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# QIBLA ACCURARY OF THE MAHLIGAI AND PAPAN TINGGI TOMB COMPLEXES AT CENTRAL TAPANULI

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**Abstract**: Several gravediggers only use predictions to determine qibla direction during burials without appropriate instruments. Therefore, this study aims to accurately determine the Mahligai and Papan Tinggi tomb complexes' qibla direction in Barus, Central Tapanuli, using the theodolite. This is descriptive and qualitative research with data collected through interviews, observations, and documentation. The result showed that the qibla direction in the Mahligai tomb complex is deviated by 1 , 11.8°, and 29° to the north, west-south, and south, respectively. Meanwhile, the qibla direction at the Papan Tinggi tomb complex is deviated 13 to the north and is different from the Mahligai tomb complex.

**Keywords:** qibla direction, Mahligai tomb, Papan Tinggi tomb

## Introduction

Qibla or Ka'bah[1] is a place and direction used by Muslims for various religious contexts such as Hajj, Mosque Direction,[2] particularly incorrect. According to Arwin[3] and Firdaus,[4] all Muslims

must face the qibla for the validity and quality of salah and other Islamic activities, such as praying, ablution, slaughtering livestock, reading the Qur'an, and the position of the body when buried, and strengthen by Indonesian Council of Religious Scholars (MUI) guidance Which has made 137 guidance, one of them is about Qibla direction.[5] Many Islamic scholars, such as al-Biruni, Abu al-Wafa al-Buzjani, ibn al-Haytham,[6] and have studied qibla direction.[7] stated that gravediggers use only predictions to determine the direction of qibla without using any instrument. Research on the accurate direction of the tomb's qibla is rarely conducted in North Sumatra, particularly in the Mahligai and the Papan Tinggi tomb complexes. Therefore, it is imperative to determine and analyze the qibla direction of past scholars' tombs to evaluate and study the contribution of science. In Islam, corpses are directed to Qibla, which differs from other religions and communities.

The following is a command based on the hadith of the Prophet Muhammad for corpses to face qibla during burials:

> A man asked the Prophet by saying, "O Messenger of Allah, what is a big sin?" Rasul replied: "There are 9 major sins", then the Prophet Muhammad explained them and added: "Disobedient to both Muslim parents, justifies everything that is not allowed in Mecca, namely Masjid al-Harâm, the Qibla of Muslims either alive or dead.[8]

The above hadith reveals the Masjid al-Haram for people and indicates that corpses must face the qibla direction during burials. Similarly, Imam Shâfi'i, in his book titled *al-Umm*, stated that the sacred mosque is the Kaaba (Bayt Allah). Every human is obligated to face the house when performing salah fardhu, salah sunnah, sujud Shukr (Prostration of thankfulness), and recitations.[9] This is similar to the opinion of the imam of other madhhabs, namely Hanafi madhhab and Hanbali madhhab, who stated that

humans are obligated to face the body in the grave towards the qibla.[10]

Hanafi and Maliki madhhab stated that it is unnecessary to excavate and correct the position of bodies buried without facing the qibla. However, Shâfi'i and Hanbali madhhab reported that corpses buried without facing the qibla need to be excavated and properly positioned.[11]

Al Masjid Al Haram in Masjidil Haram, Mecca, Saudi Arabia, is the second-largest building in the world after Boeing Everett Factory. It is the world's largest mosque and the most expensive building globally.[12]

This study accurately determines the qibla direction of the Mahligai and Papan Tinggi tomb complexes located in Barus, Central Tapanuli, North Sumatra Province. Kota Tua Barus is a District in Central Tapanuli Regency, located on the west coast of North Sumatra, Indonesia. Barus is an Emporium city and the center of civilization in the 1-17 AD, initially known as Fansur. Historically, Barus is an international port for the camphor (Barus, in Bahasa) and commodity of spices. It is used as a tourist center due to ancient Islamic tombs of saints who shared Islamic values in the Central Tapanuli. These tombs lie in several locations in Barus such as Mahligai, Papan Tinggi, Tuanku Syech Madum, and Benteng Barus and provide religious, educational, and knowledgeable values to tourists. The local government or institution such as the Department of Culture and Tourism of Central Tapanuli Regency needs to pay more attention to regions with ancient tombs for adequate maintenance.

The following are some of the gravestones found in the National Museum in Malaysia and Indonesia.

1. Flat gravestone is located in the National Museum of North Sumatra Province and used at Muslim cemetery. Arabic letters

are written on the chest, while the edge is decorated with flowers. It was found in Barus District, Central Tapanuli Regency, and became proof of Islamic civilization in the 15th century.

2. Octagon gravestone, also known as Nyoni by the Javanese, is used at a Muslim cemetery. The decoration is centered on the edge of the uppermost part, in addition to a shape like lotus buds. It was found in Barus District, Central Tapanuli Regency, and became proof of Islamic civilization in the 17-18th century.
3. Curly bracket gravestone refers to the shape of a mosque door or window with the inner part mostly allocated for Arabic writings. This gravestone was found in the Moslem cemetery of Mahligai, Barus District, Central Tapanuli Regency. One such gravestone was made for Rukn Al-din (Rukunudin), who died in 800 H.
4. Riau gravestone is shaped like a three-level crown, with the lowest part the biggest, which decreases as it gets to the topmost region. Camomile floras dominate the decoration.
5. Sultan Mansur Shah gravestone is found in Malaysian National Museum. This gravestone, which is shaped like a curly bracket with Arabic calligraphy, was found at St.Paul Valley during the Portuguese's occupation of the Malay Peninsula in 1918.[13]

The following are tombs located in Barus District, Central Tapanuli Regency:

1. Mr. Syech Maqdum's tomb is located close to the edge of the Papan Tinggi, in the village of Bukit Patu Pangan, about 500 meters towards the beach to the center of the Barus District. One needs to climb about 80 stairs to arrive at this tomb, which also houses Syech followers. The burial area is about 421.18 $m^2$, with a height of ± 5 meters above sea level.
2. Mr. Ambar's tomb is located approximately 200 meters across

a local community's cocoa plantation in Panangahan Village, North Barus District.

3. Tuan Ibrahim Syah's tomb in Barus District is located at Simpang Tiga Bukit, Patu Pangan Village, close to the Papan Tinggi tomb and only about 300 meters away. On top of this tomb, a stone plank extends from head to toe. Ibrahim Syah, the first king in Barus, was murdered in 825 H.

According to, there are approximately 300 tombstones littered around the Barus area, with the oldest built in 1350 AD.[14] The Barus tombstones were made from tuff with a unique design. Furthermore, the decoration and pattern are not conforming to any known classification to date. The carvings on the surface of the tombstones are unique, and their ornaments are similar to the Plak-Pling. This indicates the similarities between Barus and Aceh during the era of dissemination of Islam in these regions.[15] Geologically the Barus area consists *of Carboniferous* rocks, which are rocks found in the early Permian age in the Tapanuli Group.[16]

Historically this region is as ancient as foreign ships that visited to look for camphor's thousands of years ago. Barus is associated with ancient historical relics, such as the first Islamic disseminator.[17] stated that although there are 5 tomb complexes, only a few have their ages inscribed, such as those in Mahligai.

The Mahligai tomb complex is an ancient relic protected by Law Number 5 of 1992 concerning items of cultural property and has been registered at the Aceh Archaeological Heritage Preservation Center office (Balai Pelestarian Peninggalan Purbakala Aceh). The word "Mahligai" means a small palace in ancient times and was established on the hill by Sheikh Siddik. Several names and identities are listed on the tombstones, namely Sheikh Rukunuddin, Sheikh Zainal Abidin Ilyas Syamsudin, Imam Khatib Muddah,

and Sheikh Imam Muadhdham from Fansuri land and follower of Sheikh Syamsudin. One of the tombstones had the inscription 48 H, night of 13, Safar, 20 years old, 2 months, 10 days.[18]

Mahligai was formerly an inland kingdom whose king's tomb is located on a hill with area ± 2 Ha broad enough for two-wheeled and four-wheeled vehicles.[19] This area which consists of 234 tombs categorized into 3 types, namely round (104), flat (65), and mace (65), are made of rocks that vary from small to large with varying decorative patterns.[20] It has an area of 1960 $m^2$ and is fenced off by barbed wire.

Furthermore, another tomb where Qibla accuracy was taken is Papan Tinggi complex, a Cultural Conservation site under the auspices of the Aceh Cultural Heritage Preservation Center. The Papan Tinggi tomb complex is located on a hilltop in Penanggahan, North Barus District, Central Tapanuli Regency, with an altitude of ±215 meters above the sea level.[21] The Papan Tinggi tomb located on a hill is of Sheikh Mahmud, who died in 829 H/1425-6 AD. Interestingly, this tomb is filled with Persian and Arabic script on the Sheikh Mahmud tombstone and separated by 15 m. It is called the Papan Tinggi (High Board) tomb because it is located on a high hill with an area 40 x 15 meters surrounded by a 160 cm high fence. To reach the top of this tomb complex, one must climb a ladder of 708 steps with 4 resting areas every 150 steps.[22] Researched to determine the qibla accuracy of tomb Ponteh village Galis District Pamekasan RegencyAccording to them, the measurement of Qibla direction did not provide a deep historical value rather it was limited to the community cemetery block with high historical value. Moreover, Barus became the zero point of the entry of Islam in the archipelago, therefore, the research was able to reconstruct science, especially Falak in North Sumatra, Indonesia. Therefore, from the explanation above, this research aims to determine the qibla accuracy of the

Mahligai and Papan Tinggi tomb complex to provide new information that can be useful for the development of science.

## Methodology

This is a descriptive and qualitative research with a field approach, which focuses on case studies. The tool used for collecting data is an astronomical instrument called theodolite, which measures horizontal and vertical angles usable in various science fields to [23] Another tool is the Global Positioning System (GPS), a radio navigation and positioning system based on satellite.[24] Other instruments are protractor, thread, nail, paper, and other. The cluster sampling method,[25] was used to collect data through interview, observation, and documentation. Data collected were analyzed using the deductive approach by summarizing, selecting, and drawing conclusions.

## Results and Discussion

According to preliminary studies, Muslims find facing the qibla when conducting salah very important. Ulama of the four schools of Islamic law, namely Hanafi, Maliki, Shâfi'i, and Hanbali stated that facing the qibla during salah is a requirement for those determined to see the Ka'bah structure, and it is a condition in the legitimacy of *shalat* ('ayn al-Ka'bah).[26] Similarly, the imam of school stated that facing the body towards qibla direction during burials.[27]

Qibla is a word of Arabic origin, القبلت , which means direction. Therefore, linguistically, it is defined as direction or facing a point.[28] Sameon and Salleh stated that qibla direction is measured based on spherical trigonometry and true north sensor.

Presently, astronomy, mathematics, and technological advancement

assist Muslims in accurately finding Ka'bah coordinates in Mecca[29] or often referred to as Islamic Sciences Integration.[30] In addition, technology has provided several applications such as the qibla finder and universal qibla to determine its direction anywhere and anytime.[31] This modern method is dependent on GPS-based internet connectivity,[32] as opposed to the traditional method, which relies on clear skies and bright sunshine.

Determining qibla direction needs to pass through standard operating procedures to get accountable results.[33] The instrument used to determine the qibla direction of the Mahligai and Papan Tinggi tomb complex is the theodolite, with the first measurements conducted on July 09, 2021 at the Mahligai tomb complex.


Figure 1: Mahligai Tomb complex

Mahligai tomb complex covers an area of 1960 $m^2$, and it is divided into 3 parts for data sampling, namely, northern, western, and southern. The division of tombs carried out in measuring the qibla direction is due to field observations showing differences in the height of the place, location, and time of the burial. According to one of the caretakers, the top location of the Mahligai tomb complex is the initial period of burial, while the bottom is the last.

The information is still an initial assumption known by the surrounding community.

## Qibla Accuracy of Mahligai Tomb Complex

Qibla accuracy of Mahligai tomb complex was conducted on Friday, July 09, 2021, using latitude and longitude data from the site.[34] Data were collected through maps, almanac tables,[35] and a satellite-based system used to provide continuous worldwide position, velocity, time, and related data to civil and military users. It has a growing number of applications in marine, land, and aerospace navigation. Furthermore, this tool provides precise time on the transfer, survey, geodesy, mapping, precision farming, air-traffic control, asset location and tracking, and timing of communication systems and power grids. Since the 1960s, GPS has grown from a navigation concept to an operational system of about 24 spacecraft.[36] Therefore, Mahligai tomb is located at 02  02' 48.42" N 98  24'09.40" E using GPS. The measurement hold is divided into 3 parts, as follows:

1. Northern

Sheikh Zainal Abidin's tomb is among those located in the northern region with no information regarding his date. The tombs located in the northern region are parallel to the Sheikh Zainal Abidin, therefore, it was the only one measured using the Theodolite instrument to yield a deviation of 1  from the qibla direction.

Theodolite is the instrument used to determine an object's vertical angle (altitude) and horizontal (azimuth) in a straight line and planes on the ground. The instrument is widely used in land measurement, field surveys, forestry surveys, meteorological even rocket technology.[37] Different from measuring the sea level which needs special instruments.[38]

Figure 2: Tomb of Sheikh Zainal Abidin

Figure 2 indicates Sheikh Zainal Abidin tomb's location and others in the same direction.

Figure 3: The process of measuring the Qibla Direction using the theodolite

According to the tomb's interpreter, several students have taken measurements of the Mahligai tomb complex but not the qibla direction using a Theodolite. Subsequently, the qibla direction of Sheikh Zainal Abidin's tomb is accurate because it contains a 1 deviation corresponding to the tolerance. Despite all the limitations associated with the instrument used in determining the qibla direction thousands of years ago, the accuracy of the Sheikh Zainal Abidin tomb was obtained.

2. Western

One of the tombs located in the western region is Sheikh Rukunuddin, who died in 48 H on the night of 13 on Safar, at the age of 120 years, 2 months, and 10 days as written on the tomb. However, Ludvik Kalus, an expert in Islamic history from the Sorbonne University, Paris, stated that Sheikh Rukunuddin died on Monday night of 23 on Safar in 800 Hijriyah.[39] The tombs located in the western region have parallel directions to the Sheikh Rukunuddin's, therefore, the sampling technique was used.

Measurement of the qibla direction of Sheikh Rukunuddin's Tomb yields a deviation of 11.8  from the qibla direction, which is determined using the theodolite.

Figure 4: Tomb of Sheikh Rukununddin

Figure 4 shows the location of Sheikh Rukunuddin's Tomb with several others in the same direction.

Figure 5: Measurement of Qibla direction through a theodolite

Figure 5 shows the process of measuring qibla direction using the theodolite, which consists of several parts, namely handle, sight, telescope, vertical locking, vertical regulator, display screen, horizontal lock, horizontal adjuster, and position adjuster used to carry, determine the target more precisely, lock the movement of the vertical axis, rotate it smoothly, display measurement result information, horizontally locks the motion, smoothly rotate horizontal motion after locked, and adjust the theodolite position until the bubble mark (nivo) is in a balanced position. There are two types of bubble marks, namely the rod and the round at the bottom of the telescope.

3. Southern

The southern part consists of unidentified or nameless tombs close to the Al-Imam Sheikh Chatif. The tombs in the southern have parallel and were measured with sampling technique to yield 29 deivation from the qibla direction using the theodolite.

Figure 6: Unknown Tombs

Figure 6 shows the location of several unnamed tombs in the research site.

Figure 7: Shows the qibla direction measurement process using the theodolite

Figure 7 shows the qibla direction measurement process using the theodolite consisting of a horizontal angle scale (HA). The measurement of the qibla direction using the theodolite need to be mastered else it will be very difficult to conduct and inaccurate. The difficulty is mainly constrained by the true north point, especially since the sun's position is above the head. Although this position is a good choice, it is sometimes difficult to ideal, especially when its altitude is less than 60  above the horizon, which means morning or evening. The use of other celestial objects such as starlight, moon, and planets can be an option when taking measurements at night. Table 1 shows the measurement result of the qibla direction located in the Mahligai tomb complex.

Table 1:
Measurement of the qibla direction located in Mahligai tomb complex

| No | Tomb | Qibla direction | Tomb direction | deviation |
|---|---|---|---|---|
| 1 | Syeikh Zainal Abidin (Northern) | 293°13’ | 294°13’ | 1° |
| 2 | Syeikh Rukunuddin (western) | 293°13’ | 282°5’ | 11.8° |
| 3 | Unknown tomb (southern) | 293°13’ | 264°13’ | 29° |

Table 1 shows the differences in qibla deviation among tombs in the Mahligai complex. Based on the interview with caretakers, burials were conducted at different times, with the initial period located at the top near the north at a 1 deviation. However, it has not been able to precisely trace the time and method used in measuring the qibla by people in this era.

The Azimuth contained in table 1 provides distinctive directions from 3 caretakers to the apparent daily motion of the sun. Further analysis shows that the deviation of qibla or the method used to determine the direction at the Mahligai tomb complex has an effect on the position of the sun’s daily motion from north to south and vice versa monthly.


The sun is sometimes located at the north or south of the equator, and its position is called the equinox. However, its position in the farthest point in the north is called the summer solstice.

Sun declination symbolized by the Greek letter (δ) is its apparent change in distance from the celestial equator. In Arabic, it is called mail, which is the sun's distance from the celestial equator measured along the circle of declination calculated from the center to the north. The solar declination (δ) is measured from 0° (sky equator) towards the North Pole until it reaches the sun's position. This process changes from time to time during the year and is approximately the same date, which means that the position does not change yearly. From March 21 to September 23, the solar declination is positive (+) due to the sun's position in the northern hemisphere of the equator. Meanwhile, from September 23 to March 21 it is negative (-) due to the sun's position in the southern hemisphere of the equator. The sun's declination on March 21 and September 23 is at the right of the equator, meaning that the sun's position is 0 . After March 21, the sun's position gradually moves to the north from the equator, and goes farther away. On June 22, the position of the sun reaches farthest from the equator, which is 230 27' north before moving towards the equator. The sun tends to return to the equator on September 23 before shifting towards the south on December 22. On December 23, it gradually moves towards the equator until March 21, when it finally returns to its original position.

The process of measuring the qibla direction was previously conducted by referencing the sun's position qibla. This was called rashdul qibla (Rashid al-Qibla), an astronomical event carried out when the sun is above or below the Kaaba at a latitude of (21 25' N). During this time, the sun culminates above the Kaaba and its shadow is directed on a straight object qibla direction. This moment occurs every May 28 at 16:18 Western Indonesian Time (WIB) and July 16 at 16:27 Western Indonesian Time (WIB).

Table 2 compares the sun's azimuth with the tombs direction previously measured. It also shows the opinions used to determine the time and date of death on Sheikh Rukunuddin's tomb.

Table 2:
Comparison of Qibla direction Sheikh Rukunuddin's tomb with Azimuth of the Sun

| No | Hijri Date | Convert to Gregorian Date | Az Sun | Tomb direction | Difference/ deviation |
|---|---|---|---|---|---|
| 1 | Shafar 13, 48 H | April 14, 667 | 279°42' | 282°5' | 2°23' |
| 2 | Shafar 23, 800 H | November 15, 1397 | 246°05' | 282°5' | 36° |

Table 2 shows the smallest difference between the tomb's direction and the sun's azimuth is 2 23', which corresponds to the death date of Sheikh Rukunuddin on 13 Shafar 48 H. This information needs to be explored to determine the effect of the sun's position or apparent daily motion toward measuring qibla direction in the Mahligai tomb complex. This process is valuable to help track the effectiveness of the position or apparent daily motion toward measuring the qibla direction of the Mahligai tomb complex.

## Qibla Accuracy of Papan Tinggi Tomb Complex

One of the Papan Tinggi complex tombs belongs to Sheikh Mahmud and measures 40 x 15 meters. Measurement of qibla accuracy was conducted on Friday, July, 09, 2021, with coordinates 02  02' 48.42" N 98  24'09.40" E.

Sheikh Mahmud's tomb qibla direction in the Papan Tinggi tomb complex is 13  to the north from the qibla.

Figure 6: Tomb of Sheikh Mahmud

Figure 7: Measurement of Qibla Direction through Theodolite

The discrepancy between qibla direction of Sheikh Mahmud's tomb located in Papan Tinggi complex and Mahligai are shown in Figure 7. The deviation of Mahligai tomb complex turns south, while Papan Tinggi is north.

## Conclusion

Two conclusions were derived from the measurement, interview, observation, and documentation. Firstly, the differences of Qibla direction at the Mahligai tomb complex are 1 , 11.8 , and 29  to the northern, western, and southern regions. Secondly, the qibla direction at the Papan Tinggi tomb complex is 13  to the north and different from the Mahligai tomb complex. This research is still limited to qibla measurements in the Mahligai and the Papan Tinggi tomb complexes located in Barus. Therefore, further research is needed to reconstruct the development of science in the past, especially for the Falak tomb complex in North Sumatra, Indonesia.

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