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The Direction of Sunset as a Reference for Determining the Qibla Direction (Study of Imam Al-Ghazali 's Views in the Book of *Ihya' Ulumuddin*)

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ABSTRACT

Qibla direction determination is an important aspect of Islamic worship. This research examines the method of determining the Qibla direction based on the direction of Sunset described in the book "Ihya Ulumuddin" by Imam Al-Ghazali. It evaluates the method's accuracy using literature and modern astronomical analyses, especially for the Thus region, where Imam Al-Ghazali lived. The results show that this method is taqribi, in which the direction of Sunset in the Thus region can be used as a Qibla reference for 213 days or 58% of a year, with a tolerance of 45 degrees of deviation.

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I. Introduction

Qibla direction is one of the valid requirements that must be fulfilled before praying. A prayer is not valid if it is not facing the Qibla. Technically, facing the Qibla can be done in various ways with various objects that can be used as a reference to determine it. The most important thing is that when we talk about Qibla's direction, we are talking about direction, which is the closest direction to the Kaaba.[1]

Along with the development of the times, Qibla's direction was determined using modern tools such as theodolites and compasses. It also involves using technology such as GPS-based applications on smartphones and Global Positioning System (GPS) devices. The determination of Qibla direction in the early period only used miqyas or Istiwa stick, which is the determination of Qibla direction by utilising the shadow of the Sun before and after culmination on the Istiwa stick to determine the true west and east directions. Classical tools such as rubu' mujayyab were used to measure the angle of the Qibla direction after determining the true west and east directions.[2]

In addition to using miqyas or Istiwa sticks, the shadow of the Sun can also be used to determine the Qibla direction using the global Rashdul Qibla and local Rashdul Qibla methods. Global Qibla Rashdul is when the Sun is directly above Mecca, or Istiwa' A'dham. Global Rashdul Qibla is a natural phenomenon in which the Sun is directly above (zenith) the Ka'bah building, so the shadow that forms shows the direction of the Qibla. Local or daily Rashdul Qibla is a way of determining the Qibla direction using the daily position of the Sun on the path between our place and the city of Makkah. This method can be used daily but occurs at different times according to changes in its declination value and relative position to the observer's place.[3]

The Ministry of Religious Affairs has summarised the various methods of determining the Qibla direction in the pocketbook Hisab Rukyat. The book includes various traditional and modern methods to determine the Qibla direction accurately. It ranges from using simple tools such as miqyas and Istiwa sticks to using technology such as compasses and GPS. In addition, natural methods such as Rashdul Qibla are also explained in detail. This pocketbook is designed to provide an easy-to-understand and practical guide for people in determining the Qibla direction.[4]

If we look at studies on Qibla direction accuracy testing, it is often found that some mosques determine their Qibla direction by referring to the direction of the setting Sun. This method was often used especially in the past or in areas with limited access to modern technology. One such mosque is the At-Taqwa Lama Jampue Mosque, built in the 1700s. The Qibla direction is determined by looking at the position of the Sunset direction.[5] If examined further regarding the determination of the Qibla direction regarding the direction of Sunset in classical literature and books, it is found in the book Ihya Ulumuddin by Imam Al-Ghazali in which there is a discussion of how to determine the direction of the Qibla direction with the direction of Sunset.

In general, determining the Qibla direction with reference to the Sun is done when the Sun is still above the horizon. However, in Ihya Ulumuddin, Imam Al-Ghazali states that the Qibla direction can also be determined with reference to the direction of the Sun at Sunset. This approach provides a valuable alternative in situations where the conventional method when the Sun is above the horizon may not be applicable, thus expanding how Muslims can determine the Qibla direction under various conditions.

Ihya Ulumuddin is one of the great works written by Imam Al-Ghazali, a great Islamic scholar and philosopher from the 11th century. It discusses various aspects of Islamic life and teachings, including ethics, spirituality, and Islamic law. The work is highly regarded in the Islamic world and has become one of the classics in Islamic literature. In Indonesia, the existence of Ihya Ulumuddin is quite significant because it is one of the main references for Islamic scholars and scholars in understanding religious teachings and developing religious thought and there are still many Islamic boarding schools, Islamic educational institutions, and Islamic scientific development centres in Indonesia that use this book as one of the study materials.

From the above background, the author is interested in studying and analysing Imam Al-Ghazali's opinion on the direction of the setting Sun as a reference in determining the Qibla direction. The study to be carried out is to determine the accuracy of determining the Qibla direction using the direction of the Sun as a guide. In addition, the author is also

interested in examining the relevance of the practice of determining the Qibla direction using the direction of Sunset as Imam Al-Ghazali's opinion in the book of Ihya Ulumuddin because the direction of Sunset is not static. The Sun does not always set in the same place every day, this phenomenon is related to changes in the Sun's declination value.

II. Method

This research is an in-depth literature research. The main focus of the research is to examine Imam Al-Ghazali's explanation in the monumental book Ihya' Ulumuddin, especially regarding the method of determining the Qibla direction by relying on the direction of the setting of the Sun. This research will analyse the accuracy of the method from the point of view of modern astronomy. In the first step, the researcher will calculate the Qibla azimuth value for the Thus region by using this place because that is where Imam Ghazali lived. Since the declination value of the Sun changes throughout the year, we will also calculate the azimuth of the Sun at Sunset in the Thus region for the whole year. This aims to evaluate the relevance and accuracy of the traditional method used by Imam Ghazali in the context of astronomy today.

III. Result dan Discussion

A. Qibla Direction Determination in Kitab Ihya Ulumuddin

I. Kitab Ihya' Ulumuddin and Imam Al-Ghazali

The Ulama who has the name Abu Hamid Muhammad Ibn Muhammad Ibn Muhammad Al-Ghazali Al-Thusi. He was born in 1058 AD or 450 H in the Ghazalah area, located in the city of Thus and is a suburb of the Khurasan region which we now know as Iran. In addition, some say that he was born in a small village near Thus in Kurasan, which at that time was the centre of science and the territory of Baghdad under the Saljuk dynasty. He died in Thusia, where he was born, on Monday, 18 December 1111 M, or 14 Jumadil Akhir 505 AH.[6]

He was one of the foremost Islamic thinkers who was given the title *Hujjatul Islam* which means proof of the truth of Islam. This reflects the recognition of Al-Ghazali's pivotal role in articulating and strengthening Islam's intellectual and spiritual foundation in his day. In addition, Imam Al-Ghazali was also given the title *zain ad-din* which means jeweller of religion. This title was given to him because of his great contribution to the understanding and developing Islamic theology, philosophy, and Sufism.[7] Al-Ghazali's father was a poor, devout woollen spinner who favoured scholars and actively attended recitation assemblies.[8]

Al-Ghazali lived in the Levant for ten years, moving back and forth between Damascus, Baitul Maqdis, and Hijaz. As a result of a long process of evaluating his thoughts, beliefs, and soul, he finally considered finding the truth he was looking for. The book Ihya' Ulumuddin, Al Ghazali's monumental work, was created during his journey of thought, belief, and soul in the Levant. Al Ghazali later taught it in Baghdad."[9] The book of Ihya ulumuddin, written by Imam Al-Ghazali, focuses on the treasures of Sufism. Moreover, according to Imam Al-

Ghazali, "not only is knowledge to be understood, it is also required to be practised or put into practice." Therefore, this book serves as a bridge that connects sharia with Sufism.

The book of ihya ulumuddin includes four main discussions (*rubu'*). The first *Rubu' Ibadah* covers the science and principles of creed, as well as the procedures for purification, prayer, zakat, fasting, hajj, the manners of reading the Qur'an, dhikr and prayer, wirid and the timing of its implementation. *Rubu' 'Adah* discusses the etiquette of eating and drinking, marriage, work, halal and haram, and associating and making friends, uzlah, travelling, and amar ma'ruf nahi munkar. *Rubu' Muhlikat* deals with matters relating to the heart, including an explanation of the greatness of the heart, the training of the soul, the dangers of lust of the stomach and private parts, the dangers of the tongue, anger, envy, and spite, as well as the dangers of the world, wealth, avarice, pride, riya, and the dangers of speaking unwholesome things. *Rubu' Munjiyat* discusses the actions that must be taken by a servant to purify himself to always be close to Allah SWT, including repentance, patience, gratitude, fear of Allah, always hoping in Him, zuhud, tawakkal, honesty, sincerity, muhasabah, self-reflection, and remembering death.[10]

II. Determination of Qibla Direction with Reference to the Sunset Direction in Kitab Ihya 'Ulumuddin

Fiqh scholars classify several existing Qibla references with the term adillah al-qiblat. Some of these Qibla references are lailiyyah (applicable at night) and some are nahariyyah (applicable during the day). When viewed from its location, the Qibla reference is located on Earth (*ardhiyyah*), air (*hawaiyyah*) and the sky (*samawiyyah*).[11]

In the book of Ihya 'Ulumuddin, the Qibla issue is included in *rub'u al-'adah,* specifically in discussing the manners of people who want to travel *(musafir).* For someone who wants to travel or *musafir*, it is appropriate to know and master the knowledge to determine the Qibla direction so that they can still pray in the middle of their journey. Imam Al-Ghazali then explained that the Sun is the Qibla reference in the sky. When the Sun sets, the direction of the setting Sun can be used as a reference to determine the Qibla direction. This is what he said in the book Ihya 'Ulumuddin[12]:

وأما القبلة وقت المغرب فإنها تدرك بموضع الغروب

> "As for the Qibla direction at maghrib time, it can be found by looking at the position of the setting Sun."

The Sun as a reference in determining the Qibla direction by Imam Al-Ghazali is said to be as if its position indicates the direction of the Qibla for the 5 daily prayers. This is according to him as he said

فكأن الشمس تدل على القبلة في الصلوات الخمس

"It isas if the Sun indicates the Qibla direction in the five daily prayers".[12]

B. Astronomical Analysis in Determining Qibla Direction in Thus City with Reference to Sunset Direction

In an astronomical context, the Qibla is the closest direction to the Ka'bah.[13]When depicted on a spherical plane by forming a spherical triangle, the Qibla direction is the direction of one of the great circles in the spherical triangle that connects a city to the Ka'bah. The coordinate system used is the Horizon coordinate system. The Horizon coordinate system is more appropriate because it relates directly to the observer's position on the Earth's surface, where the Qibla direction is the horizontal direction from the observer's position towards the Ka'bah in Mecca. This means that to know the Qibla direction, it is necessary to know the latitude of the place, the longitude of the place, the latitude of the Ka'bah and the longitude of the Ka'bah as shown in Figure 1.

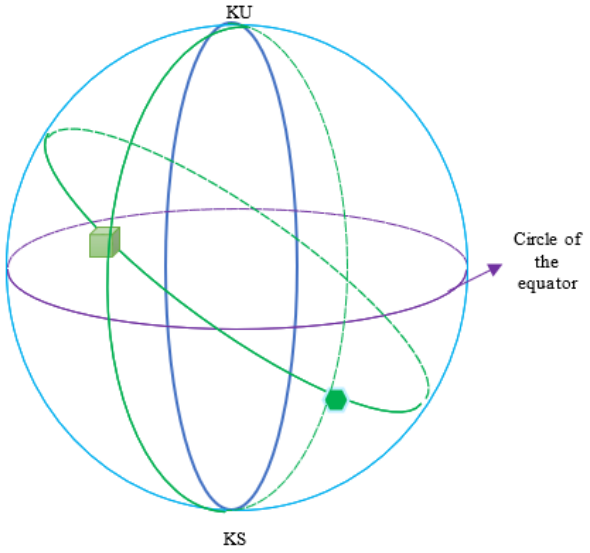

Figure 1. Qibla Direction on the Earth's Surface from a Specific Location

From this description, the formula for determining the Qibla value of an area is obtained is shown in (1):

(1.) Tan AQ = Tan LK * Cos LT / Sin SB - Sin LT / Tan SB

Where:
AQ: Qibla Direction
LK: Latitude of the Kaaba
BK: Longitude of the Kaaba
LT : Latitude of Place
BT : Longitude of Place
SB : Longitude Difference

So, to determine whether a celestial body is appropriate to be used in the Qibla direction, one must see whether the position of the celestial body is in the direction or azimuth of the Qibla. In this context, as an analysis of the Qibla concept in Thus City with reference to the position of the setting Sun can be seen as follows:

I. Thus City

Thus, or Tus, is a historical city currently located in the Razavi province of Khorasan in northeastern Iran. The city has a long and rich history, dating back to ancient times and is famous as the birthplace of several important figures in Iranian history and culture, one of whom is Imam Al-Ghazali as shown in Figure 2.

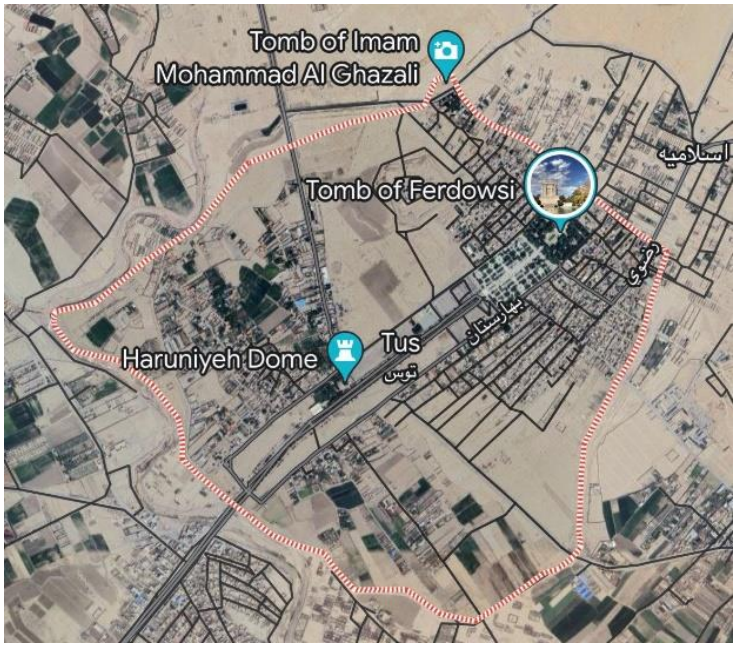

Figure 2. location of Thus city seen from google earth

II. Geographical Condition and Qibla Direction of Thus City

The city of Thus, which is now part of the Khurasan Rezavi province in Iran, has an interesting neighbourhood. Thus is located about 24 Km east of Mashad, the capital of the province, and is surrounded by lowlands and hills. In addition, many deserts border this area. Thus has a semi-desert climate, with hot and dry summers and cold and slightly rainy winters. In summer, temperatures can reach over 40 degrees Celsius; in winter, temperatures can drop to freezing. The Kashaf River that runs through the city is essential for providing water for the surrounding farms. Thus, natural resources, including copper mines and other mineral deposits, are very rich. Agriculture is very important in the region, especially in the fertile lowlands. Thus, Iran's strategic city has a diverse

geographical environment and important natural resource potential. Thus, the city is astronomically located at Latitude 36° 28'35.47" LU and 59° 30' 11.19" East, with an altitude of 998 Metres.

To calculate the Qibla direction of the city of Thus, we need the following data:

The latitude of the place (φ^x) : 36°28'35.47"
Longitude of the place (λ^x) : 59°30'11.19"
Latitude of Makkah (φ^m) : 21°25'21,17"
Longitude of Makkah (λ^m) : 39°49'34,56"
Longitude Difference of Makkah-Region (SBMD)
$SB = \lambda^x - \lambda^m$
SB = 59°30'11.19" – 39°49'34.56"
SB = 19°40'36.63"

Calculation of Qibla azimuth is shown in (2):

(2) Tan AQ = Tan LK * Cos LT / Sin SB - Sin LT / Tan SB

Tan Q = Tan 21°25'21.17"x Cos 36°28'35.47" / Sin 19°40'36.63"- Sin 36°28'35.47"/Tan 19°40'36.63"
AQ = -35° 57' 40.68"

Qibla azimuths are:

West – North : -35° 57' 40,68"
North – West : 125° 57' 40,68"
North - East - South – West : 234° 2' 19,32"

Based on the results of the above calculations, the results of the calculation of the Qibla azimuth for Thusi City carried out by the researcher show the results with a value of **234° 2' 19.32"** NESW as shown in Figure 3.

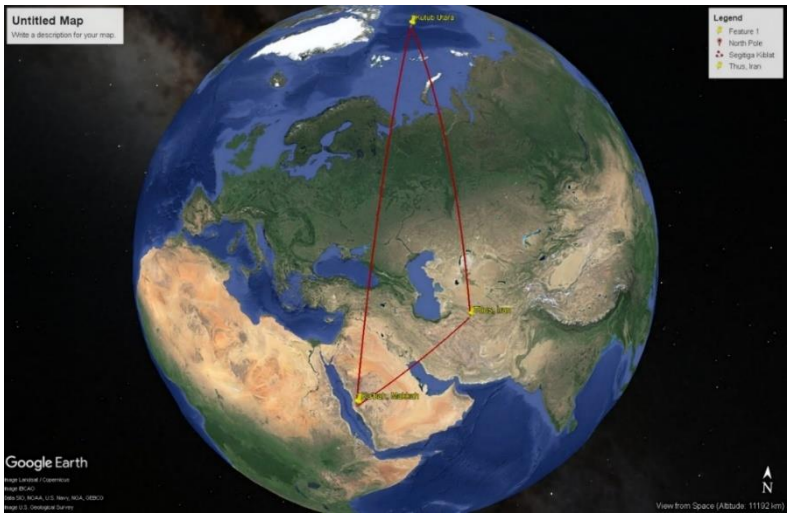

Figure 3. The location of Thus City seen from Google Earth

C. Sun's Azimut at Sunset

Azimut is the angle formed between a point from north, calculated clockwise with a range of 0° -360°. The azimuth between two points is the angle formed from a clockwise reference to the line connecting the two points. North has an azimuth of 0°, east 90°, south 180°, and west 270°. When someone points a compass at a particular object and measures the angle between that object and north, that angle is called the azimuth. Azimut is one method used to determine an object's direction or position. To determine the azimuth, we must know the true cardinal directions first. This cardinal direction can also be used as a reference for the Qibla azimuth, so that the observer can use the reference as a reference as shown in Figure 4.[14]

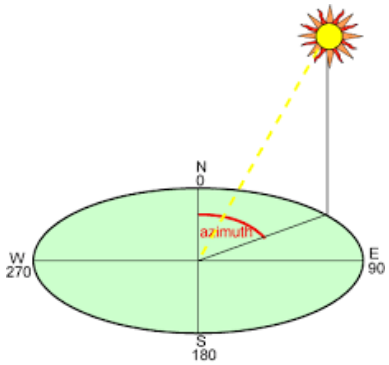

Figure 4. azimuth illustration

Every day, the position of the Sunset astronomically changes from day to day due to the tilt of the Earth's axis. The rotational motion of the Earth and its orbit around the Sun determine the position of Sunset each day. The position of the setting Sun is always different every day due to the Earth's rotational motion on its axis and the Earth's journey around the Sun in its orbit. As the Earth rotates, the relative positions between the Earth, the Sun and the observer are constantly changing, causing the point of Sunset to appear to shift each day. Earth's rotational movement and its orbit create a continuous change in the angle of Sunset that, if observed daily, creates a diverse sky panorama. The azimuth in this figure is the value measured along the horizon circle from true north to the point where the celestial body passes, as shown in Figure 5.

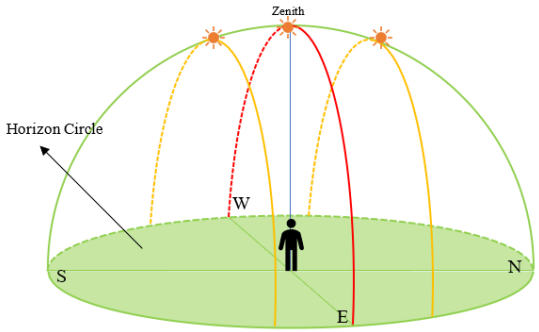

Figure 5. Illustration of the changing position of the rising and setting Sun

D. Declination Of The Sun

Declination is the distance of a celestial body to the celestial equator measured through the circle of time to the celestial pole. In other words, declination is the mail or inclination of a celestial body from the celestial equator. North of the equator, declination is signalled(+) and is positive; south of it, declination is signalled(-) and is negative. In astronomy, declination is characterised by the Greek letter "delta" (δ).[15]

Meanwhile, the declination of the Sun is defined as the celestial latitude of the Sun at the time in question. It is the angle in the sky measured from the celestial equator's plane, indicating the Sun's north or south position at any given moment. With a value of 0° when on the celestial equator, the celestial latitude ranges between -23.5° when on the southern solstice and +23.5° when on the northern solstice. Due to the inclination of the Earth's axis with respect to the plane of the ecliptic, this declination changes periodically throughout the year. When the Sun passes the solstice, declination reaches a maximum, and when the Sun crosses the celestial equator, declination is 0° as shown in Figure 6.

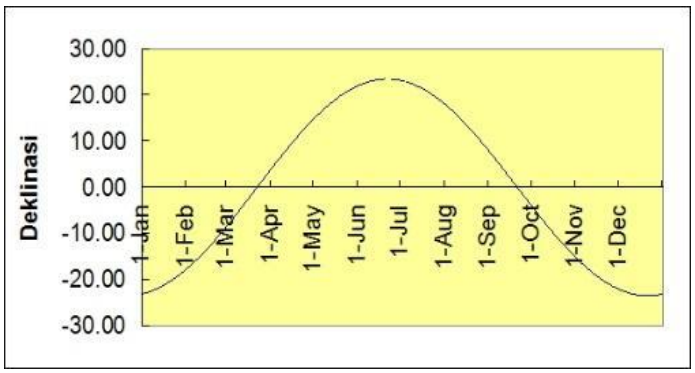

Figure 6. Variation in solar declination

The Sun's decline changes throughout the year, but on any given date, the Sun's decline is almost the same. Between 21 March and 23 September, the declination is positive (+); from 23 September to 21 March, the declination is negative(-). After 21 March, the Sun gradually moves northwards from the equator and further away from the equator. On 22 June, the Sun reaches its farthest point north by 23.5°. Then, gradually, the Sun turned towards the equator, getting closer to the equator, and on 23 September, the Sun was again right on the equator. Since then, the Sun has continued to move southwards and on 22 December, the Sun is further away from the equator, as far as 23.5° South. Then, it turns around and gets gradually closer to the equator until it is exactly on the equator on 21 March as shown in Figure 7.[15]

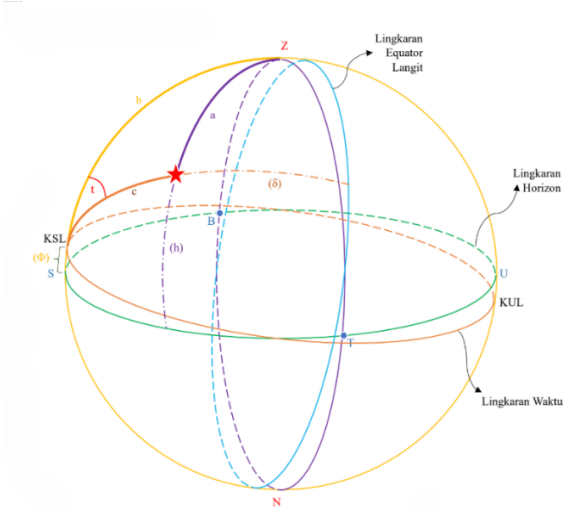

Figure 7. Depiction of the Sun's declination (δ) on the celestial sphere from a position of latitude -7 degrees.

This declination variable greatly affects changes in the Sun's azimuth, which is the horizontal angle between true north and the Sun's projected position on the horizon. Changes in declination cause daily variations in the Sun's rising and setting positions, which affect its azimuthal value. This understanding is important in astronomy and various applications that require knowledge of the Sun's position in the sky. If we observe how the Sun's declination changes over the course of a year, we can see how the Sun's azimuth changes. Based on the Earth's elliptical revolutionary trajectory and its tilt to the axis of rotation of 23 degrees 27 minutes, this causes a phenomenon called the "Analemma", the Analemma is the position of the Sun on its trajectory as seen from Earth over the course of a year at the same time and location. The position of the Sun when combined in a diagram will form a pattern resembling the number 8. The Analemma serves to determine the location with three coordinate variables, namely the Sun's declination, latitude, and hour as shown in Figure 8.[16]

Figure 8. Photograph of Annalemma taken by Dannis di Cicco[17]

E. Relevance of Qibla Direction Determination Using Sunset Direction in Kitab Ihya Ulumuddin

Using the Sun as a reference in determining the Qibla direction can be done by paying attention to several things if you want to get accurate results. In determining the Qibla direction using the setting direction of the Sun, we must pay attention to the Sun's declination times that correspond to the Qibla azimuth at the time of Sunset. By calculating the declination of the Sun, then using it to determine the position of the setting Sun, we can find out when the Sun sets according to the Qibla azimuth of the place of observation. This should be noted because using the setting direction of the Sun in determining the Qibla direction cannot be done every day because the place where the Sun sets always changes every day depending on the value of the Sun's declination as shown in Figure 9.

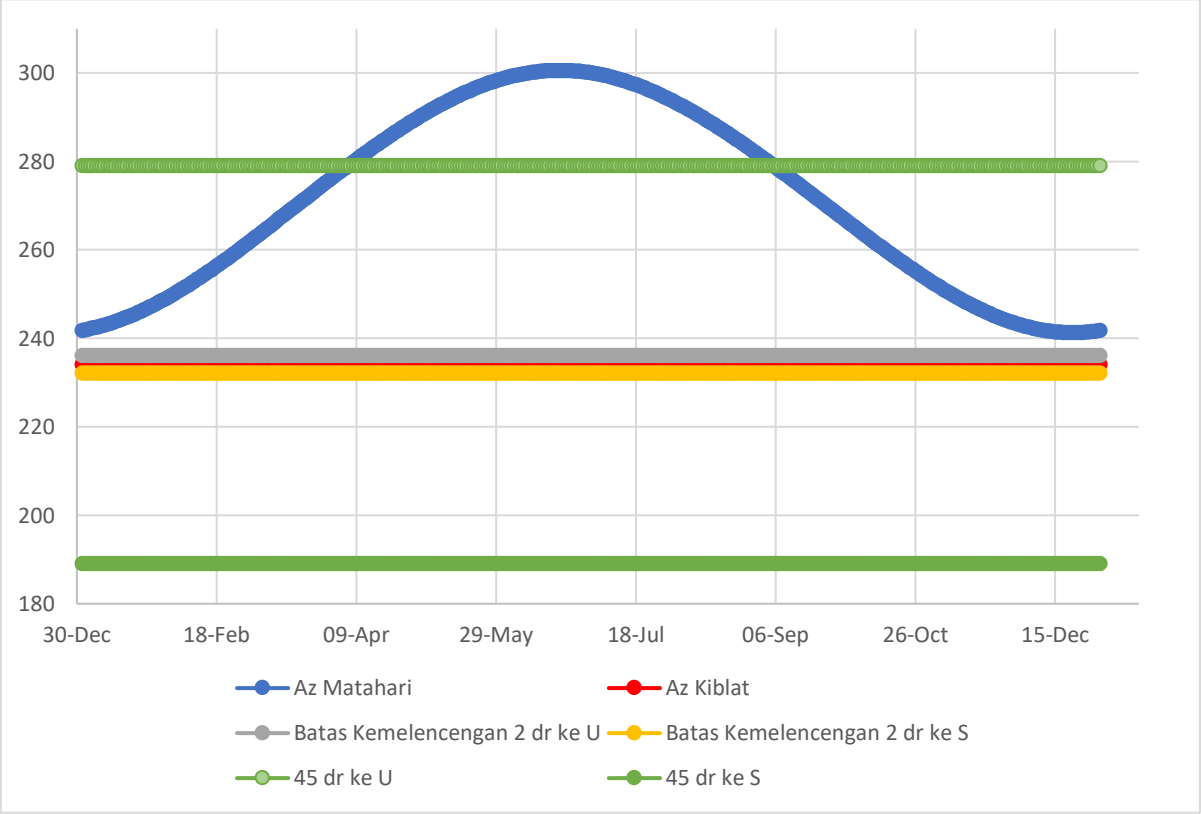

Figure 9. Changes in the Azimut of Sunset to Qibla Azimut of Tus City

In the case of Qibla direction in the city of Thus, after calculating the declination of the Sun for one year in 2024. In this way, we can find out potentially when the setting direction of the Sun corresponds to the Qibla direction in the region of Thus. From the graph above, the red line shows the Qibla direction, the yellow and grey lines show the tolerance limit of 2 degrees to the right and left, the green line shows the corridor limit of "*jihah qiblah*" (45 degrees) and the blue graph shows the change in the azimuth value of the Sun at Sunset in the Thus region for 1 year

In 1 year, the azimuth value of the Sun at Sunset fluctuates, ranging from 241° 11' 54.87'' to 300° 30' 14.25''. While the value of Qibla azimuth for Thus region is ^{2340} 2' 19.32''. This means that the position of the Sun at Sunset in the region of Thus is never precisely at the Qibla azimuth. Its closest position to the Qibla azimuth is still 07° 09' 35.55''. The furthest distance from the qibla azimuth reaches 59° 18' 19.38''. This means that it has exceeded the limit of the *jiha* corridor (45 degrees) so that it can no longer be used as a reference at certain times. This condition can occur between 07 April and 05 September if examined further. The difference in the Sun's azimuth value from the Qibla azimuth exceeds 45 degrees, which means that in that date range, the position of the setting Sun cannot be used as a reference for determining the Qibla. The position of the setting Sun can be used as a reference only when the value is outside these dates. This phenomenon, if pro-rated, will result in the following data In 365 days, only 213 days or equivalent to 58% of the position of the setting of the Sun can be used as a reference for determining the Qibla, because the difference in azimuth is less than 45 degrees. The rest (42%) cannot be used as a reference because the difference exceeds 45 degrees, as shown in Figure 10.

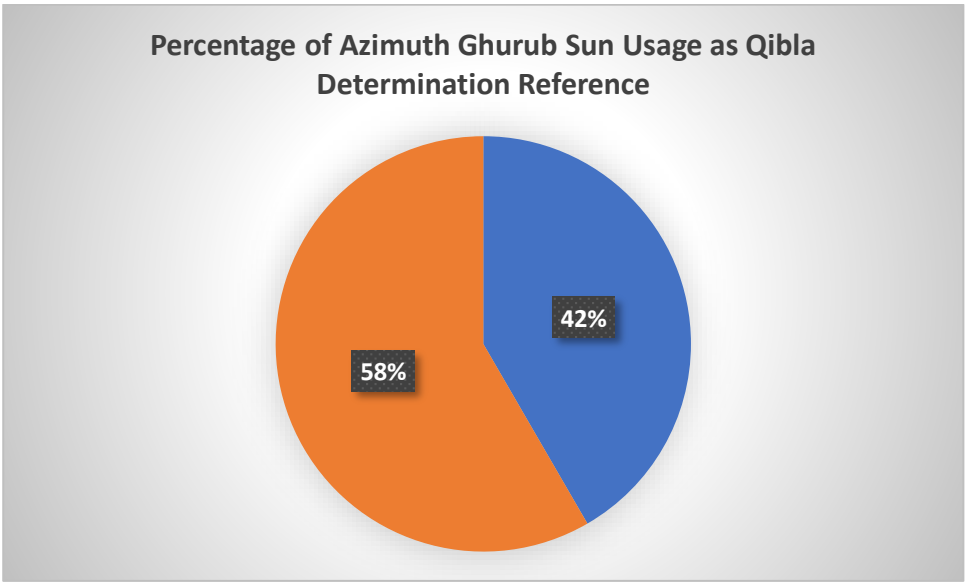

Figure 10. Percentage of Azimuth Ghurub Sun Usage as Qibla Determination Reference

Using the position of the setting Sun as a reference in determining the Qibla direction in a place is an accurate method as long as we know the times when the position of the setting Sun corresponds to the Qibla direction. By knowing the declination of the Sun, we can know the time when the Sun sets following the Qibla direction of a place. This method of determining the Qibla direction regarding the direction of Sunset for Thus city is a taqhribi or approximate method of determining the Qibla direction because the results do not get an exact value but have a variable value of difference.

IV. Conclusion

From the above explanation, it can be concluded that the method of determining the Qibla direction by using the reference of the position of the setting of the Sun in the Thus region as mentioned in the book of Ihya' Ulumiddin is taqribi, there is no position of the Sun that is exactly the azimuth value in accordance with the value of the Qibla azimuth in Thus for 1 year. Nevertheless, for the context of qibla jiha 'ah that tolerates a 45-degree deviation, within a span of 1 year the phenomenon of the setting of the Sun can be used as a reference for determining the Qibla in the Thus region for 213 days or 58%, namely other than in the span of 07 April to 05 September.

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