

1100103674

lp
LP I PPKK I 2016



1100103674
Predicting tropospheric ozone concentration using two different approaches at selected sites in Klang valley / Cheng Jing Jing.

PERPUSTAKAAN SULTANAH NUR ZAHIRAH UNIVERSITI MALAYSIA TERENGGANU (UMT) 21030 KUALA TERENGGANU		
1100103674		
RECEIVED 7 OCT 2010		

Lihat Sebelah

PREDICTING TROPOSPHERIC OZONE CONCENTRATION USING TWO
DIFFERENT APPROACHES AT SELECTED SITES IN KLANG VALLEY

By
CHENG JING JING

A PITA report submitted in partial fulfilment of
the requirements for the award of the degree of
Bachelor of Technology (Environment)

SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU
2016



**SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU**

VERIFICATION AND APPROVAL FORM

This PITA research report entitled *Predicting Tropospheric Ozone Concentration Using Two Different Approaches At Selected Sites In Klang Valley* prepared and submitted by Cheng Jing Jing, Matric No UK29523 in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (Environment) has been examined and is recommended for approval of acceptance.

Approved by:



.....

Supervisor

Name: Dr. Nurul Adayani Ghazali

Official Stamp: DR. NURUL ADYANI BINTI GHAZALI
Pensyarah
Pusat Pengajian Kejuruteraan Kelautan
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 8.6.2016



.....

Head of Environmental Technology Program

Name: Prof. Dr. Ir. Ahmad bin Jusoh


Official Stamp:

PROF. IR. DR. AHMAD BIN JUSOH
Dean
School Of Ocean Engineering
Universiti Malaysia Terengganu

Date: 8.6.2016

DECLARATION

I hereby declare that this PITA research report entitled *Predicting Tropospheric Ozone Concentration Using Two Different Approaches At Selected Sites In Klang Valley* is the result of my own research except as cited in the references.

Signature	: 
Name	: CHENG JING JING
Matric No.	: UK29523
Date	: 13 th JUNE 2016

ACKNOWLEDGEMENTS

Firstly, I would like to express my deepest appreciation to my supervisor, Dr. Nurul Adyani binti Ghazali who provided continuous guidance, encouragement and inspiration to me during the development of this project. I have been extremely lucky to have a supervisor who patiently responded to my questions, asked insightful questions and offered invaluable advices to me. I sincerely thank my supervisor for her support in both research work and other aspects.

I would also like to convey sincere gratitude to Dr. Hajah Noor Zaitun binti Yahaya and Pn. Nazaitulshila Rasit for their valuable and constructive suggestions on my final year project.

A word of gratitude is extended to seniors and my fellow mates who provided support and guidance in completing this project.

Last but not least, I would like to thank my family, especially my mother for their constant support and love throughout my study period.

PREDICTING TROPOSPHERIC OZONE CONCENTRATION USING TWO DIFFERENT APPROACHES AT SELECTED SITES IN KLANG VALLEY

ABSTRACT

Tropospheric ozone is main pollutant of important concern in Malaysia due to its contributions to high number of unhealthy days recorded in many industrial, urban and suburban area. Furthermore, tropospheric ozone is responsible for adverse effects on human health, vegetation and building materials. Thus, prediction of ozone concentration is significant to provide early warning system in order to reduce the exposure of population especially sensitive groups to certain level of ozone pollution. In Malaysia, studies on applying different types of approaches including regression models, neural network and probability distribution to predict ozone concentration have been established, yet a model with good predicting ability has to be identified and used so as to develop effective warning strategies. This study aims to study the application of multiple linear regression (MLR) model and artificial neural network (ANN) models in predicting ozone concentration at Cheras and Petaling Jaya for year 2012. Stepwise method was used to choose the independent variables to develop linear regression model using Statistical Package for Social Sciences (SPSS) software while a feedforward algorithm was used to prepare the neural network using Matrix Laboratory (MATLAB) software. The evaluation of the performance of MLR and ANN models was conducted using performance indicators including coefficient of determination (R^2), prediction accuracy (PA), root mean squared error (RMSE) and normalised absolute error (NAE). Higher accuracy measure and smaller error measure of ANN model showed that ANN model performed slightly better than MLR model. The result of this study could be used as an input in policy framework in order to control the magnitude of ozone pollution impacts in Malaysia.

RAMALAN KEPEKATAN OZON TROPOSFERA MENGGUNAKAN DUA KAEDAH YANG BERBEZA DI KAWASAN TERPILIH DI LEMBAH KLANG

ABSTRAK

Ozon troposfera merupakan bahan pencemar utama yang memerlukan perhatian di Malaysia kerana ozon telah menyumbang kepada hari tidak sihat yang dicatatkan di kawasan perindustrian, bandar dan luar bandar. Di samping itu, ozon troposfera mempunyai kesan buruk pada kesihatan, pertanian dan bahan bangunan. Oleh hal yang demikian, ramalan kepekatan ozon adalah penting untuk menyediakan sistem amaran awal demi mengurangkan pendedahan orang awam kepada pencemaran ozon. Di Malaysia, kajian mengenai mengaplikasikan kaedah yang berbeza termasuk model regresi linear berganda, rangkaian neural tiruan dan taburan kebarangkalian untuk meramalkan kepekatan ozon telah diterbitkan, namun begitu, model yang mempunyai keupayaan ramalan yang unggul adalah diperlukan untuk membentuk strategi amaran yang berkesan. Kajian ini bertujuan untuk mengaji pengaplikasian model regresi linear berganda dan rangkaian neural tiruan untuk meramalkan kepekatan ozon di Cheras dan Petaling Jaya bagi tahun 2012. Kaedah 'stepwise' telah digunakan untuk membentuk model regresi linear berganda dengan menggunakan perisian *Statistical Package for Social Sciences (SPSS)* manakala kaedah 'feedforward algoritim' telah digunakan untuk menyediakan rangkaian neural tiruan dengan menggunakan perisian *Matrix Laboratory (MATLAB)*. Penilaian prestasi kedua-dua model tersebut telah dijalankan menggunakan pekali penentuan (R^2), ketepatan ramalan (PA), punca min ralat kuasa dua (RMSE) dan ralat mutlak ternormal (NAE). Ukuran ketepatan yang lebih tinggi dan ukuran ralat yang lebih rendah telah diperolehi oleh rangkaian neural tiruan. Dapatan ini telah menunjukkan rangkaian neural tiruan meramal kepekatan ozon dengan lebih baik daripada regresi linear berganda. Hasil kajian ini dapat digunakan sebagai input dalam rangka kerja dasar untuk mengawal magnitud kesan pencemaran ozon di Malaysia.