Analysis of the Qur’anic Concepts of Mashriq (East), Maghreb (West), Mashriqain (Two Easts), Maghribain (Two Wests), Mashariq (Several Easts) and Maghreb (Several Wests): Observations in Quetta, Pakistan

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Abstract: In the current era, various scientific facts revealed by the Holy Qur’an have been scientifically tested and acknowledged by the modern scientists. Scientific knowledge of Earth and related sciences confirms and support the concepts given in the relevant verses of the Qur’an. For example, the Qur’an contains verses that reveal the concepts of Mashriq (east), Maghrib (west), Mashriqain (two easts), Maghribain (two wests), Mashariq (several easts) and Magharib (several wests). This paper pinpoints and puts forward scientific analysis of these concepts of the Qur’an, compares and summarizes the pre-existing conventional tafaseer (explanations) with the modern scientific judgments and deliberates on their undisputable integrity. We analyzed these concepts, using scientific methodology, on a fixed location (x, y, z = 67.002, 30.1853, 1684 m) in Quetta, Pakistan. It was observed that the positions and timing of the sunrise and sunset change daily by shifting gradually from their winter to summer extremes and vice versa in a systematic and predictable manner. This leads to a conclusion that the Qur’anic words Mashriq (east) and Maghrib (west) refers to the spans of horizons between the eastern and western extremes of the sun rises and sets. The words Mashriqain (two easts) and Maghribain (two wests) refer to the two extremes, i.e., northern and southern positions of sunrise and sunset on the eastern and western horizons, on 22nd June (in summer) and 22nd December (in winter), respectively. The words Mashariq (many easts) and Magharib (many wests) simply refer to the numerous positions of the daily sunrise and sunset on the eastern and western horizons. These results are supported by relevant verses and notions of the Qur’an that have been further explained in various tafaseer, with reference to the explanations of Ib-e-Abbas (RAA) and Akrama (RAA).

Keyword: Qur’an, Quetta, Mashriq, Mashriqain, Magharib, Maghribain

1. Introduction

The Glorious Qur’an is basically the book of guidance, revealed by The Creator Almighty Allah, for the human beings, which includes the essence of faith, the acts of worship, the moral codes, rules and procedures. The well-known Muslim philosopher Iqbal (1930) in his famous book “Reconstruction of the Religious Thought in Islam” emphasized on the need to introduce the Holy Qur’an to the world in the light of contemporary developments in knowledge. Subsequently

The Holy Qur’an in numerous verses refers to the scientific facts regarding the Earth and Cosmos. It has been established that the modern scientific knowledge of Earth and related sciences also confirm and support the concepts given in the relevant verses of the Holy Qur’an. Several verses of the Holy Qur’an convey a number of facts about the Earth, Universe and related sciences that demonstrate the miraculous nature of the Holy Qur’an, which has been kept absolutely intact for over 14 centuries (Jusop, 2006, Iravani & Taghipour, 2013, Iravani & Zade, 2013). Kangazian et al. (2014) reported that 112 verses of the Holy Qur’an pronounce the Earth, its geology, its outer surface, hydrology, sediments, geography, archaeology, catastrophes, earthquakes, volcanology, clouds, and relevant sciences. However, so far the verses of the Holy Qur’an that refer to the subject of Earth sciences have not been systematically examined by the Earth scientists.

The Holy Qur’an contains eleven verse (Table 1) that refer to the concepts of Mashriq (East), Maghrib (West), Mashriqain (two easts), Maghribain (two wests), Mashariq (several easts) and Magharib (several wests). This paper pinpoints and put forward scientific analysis of the mentioned concepts and compares and summarizes the pre-existing conventional tafaseer (explanations) with the modern scientific judgments and deliberates on their undisputable integrity.

<table>
<thead>
<tr>
<th>No.</th>
<th>Surah No./ Name</th>
<th>Ayah No.</th>
<th>English Translation (Al-Hilali and Khan, 1998)</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/ (Al-Baqara)</td>
<td>115</td>
<td>And to Allah belong the east and the west, so wherever you turn yourselves or your faces there is the Face of Allah (and He is High above, over His Throne). …</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
<tr>
<td>2</td>
<td>2/ (Al-Baqara)</td>
<td>142</td>
<td>.. Say, (O Muhammad, SAAW), &quot;To Allah belong both, east and the west …</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
<tr>
<td>3</td>
<td>2/ (Al-Baqara)</td>
<td>177</td>
<td>It is not righteousness that you turn your faces towards the East and the West; …</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
<tr>
<td>4</td>
<td>2/ (Al-Baqara)</td>
<td>258</td>
<td>Ibrahim said: So surely Allah causes the sun to rise from the east, then make it rise from the west ...</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
<tr>
<td>5</td>
<td>26/ (Ash-Shu’ara)</td>
<td>28</td>
<td>Musa (Moses) said: “Lord of the east and the west, and all that is between them, if you did but understand!”</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
<tr>
<td>6</td>
<td>73/ (Al-Muzzammil)</td>
<td>9</td>
<td>The Lord of the East and the West-- there is no god but He-- therefore takes Him for a protector.</td>
<td>Mashriq (East), Maghrib (West)</td>
</tr>
</tbody>
</table>
2. Methodology

In order to observe and record the positions and timings of sunrise (in the east) and sunset (in the west) we took photographs of the positions, azimuths and timings of the sunrise in the east and sunset in the west, from a fixed location, in the middle part of the Quetta valley, at Algilani Road, Quetta, Pakistan \((x, y, z = 67.002, 30.1853, 1684 \text{ m})\) on the 22nd of each month, as the 22nd December is the winter extreme (winter solstice) and 22nd June (summer solstice) is the summer extreme of the seasons.

Using shadows of the objects, the angles of the sun rays with the horizon were measured at the times of Solar Noon (Ziwal), the time of shift of shadows from west to east, which enabled us to determine the variability in the pathways of the sun. The process of careful acquisition of field data spanned over a period of one year, starting from 22nd December 2018. Azimuths of the positions and timings of sunrise and sunset and their angles with the horizons in the east and west, respectively, were shown on panorama photographs for visual demonstration. The acquired data and results were compared with the modern scientific concepts on the subject and discussed in the light of well-known tafaseers of the Holy Qur’an.

3. Results

The positions (azimuths) and timings of sunrise (in the east) and sunset (in the west), observed from a fixed location \((x, y, z = 67.002, 30.1853, 1684 \text{ m})\) in the vicinity of Algilani Road, Quetta are shown in Table 2. This table shows the timings of sunrise and sunset at Mashriqain, Maghriban, Mashariq and Maghrib on the 22nd of each month observed during 2018 and 2019 in Quetta; observations made at the location of Algilani Road, Quetta \((x, y, z = 67.002, 30.1853, 1684\text{m}/5525\text{ft})\). Positions of the sunrise and sunset are given in Figures 1, 2 and 3.
Figure 3a, indicate positions, azimuths of sunrise and angle of sun rays at the time of Ziwal through December, with positions and angles of sunrise and sunset. Similarly Figure 2b indicate same parameters on 22nd of December through January, February, March, April and May generally coincide with those of the November, October, September, August and July, respectively. Similarly, positions (azimuths) of the sunrise on 22nd of January, February, March, April and May generally coincide with those of the November, October, September, August and July, respectively.

To make the observations clearer, various positions of the sunrise, and their angles with the horizon, have been shown on two panorama photographs: one for the positions of sunrise in the east (Figure 3a) and one for the positions of sunset in the west (Figure 3b). These panoramas helped us to understand the pathways of the sunrise and sunsets and, to further understand, why in winters days are shorter and nights are longer.

These results clarify that in the time and positions of sunrise and sunset occur in a systematic and predictable manner, if observed from a fixed locality. The well-known Daemi Nagsha-e-Augaat-e-Namaaz (the perpetual time-table of sunrise and sunset), prepared by Maulana Noor-Un-Nabi in 1976, published by Jamia-e-Arabia Markazia Tajweed-ul-Quran, Quetta, for the Quetta and surrounding areas was used, which is very reliable for observing the timings of prayers. Help was also taken from the website (https://www.timeanddate.com/sun/pakistan/quetta) for taking parameters such as the timings of sunrise, sunset, azimuths and angles of sun rays at solar moon for the Quetta area (Table 2).

When observed from a fixed point (Quetta, Pakistan) the azimuths of the positions of sunrise varies between 62° in the northeast (on 22nd June) and 117° (on 22nd December) in southeast. Also azimuth of the positions of sunset varies between 300° (on 22nd June) in northwest and 247° in the southwest (on 22nd December). The difference indicates an average daily shift of about 0.3° in azimuths. The angles of sunlight with the ground surface at the time of Ziwal show significant variations (Table 2); ranging from 83.2°N on the 22nd of June to 36.4°N on 22nd of December. This factor is related with the gradual shift of axis of rotation of the Earth, which causes prolonged nights and short days during winters and vice versa during summers.

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Table 2 - Detailed timings of sunrise and sunset during observation at Algilani Road, Quetta

<table>
<thead>
<tr>
<th>Surah No.</th>
<th>Date</th>
<th>Timings*</th>
<th>Timings at Observation Location</th>
<th>Angle of sunlight with the horizon at Solar Noon (Ziwal)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sunrise (am) / Azimuth</td>
<td>Sunset (pm) / Azimuth</td>
<td>Sunrise (am)</td>
</tr>
<tr>
<td>1</td>
<td>22nd December</td>
<td>7:24 (117°)</td>
<td>5:36 (243°)</td>
<td>8:04 (122°)</td>
</tr>
<tr>
<td>2</td>
<td>22nd January / Nov.</td>
<td>7:02 (113°)</td>
<td>5:32 (247°)</td>
<td>7:03</td>
</tr>
<tr>
<td>3</td>
<td>22nd Feb./Oct.</td>
<td>6:38 (102°)</td>
<td>5:54 (258°)</td>
<td>7:20</td>
</tr>
<tr>
<td>4</td>
<td>22nd Mar. / 22nd Sep.</td>
<td>6:20 (89°)</td>
<td>6:28 (271°)</td>
<td>7:08</td>
</tr>
<tr>
<td>28th Sept. / 16th Mar.</td>
<td>6:23, 6:42</td>
<td>6:25 (263°)</td>
<td>6:42</td>
<td>7:00</td>
</tr>
<tr>
<td>5</td>
<td>22nd April /Aug.</td>
<td>6:02 (76°)</td>
<td>7:06 (284°)</td>
<td>6:21</td>
</tr>
<tr>
<td>6</td>
<td>22nd May / July</td>
<td>5:44 (66°)</td>
<td>7:32 (294°)</td>
<td>5:51</td>
</tr>
<tr>
<td>7</td>
<td>22nd June</td>
<td>5:31 (62°)</td>
<td>7:36 (298°)</td>
<td>5:45 (63°)</td>
</tr>
</tbody>
</table>


Fig. 1 - Photographs showing positions of the sunrise in Quetta during the months from December through June on 22nd day of each month; observations made during 2018 and 2019, at a location in Algilani Road, Quetta (x,y,z = 67.002, 30.1853, 1684m/ 5525ft).
Fig. 2 - Photographs showing positions of the sunset in Quetta during the months from December through June on 22nd day of each month; observations made during 2018 and 2019, at a location in Algilani Road, Quetta (x, y, z = 67.002, 30.1853, 1684m / 5525ft).
Fig. 3 - Panoramas of the east and west from the selected site at Algilani Road, Quetta ($x, y, z = 67.002, 30.1853, 1684m/ 5525ft$), showing positions (azimuths) of the sunrise and sunset and angles of the sun rays with surface of the Earth at the time of solar moon (a) positions of the sunrise in the east and; (b) positions of the sunset in the west

4. Discussion

The concepts of *Mashriq* (east), *Maghrib* (west), *Mashriqain* (two easts), *Maghribain* (two wests), *Mashariq* (several easts) and *Magharib* (several wests) have been briefly explained in conventional *tafaseer* of the Holy Qur’an [Tafseer Ibne-Kathir (Ibn-e-Kathir, I.I., 701-774 A.D.); Anwaar-ul-Bayyan (Merrathi, M.A.I.), Mahajir Madani (1990), Tafseer-e-Haqqani (Haqqani); Dars-e-Qur’an (Thanwai, 1997); Tafseer-e-Usmani (Al-Hassan and Usmani, 2007), where several explanations have been cited.

Tafseer Ibe-Kathir (English version, 2013) explains the Ayah 55 of Ar-Rahman (17) (*The Lord of the two easts and the Lord of the two wests*) as the two positions of sunrise and sunset on each of the summers and winters. Also that Ayah 70 of the Al-Ma’ajir (40) (*I swear by the Lord of all the points of sunrise and sunset in the east and the west*) refers to all the positions of sunrise and sunset; and in Ayah 73 of Al-Muzzammil (9) (*The Lord of the easts and the wests; none has the right to be worshipped but He*) again refers to all the positions of sunrise and sunset and the benefits that these variations bring to the mankind. Anwaar-ul-Bayyan (Merrathi, M.A.I.) explains these concepts, with reference to the Ibne-Abbas (RAA) and Akrama (RAA), stating that *Mashriq* (east) and *Maghrib* (west) refer to the concept of overall eastern...
and western sides of the sunrise and sunset; the *Mashriqain* (two easts) and *Maghribain* (two wests) refer to the two positions of sunrise and sunset in the extreme winters and summers each year. They further explain that in winters the positions of sunrise and sunset are at their southeastern and southwestern extremes, respectively, whereas, in summers the positions of sunrise and sunset are at their northeastern and northwestern extremes, respectively.

The Dars-e-Qur’an (Thanwi, 2003) explains the Ayah 55 of ArRahman (17) (*the Lord of the two easts and the Lord of the two wests*), stating that the *Mashriqain* (two easts) and *Maghribain* (two wests) refers to the two positions of sunrise and sunset in winters and summers; and further explains that in winters the sun rises and sets at the lowest angle (with the horizon) on the smallest day of the year; whereas on the largest day of the year in summers the sun rises and sets at the highest angle with the horizon. These *tafaseer* explain the Ayah 40 of Maarig (70) that *Mashariq* (several easts) and *Magharib* (several wests) relate to the positions of sunrise and sunset that change on daily basis. The scientific *tafaseer* of Mehmood (2009, 2014, 2015, 2017) further explain that the Qur’anic concepts of the *Mashriq*, *Maghrib*, *Mashriqain*, *Maghribain*, *Mashariq* and *Magharib* are in complete conformity with the current scientific knowledge. However, no further scientific analyses have been carried out to provide further details and description of these concepts on scientific basis.

Figure 4 shows the schematic diagram of azimuths of the sunrise and sunset during observation. This figure, along with the previous results showed in Figure 1 - Figure 3; Table 2) indicate the *Mashriq* (East) and *Maghrīb* (West) to be the overall eastern and western horizons from where the sunrises and sunsets. In Quetta, Pakistan, it means the horizon between the azimuths of two extreme positions of sunrise [i.e., 62° (NE) on 22nd June and 117° (SE) on 22nd December, respectively] and sunset [i.e., 300° (NW) on 22nd June and 247° (SW) on 22nd December, respectively]. The *Mashriqain* (two easts) and *Maghribain* (two wests) refer the mentioned two northern and southern extreme positions of the sunrise and sunset on 22nd June (summer) and 22nd December (winter), respectively. Whereas *Mashariq* (many easts) and *Magharib* (many wests) means various positions of the sunrise and sunset that change on daily basis. Although we observed these positions on 22nd of each month; they gradually shift on daily basis, i.e., from 22nd December through 22nd June, there are 182 positions of sunrise in the east and sunset in the west.

![Fig. 4 - Schematic diagram showing positions (azimuths) of the sunrise and sunset from June through December, on 22nd of each month](image-url)

The positions (azimuths) and timings of the sunrise and sunset, when observed from a fixed location, shift gradually and systematically throughout the year in a predictable manner (Figure 1 - Figure 4, Table 2). The positions of the sunrise on 22nd of January, February, March, April and May, generally coincide with those on 22nd of November, October, September, August and July, respectively. Similarly, positions of sunset on 22nd January, February, March, April and May, coincide with those of the 22nd of November, October, September, August and July, respectively. Various positions of the sunrise, as shown on the panoramas for sunrise (Figures 2 and 3a) and sunset (Figures 2 and 3b), help to understand...
the pathways of the sunrise and sunsets; and to comprehend why in winters the days are shorter and nights are longer. However, variations in positions of sunrise and sunset do not coincide exactly during their shifts from winters to summers and vice versa, so that some sort of asymmetrical behavior is found.

The timings of the sunrise and sunset shift in a systematic and predictable manner, which has been demonstrated by the well-known \textit{Daeeeni Naaghu-e-Auguat-e-Namaaz} (the perpetual time-table of the sunrise and sunset), prepared by Maulana Noor Un Nabi in 1976 for the Quetta and surrounding areas, and published and promoted by Jamia-e-Arabia Markazia Tajweed-ul-Qur'an, Quetta. The angles of sunlight with horizon at the time of Ziwail show significant variations (Table 2): ranging from 83.2°N on the 22\textsuperscript{nd} of June to 36.4°N on the 22\textsuperscript{nd} of December, which are related to the change of axis of rotation of the Earth and responsible for prolonged days and short nights during summers and prolonged nights and short days during winters. Minor variations in observed timings, positions (azimuths) and angles of sunrise and sunset in our specific locality (Table 2) are due to the factors such as positions, altitude, orientation, height and distance of the mountains to the east and west of the observation site.

For a given location and day of the year prediction of the times of sunrise and sunset can be made. Also, some simple tools of trigonometry and analytic geometry have been devised (Teets, 2003) to produce a fairly good set of approximations for sunrise and sunset times. Procedure has been proposed (Woolf, 1968) for precise computation of solar elevation angle as a function of latitude, longitude, date, and time. A graphical aid for determining times of sunrise and sunset, with a precision of one minute, as functions of latitude, longitude, date, and altitude has been constructed.

The outcome of the results (Figures 1-4; Table 2), therefore, confirm that the words \textit{Mashriq} (east) and \textit{Maghrib} (west) mean the overall eastern and western horizons from where sun rises and sets, respectively. The words \textit{Mashriqain} (two easts) and \textit{Maghribain} (two wests) refer to the northeastern and southeastern, extreme positions of the sunrise, whereas, \textit{Maghribtwin} (two wests) refer to the northwestern and southwestern extreme positions of sunset on 22\textsuperscript{nd} June (summer) and 22\textsuperscript{nd} December (winter), respectively. Whereas, \textit{Masrahir} (many easts) and \textit{Magharib} (many wests) are the numerous positions of sunrise and sunset that gradually shift on daily basis on the eastern and western horizons, respectively. Although we made our observations on the 22\textsuperscript{nd} of each month, the positions of sunrise and sunset shift on daily basis, meaning that from 22\textsuperscript{nd} December through 22\textsuperscript{nd} June there are 182 days (positions) of sunrise in the east and sunset in the west. Conversely from the 22\textsuperscript{nd} June through 22\textsuperscript{nd} December the same number of positions of the sunrise in the east and sunset are observed.

5. Conclusion

This paper pinpoints and put forward scientific analysis of these concepts of the Qur'an, compares and summarizes the pre-existing conventional 	extit{tafaseer} (explanations) with the modern scientific judgments and deliberates scientific methodology on a fixed location \((x, y, z = 67.002, 30.1853, 1684 \text{ m})\) in Quetta, Pakistan. The research arrives at four conclusions.

First, on a fixed location \((x, y, z = 67.002, 30.1853, 1684 \text{ m})\) in Quetta, Pakistan the timings and positions (azimuths) of sunrise range from its northeastern extreme on 22\textsuperscript{nd} June, at 5:45 am, as 63°, to its southeastern extreme on 22\textsuperscript{nd} December at 8:04 am, as 122°, respectively. The timings and positions (azimuths) of the sunset range from its northwestern extreme on 22\textsuperscript{nd} June at 7:21 am, as 300°, to its southwestern extreme on 22\textsuperscript{nd} December at 5:15 am, as 242°, respectively. Second, the positions and timing of the sunrise and sunset change on daily basis, moving from their winter to summer extremes and vice versa in a systematic and predictable manner.

Third, the \textit{Mashriq} (east) and \textit{Maghrib} (west) refer to the overall eastern and western horizons from where the sun rises and sets, respectively. The \textit{Mashriqain} (two easts) and \textit{Maghribain} (two wests) are the two northern and southern extreme positions of sunrise and sunset. The \textit{Mashriqin} (two easts) and \textit{Maghrabil} (two wests) are the two northern and southern extreme positions of sunset. The \textit{Mashriq} (east) and \textit{Maghrib} (west) refer to numerous positions of sunrise and sunset on daily basis. Finally, the results are in complete conformity with the relevant Ayahs of the Holy Qur’an, which have been further explained in various 	extit{tafaseer}, with reference to the explanations of Ib-e-Abbas (RAA) and Akrama (RAA).

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References

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