LIGHT POLLUTION AND ITS IMPACT TOWARDS ISLAMIC NEW MOON (*HILAL*) OBSERVATION

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OBJECTIVE:

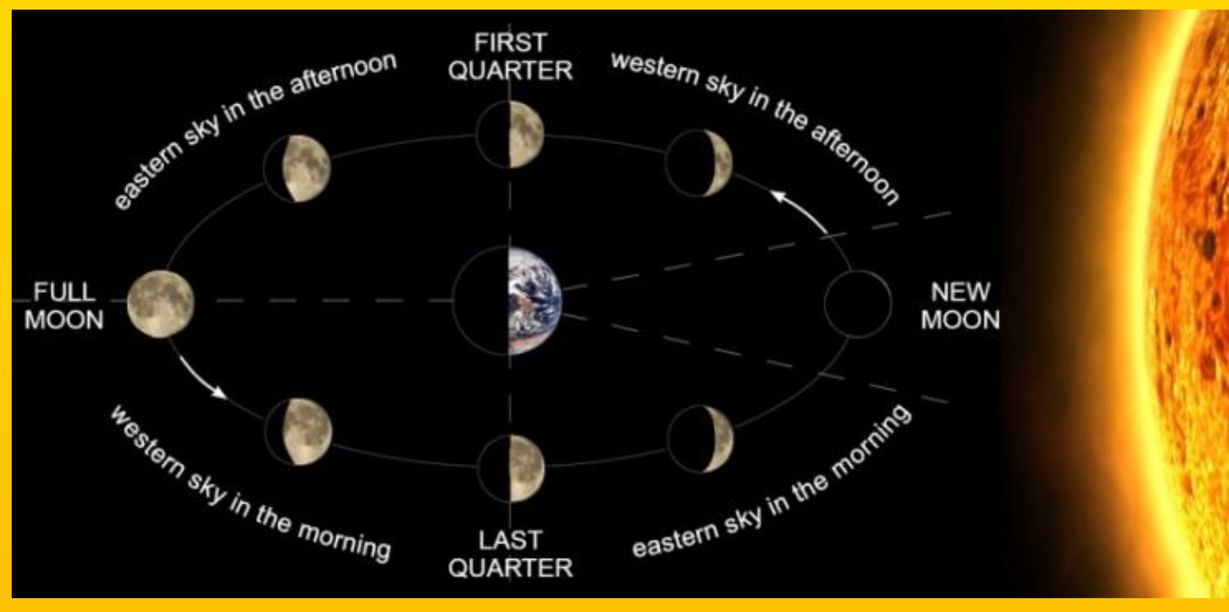
To investigate how sky **limiting magnitude** influences the visibility of ***hilal***

Hilal (Islamic new moon)

VS. Astronomical new moon?

Hilal (Islamic new moon): sightings of the first sliver of the waxing moon marking the start of each month in order to determine determination of first day of months based on visibility of Islamic new moon

Limiting magnitude: faintest apparent magnitude of a celestial body that is detectable or detected by a given instrument.



7 QUICK FACTS

1. The origin to differentiate new moon and Islamic new moon is based on Quranic verse: "They ask you about the crescent moons; say they are a means to measure your specific times (*mawaqit*) and are also for the commencement of the *hajj*" (2: 189).
2. Malaysia opts to choose *imkanur rukyah* (lit. possible of visibility by observation) – one of method in determining new hijric month (Islamic calendar).
3. *Imkanur rukyah* has three (3) criteria: 1) 2^o of Moon's altitude; 2) 3^o of Moon-Sun elongation; and 3) minimum of eight (8) hours of Moon's age.
4. The visibility of new moon is a function primarily of the angle between the moon, observer, and sun (which affects the brightness of the crescent) and the apparent altitude of the moon above the horizon and of the sun below the horizon (which affects the background brightness against which the moon is to be observed).
5. Based on *hilal* observation report (1972-2015) by JAKIM (Malaysia Department of Islamic Development), before 1990, the *hilal* was more frequently seen in 29th day. After 1990, the *hilal* was frequently seen in 30th day.
6. The culprit *hilal* visibility for many years is misdirected, excessive and obtrusive artificial light – light pollution.
7. This research proposing a new criteria for hilal observation i.e. Threshold of sky limiting magnitude.

HOW DO WE CONDUCT THE RESEARCH?

To conduct this research,:

1. Choose west-facing sites – because the *hilal* sets at west. The sites are: 1) Telok Kemang, Malaysia; 2) Kuala Lumpur, Malaysia; and 3) Coonabarabran, Australia.
2. Measurements of the limiting magnitude were made at least one hour before and after the Moon set on dates spread over a period of six months.
3. The data were taken using Sky Quality Meter (SQM) which records the visual magnitudes per square arcsecond (mpsas) to measure sky limiting magnitude.

RESULT & CONCLUSION

Table 1 showed preliminary results of this research which is the limiting magnitude threshold for the *hilal* to be witnessed. The given readings implies that reading within that range, there is high possibility to witness the *hilal*. On the other hand, reading with less than 16 mpsas, the *hilal* was not visible during the observation.

The main important result of this research is to find out a vital parameter for *hilal* observations in order to increase its visibility – proposing a new criteria. This research helps us to understand the phenomenon better about the threshold of sky limiting magnitude for *hilal*.

NO.	SITE	READING (in mpsas)
1.	Telok Kemang, Malaysia	16-19
2.	Kuala Lumpur, Malaysia	16-18
3.	Coonabarabran, Australia	16-22

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