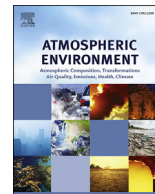




Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

Characterisation of particle mass and number concentration on the east coast of the Malaysian Peninsula during the northeast monsoon



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H I G H L I G H T S

- Multivariate analysis used for the characterisation and distribution of particles.
- Particle number variations dominated by smaller particles ($D_p \leq 4.50 \mu\text{m}$).
- Local activities influence the daily pattern of particles.
- Wind trajectory plays important role in the variability of particles.

A R T I C L E I N F O

Article history:

Received 5 April 2015

Received in revised form

10 July 2015

Accepted 11 July 2015

Available online 16 July 2015

Keywords:

Aerosols

Multivariate analysis

Meteorology

Long-range transport

Biomass episodes

A B S T R A C T

Particle mass concentrations (PM_{10} , $\text{PM}_{2.5}$ and PM_1) and particle number concentration ((PNC); $0.27 \mu\text{m} \leq D_p \leq 34.00 \mu\text{m}$) were measured in the tropical coastal environment of Bachok, Kelantan on the Malaysian Peninsula bordering the southern edge of the South China Sea. Statistical methods were applied on a three-month hourly data set (9th January to 24th March 2014) to study the influence of north-easterly winds on the patterns of particle mass and PNC size distributions. The 24-h concentrations of particle mass obtained in this study were below the standard values detailed by the Recommended Malaysian Air Quality Guideline (RMAQG), United States Environmental Protection Agency (US EPA) and European Union (EU) except for $\text{PM}_{2.5}$, which recorded a 24-h average of $30 \pm 18 \mu\text{g m}^{-3}$ and exceeded the World Health Organisation (WHO) threshold value ($25 \mu\text{g m}^{-3}$). Principal component analysis (PCA) revealed that PNC with smaller diameter sizes ($0.27\text{--}4.50 \mu\text{m}$) showed a stronger influence, accounting for 57.6% of the variability in PNC data set. Concentrations of both particle mass and PNC increased steadily in the morning with a distinct peak observed at around 8.00 h, related to a combination of dispersion of accumulated particles overnight and local traffic. In addition to local anthropogenic, agricultural burning and forest fire activities, long-range transport also affects the study area. Hotspot and backward wind trajectory observations illustrated that the biomass burning episode (around

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