

Pencemaran udara berikutan peristiwa jerebu tahun 2005: Kajian kes di Perai, Pulau Pinang, Malaysia

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Abstrak

Peristiwa jerebu yang disebabkan oleh kebakaran hutan di Sumatera dan Kalimantan telah memberi kesan yang hebat di pantai barat Semenanjung Malaysia terutamanya di sekitar Lembah Klang sehingga menyebabkan darurat jerebu diistiharkan di Kuala Selangor dan Kelang pada 11 Ogos 2005. Oleh itu, satu kajian dilakukan bagi melihat sejauhmana fenomena jerebu ini mempengaruhi kualiti udara di Perai, Pulau Pinang dengan mengkaji pencemar yang terdiri daripada gas karbon monoksida, nitrogen dioksida, sulfur dioksida, ozon serta zarah terampai kurang daripada 10 mikron (PM_{10}). Tahap kepekatan bulanan PM_{10} menunjukkan dua taburan yang ketara, di mana nilainya melebihi $80 \mu g m^{-3}$ dari Januari ke Julai, dan kurang daripada $60 \mu g m^{-3}$ dari Ogos ke Disember. Analisis dilakukan mengikut pecahan tiga tempoh iaitu dari Januari hingga Disember, Januari hingga Julai, dan Ogos hingga Disember. Hasil analisis regresi multivariat menunjukkan bahawa parameter cuaca seperti hujan dan angin menyumbang kepada 5.3% terhadap kepekatan habuk halus kurang daripada 10 mikron (PM_{10}) dari Januari hingga Disember. Hasil analisis korelasi pula menunjukkan bahawa hujan mempunyai hubungan yang lemah dan songsang terhadap kepekatan PM_{10} . Nilai pekali korelasi dari Januari hingga Disember adalah -0.188, berbanding nilai -0.184 (Januari hingga Julai), dan -0.164 (Ogos hingga Disember). Kelajuan angin turut menunjukkan pengaruh yang lemah dengan nilai pekali korelasi 0.152, 0.042, dan 0.127 bagi ketiga-tiga pecahan tempoh. Secara keseluruhan, didapati jerebu yang berlaku pada Ogos 2005 tidak memberi kesan yang teruk kepada kualiti udara di Perai kerana kepekatan PM_{10} tidak melebihi $70 \mu g m^{-3}$.

Katakunci: fenomena jerebu, kualiti udara, ozone, pencemaran udara, Pulau Pinang, zarah terampai

Air pollution during the haze event of 2005: The case of Perai, Pulau Pinang, Malaysia

Abstract

The transboundary haze from the biomass burning in Sumatera and Kalimantan brought about a haze emergency on 11 August 2005 in the districts of Kuala Selangor and Kelang, on the western coast of Peninsular Malaysia. A study on how far this haze phenomenon had influenced the air quality in Perai, Pulau Pinang was conducted whereby the state of air pollutants such as carbon monoxide, nitrogen dioxide, sulphur dioxide, ozone, and particulate matters of size less than 10 microns (PM_{10}) was investigated. The monthly PM_{10} concentrations revealed two distinct distributions, where values of more than $80 \mu g m^{-3}$ occurred from January to July but were lower than $60 \mu g m^{-3}$ from August to December. The analysis was carried in three temporal durations that ranged from January to December, January to July and August to December. The multivariate regression analysis showed that rainfall and wind speed contributed to 5.3% of the PM_{10} concentration from January to December. The correlation analysis showed a weak and inverse relationship between rainfall and the PM_{10} concentration. The correlation coefficients during the three temporal periods were -0.188, -0.184, and -0.164, respectively. Wind speed also showed a very weak influence on the PM_{10} concentration where the correlation coefficients were 0.152 (January to December), 0.042 (January to July), and 0.127 (August to December), respectively. In conclusion, the haze

phenomenon during August, 2005 did not severely affect the air quality in Perai since the PM₁₀ concentration did not exceed 70 µg m⁻³.

Keywords: haze phenomenon, air quality, ozone, air pollution, Pulau Pinang, suspended particulates