

UNIVERSITI TEKNOLOGI MARA

**RELATIONSHIP BETWEEN NIGHTTIME LIGHT
(NTL) AND AIR QUALITY (NO₂ & SO₂) IN A
DEVELOPING AREA AT PENINSULAR
MALAYSIA**

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**BACHELORS IN SURVEYING SCIENCE AND
GEOMATICS (HONOURS) - AP220**

August 2023

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NURUL SHUHADAH BINTI SALEHUDIN

Thesis submitted in fulfilment
of the requirements for the degree of
Bachelors in Surveying Science and Geomatics (Honours)

College of Built Environment, CBE.

August 2023

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 Under - Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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Thesis Title : Relationship Between Nighttime Light (Ntl) And Air
Quality (NO₂ & SO₂) In A Developing Area in
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ABSTRACT

Artificial light emissions, also known as night-time light (NTL), can be used to monitor human activity from space. Malaysia was also no exception to the spread of the COVID-19 pandemic in 2020, leading the government to implement the Movement Control Order (MCO), which had a significant impact on various sectors. Among the most affected sectors are the economy, companies, and services, including tourism, creative industries, manufacturing, healthcare, and more. This might have indirectly led to a decline in artificial light emissions at night. Even if COVID-19 had negative consequences for the country's economy and health, the air quality actually improved during the Malaysian Government Movement Control Order (MCO). The Movement Control Order (MCO), Conditional Movement Control Order (CMCO), Recovery Movement Control Order (RMCO), Total Lockdown, and National Recovery Plan (NRP) phases are among those that make up the MCO. Therefore, it is interesting to see how the emission of artificial light at night and the improvement of air quality are related. This study aims to investigate the relationship between NO_2 and SO_2 levels in the air and NTL emissions caused by human activities in a developing area of Peninsular Malaysia from 2019 until 2021. Using the Google Earth Engine platform, this study measured NTL radiation values using VIIRS-DNB images and column density values (NO_2 and SO_2) using Sentinel-5P images. Spatial-temporal maps were generated for NTL, NO_2 , and SO_2 for the years 2019, 2020, and 2021, respectively. The analysis of the correlation between NTL and NO_2 resulted -0.136 till 0.705, while the relationship between NTL and SO_2 resulted in -0.075 till 0.2. These findings indicate that NTL can be used as an indicator to assess changes in air quality associated with human activities.

Keywords: *Nighttime Light (NTL), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2)*

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