**Long Term Assessment of Air Quality on a Small Island in Malaysia**

Nor Diana Abdul Halim1,2 and Mohd Talib latif1,3\*

1Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

2School of Social, Development and Environmental Studies, Faculty of Social Science and Humanities, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

3School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

\*Corresponding author

Email: talib@ukm.edu.my

Air pollution has become major global concern due to the harmful effects towards human health since rapid development can increase air pollutant emission. Measuring the concentration of air pollutants continuously is important in order to monitor the air quality of an area. Thus, long-term evaluation of air quality in Langkawi Island, which is a famous tourist island in Malaysia, was carried out using data recorded by Department of Environment Malaysia from 1999 to 2011. Variations of seven air pollutants (O3, CO, NO, NO2, NOx, SO2 and PM10) and three meteorological factors (temperature, humidity and wind speed) were analyzed. Statistical methods were used including principal component regression (PCR) and sensitivity analysis. The result showed that the range of PM10 concentrations for 24 h average is between 5.0 µg m-3 and183.2 µg m-3. The high concentrations of PM10 were recorded during haze phenomenon that hit the country in 2005. Other air pollutants (O3, CO, NO, NO2, NOx, and SO2) showed an upward trend throughout the thirteen years period. However, all the air pollutants showed average concentration values below the maximum limit recommended by World Health Organization and New Malaysian Air Quality Standard for 2015. Ratio analyses between air pollutants shows Langkawi air quality influenced by mobile sources. This is because ratio values of CO/NOx (between 28.3 and 43.6) were high; ratio values of SO2/NOx (between 0.04 and 0.12) were low and the ratio value of NO/NO2 of this study between 1.34 and 2.20. The patterns of monthly concentration showed that the concentration of air pollutants in Langkawi Island (CO, NO, NO2, NOx, SO2 and PM10) were higher during the southwest monsoon (June-September). This is closely related to the spread of air pollutants by the wind originated from biomass burning activity and uncontrolled forest fires in Sumatra, Indonesia. Although the air pollutants concentration in Langkawi Island are still below the maximum values recommended by the air quality standards, well planned development is crucial to reduce the magnitude of the increasing trend in pollutant concentrations.

**Keywords:** Small island, major air pollutants, meteorological factors, potential sources