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RE-EVALUATION OF TWILIGHT ANGLE FOR 'ISHĀ' AND ṢUBḤ PRAYER QUANTITATIVELY USING SKY QUALITY METER

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MA

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The polemics on determining the twilight angle parameter used in astronomical calculations for the beginning of 'Ishā' and Ṣubḥ prayer times are still ongoing due to the openness of space for *ijtihād* in interpreting the indicators for both prayer times, i.e., shafaq and fajr. Therefore, this study was implemented to re-evaluate the 'Ishā' and Ṣubḥ twilight angle based on the changes of sky brightness in Malaysia by utilizing the light detector device, namely Sky Quality Meter type USB Data Logging (SQM-LU-DL). For this study, the sky brightness data were collected at five (5) selected locations, which are Langkawi National Observatory (ONL), Selangor Observatory (BCS), Kuala Besut (BST), Kuala Lipis (LPS) and Kundasang Islamic Training Centre (PLI). Inductive method was used to review information about *shafaq aḥmar* & *shafaq abyaḍ* and *fajr kādhib* & *fajr ṣādiq*. For analysing the recorded night sky brightness data, Pearson correlation, quartic polynomial-Type 6 function and data visualisation process were applied to answer the second and third objectives. Overall, with 574 observation days within 20 months, from April 2018 to November 2019, the study found that each observation site showed the tendency for 'Ishā' and Ṣubḥ twilight angle distribution is around the range of -17.6^{o} to -18.7^{o}, on average. For 'Ishā', the measured twilight angles are within the range of -18^{o}. The values are as follow, -18.18^{o} (SD=0.67) for ONL, -18.49^{o} (SD=0.92) for BCS, -18.65^{o} (SD=0.79) for BST, -18.73^{o} (SD=0.81) for LPS and -18.35^{o} (SD=0.83) for PLI. Meanwhile, for Ṣubḥ twilight angle, the acquired average values are likely to be around -17.6^{o} to -18.2^{o}, which -17.63^{o} (SD=0.92) for ONL, -18.18^{o} (SD=0.87) for BCS, -17.92^{o} (SD=1.11) for BST, 18.02^{o} (SD=0.67) for LPS and -18.19^{o} (SD=0.72) for PLI. Therefore, based on the average and frequency of twilight angle distribution from this measurement, the obtained twilight angle values are almost parallel and not far from the official twilight value used in Malaysia for both prayers, which is -18^{o}. The findings of this study serve as a scientific document in re-evaluating twilight angle in Malaysia and complement previous related studies as twilight phenomena has its own dynamism and need continuous research to monitor its consistency.

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