| Mosque | Compass | Inclination | Compass + Magnetic Declination | Inclination |
|---|---|---|---|---|
| Aulia Sapuro | 294º39’13” | 13º39’13” to North | 294º0’13” | 13º 0’13” to North |
| Jami’ Kauman | 294º39’07” | 3º39’07” to North | 294º00’7” | 3º00’7” to North |
| Wakaf | 294º38’59” | 3º08’59” to North | 293º59’59” | 2º29’59” to North |

**b. *Local Raṣdu Qiblah***

Researchers also used *Local Raṣdu Qiblah* to check the direction of the Qibla of the historic mosque in Pekalongan city. The results are as follows:

**Table 3.2 Measuring the Qibla Direction of the Historic Mosque of Pekalongan City with the *Raṣdu Qiblah***

| No. | Mosque Name | *Local Raṣdu Qiblah* | Inclination |
|---|---|---|---|
| 1. | Aulia Sapuro | 16:43 WIB | 16º to North |
| 2. | Jami’ Kauman | 16:45 WIB | 5º to North |
| 3 | Wakaf | 16:41 WIB | 4º30’ to North |
| *WIB stands for Waktu Indonesia Barat or UTC + 7) | | | |

The results of measuring the direction of the Qibla using a Compass without and using magnetic declination and *Local Raṣdu Qiblah*, gave the same results at the level of accuracy of 3 mosques. The mosque with the largest inclination of the Qibla direction is the Aulia Sapuro Mosque, while the smallest inclination of the Qibla direction is in the direction of the Wakaf Mosque. Then, the largest inclination of the Qibla direction of 3 historic mosques was found in the *Local Raṣdu Qiblah* method, while the smallest inclination used a Compass.

The Interesting facts from the 3 methods of measuring the direction of the Qibla in the previous 2 tables. The Jami' Mosque of Pekalongan City and Wakaf have almost the same inclination of the Qibla direction with a difference of 0.5 degrees between the two in each method. In addition, the results of the inclination of the 3 mosques when associated with the year they were built, are in accordance i.e. mosque that is older has a greater inclination of the qibla direction compared to the direction of the Qibla of the younger mosque. Indeed, if seen from the data, the Aulia Sapuro Mosque was built in 1614 AD and has the largest inclination. Then, followed by the largest inclination of the direction of the qibla is the Jami' Mosque of Pekalongan City which was built in 1852 AD and the smallest is the inclination of the direction of the qibla of the Wakaf Mosque (estimated to be built in 1854 AD). In addition, the direction of the qibla of the Jami' Mosque of Pekalongan City and Wakaf only differs by an average 0.5 degrees in each method of checking the direction of the qibla, It is suspected that two mosques were built in a close time span, namely a difference of only 2 years, so the difference in the direction of the qibla is not too far. Unlike the Jami' Aulia Sapuro Mosque which is 2 centuries different from the construction of the Jami' Mosque of Pekalongan City and Wakaf. However, this still needs to be confirmed with re-checking data from other mosques in Pekalongan.

## 4. Qibla Direction Tolerance

Facing the Qibla is one of the conditions for the validity of prayer. Except when the prayer is performed in two circumstances, the ongoing war and the sunnah prayer while travelling. Regarding the law of facing the Qibla, the scholars have the same opinion that facing the Ka'bah building is an obligation for people who can see the Ka'bah building directly. However, the imams of the madhhabs differ in their opinions regarding the ruling of facing the Qibla for people who are outside the city of Makkah or cannot see the Ka'bah. The following are the opinions of each madhhab:

### a. Hanafi Madhhab

If a person cannot see the Ka'bah because of distance or otherwise, he must face in the direction of the Qiblah only (*jihat al-ka'bah*), which means facing the walls of the place of prayer that point to the Ka'bah. Some of the Hanafis are of the view that it is correct to face the direction of the Qiblah with ijtihad to find out the direction.[24]

[24]Imam Al-Timirsani, *Tanwir Al-Abshar* (Dar al-Kutub al-Ilmiah, 1997), 108.

**b. Maliki Madhhab**

Imam Ibn Rushd argued that if facing the Kaaba is obligatory, it is very difficult, especially for areas outside the city of Makkah.[25] Imam Qurtubi said that the scholars differed on this issue. The first opinion is that the Qiblah for those who cannot see the Ka'bah is Ka'bah Building. Ibn Arabi commented on this opinion, saying that this opinion is weak (*dhaif*), because it is a difficult command to carry out. [26] The second opinion is that the Qiblah for those who cannot see the Ka'bah is the direction of the Ka'bah. The majority of scholars of the Maliki madhhab favour the second opinion.[27]

**c. Syafi'i Madhhab**

The scholars of the Shafi'i madhhab also have two opinions like the scholars of the Maliki madhhab. Imam Al-Shirazi argues that if a person does not know the Qibla direction. If he is among those who know how to determine the Qibla direction by several methods such as the Sun, Moon, or wind, then he is obliged to do ijtihad to determine the Qibla direction. Imam Shafi'i argues that the Qiblah for those who can see or do not see the Ka'bah is Ka'bah building. Al-Muzanni disagreed with his teacher. He argues that it is obligatory to face the direction of the Ka'bah (*jihat al-Ka'bah*). Imam Nawawi narrated that between these two opinions, the closest to the truth is the opinion that must face the Ka'bah building (*'ain al-Ka'bah*).[28]

**d. Hanbali Madhhab**

Most Hanbalis agree that the ruling on the direction of Qibla for people who are far away from the Ka'bah is the direction to the Ka'bah (*jihat al-Ka'bah*). Some Hanbali scholars divided the conditions of people facing the Qiblah: 1) One who has strong belief, i.e. one who sees the Ka'bah directly; 2) A person who faces the Qiblah direction based on what someone else tells him. So, he does not need to do ijtihad to determine the Qibla direction, just adjust the notification from the person or the Qibla direction that has been determined in a location; 3) Those who are not in the conditions mentioned in points 1 and 2, must perform ijtihad to determine the Qibla direction; 4) Those who are unable to determine the Qibla direction and those who are blind. In this case, it is obligatory to follow the mujtahid/measurer of Qibla direction.[29]

Regardless of the different views of the madhhab scholars on the ruling of Qibla direction for people outside the Grand Mosque. It is difficult for the majority of Muslims, if they are required to face the Ka'bah building precisely. So that there is tolerance for the inclination of the Qibla direction, scholars differ in opinion regarding its value, as follows:

[25]Ibnu Rusyd, *Bidayah Al-Mujtahid Wa Nihayah Al-Muqtashid* (Kairo: al-Syuruq al-Dauliah, 1993), 93.
[26]Imam Al-Qurtubi, *Al-Jami' Li Ahkam Al-Quran* (Kairo: Dar alHadits, 1991), 363.
[27]S Mujab, "Kiblat Dalam Perspektif Madzhab-Madzhab Fiqh," *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 2 (2014): 330, https://doi.org/http://dx.doi.org/10.21043/yudisia.v5i2.709.
[28]Mujab, 333–34.
[29]Ibnu Qudamah, *Al-Mughni* (Beirut: Dar al-Kutub al-Ilmiah, 1990), 100–102.

a. Syafi'iyyah are of the opinion that it is obligatory to face the *'ain al-qiblah* within the reach of their eyes, with a tolerance of 20° from the *'ain al-Ka'bah* either to the right or to the left. If it exceeds this limit, it is considered to be out of the Qiblah direction;
b. Hanafiyyah are of the opinion that it is obligatory to face the Qiblah direction with the whole face or part of the face (*jihat al-Asghor*) and a tolerance of inclination from *'ain al-Ka'bah* of 35°. If it exceeds this limit, it is considered to be out of the Qiblah direction;
c. Hanabilah: It is obligatory to face the Qibla direction, assuming that there is a Qibla direction between the West and the East. Thus, the boundary of their Qibla is between the right and left of the Ka'bah with a limit of 90° from 'ain al-Ka'bah called *jihat al-Kubro*;
d. The majority of scholars/*Jumhur Ulama* are of the opinion that it is obligatory to face the Qiblah in one of the four directions of the Ka'bah within 45° to the right and left of the *'ain al-Ka'bah*. If one goes beyond this limit, one is considered to have gone out of the Qiblah direction.[30]

The following is a table of the largest Qibla direction slope of 3 historical mosques in Pekalongan City, which is confirmed with the minimum tolerance criteria for Qibla direction:

**Table 4.1 The Greatest Qibla Tilt of 3 Historic Mosques in Pekalongan City with Qibla Direction Tolerance**

| No. | Mosque Name | Biggest Inclination | Syafi'iyyah ( ≤ 20 º) | Hanafiyyah ( ≤ 35 º) | Syafi'iyyah ( ≤ 45 º) | Syafi'iyyah ( ≤ 90 º) |
|---|---|---|---|---|---|---|
| 1. | Aulia Sapuro | 16º to North | √ | √ | √ | √ |
| 2. | Jami' Kauman | 5º to North | √ | √ | √ | √ |
| 3 | Wakaf | 4,5º to North | √ | √ | √ | √ |

Based on several opinions about the tolerance of Qibla direction above, the inclination of the Qibla direction of Aulia Sapuro Mosque, Jami' Kauman Mosque of Pekalongan City and the Wakaf Mosque is still in the minimum category of tolerance of Qibla direction of all madzhab. So, even though they do not face the exact Qibla direction, their prayers are still valid if the inclination of the Qibla direction is still within the criteria for tolerance of the Qibla direction.

[30]Shalih Mubaraok Di'kik, *Al Inhiraf 'an Al Ka'Bah Al Musyarrofah Wa Miqdar Al Jaiz Wa Al Mamnu' Minhu*, n.d., 31–32.

## 5. The Comparison of Ancient Mosque Qibla Inclination

The results of the accuracy of the direction of the Qibla of the 3 historical mosques in Pekalongan city above, are then compared with the results of the accuracy of other historical mosques, including: The Great Mosque of Demak, the Wali Baiturrahim Mosque in Gambiran Pati, the Ancient Mosque of Gunung Pujut, Central Lombok, the Ancient Mosque of Bayan, North Lombok, the Ancient Mosque of Songak, East Lombok, and the Ancient Mosque of Al-Abror, Bandar Lampung. Studies to determine the accuracy of the direction of the Qibla of historical/ancient mosques have been carried out a lot. Comparisons are made to determine the pattern of the direction of the Qibla of these ancient mosques. The accuracy results that are compared are only from the method of determining the direction of the Qibla using the Sun such as Local Raṣdu Qiblah or using the help of the mizwala or Istiwa'aini tool, as follows:

**Table 5.1 The Comparison Qibla Inclination of Ancient**

| No. | Mosques | Established | Location | Inclination |
|---|---|---|---|---|
| 1 | Ancient Mosque Songak | 13th century | East Lombok | 24º to North[31] |
| 2 | Baiturrahim Mosque | 1445 AD | Pati | $31^0$ to North[32] |
| 3 | Demak Great Mosque | 1477 AD[33] | Demak | $12^0$ 1’ to North[34] |
| 4 | Gunung Pujut Mosque | 1587 AD | Central Lombok | $20^0$ 49’ 23 to North[35] |
| 5 | Bayan Mosque | 16th Century | Lombok Utara | 6º to North[36] |
| 6 | Aulia Sapuro Mosque | 1614 AD | Pekalongan | 16º to North |
| 7 | Jami’ Pekalongan Mosque | 1852 AD | Pekalongan | 5º to North |

[31]Tri Pangestu Utami and Muhammad Awaludin, “Komparasi Arah Kiblat Masjid Kuno Songak Dan Masjid Kuno Bayan Di Lombok,” *Al-Afaq: Jurnal Ilmu Falak Dan Astronomi* 3, no. 1 (2021): 84, https://journal.uinmataram.ac.id/index.php/afaq/article/view/3571.

[32]Muhammad Nurkhanif, “Problematika Sosio-Historis Arah Kiblat Masjid ‘Wali’ Baiturrahim Gambiran Kabupaten Pati Jawa Tengah,” *Al Qodiri : Jurnal Pendidikan, Sosial Dan Keagamaan* 15, no. 2 (2018): 54.

[33]Noor Hasyim, Intan Rizky Mutiaz, and Agus Sachari, “Perancangan Desain Aplikasi Buku Digital (E-Book) Dengan Objek Masjid Agung Demak,” *Techno.Com* 13, no. 3 (2014): 160, http://publikasi.dinus.ac.id/index.php/technoc/article/view/566.

[34]Ahmad Munif, “Kontroversi Fiqh Kiblat; Studi Komparatif Atas Fiqh-Mitologis Dan Fiqh-Falak Di Masjid Agung Demak,” *Jurnal Studi Hukum Islam* 1, no. 1 (2014): 42.

[35]Istiwa’aini result. Ani Wafiroh, “Akurasi Arah Kiblat Masjid Kuno Bayan Beleq Dan Masjid Kuno Gunung Pujut Di Pulau Seribu Masjid,” *Nurani: Jurnal Kajian Syari’ah Dan Masyarakat* 18, no. 2 (2018): 173.

[36]Utami and Awaludin, “Komparasi Arah Kiblat Masjid Kuno Songak Dan Masjid Kuno Bayan Di Lombok,” 85.

| | | | | |
|---|---|---|---|---|
| 8 | Wakaf Mosque | 1854 AD | Pekalongan | 4º 30' to North |
| 9 | Al-Abror Mosque | 1914 AD | Bandar Lampung | $10^0$ 50' 38,63" to North[37] |

Based on the table above, the results of the comparison of the inclination of the direction of the Qibla of the ancient mosques show a pattern of the inclination of the direction of the Qibla being greater for older mosques, only for mosques in the Lombok area: Oldest Ancient Mosque Songak with (13th century) with qibla inclination 24º to North[38], Gunung Pujut Mosque (1587 AD) with qibla inclination $20^0$ 49' 23 to North[39] and Bayan Mosque (16th Century) with qibla inclination 6º to North[40]. This pattern is also the same as the direction of the qibla of the ancient mosque in Pekalongan which has been discussed in the previous discussion.

## D. Conclusion

The accuracy of the Qibla direction of the 3 oldest mosques in Pekalongan City using compass (without and using magnetic declination) and *Local Raṣdu Qiblah* varies in value with the largest inclination of Qibla direction is the Aulia Sapuro mosque and the smallest inclination is the Qibla direction of the Wakaf Mosque. In addition, there is a correspondence between the year the mosque was founded and the level of the Qibla direction inclination, namely the older mosque has greater inclination of the Qibla direction. However, this needs further research with Qibla direction data on a larger number of nearby mosques. The inclination of the Qibla direction of the historic mosques of Pekalongan is still in the minimum category of tolerance for Qibla direction, so it is still legal to pray in these mosques. The same pattern in Pekalongan mosques' qibla inclination case occurs in 3 ancient mosques in Lombok.

## Bibliography

Al-Qurtubi, Imam. *Al-Jami' Li Ahkam Al-Quran*. Kairo: Dar alHadits, 1991.
Al-Timirsani, Imam. *Tanwir Al-Abshar*. Dar al-Kutub al-Ilmiah, 1997.
Arif Dirhamsyah. "Masjid Aulia Sapuro Pekalongan Yang Terlupakan," 2020.
Awaludin, Muhammad. "Re-Interpretasi Keabsahan Arah Kiblat Masjid Kuno." *Elfalaky* 5, no. 2 (2021): 138–54. https://doi.org/10.24252/ifk.v5i2.22949.
Budiwati, Anisah. "TONGKAT ISTIWA', GLOBAL POSITIONING SYSTEM (GPS) DAN GOOGLE EARTH UNTUK MENENTUKAN TITIK KOORDINAT BUMI DAN

[37]Ariba Khairunnisa and Dian Ika Aryani, "Akurasi Arah Kiblat Masjid Kuno Al-Abror Bandar Lampung Dengan Metode Rashdul Kiblat Harian," *Journal of Islamic Studies and Humanities* 8, no. 2 (2023): 180, https://doi.org/10.21580/jish.v8i2.18370.

[38]Utami and Awaludin, "Komparasi Arah Kiblat Masjid Kuno Songak Dan Masjid Kuno Bayan Di Lombok," 84.

[39]Istiwa'aini result. Wafiroh, "Akurasi Arah Kiblat Masjid Kuno Bayan Beleq Dan Masjid Kuno Gunung Pujut Di Pulau Seribu Masjid," 173.w

[40]Utami and Awaludin, "Komparasi Arah Kiblat Masjid Kuno Songak Dan Masjid Kuno Bayan Di Lombok," 85.

APLIKASINYA DALAM PENENTUAN ARAH KIBLAT." *Al-Ahkam* 26, no. 1 (2016): 65. https://doi.org/10.21580/ahkam.2016.26.1.808.

Hasyim, Noor, Intan Rizky Mutiaz, and Agus Sachari. "Perancangan Desain Aplikasi Buku Digital (E-Book) Dengan Objek Masjid Agung Demak." *Techno.Com* 13, no. 3 (2014): 158–67. http://publikasi.dinus.ac.id/index.php/technoc/article/view/566.

Izzuddin, Ahmad. *Ilmu Falak Praktis: Metode Hisab Rukyat Praktis Dan Solusi Permasalahannya*. Semarang: Pustaka Rzki Putra, 2012.

Khairunnisa, Ariba, and Dian Ika Aryani. "Akurasi Arah Kiblat Masjid Kuno Al-Abror Bandar Lampung Dengan Metode Rashdul Kiblat Harian." *Journal of Islamic Studies and Humanities* 8, no. 2 (2023): 179–98. https://doi.org/10.21580/jish.v8i2.18370.

Magnetic-Declination.com. "What Is Magnetic Declination?" Magnetic-Declination.com, 2023. https://www.magnetic-declination.com/what-is-magnetic-declination.php.

Moleong, Lexy J. *Metodologi Penelitian Kualitatif*. 35th ed. Bandung: Remaja Rosdakarya, 2016.

Mubaraok Di'kik, Shalih. *Al Inhiraf 'an Al Ka'Bah Al Musyarrofah Wa Miqdar Al Jaiz Wa Al Mamnu' Minhu*, n.d.

Muhammad Nurkhanif. "Problematika Sosio-Historis Arah Kiblat Masjid 'Wali' Baiturrahim Gambiran Kabupaten Pati Jawa Tengah." *Al Qodiri : Jurnal Pendidikan, Sosial Dan Keagamaan* 15, no. 2 (2018): 1–23.

Mujab, S. "Kiblat Dalam Perspektif Madzhab-Madzhab Fiqh." *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 2 (2014): 317–43. https://doi.org/http://dx.doi.org/10.21043/yudisia.v5i2.709.

Mujab, Sayful. "QIBLAT TIAP SAAT SEBAGAI JEMBATAN PENENTU ARAH QIBLAT." *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 6, no. 1 (2015): 160–80. https://doi.org/10.21043/yudisia.v6i1.1486.

Munif, Ahmad. "Kontroversi Fiqh Kiblat; Studi Komparatif Atas Fiqh-Mitologis Dan Fiqh-Falak Di Masjid Agung Demak." *Jurnal Studi Hukum Islam* 1, no. 1 (2014): 41–54.

Nurkhofi, Muhammad. "Sepenggal Kisah Tempat Ibadah Masjid Wakaf Pekalongan," 2016.

Qudamah, Ibnu. *Al-Mughni*. Beirut: Dar al-Kutub al-Ilmiah, 1990.

Rusyd, Ibnu. *Bidayah Al-Mujtahid Wa Nihayah Al-Muqtashid*. Kairo: al-Syuruq al-Dauliah, 1993.

Sado, Arino Bemi. "PENGARUH DEKLINASI MAGNETIK PADA KOMPAS DAN KOORDINAT GEOGRAFIS BUMI TERHADAP AKURASI ARAH KIBLAT." *AL - AFAQ : Jurnal Ilmu Falak Dan Astronomi* 1, no. 1 SE-Articles (June 19, 2019): 1–12. https://doi.org/10.20414/afaq.v1i1.1843.

Subarkah, Muhammad. "Napak Tilas Masjid Al Jami' Pekalongan Dari Dosen UGM," 2020.

Sulaiman, Sulaiman. "Pertautan Emosi Sejarah, Magis Dan Penjaga Madzhab: Analisis Terhadapn Masjid Agung Kyai Gede Di Kota Waringin Barat, Kalimantan Tengah." *Ibda': Jurnal Kebudayaan Islam* 12, no. 1 (2014): 85–99. https://doi.org/https://doi.org/10.24090/ibda.v12i1.438.

Thoyfur, Muhammad. "DIGITALIZATION OF LOCAL RASHDUL QIBLA BY QIBLA DIAGRAM." *Al-Hilal: Journal of Islamic Astronomy* 3, no. 1 (2021). https://doi.org/10.21580/al-hilal.2021.3.1.7697.

———. "PERKEMBANGAN METODE DAN INSTRUMEN ARAH KIBLAT ABAD PERTENGAHAN: STUDI KAJIAN HISTORIS PERSPEKTIF DAVID A KING." *AL -*

*AFAQ : Jurnal Ilmu Falak Dan Astronomi* 3, no. 1 SE-Articles (July 19, 2021): 41–58. https://doi.org/10.20414/afaq.v3i1.2879.

Utami, Tri Pangestu, and Muhammad Awaludin. "Komparasi Arah Kiblat Masjid Kuno Songak Dan Masjid Kuno Bayan Di Lombok." *Al-Afaq: Jurnal Ilmu Falak Dan Astronomi* 3, no. 1 (2021): 78. https://journal.uinmataram.ac.id/index.php/afaq/article/view/3571.

Wafiroh, Ani. "Akurasi Arah Kiblat Masjid Kuno Bayan Beleq Dan Masjid Kuno Gunung Pujut Di Pulau Seribu Masjid." *Nurani: Jurnal Kajian Syari'ah Dan Masyarakat* 18, no. 2 (2018): 161–75.