

PERSIDANGAN NATIONAL ENVIRONMENTAL HEALTH ACTION PLAN  
(NEHAP)

*PARTICULATE AIR POLLUTION AROUND  
MINING AREAS*

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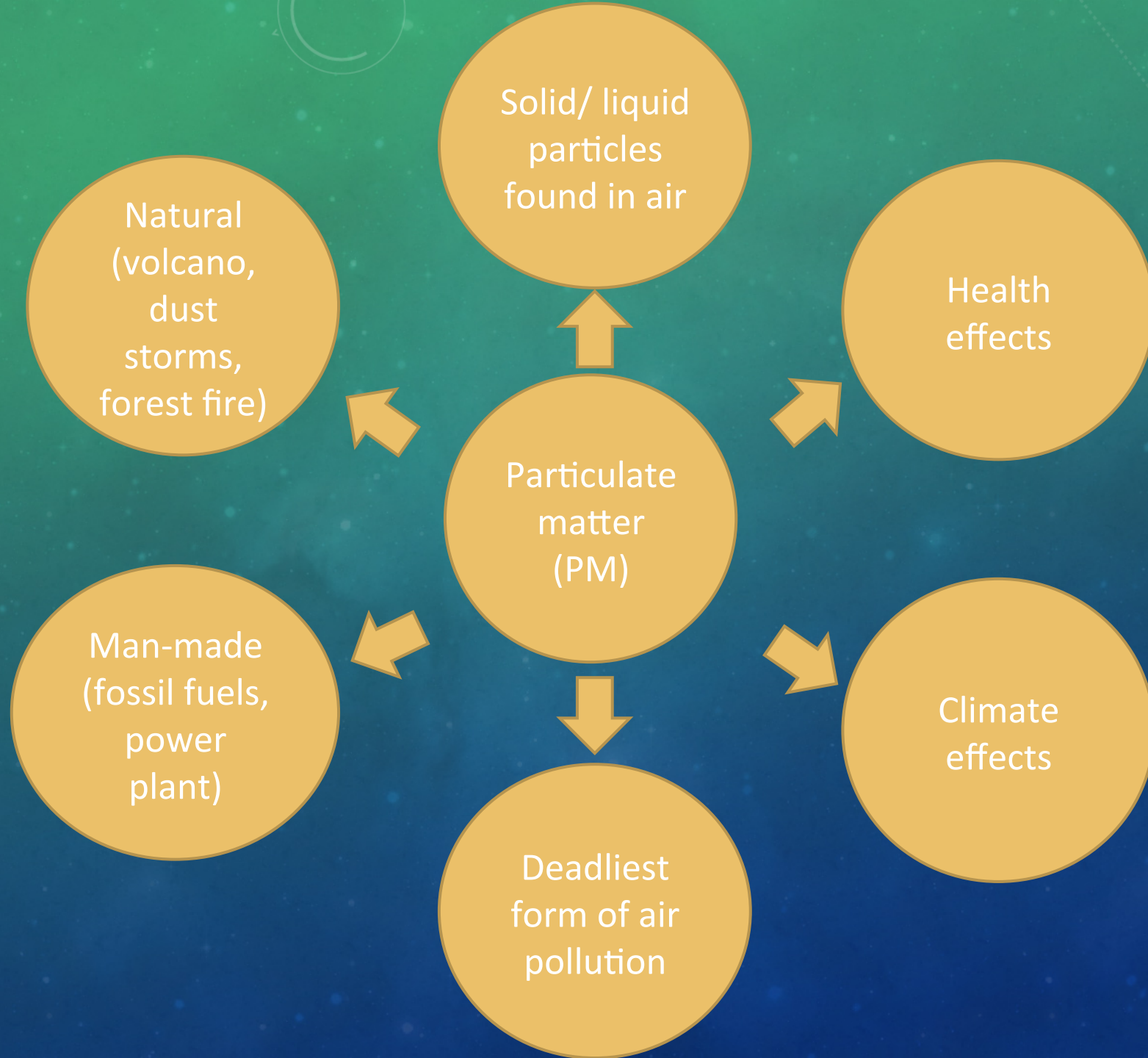
ENVIRONMENTAL HEALTH RESEARCH CENTER

INSTITUTE FOR MEDICAL RESEARCH

KUALA LUMPUR

# *INTRODUCTION*

The background is a blue gradient with faint technical diagrams and circular patterns. On the right side, there is a large circular diagram with concentric circles and a scale from 0 to 200. On the left side, there are smaller circular diagrams with arrows indicating direction.



Natural  
(volcano,  
dust  
storms,  
forest fire)

Solid/ liquid  
particles  
found in air

Health  
effects

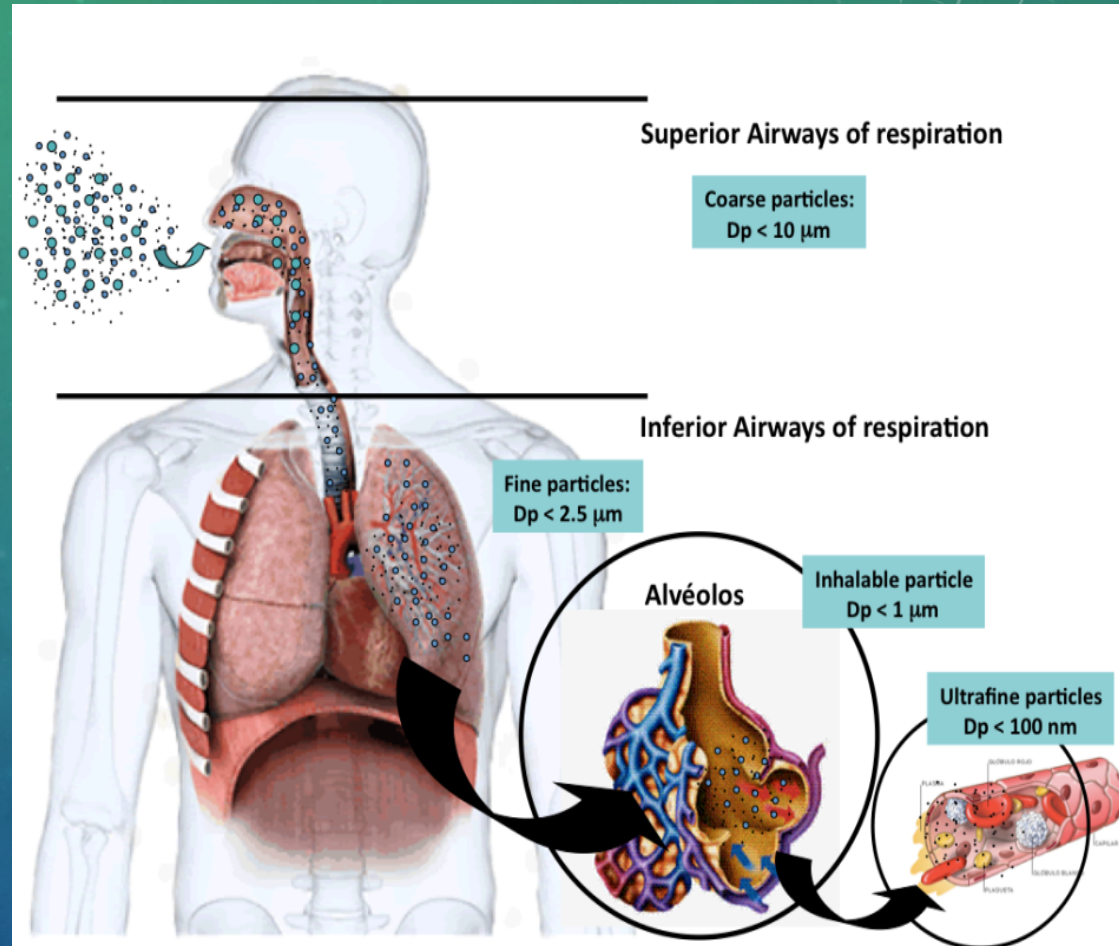
Particulate  
matter  
(PM)

Man-made  
(fossil fuels,  
power  
plant)

Climate  
effects

Deadliest  
form of air  
pollution

- Larger particles filtered in the nose and throat via cilia and mucus
- PM smaller than about  $10\ \mu\text{m}$  ( $\text{PM}_{10}$ ) can settle in bronchi and lungs and cause health problems
- Fine PM, smaller than  $2.5\ \mu\text{m}$  ( $\text{PM}_{2.5}$ ) can penetrate into gas exchange regions (alveolus) and pass through lungs to affect other organs.



# IMPORTANT HEALTH EFFECTS OF PARTICULATES (WHO REVIEW)

## Effects related to short term exposure

- Lung inflammatory reactions
- Respiratory symptoms
- Adverse effects on the cardiovascular system
- Increase in medication usage
- Increase in hospital admissions
- Increase in mortality

## Effects related to long term exposure

- Increase in lower respiratory symptoms
- Reduction in lung function in children
- Increase in chronic obstructive pulmonary disease
- Reduction in lung function in adults
- Reduction in life expectancy, owing mainly to cardiopulmonary mortality and probably to lung cancer.

# OBJECTIVE

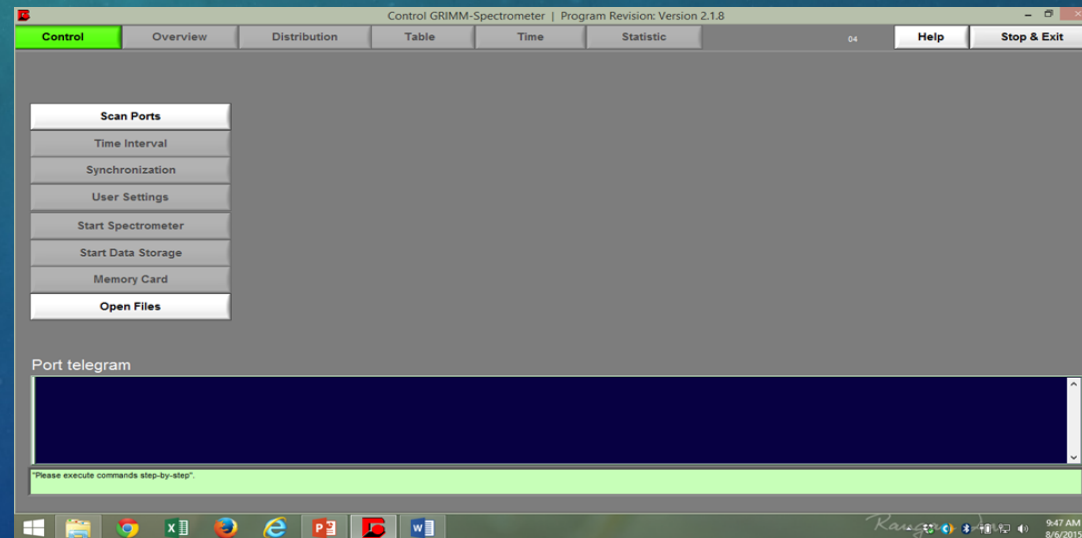
To determine the concentration of  $PM_{10}$  and  $PM_{2.5}$  near mines (0.5 km) and 2 km away from the mines

# METHODOLOGY

- Conducted from January to December 2013 at 4 locations
- Particulate matter measurements were taken once a month over a period of 24 hours using Grimm Aerosol Spectrometer Model 1.108. Results were analysed using GRIMM Spectrometer Software



Grimm



GRIMM Spectrometer Software

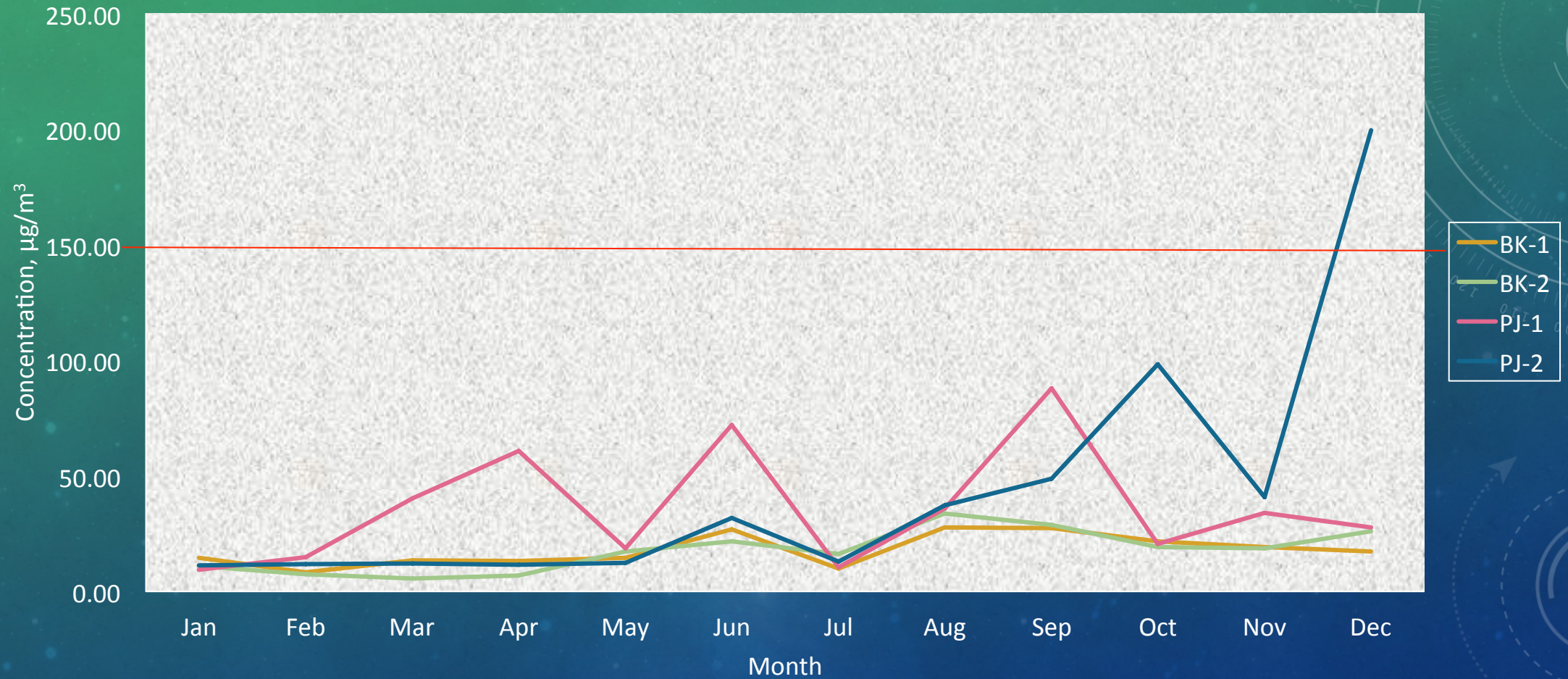
# LOCATION



The background features a vertical gradient from light green at the top to dark blue at the bottom. It is decorated with faint technical diagrams, including circular gauges with numerical scales (e.g., 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200) and dashed lines. There are also several glowing blue particle-like specks scattered across the field.

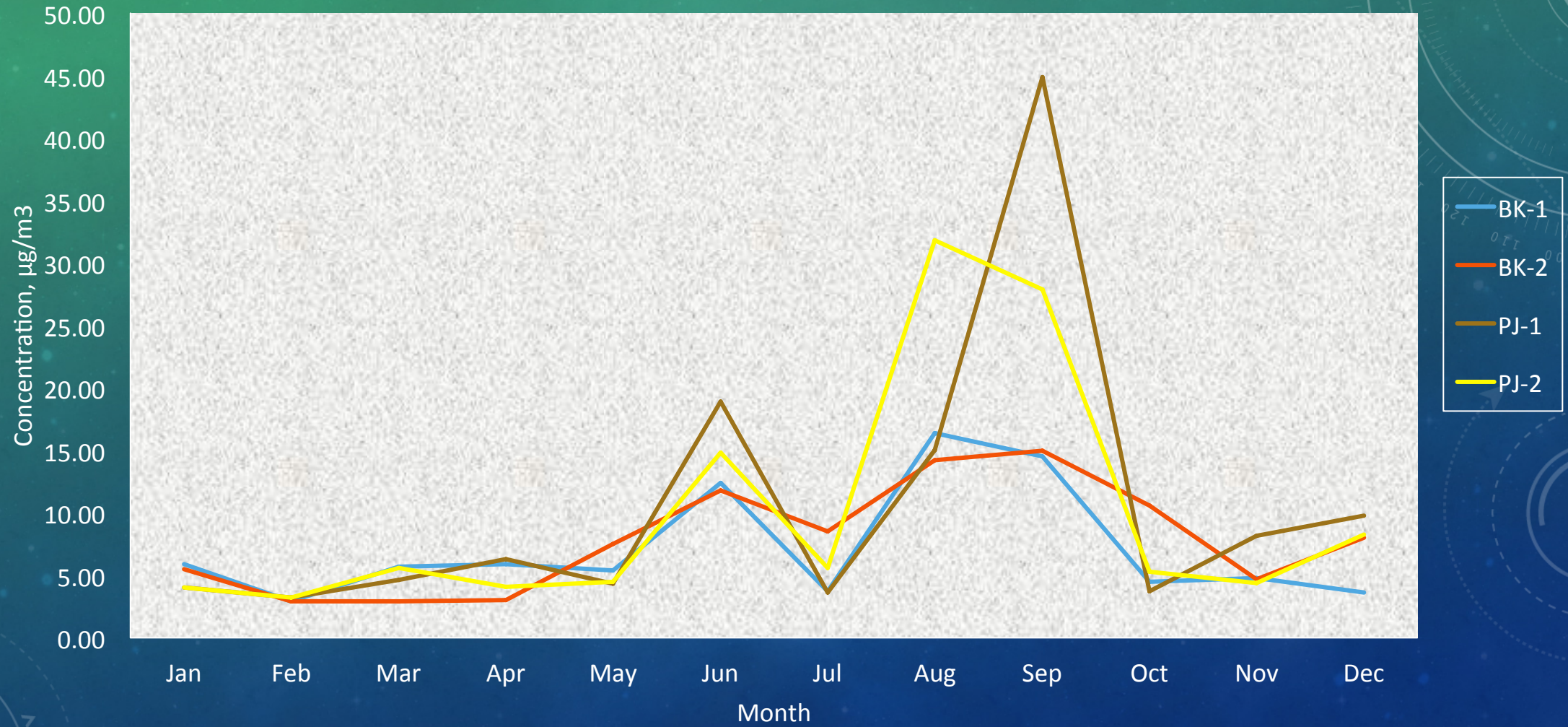
# *RESULTS AND DISCUSSION*

Concentration of PM<sub>10</sub> over a year

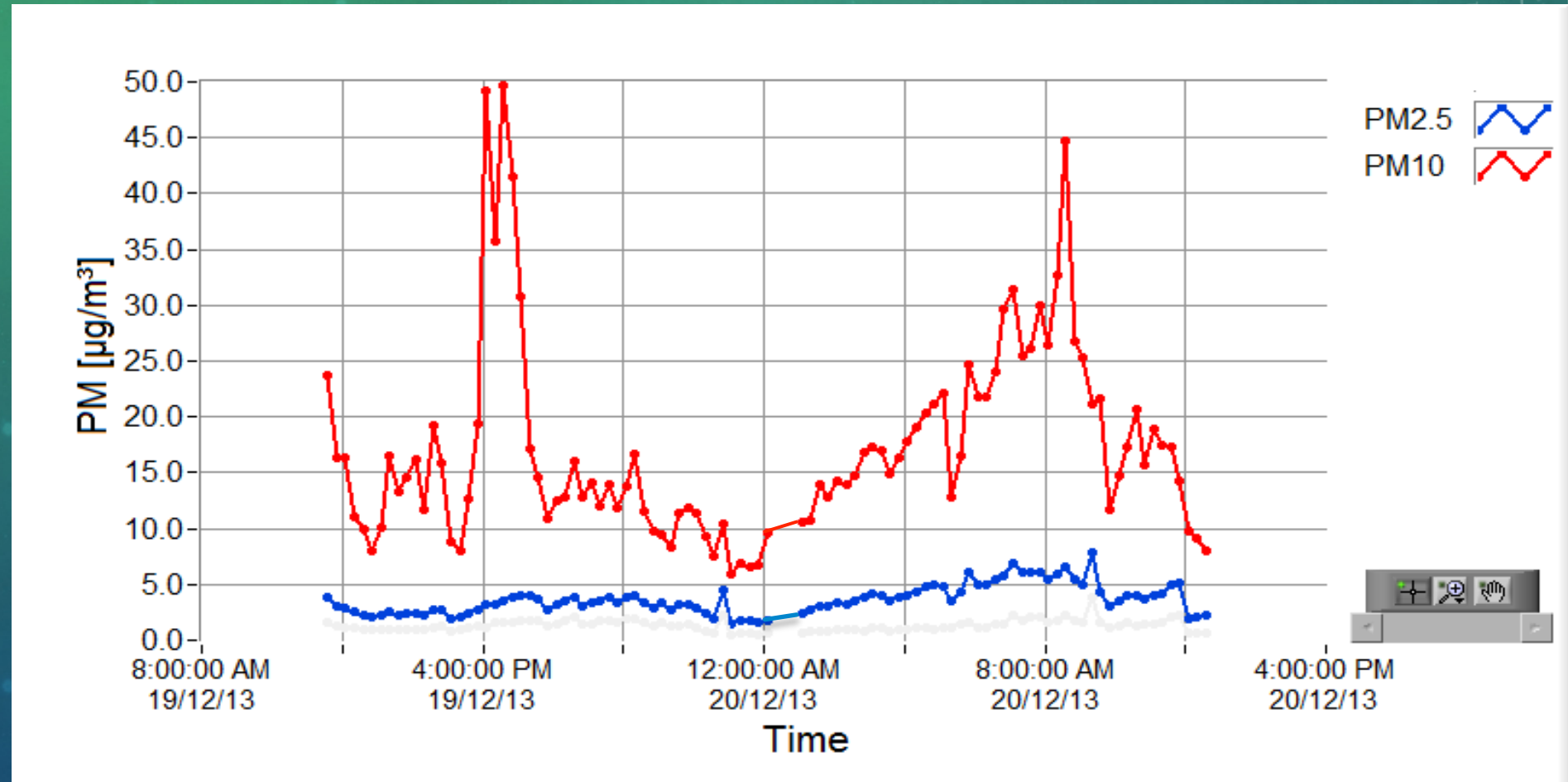


- Standard limit -150 µg/m<sup>3</sup> (Malaysian Ambient Air Quality guideline averaging 24 hours)

Concentration of PM<sub>2.5</sub> over a Year



# GRAPH ON PARTICULATE MATTER BASED FOR AVERAGING 24 HOURS



# TABLE SHOWS THE LEVELS OF PM<sub>10</sub> AND PM<sub>2.5</sub> WITH AVERAGING A YEAR

PM <sub>10</sub>													Averaging
Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1 year
BK-1	14.50	8.30	13.40	13.30	14.50	26.80	9.80	27.70	27.40	21.60	19.35	17.20	17.82
BK-2	11.10	7.40	5.60	7.00	17.40	21.60	16.20	33.70	28.85	19.30	18.70	26.10	17.75
PJ-1	9.30	14.90	40.40	60.90	18.55	72.00	10.37	36.00	87.95	20.70	34.10	27.60	36.06
PJ-2	11.20	11.80	12.00	11.60	12.40	31.70	13.00	37.40	48.90	98.42	40.80	199.53	44.06

PM <sub>2.5</sub>													Averaging
Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1 year
BK-1	5.90	2.90	5.70	5.90	5.40	12.40	3.70	16.40	14.50	4.50	4.80	3.60	7.14
BK-2	5.50	2.90	2.90	3.00	7.50	11.80	8.50	14.20	14.95	10.60	4.70	8.00	7.88
PJ-1	4.00	3.20	4.63	6.30	4.35	18.90	3.63	15.00	44.90	3.70	8.17	9.80	10.55
PJ-2	4.00	3.20	5.60	4.10	4.50	14.80	5.60	31.80	27.90	5.26	4.40	8.26	9.95

- Standard limit for PM<sub>10</sub> - 50 µg/m<sup>3</sup> (Malaysian Ambient Air Quality guideline averaging 1 year)
- Standard limit for PM<sub>2.5</sub> - 25µg/m<sup>3</sup> (EU directive averaging 1 year)

# *SUMMARY*

The background is a blue gradient with faint technical diagrams and circular patterns. On the right side, there is a large circular diagram with concentric circles and radial lines, resembling a gauge or a scale. The numbers 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, and 200 are visible along the outer edge of this diagram. There are also smaller circular diagrams and dashed lines scattered across the background.

- All the averaging 1 year concentration of both  $PM_{10}$  and  $PM_{2.5}$  did not exceed the standard limit of EU directive and Malaysian Air Quality Guidelines.
- This showed that the quality of the air was not affected by the mining industry and control measures taken them were effective in controlling air pollution.
- The levels of  $PM_{10}$  and  $PM_{2.5}$  were influenced by the condition of the traffic at that particular moment of time. It was higher during the peak hour (early in the morning and in the evening).

