4th Atmospheric Composition and the Asian Monsoon (ACAM) workshop
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Air pollution in rural ecosystem in Myanmar: The issue being neglected so far

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Introduction

- **Myanmar - the *largest country* in *mainland Southeast Asia* with a total land area *of 677,000 sq.km.***
- **The latest estimations of population - about *54 million in 2018***
- **About *65 million by 2050* with *annual increase of 0.71%.***

Introduction (contd.)

- **Out of this population, one-third lives in urban areas, while the remaining *in rural areas* - depending on subsistence farming (UNDP, 2019).**

Introduction (contd.)

- In *Myanmar*, the developing country, *rural air quality* becomes a *challenge* since several rural areas have exceeded the national air quality guideline for *one or more air pollutants.*

Introduction (contd.)

- ***Rural*** **ecosystem where** ***a large percentage (70%)*** **of the population depends on is being** ***affected by air pollution*** **in a number of ways.**

Introduction (contd.)

- Currently, ***policy decision and actions on air quality*** mainly consider on ***mobile emissions*** resulting in ***urban air pollution***.

Objective

- To *raise understanding* of *policy makers, administrative personnel, developers and local community* on the *potential sources* of the *exceeding air quality guideline in Myanmar*

Introduction (contd.)

U.S.-Asia Environmental Law

Two Year's On – Some thoughts on Reviewing EIAs, IEEs, and EMPs

17 November 2017
Yangon

- Environmental Conservation Law, 2012
- Environmental Conservation Rule, 2014
- Environmental Impact Assessment Procedures , 2015
- EIA – Development projects in remote /rural areas
- Environmental Baseline Studies – (Air, Water, Soil etc.) in Rural areas – *The existing baseline air quality status*

Environmental Baseline Data

- **The *five years data (2013-2018)* provides the *insight of rural air status* and the notable findings**

Ambient Air Monitoring in Rural Areas

- The *perimeter air monitoring station* has been *24hr continuously monitoring on particulates and gases* in the rural areas across states and regions of the country in which the development projects will be operated.

- These surveys were *cross sectional studies* being conducted as the *scope of works for the Environmental Impact Assessment.*

HAZ-SCANNER EPAS Wireless Environmental Perimeter Air Monitoring Station (EPAS)

Sr	Parameters	Sensors	Detection limit
1	**TSPM, PM10, PM2.5**	**90 degree Infra Red Light Scattering**	0 to 5000 µg/m3

Calibration: Gravimetric reference NIST Traceable - SAE fine dust- ISO12103-1, Accuracy (± 10% to filter gravimetric SAE fine test dust which falls under the ACGIH/ ISO/CEN criteria.

Sr	Parameters	Sensors	Detection limit
1	NO2	Electrochemical	(0-5000) ppb
2	SO2	Electrochemical	(0-5000) ppb
3	CO	Electrochemical	(0 -10,000) ppb
4	NH3	Electrochemical	(0 -100) ppm
5	H2S	Electrochemical	(0 -25) ppm
6	VOC	Photoionization	0 to 50,000 ppb
7	CO2	NDIR	0 to 5000 ppm
8	Methane	NDIR	0 to 1% Vol,0 to 10,000 ppm,0 to 20% LEL
9	O3	Metal oxide semiconductor (MOS),	(0 -150) ppb

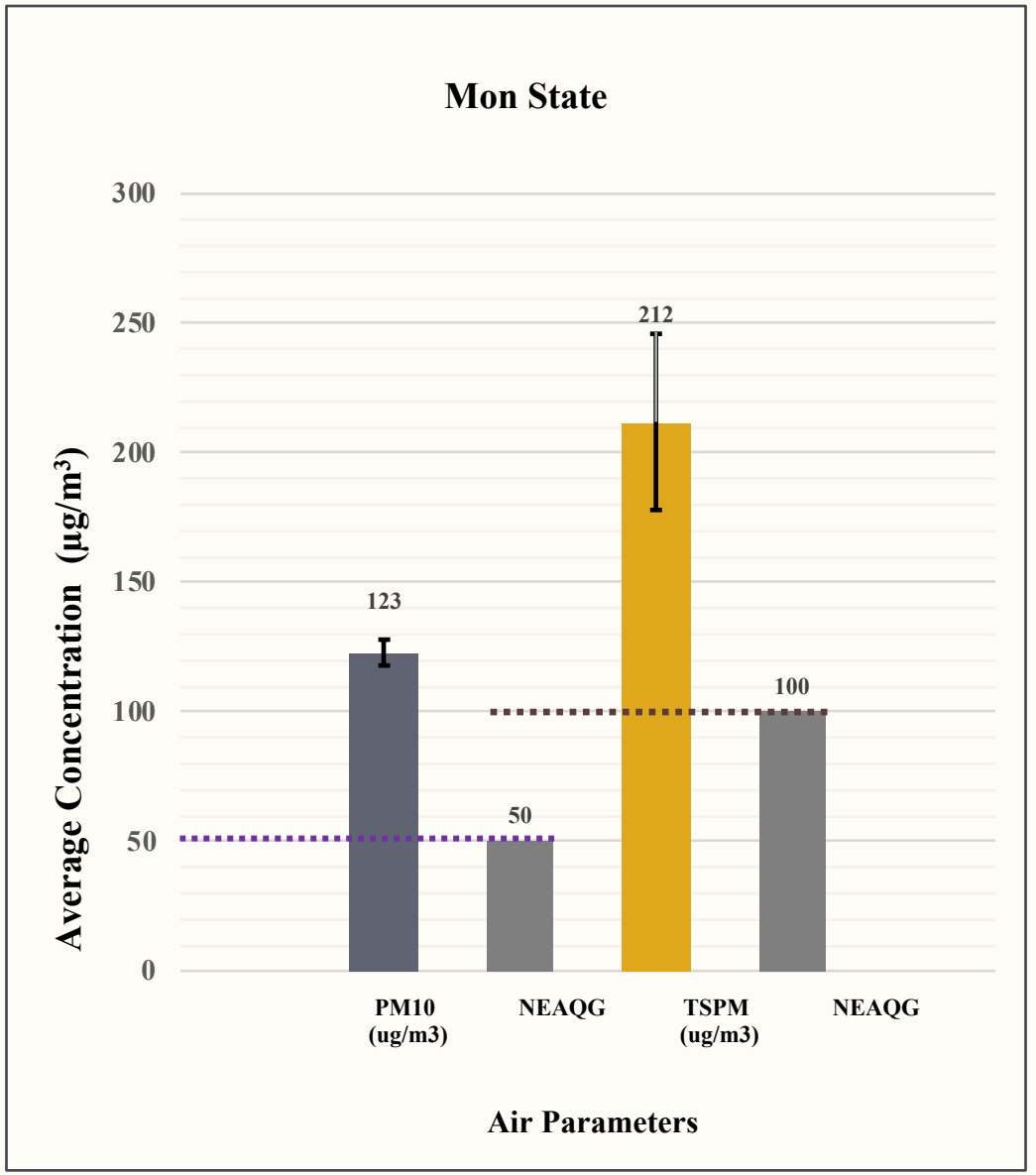
Sr	Parameters	Sensors	Detection limit
1	Temperature, Detection limit -)/ (-20°C - 60°C)	NTC	(-20 to 60 C)/ (-4° to 140°F
2	Relative Humidity	CAP	(0-100)%
3	Wind Speed (sensor:), Detection limit -	3-cup anemometer a	(0 – 125 mph)
4	Wind Direction	Continuous rotation potentiometric wind direction vane	5. – 355)degrees
1	Atomic/Nuclear Radiation	Geiger counter	Geiger counter

Major findings

- ***PM10, PM 2.5*** **and** ***SO2*** **levels were** ***higher than/did not meet national air quality guideline*** **while** ***three transportation-related*** **pollutants including** ***Carbon monoxide, Ozone and NO2*** **were** ***below/meet the guideline.***

Mon State, Southern part of Myanmar

Major findings (contd.)

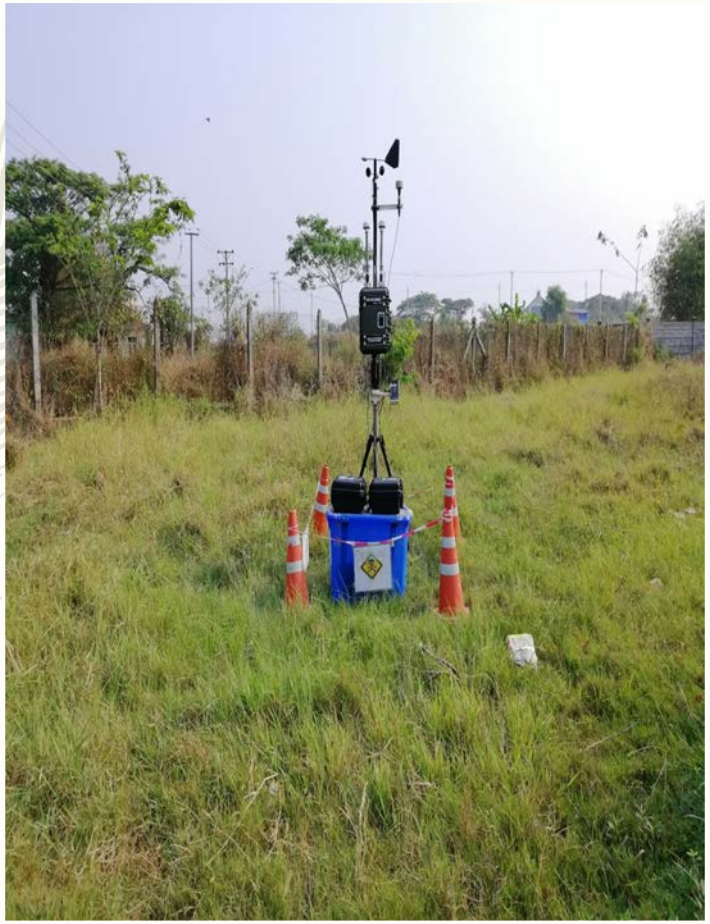


Alat Chaung Village (Suburban Area)

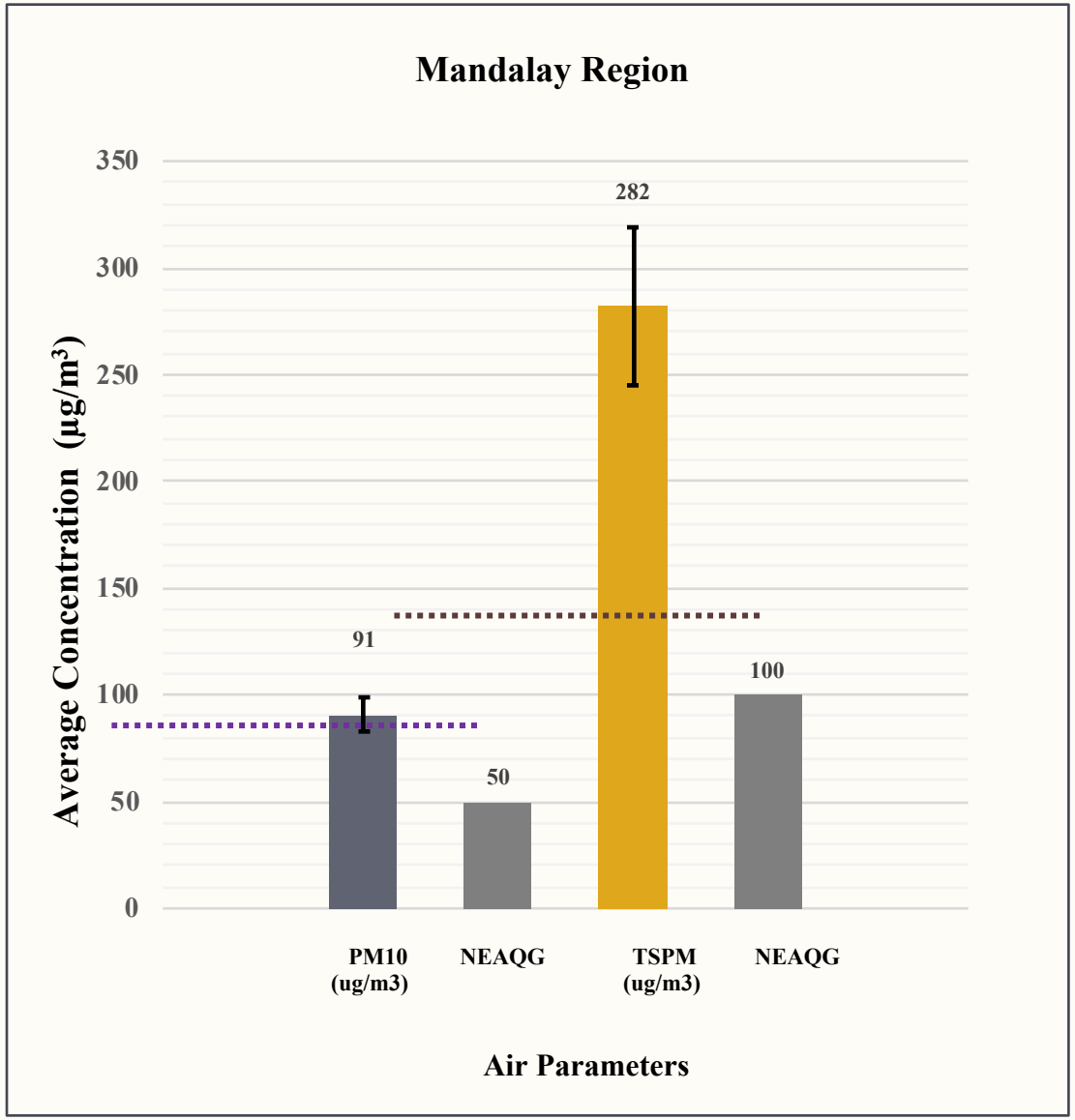
Middle part of Myanmar

Major findings (contd.)

Mandalay region



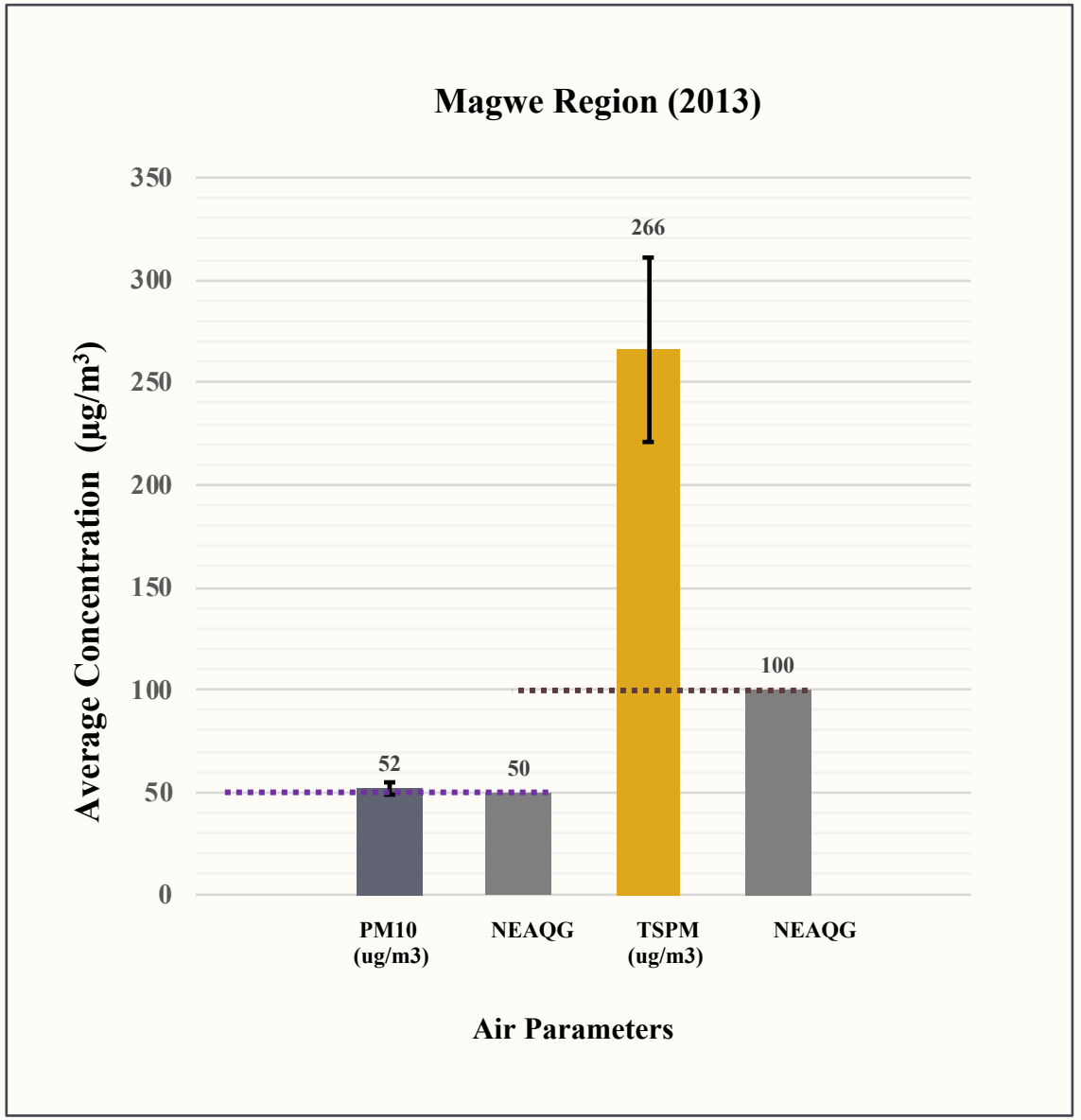
Mandalay region (Suburban Area)



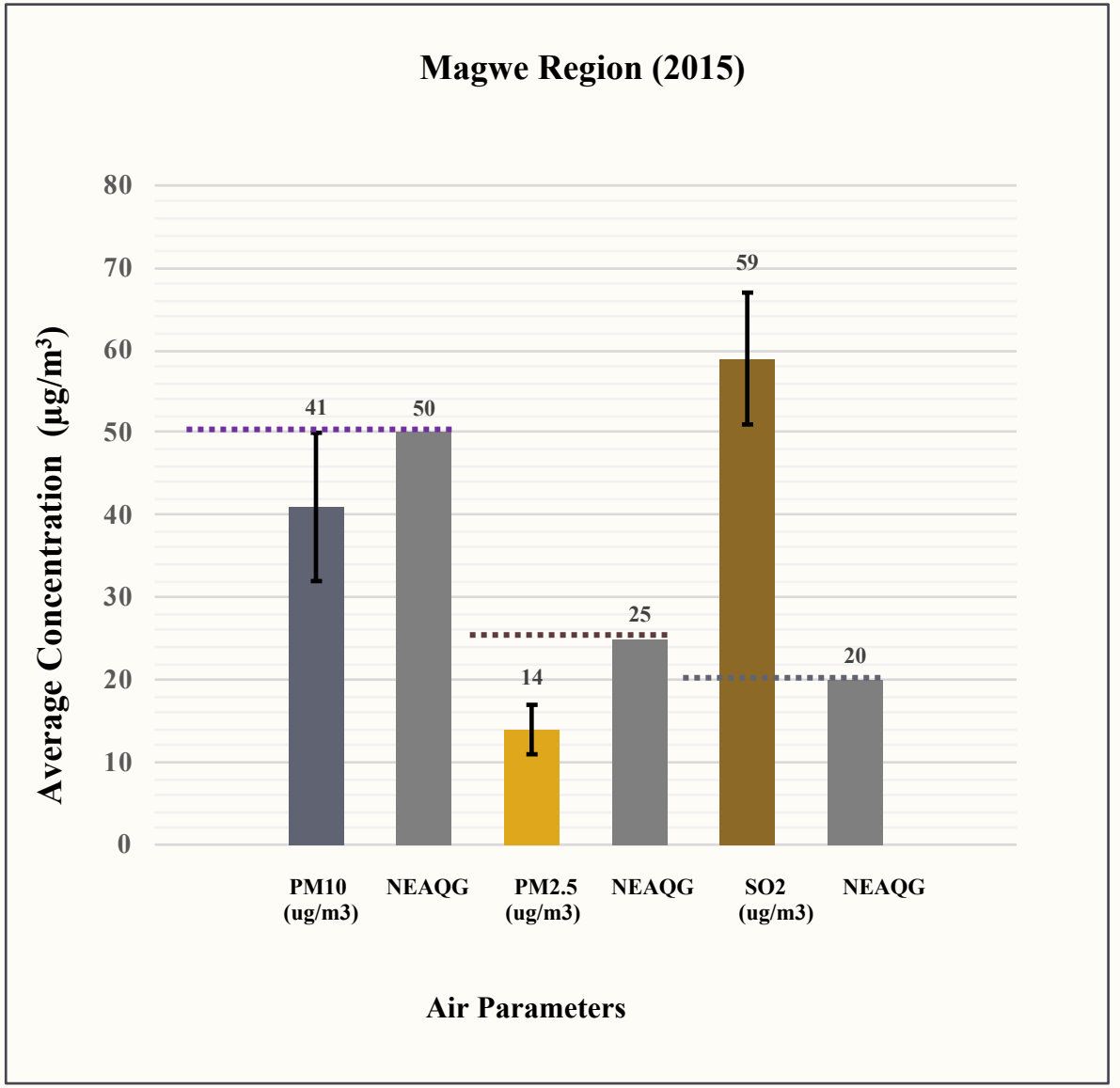
Major findings (contd.)

Magwe Region

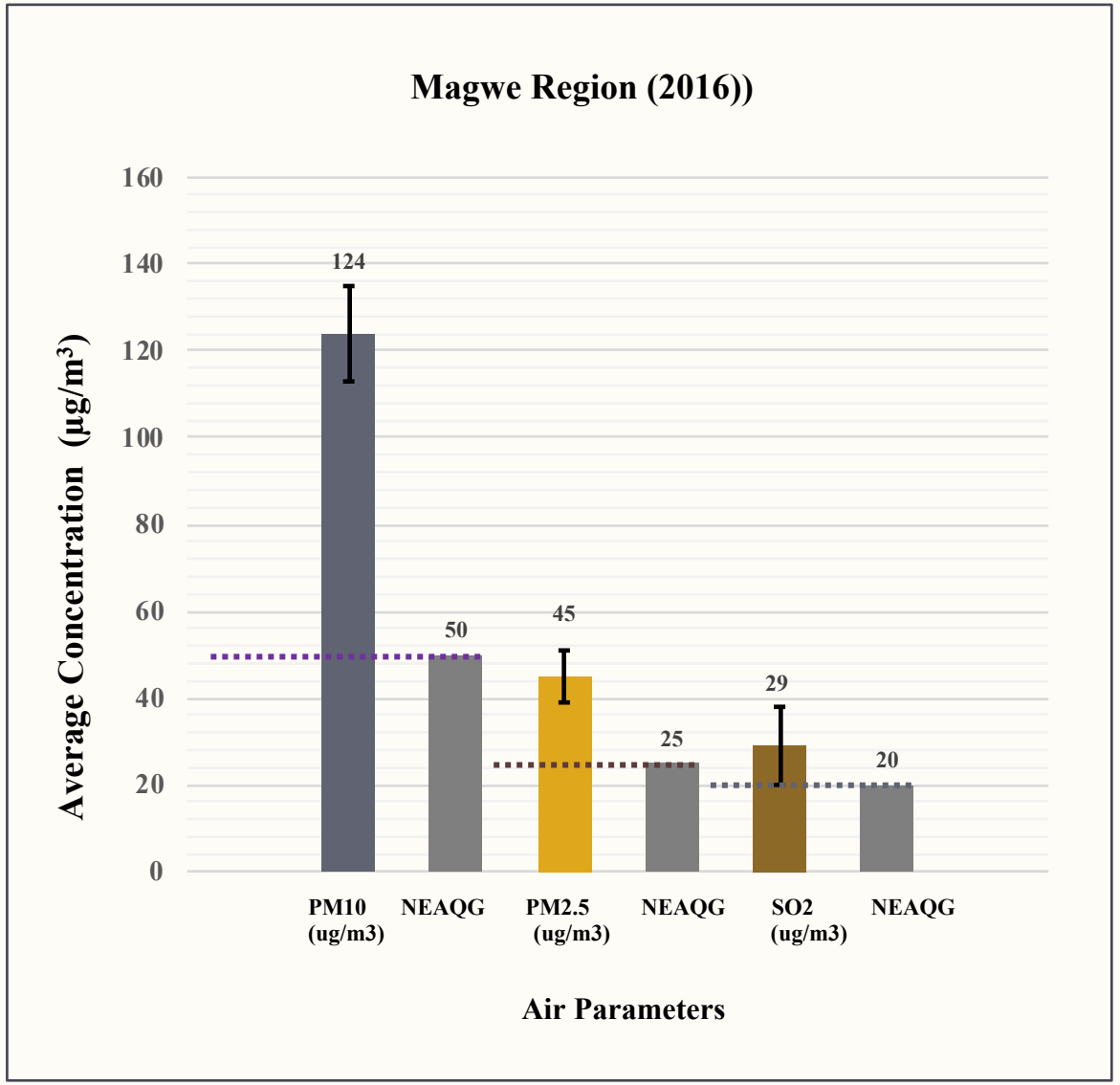
Magwe region (Suburban Area)

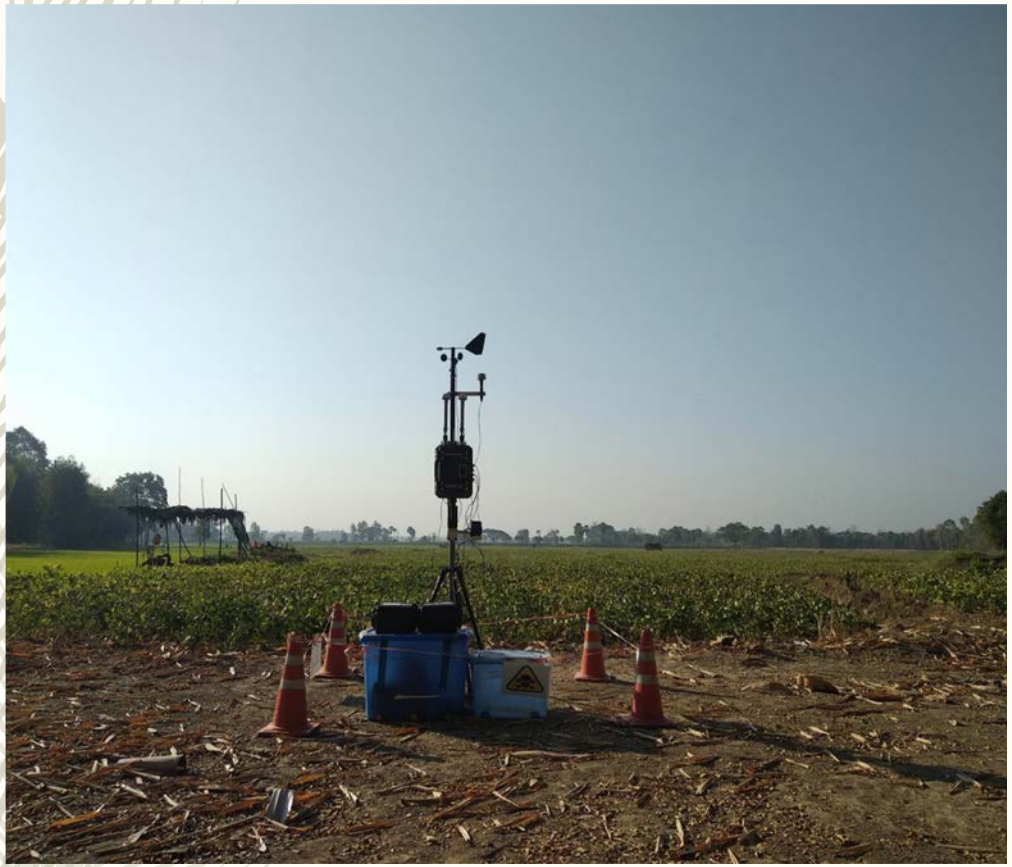


Magwe region (Suburban area)

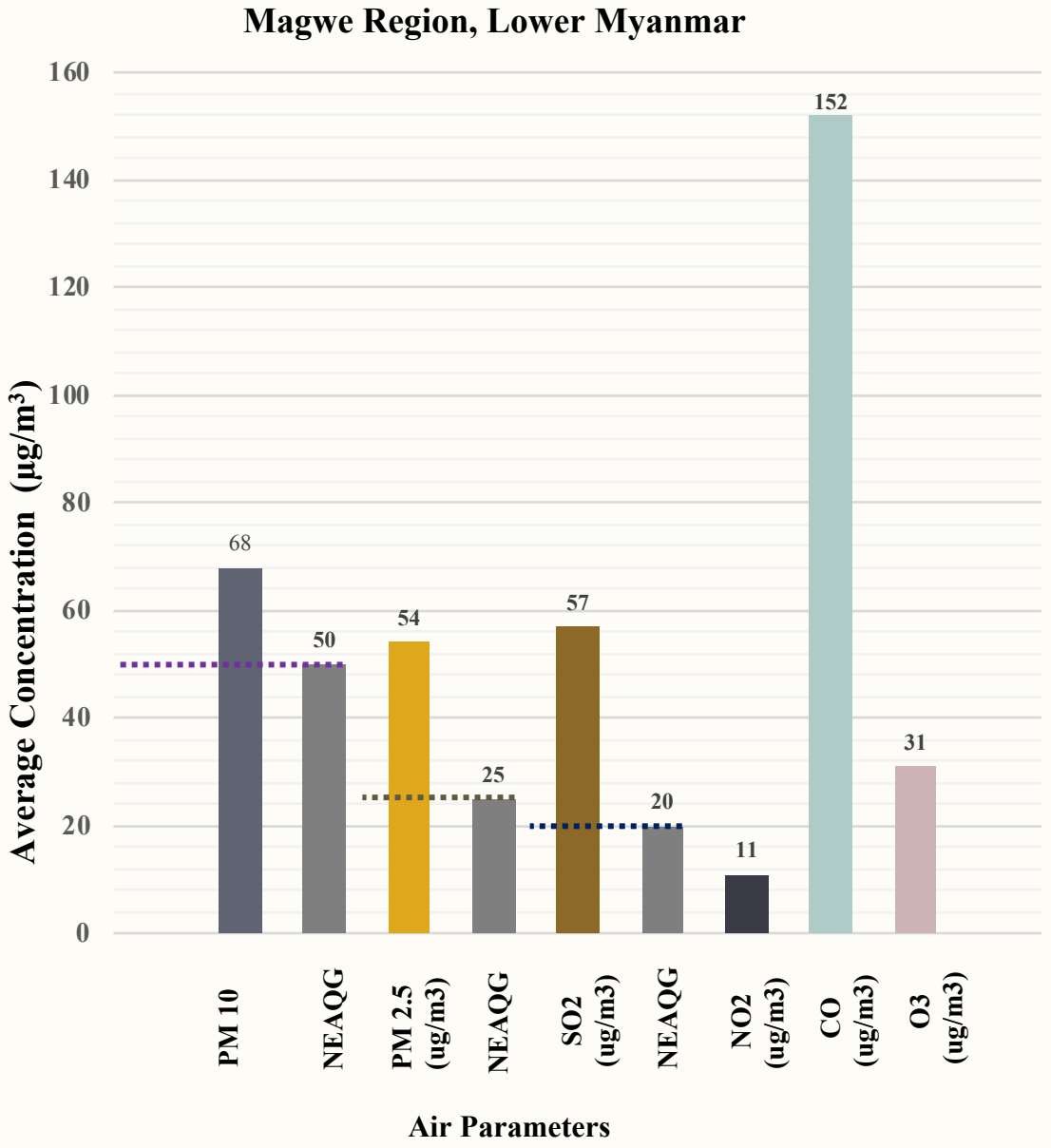


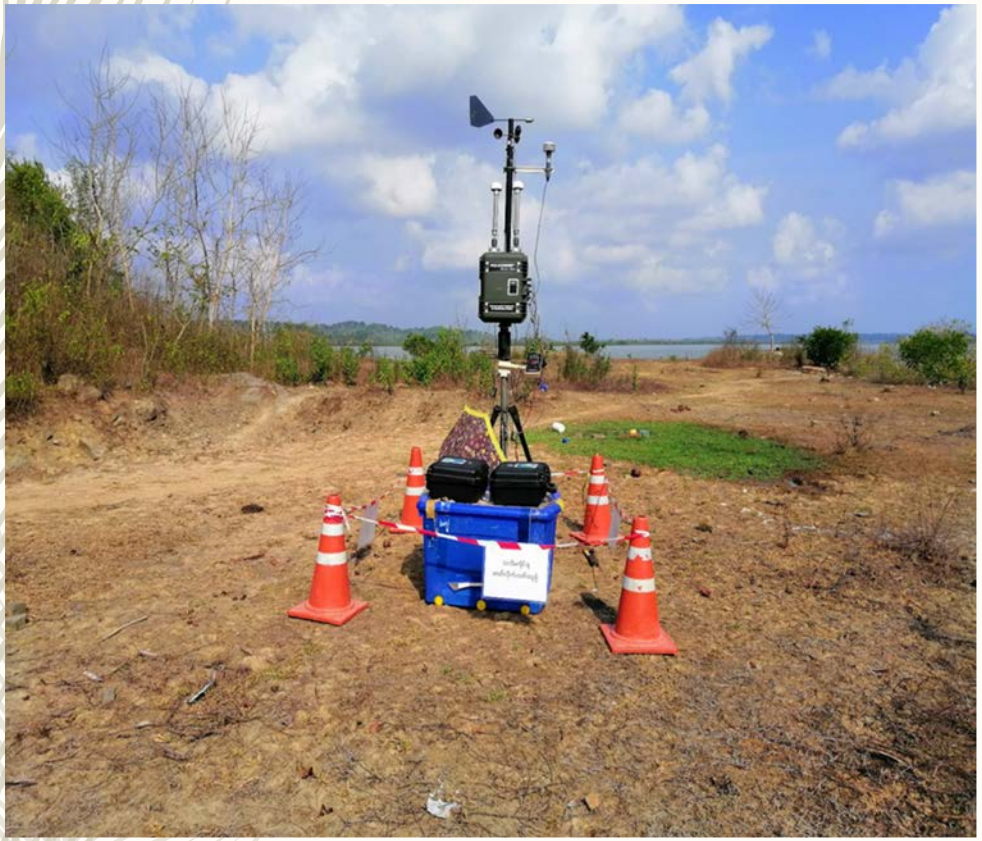
Magwe region (Suburban Area)



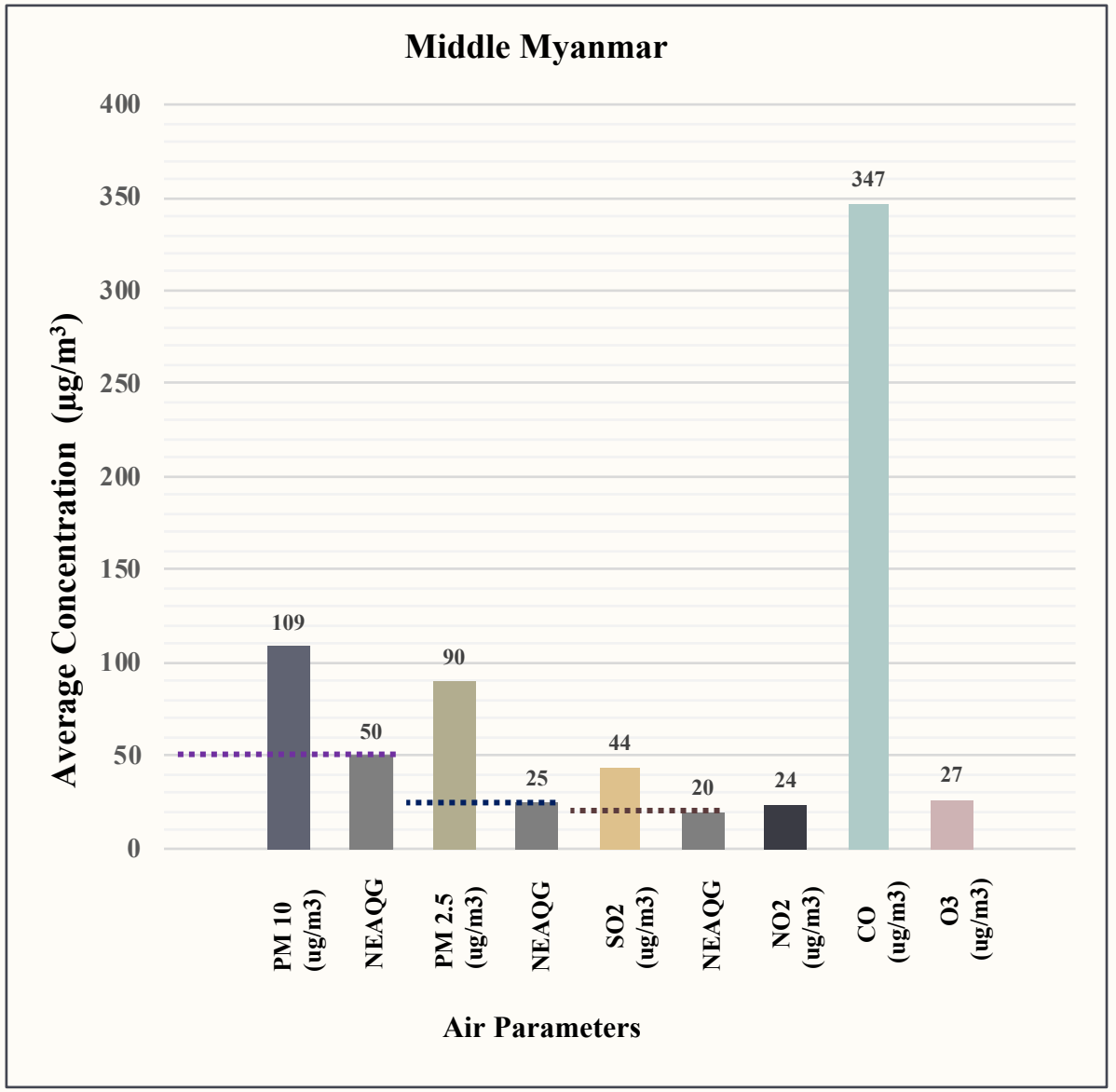


Magwe Region

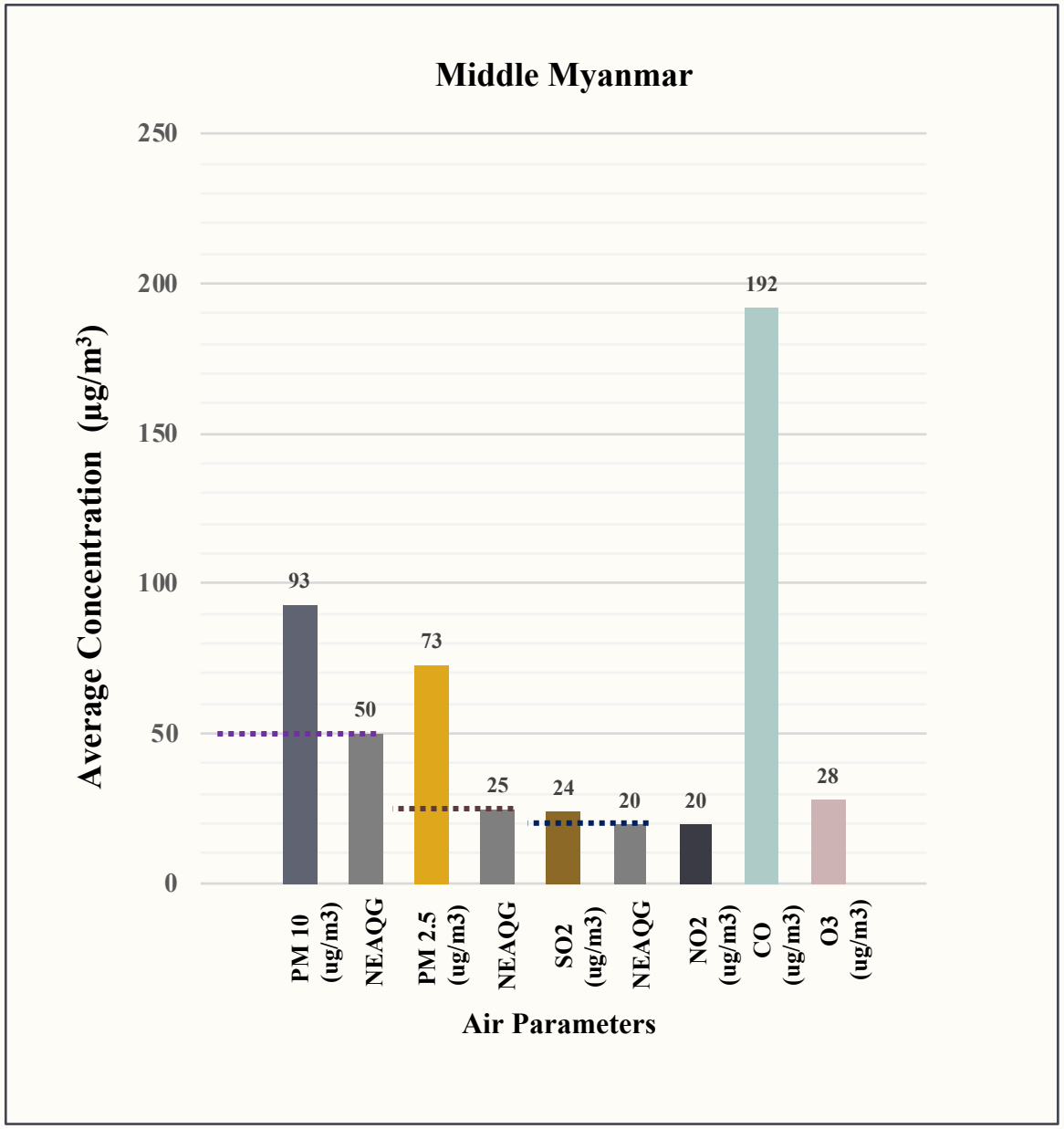




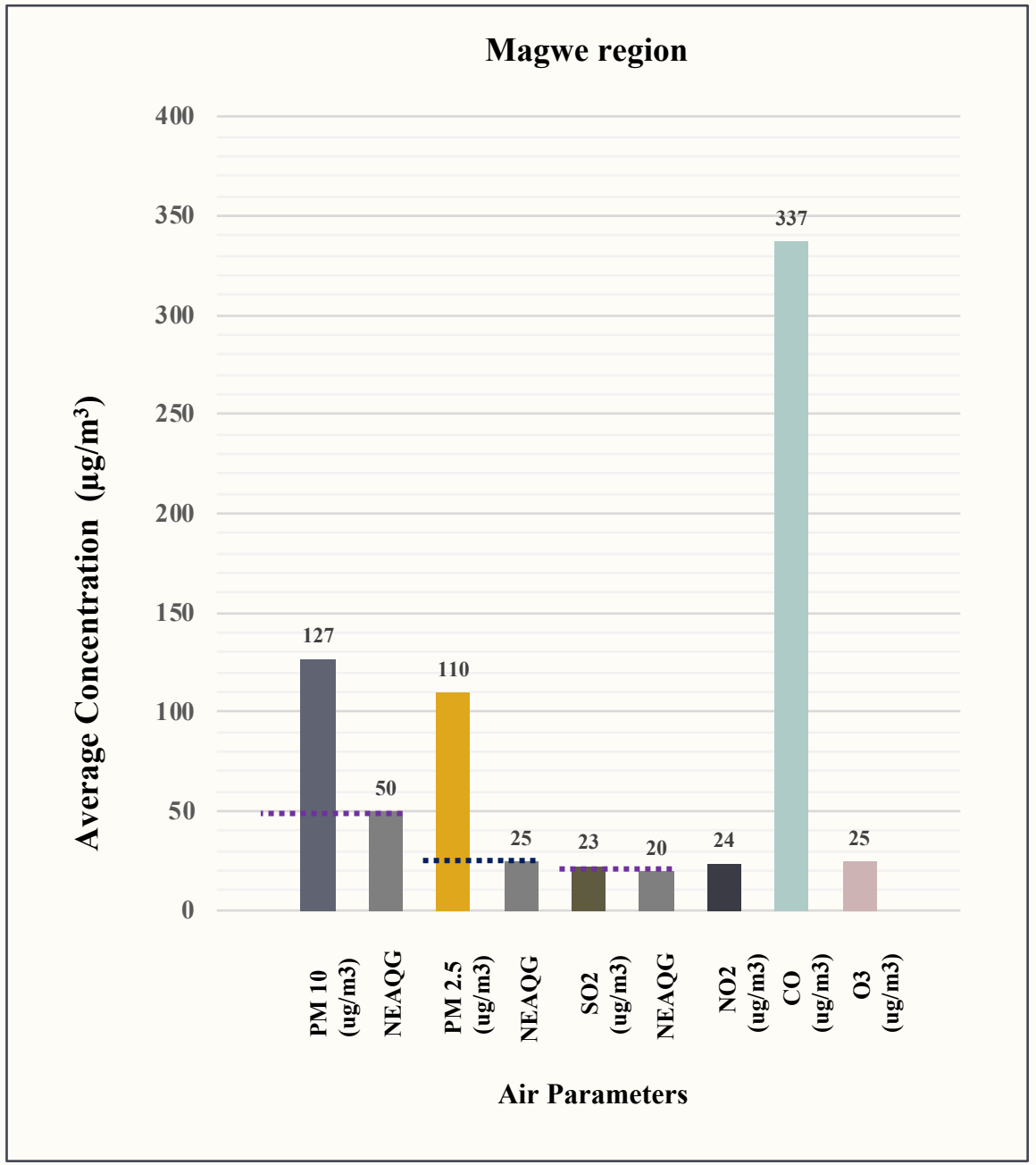
Middle Myanmar



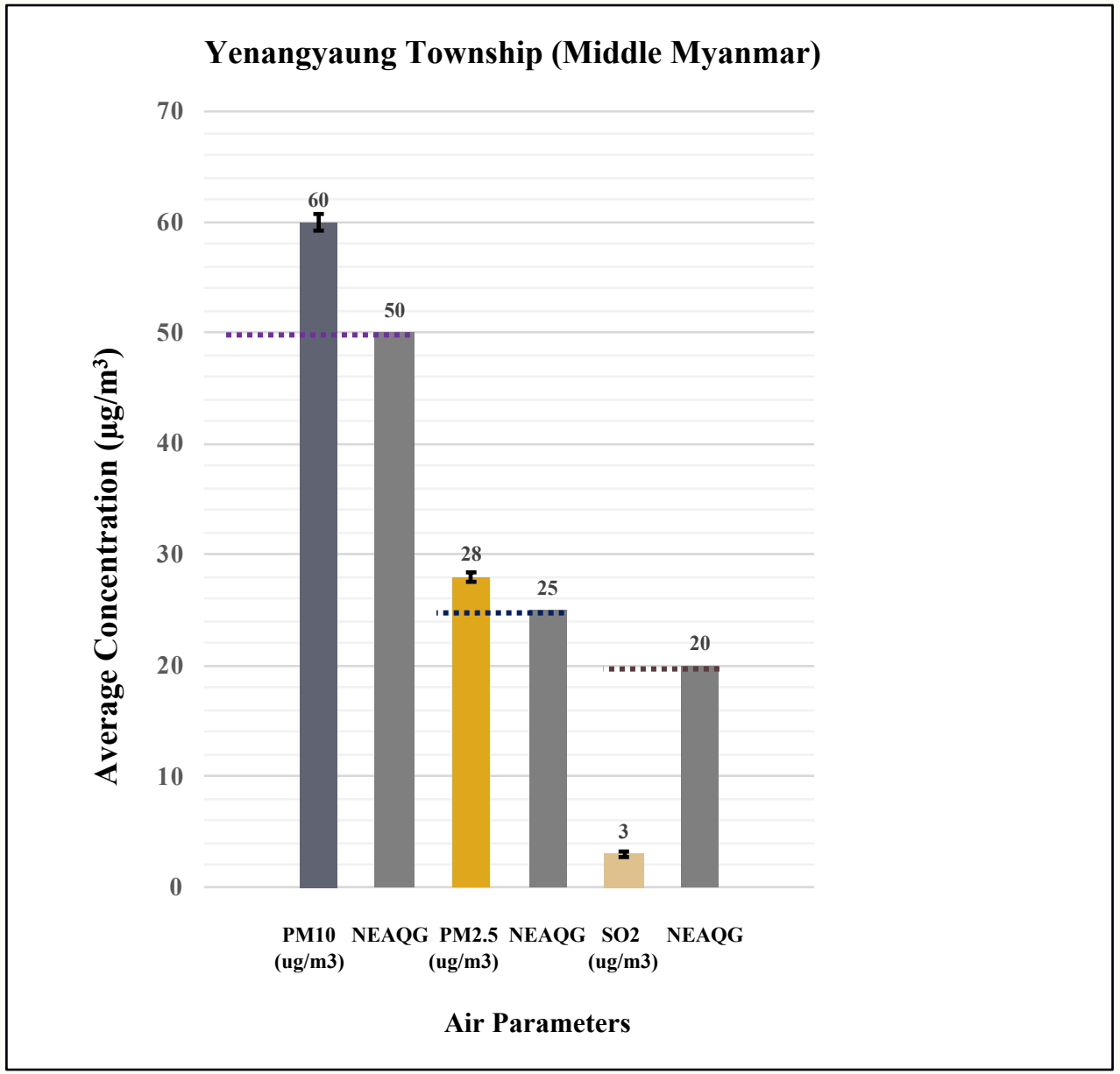
Middle Myanmar



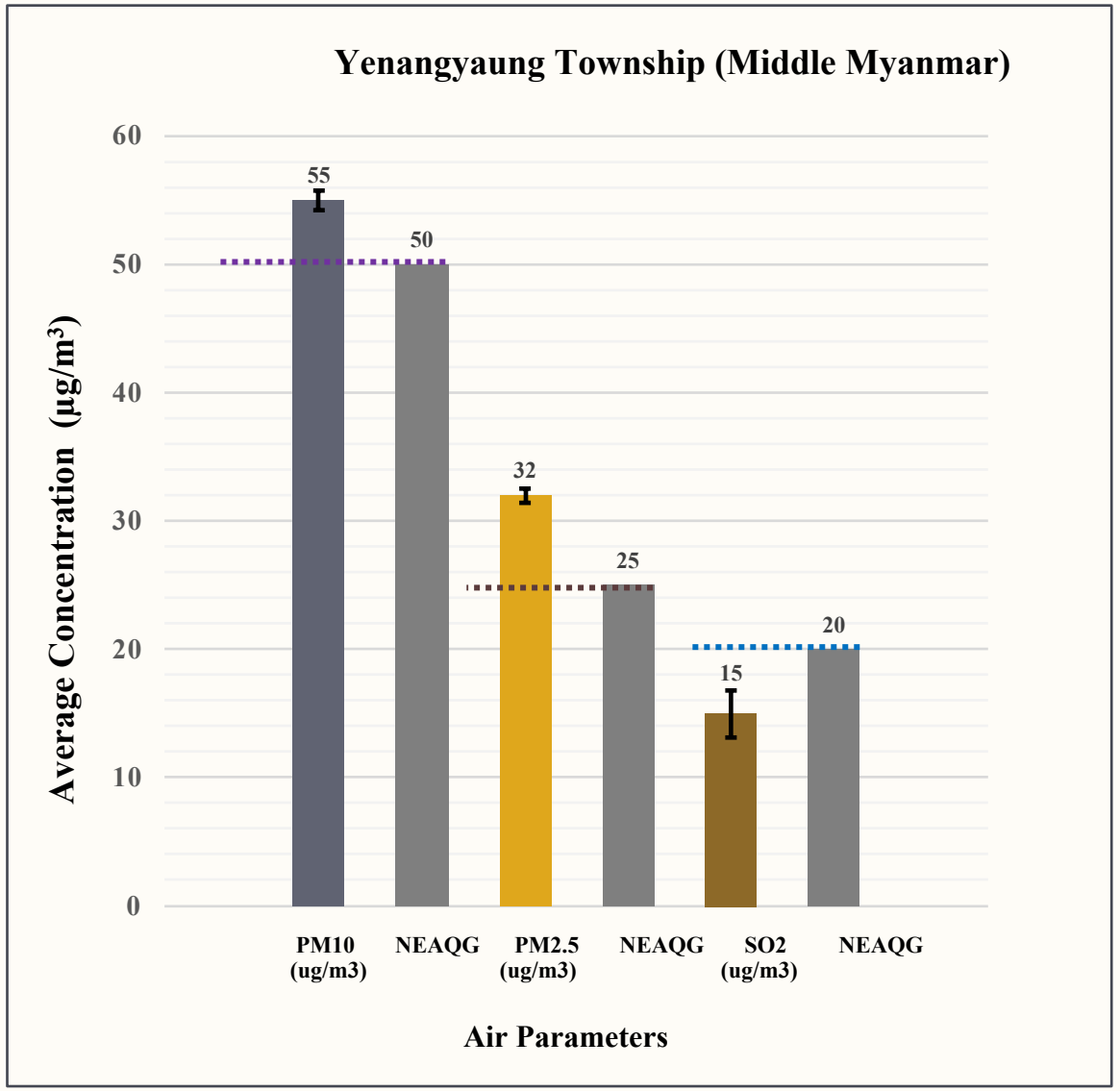
Magwe region, Myanmar



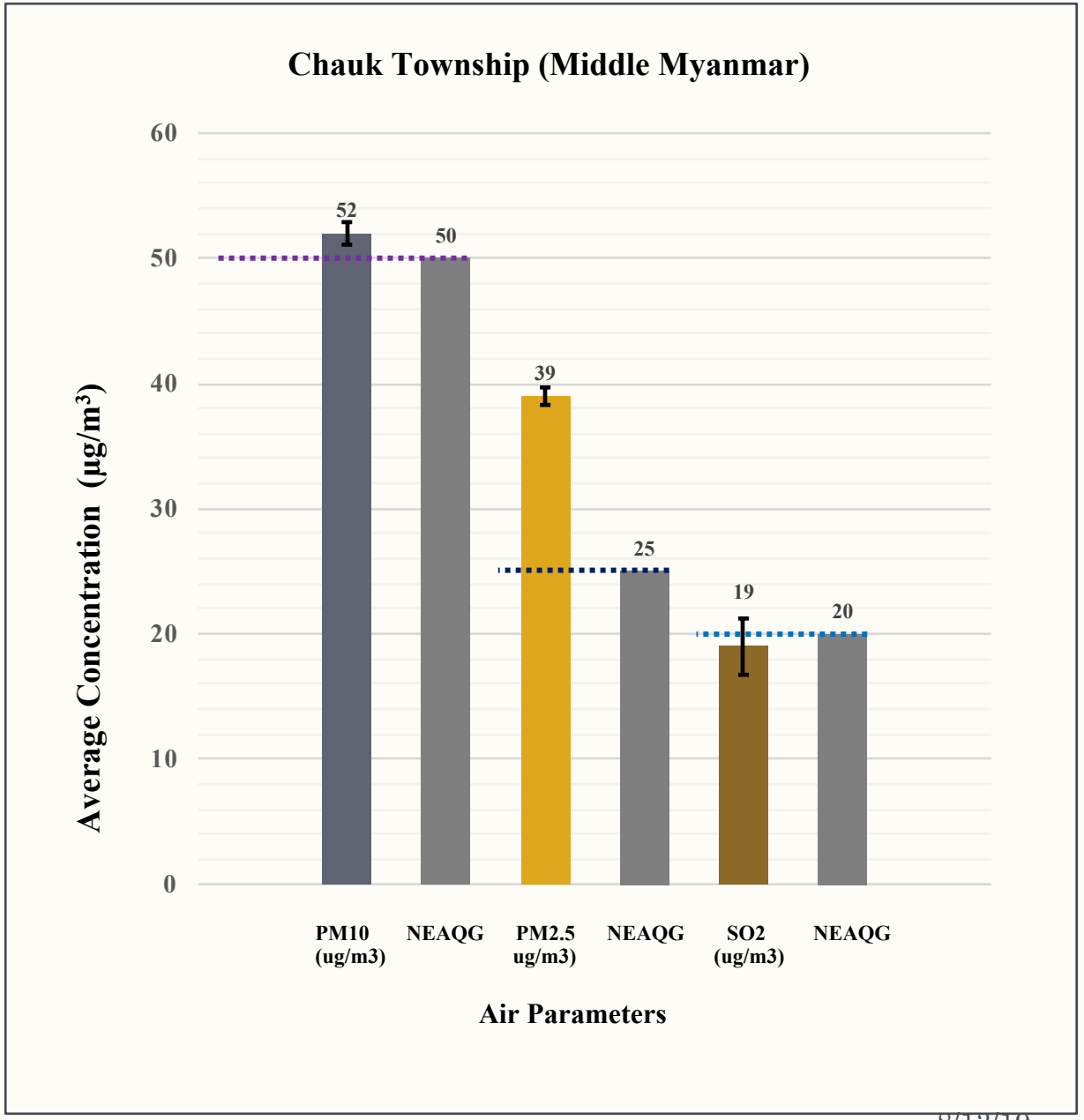
Yenangyaung Township



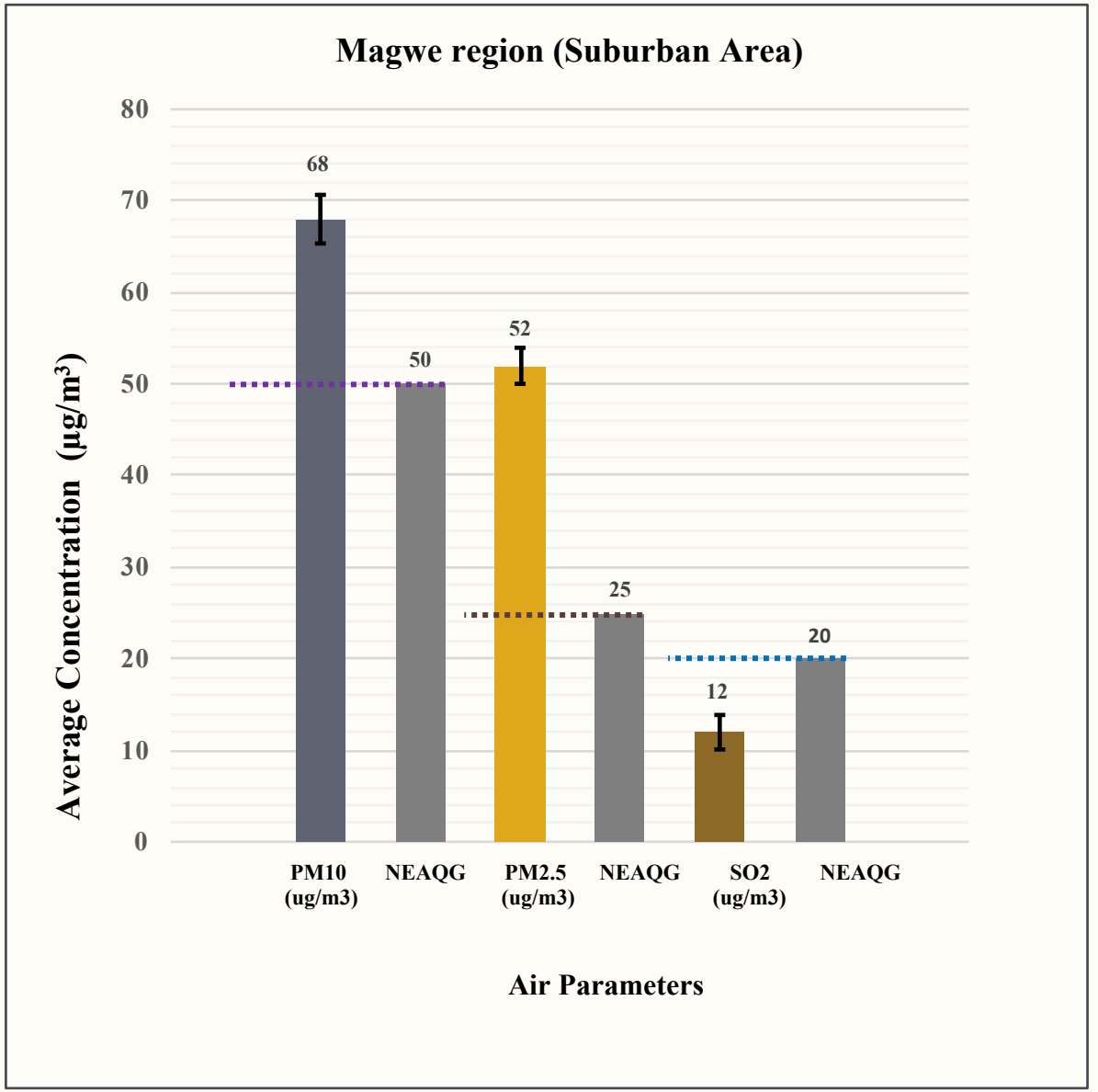
Yenangyaung Township



Chauk Township



Magwe region

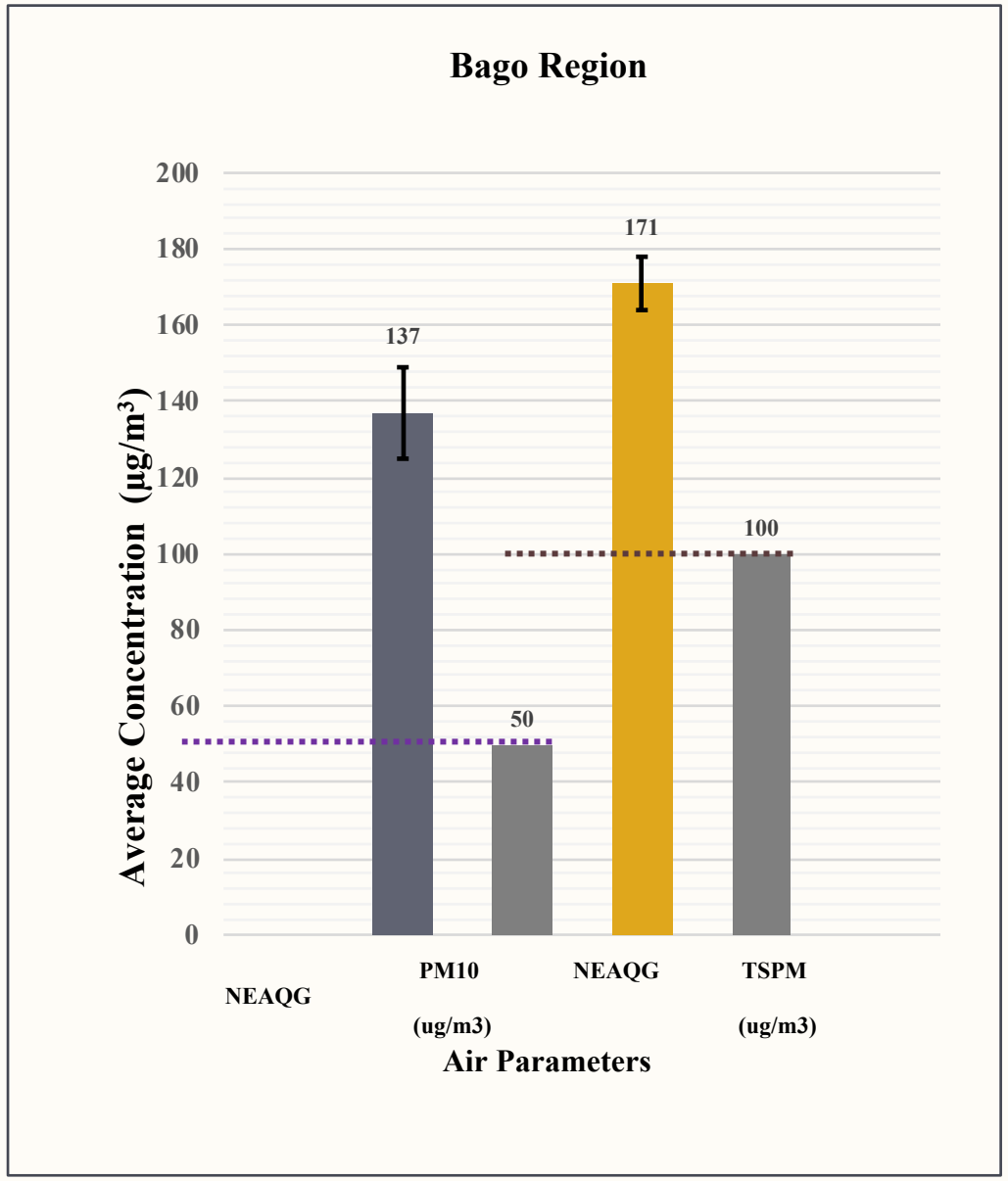


Lower Myanmar

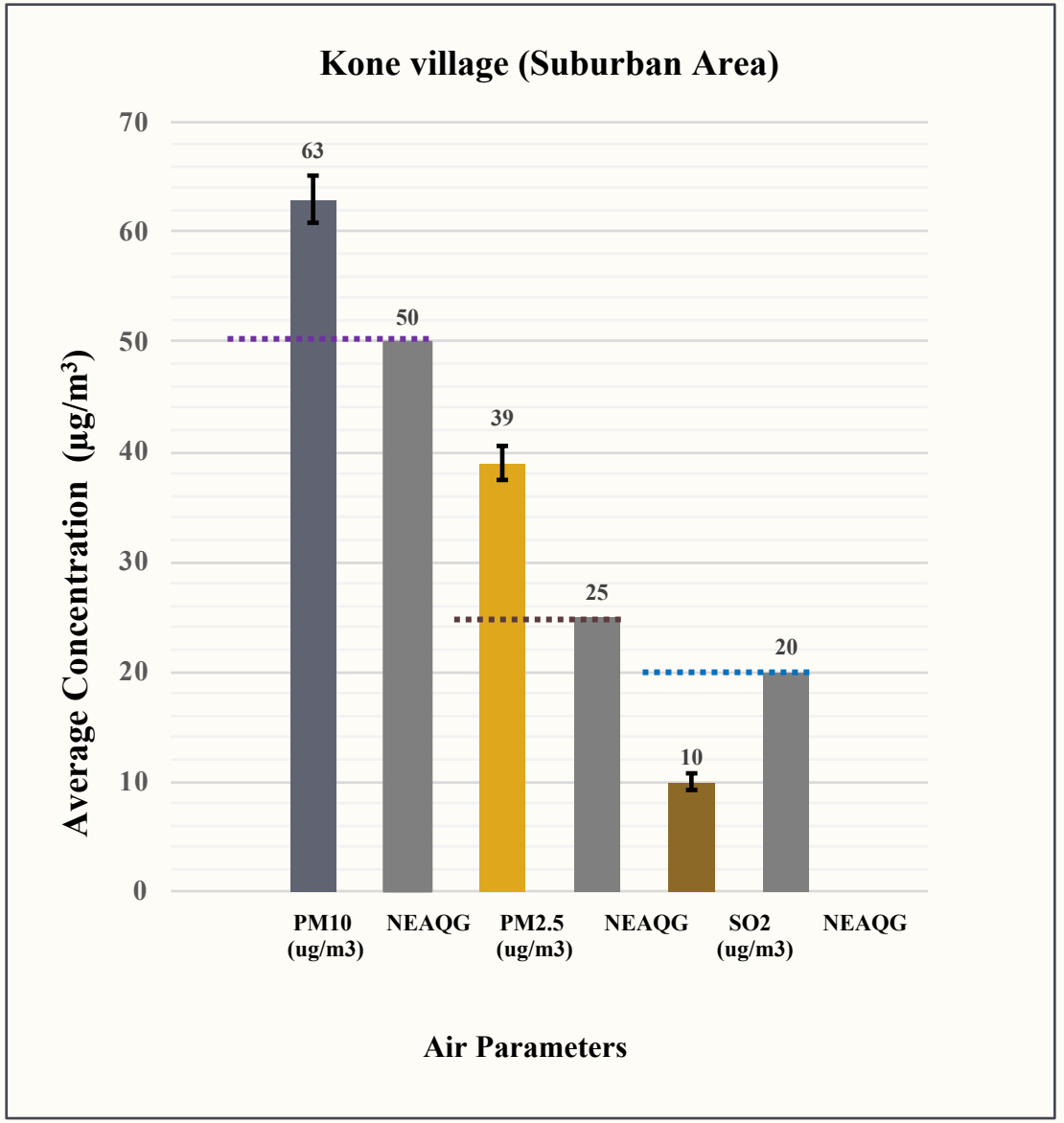
Major findings (contd.)

Bago Region

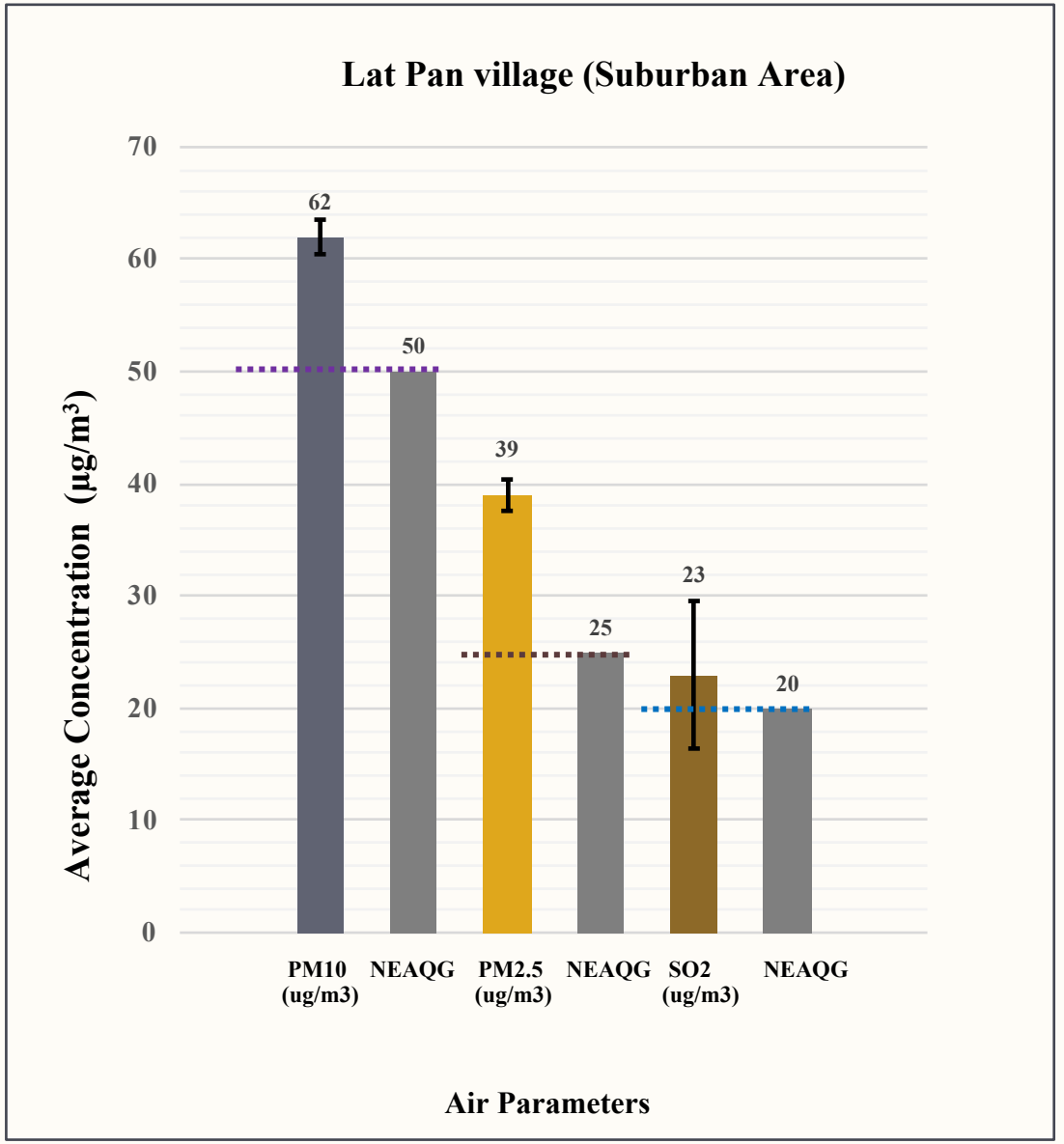
Bago region (Suburban Area)



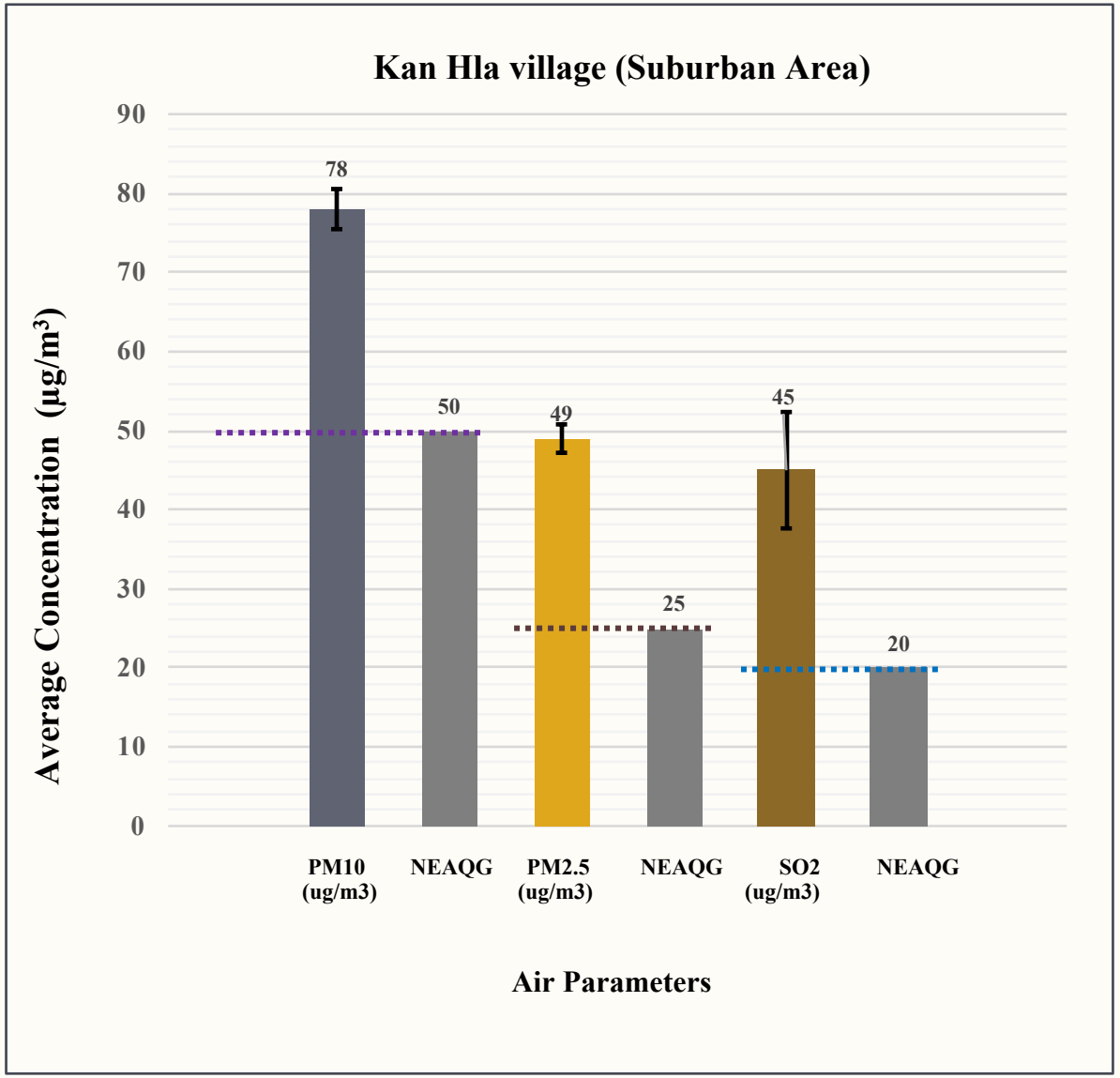
Kone village (Lower Myanmar)



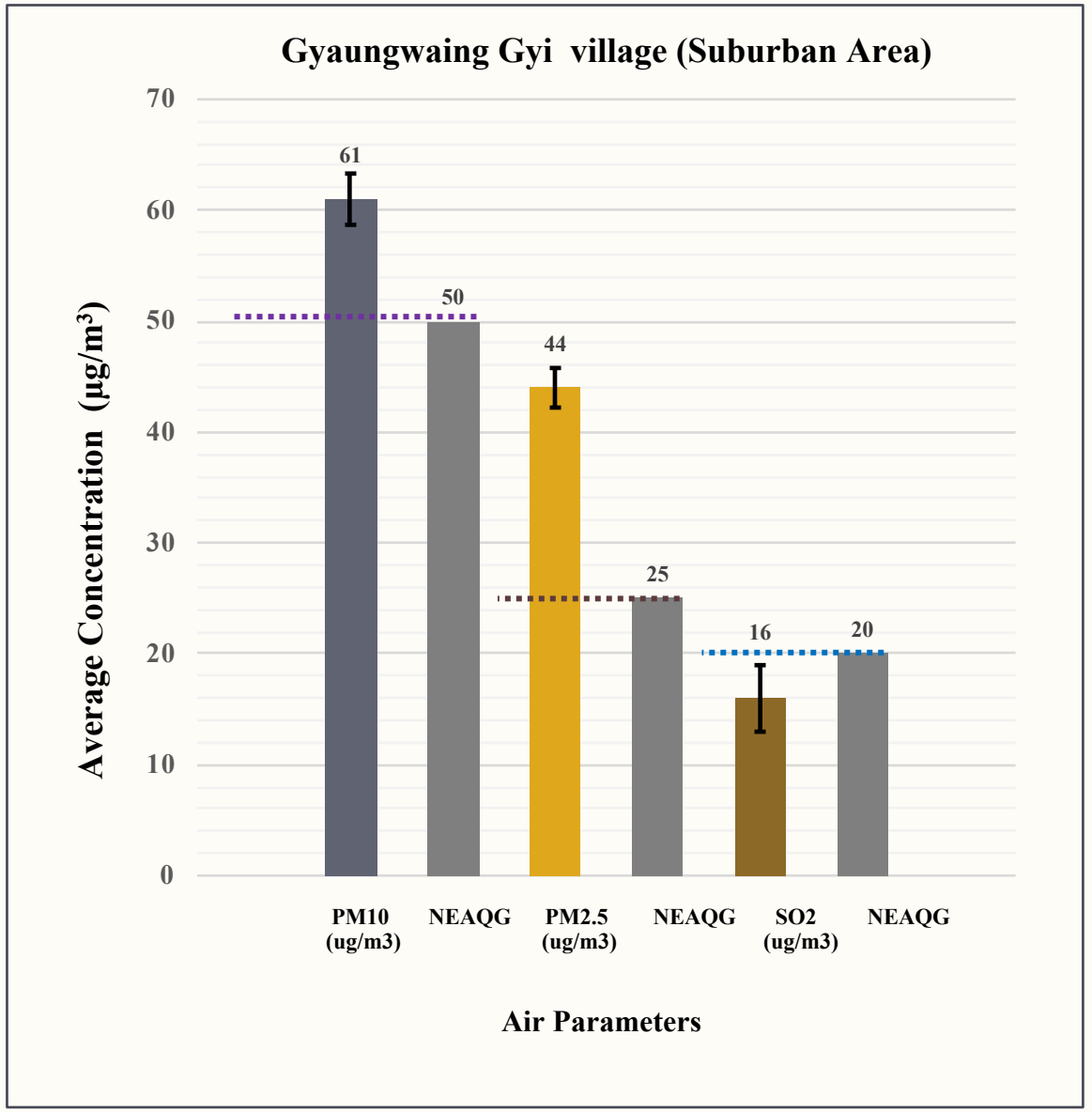
Lat Pan village , Lower Myanmar



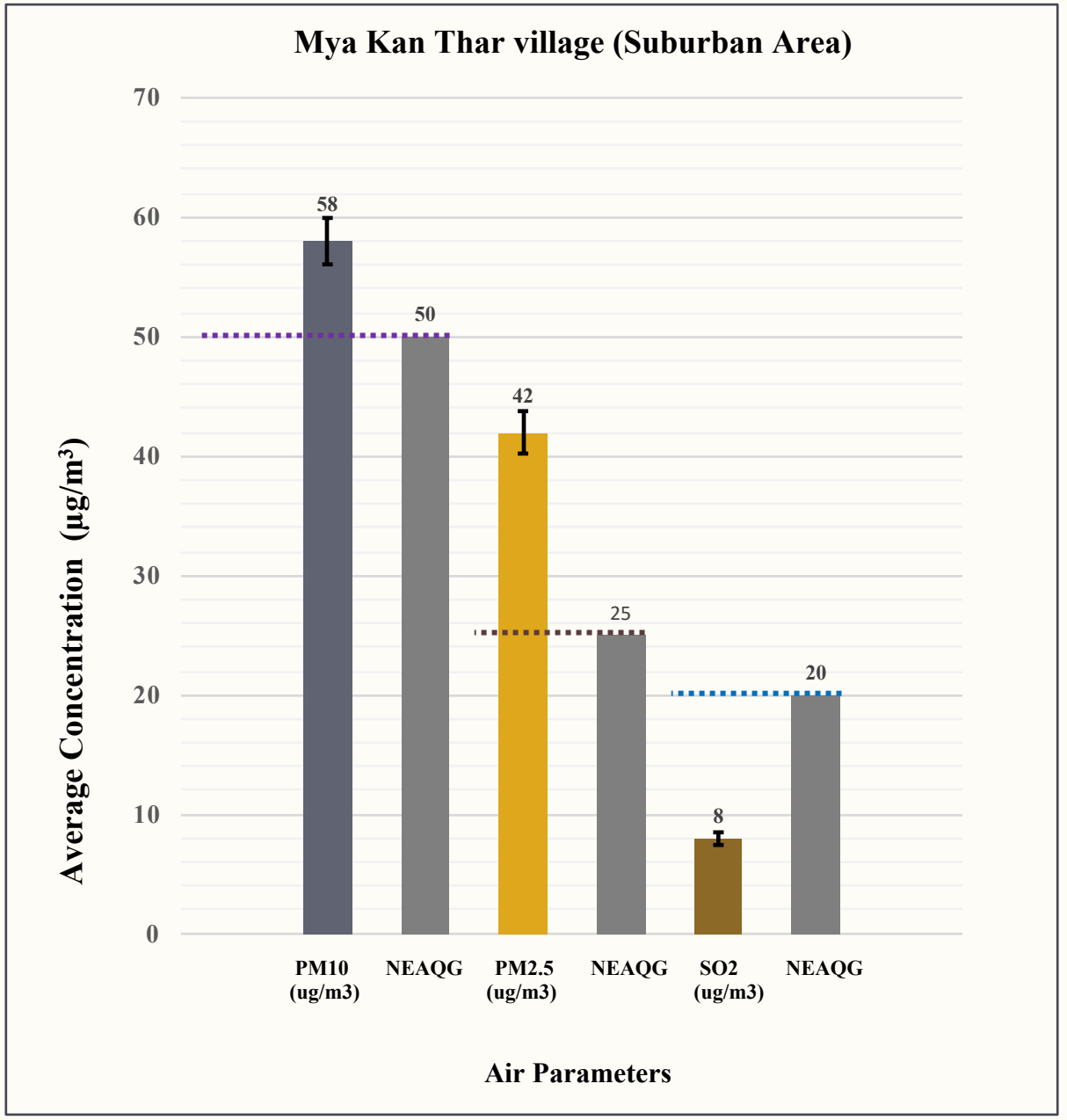
Kan Hla village, Lower Myanmar



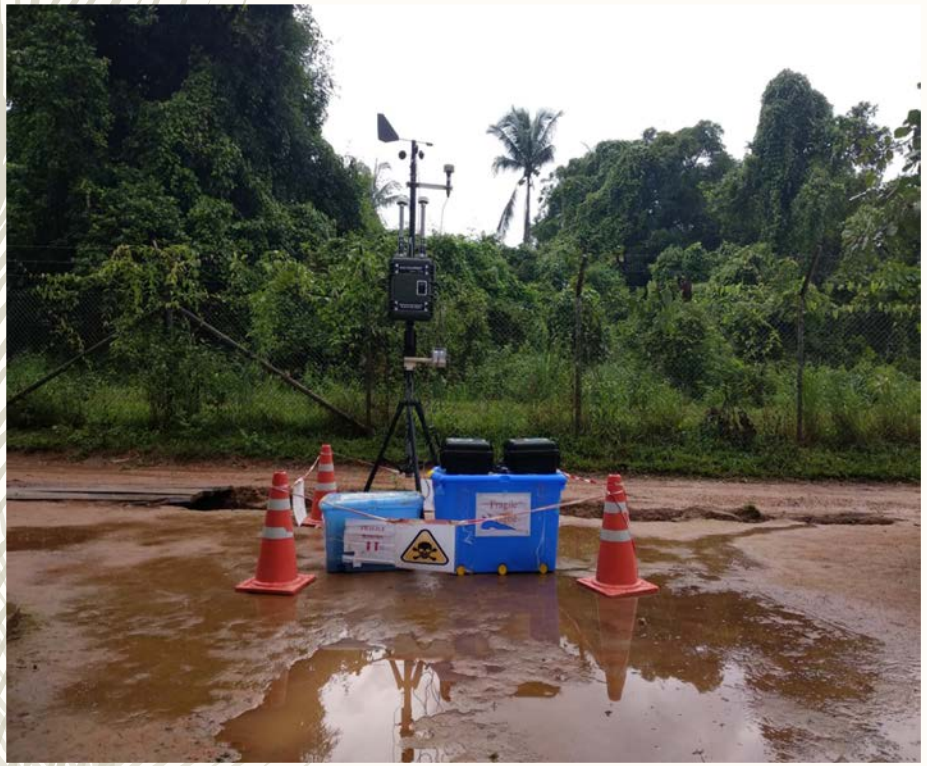
Gyaungwaing Gyi village, Lower Myanmar



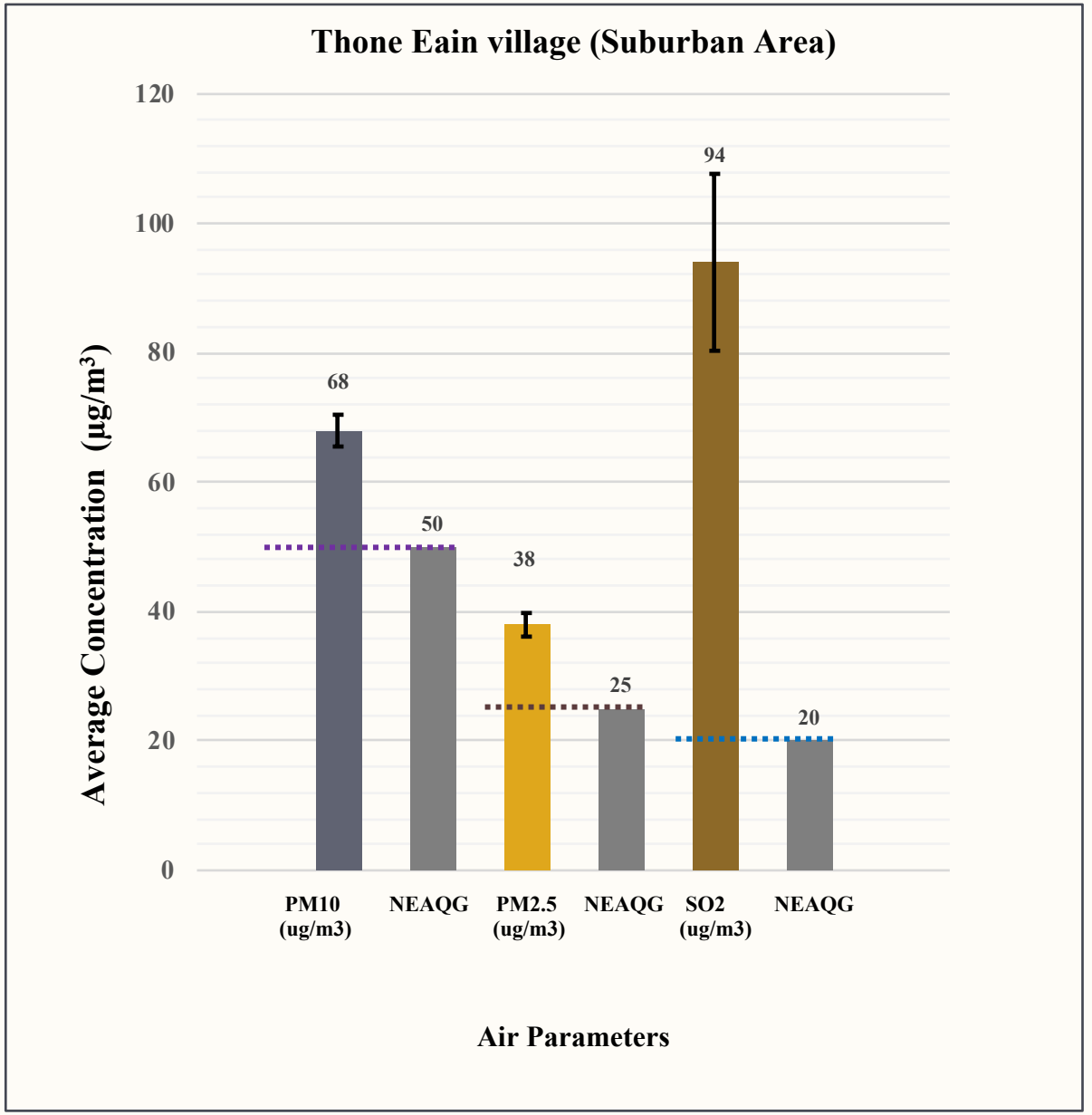
Mya Kan Thar village, Lower Myanmar

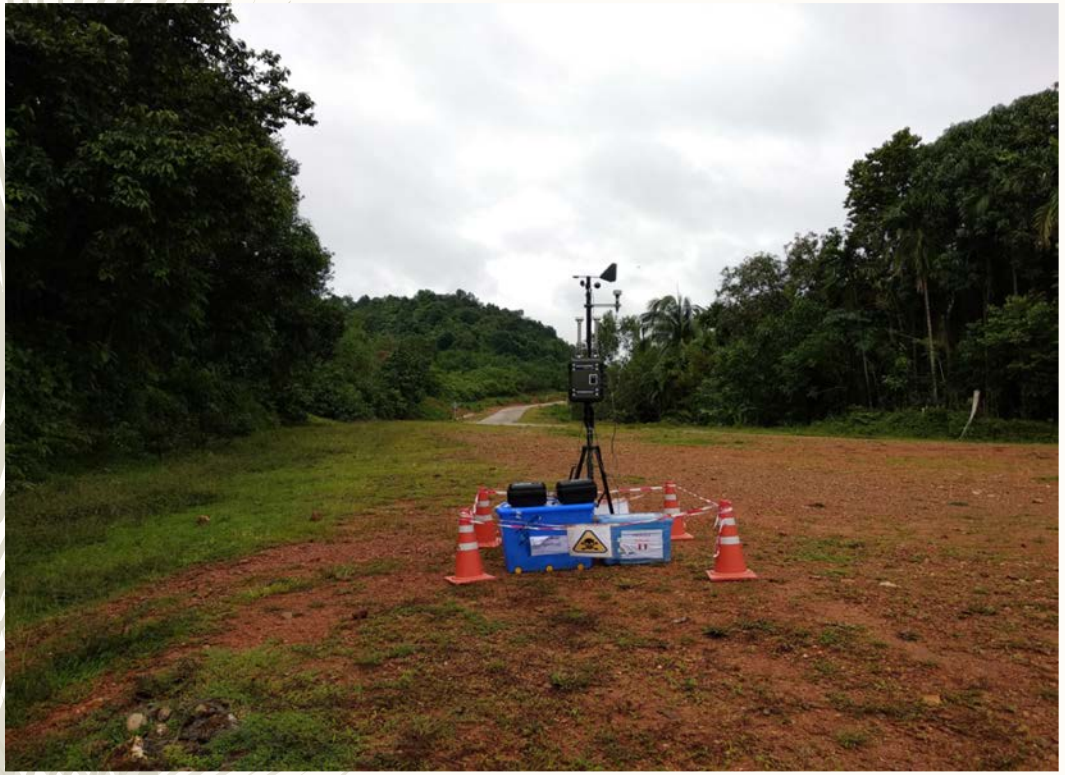


Upper Myanmar

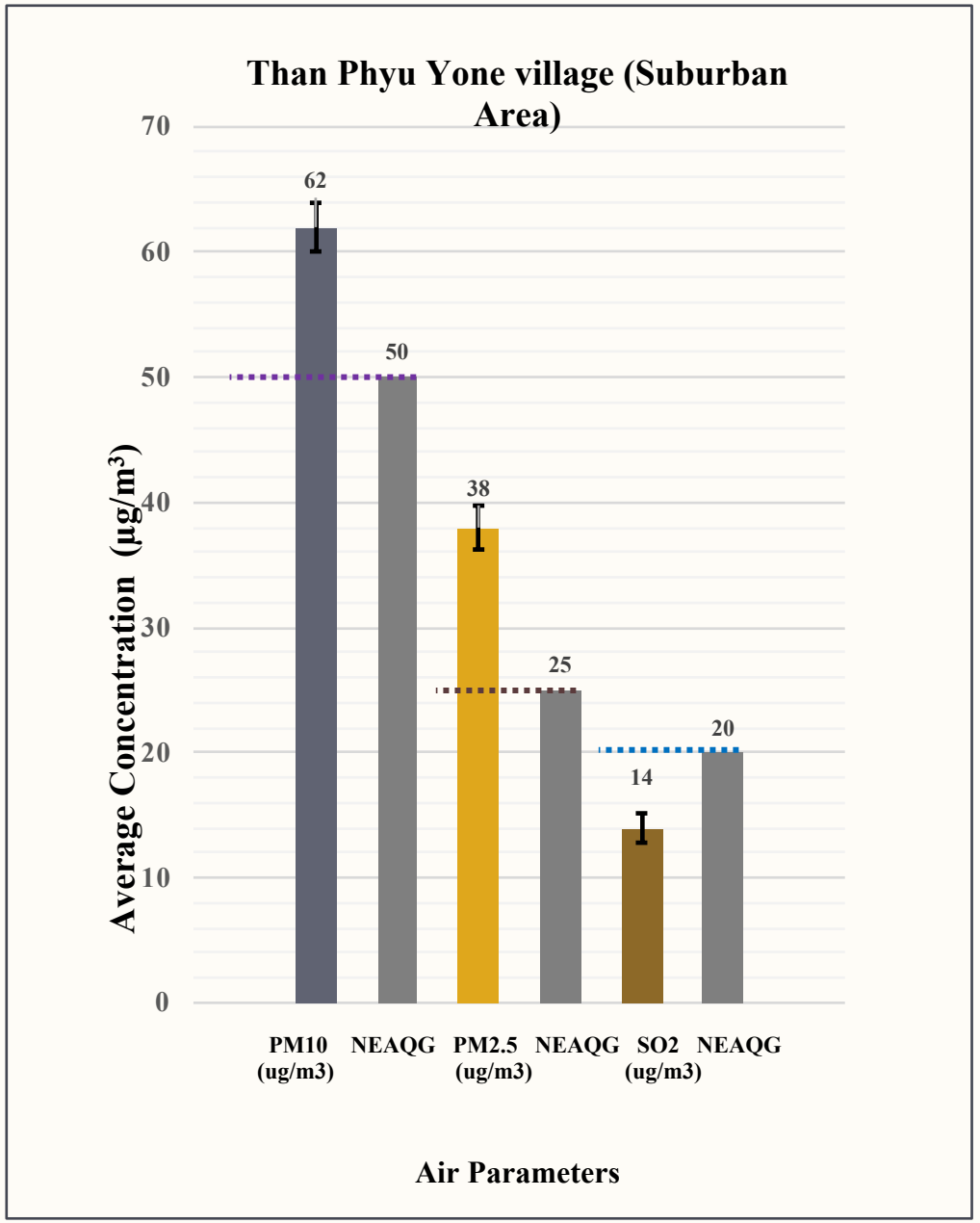


Thone Eain village, Upper Myanmar

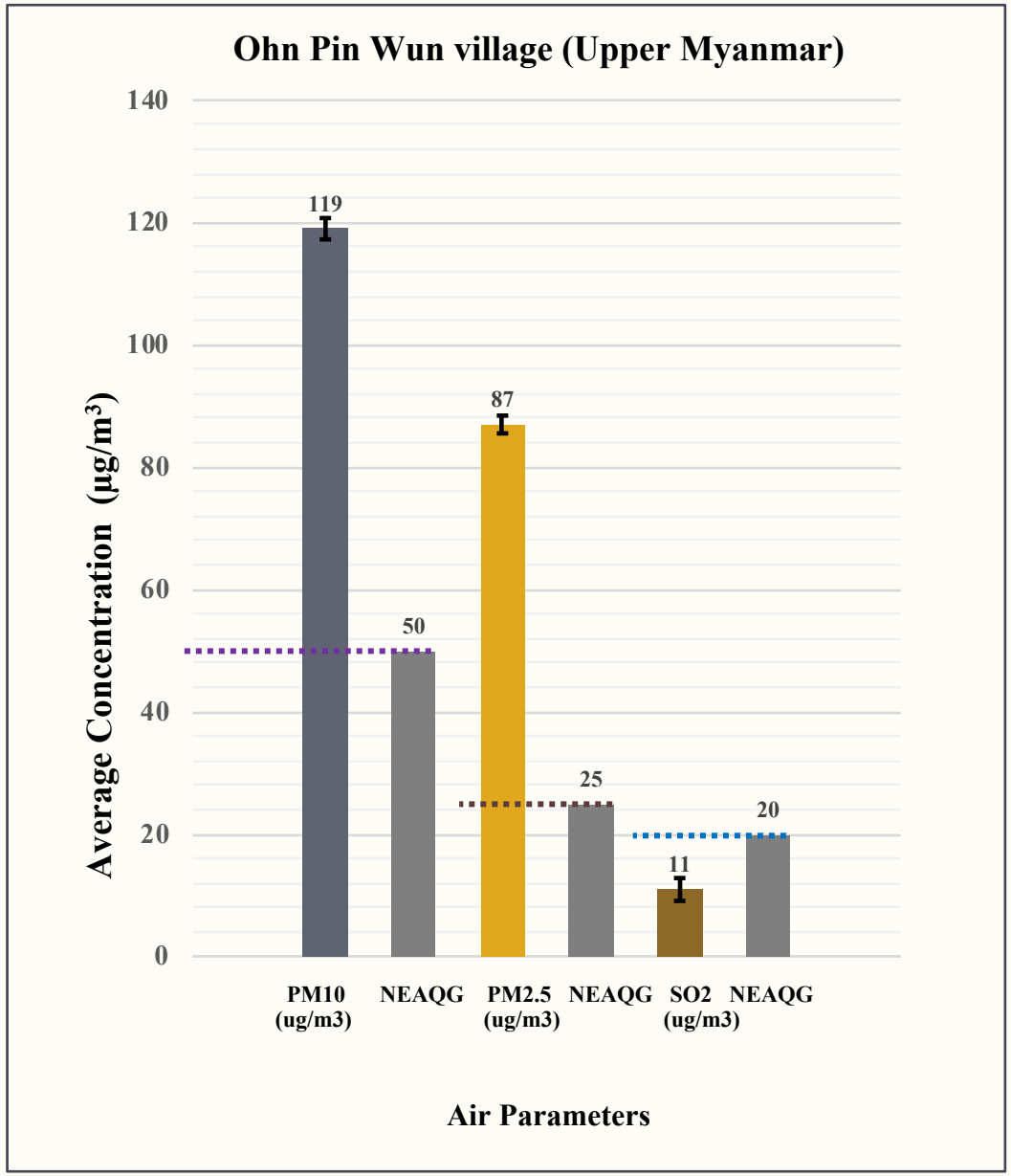




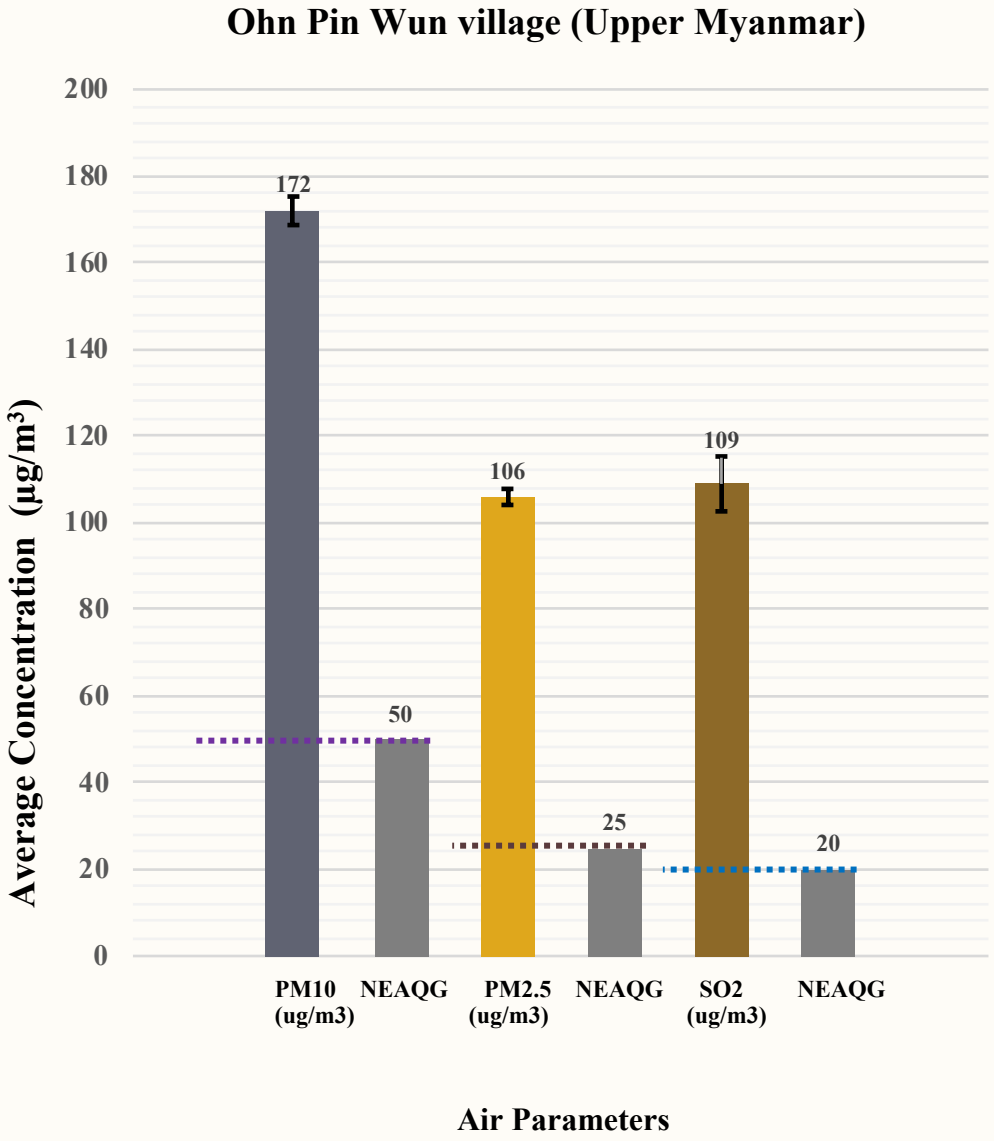
Than Phyu Yone village,Upper Myanmar



Ohn Pin Wun village, Upper Myanmar

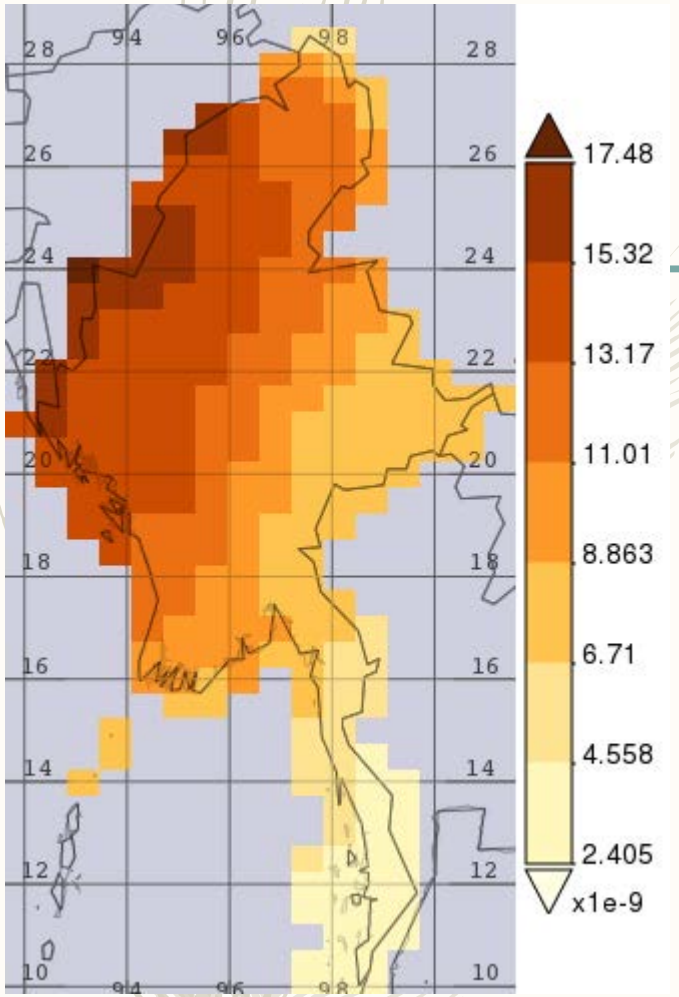


Ohn Pin Wun village, Upper Myanmar

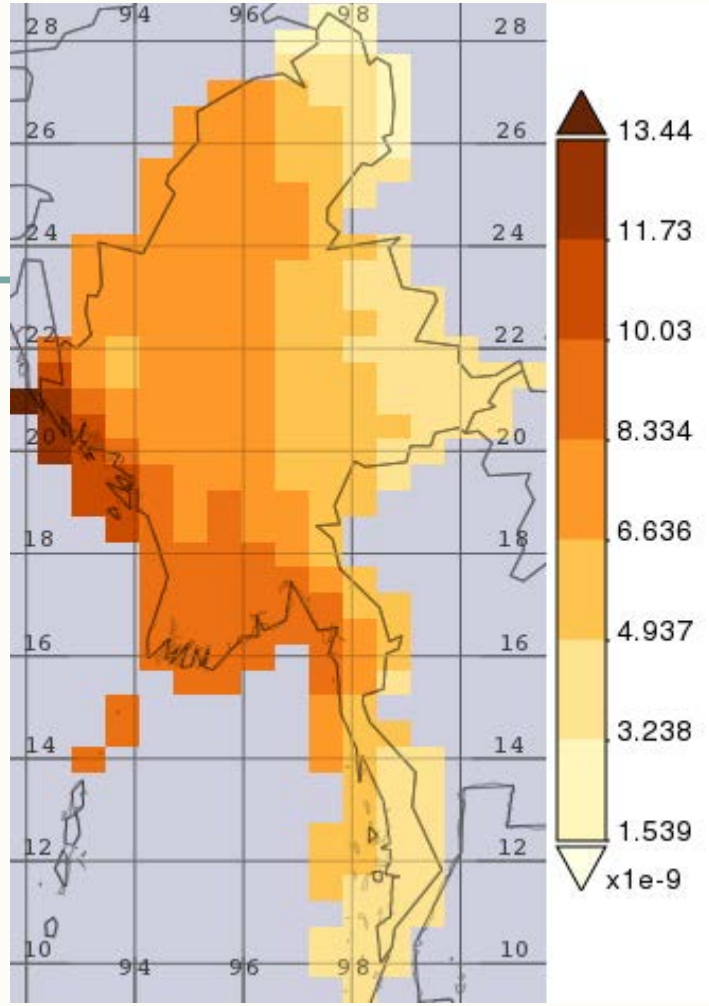


Dust Surface Mass Concentration

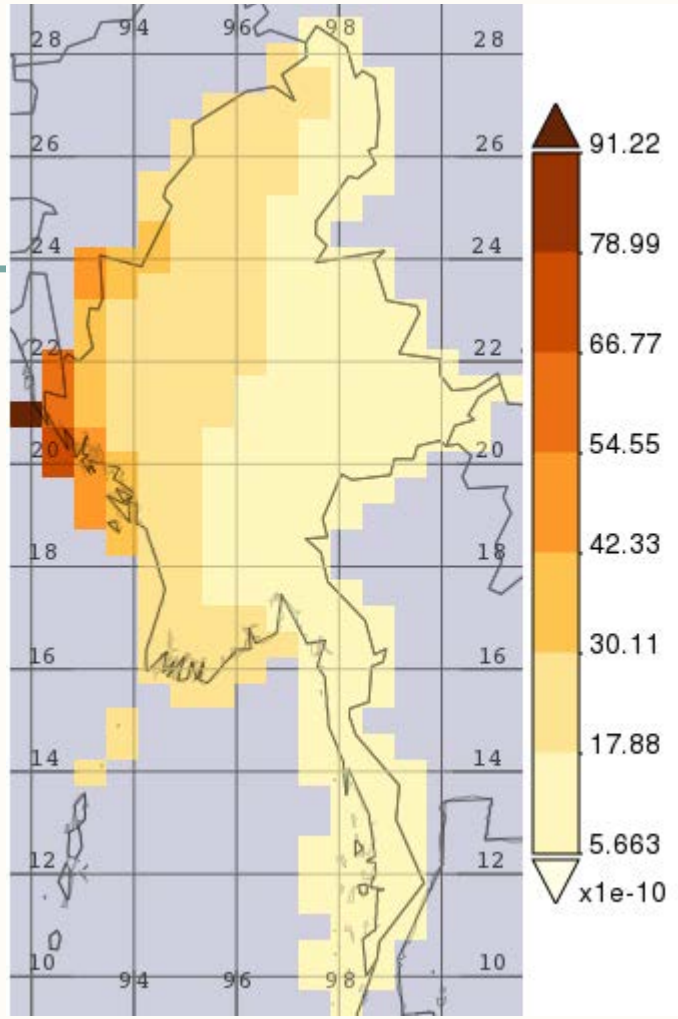
https://giovanni.gsfc.nasa.gov/giovanni/



Summer, 2018



Rainy, 2018



Winter, 2018

Research Data on Waste Open Burning (Throughout Summer, Rainy and Winter)

- Environmental Exposure on Particulates and Gases
- Personal Exposure on PM 2.5
- Health Effects (Health Indicators: BP, HR, PEFR, Pulse Oximetry)
- Community surveys
- Air Modelling

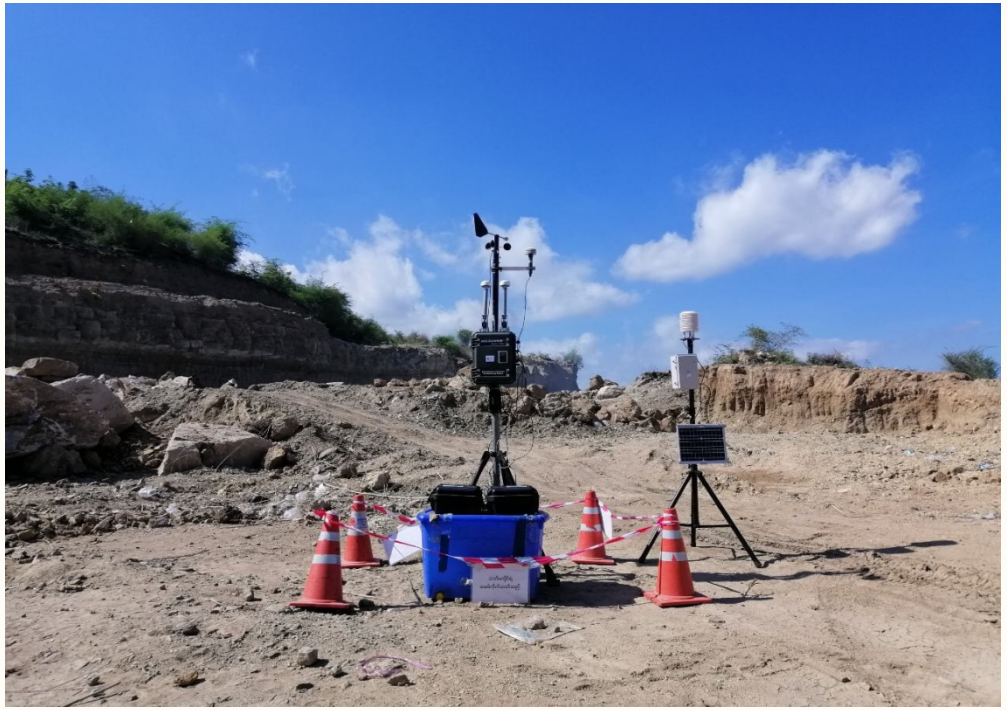
Environmental Monitoring
Waste Disposal Site and Control Area


Final Disposal Site
3.11 km
Patheingyi CDC Office
Patheingyi

Environmental Monitoring at Waste Disposal Site

Upwind

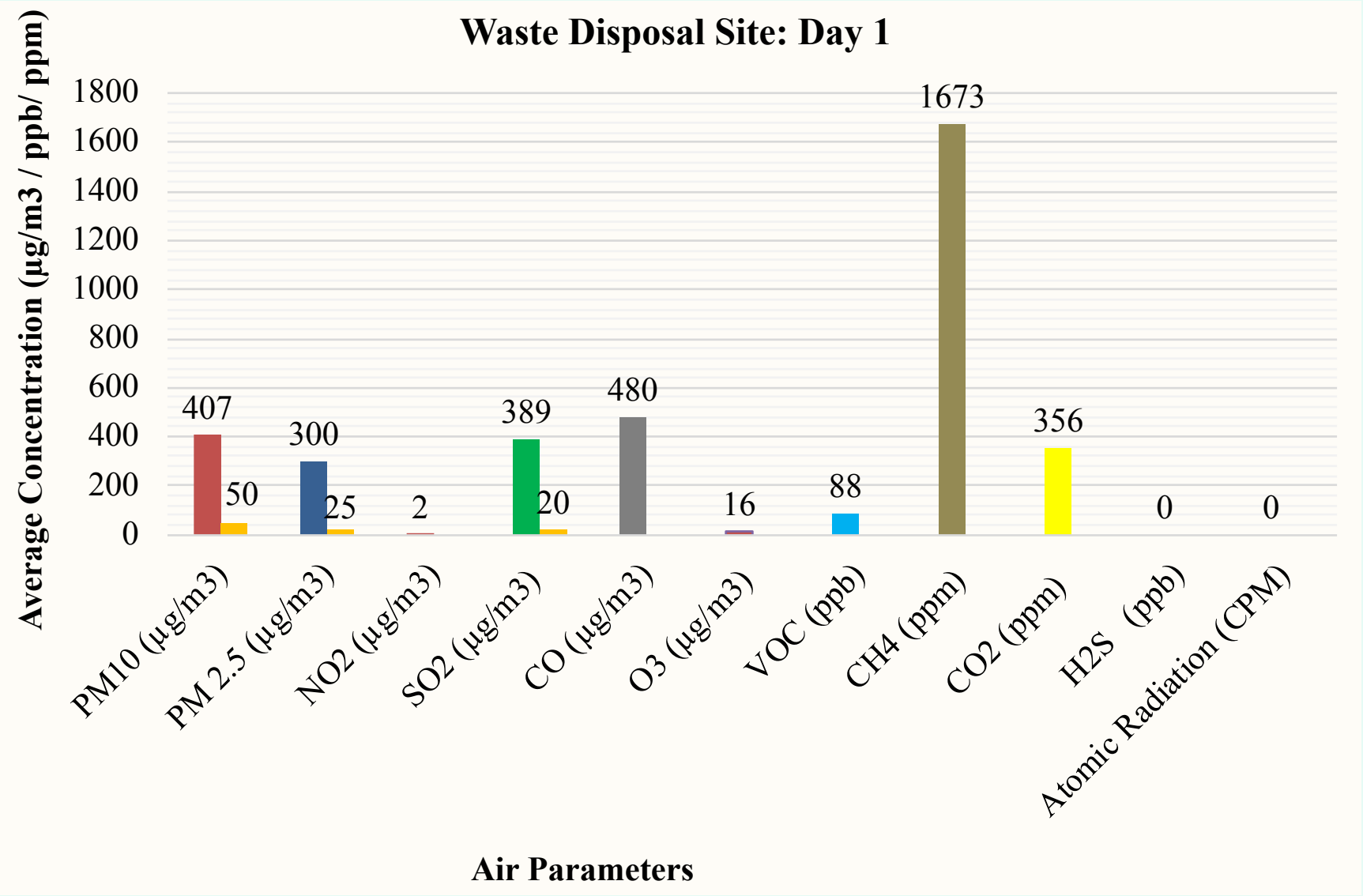
Downwind

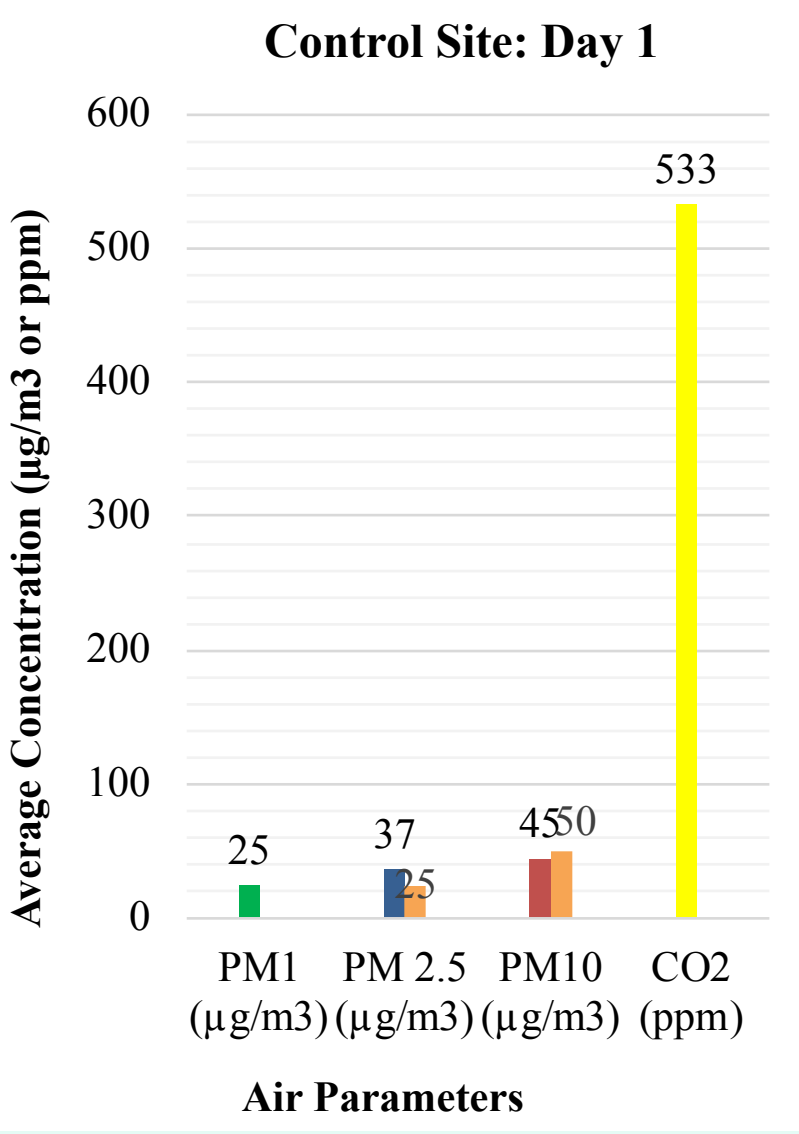


Personal Monitoring
Exposed Persons and Control

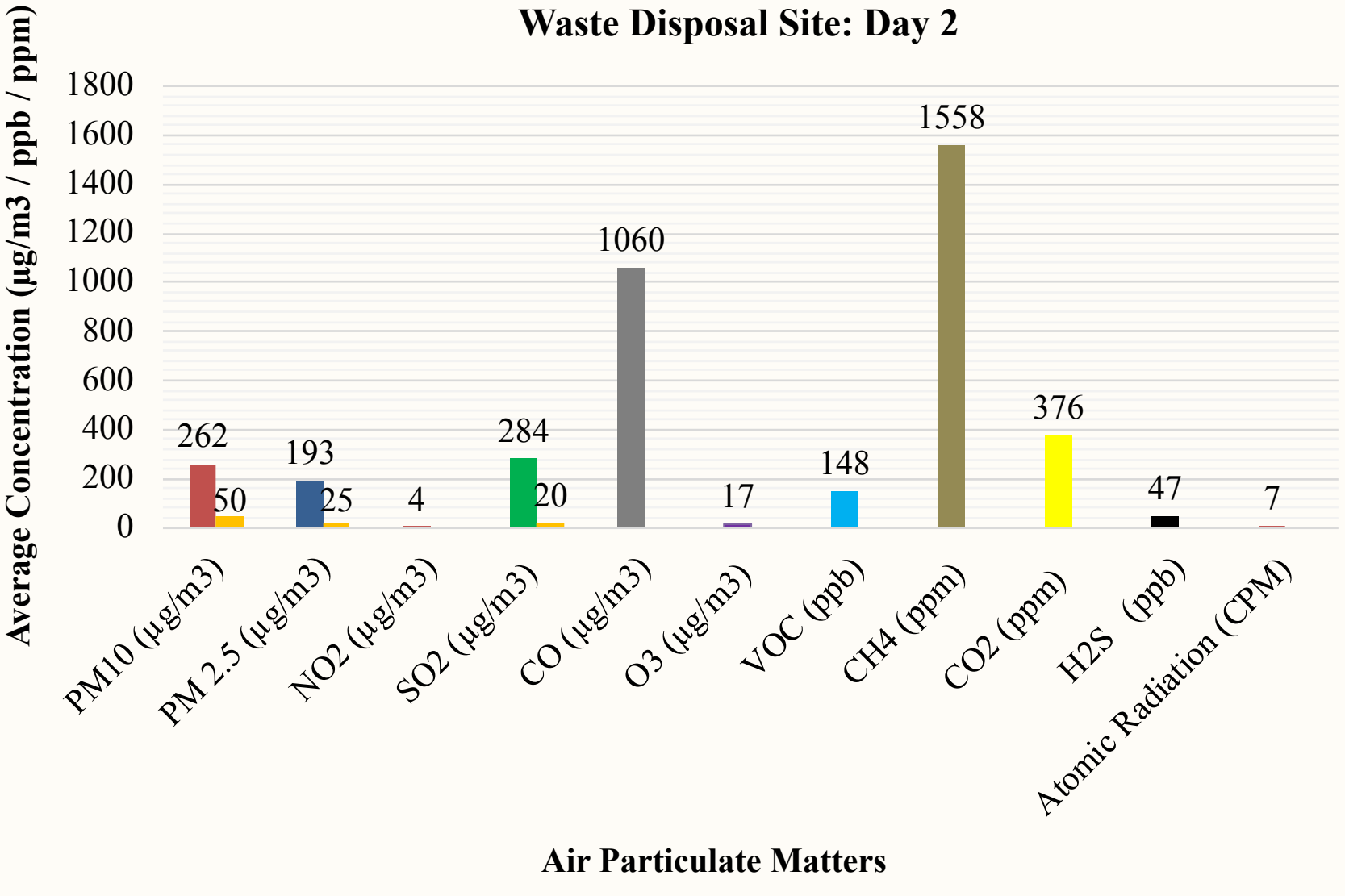
Health Effect

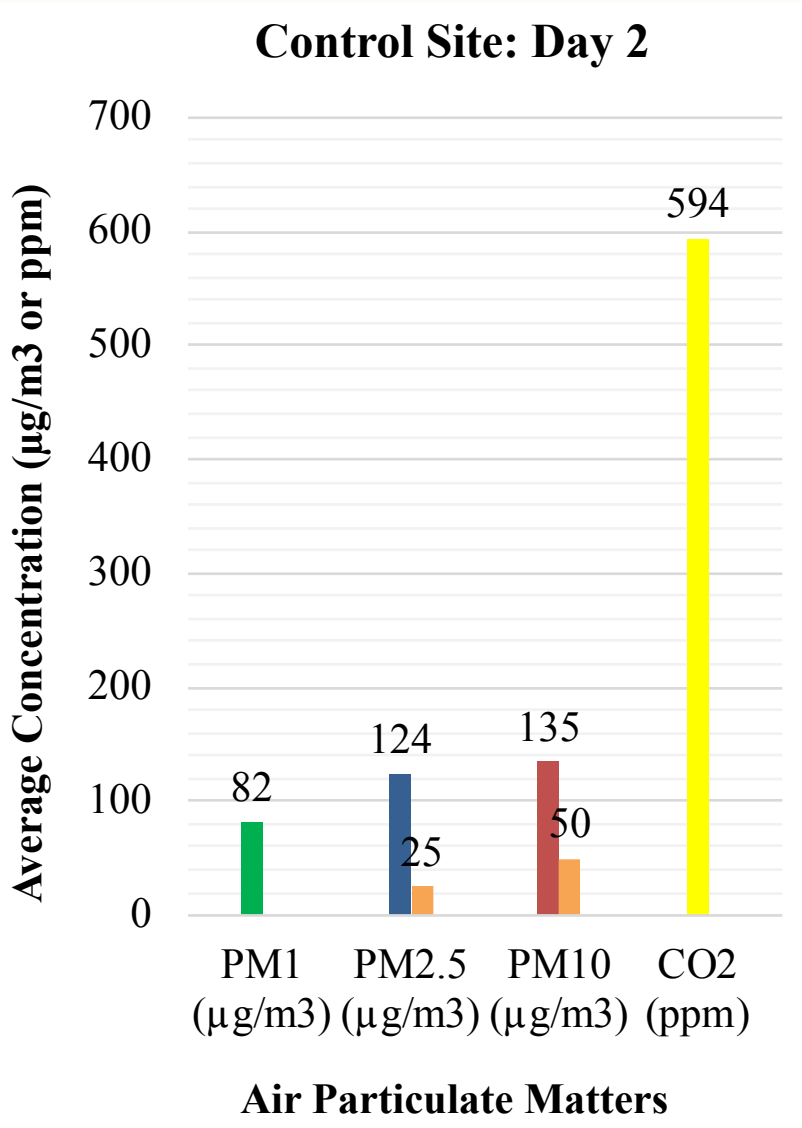
Waste Disposal Site and Control Site Monitoring



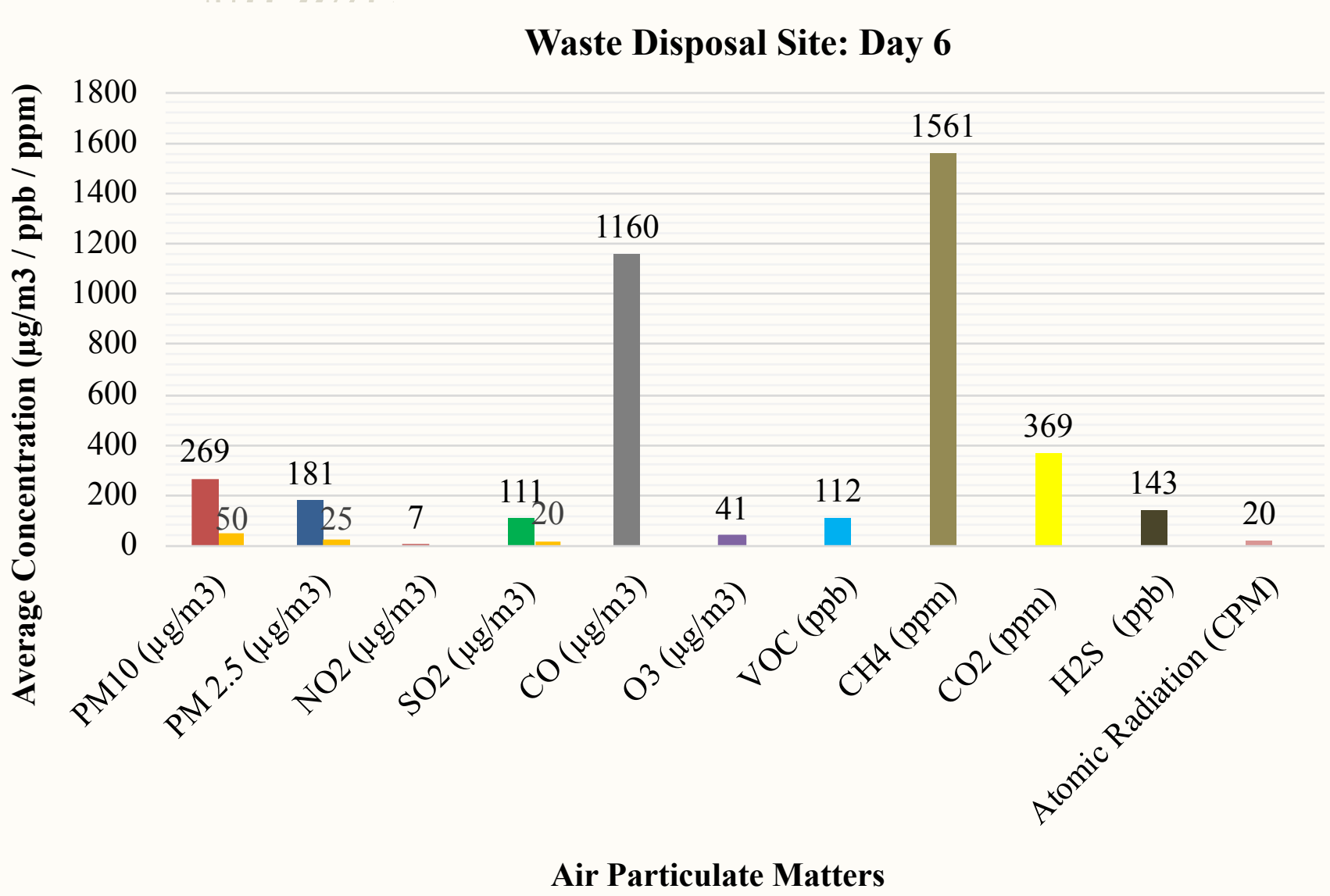


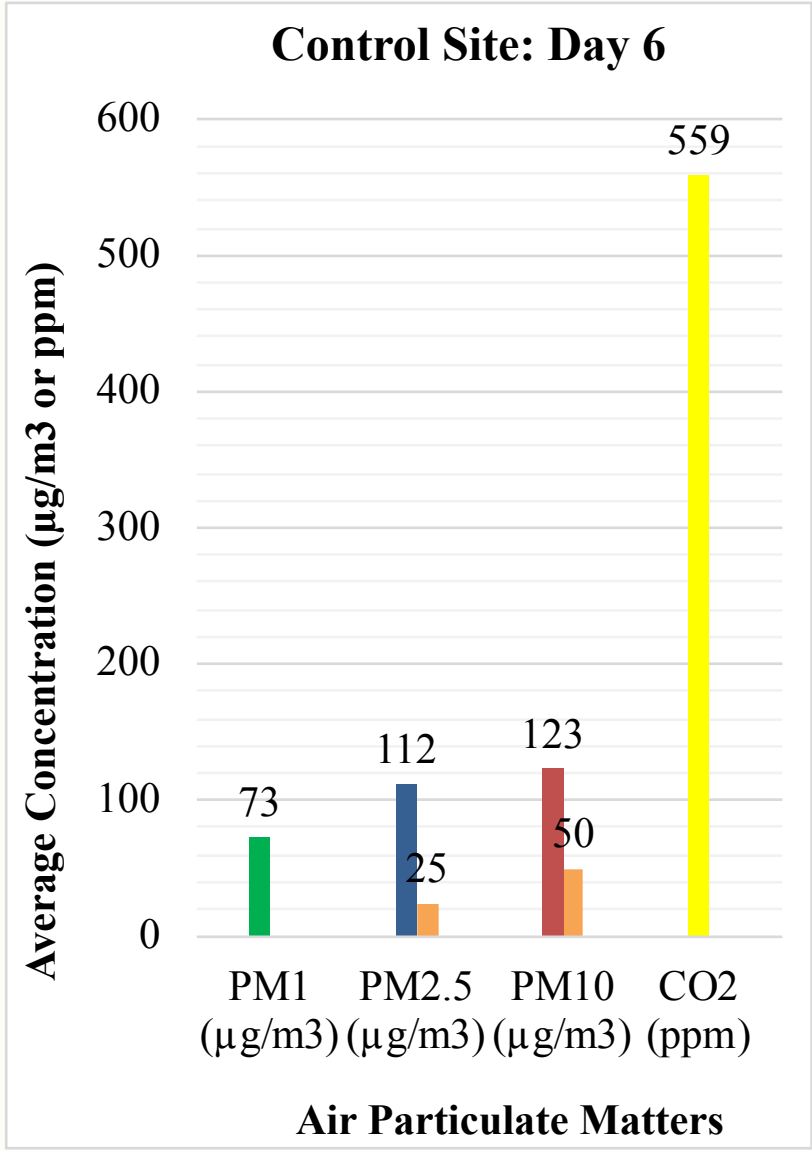
Waste Disposal Site and Control Site Monitoring



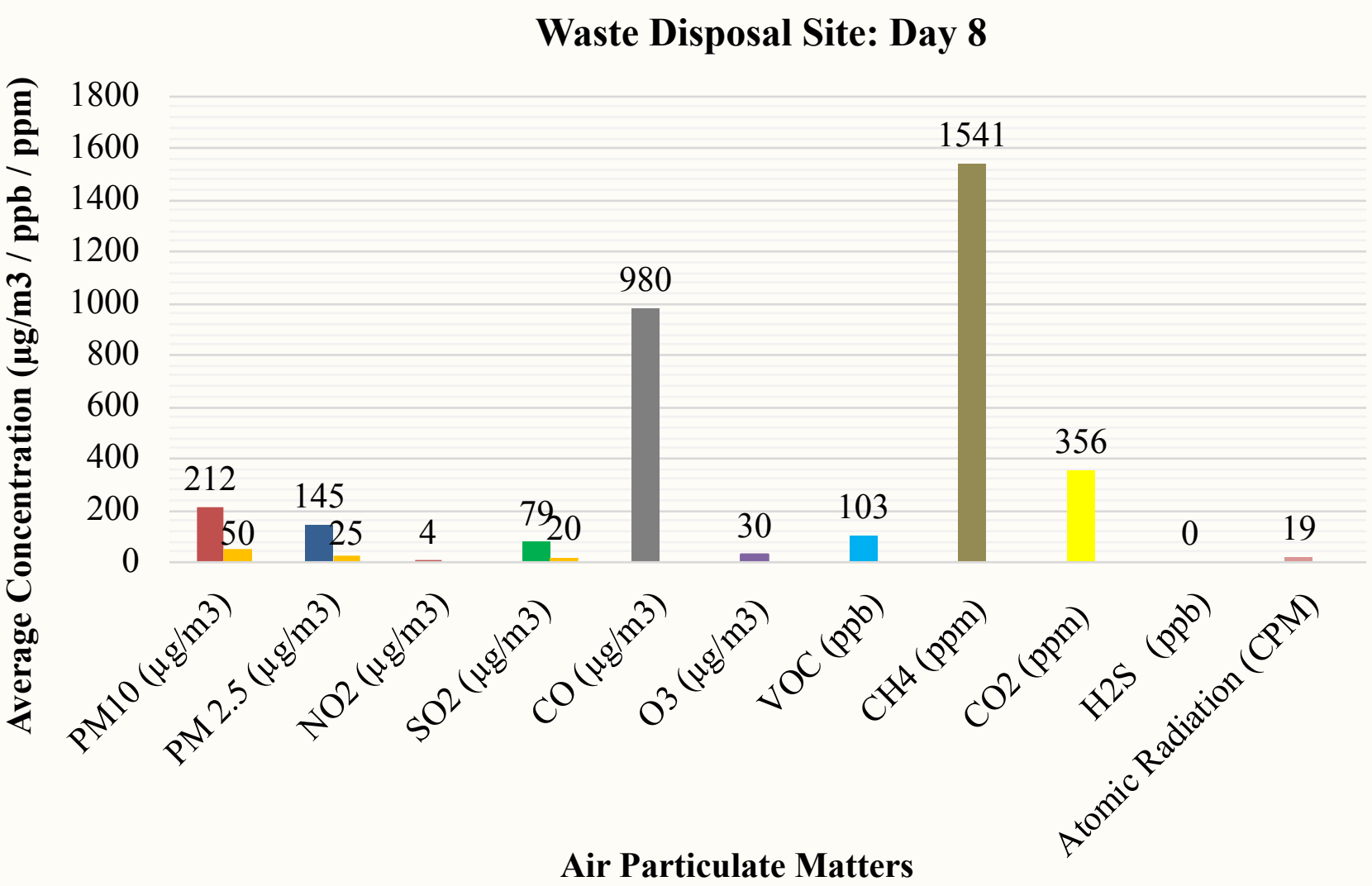


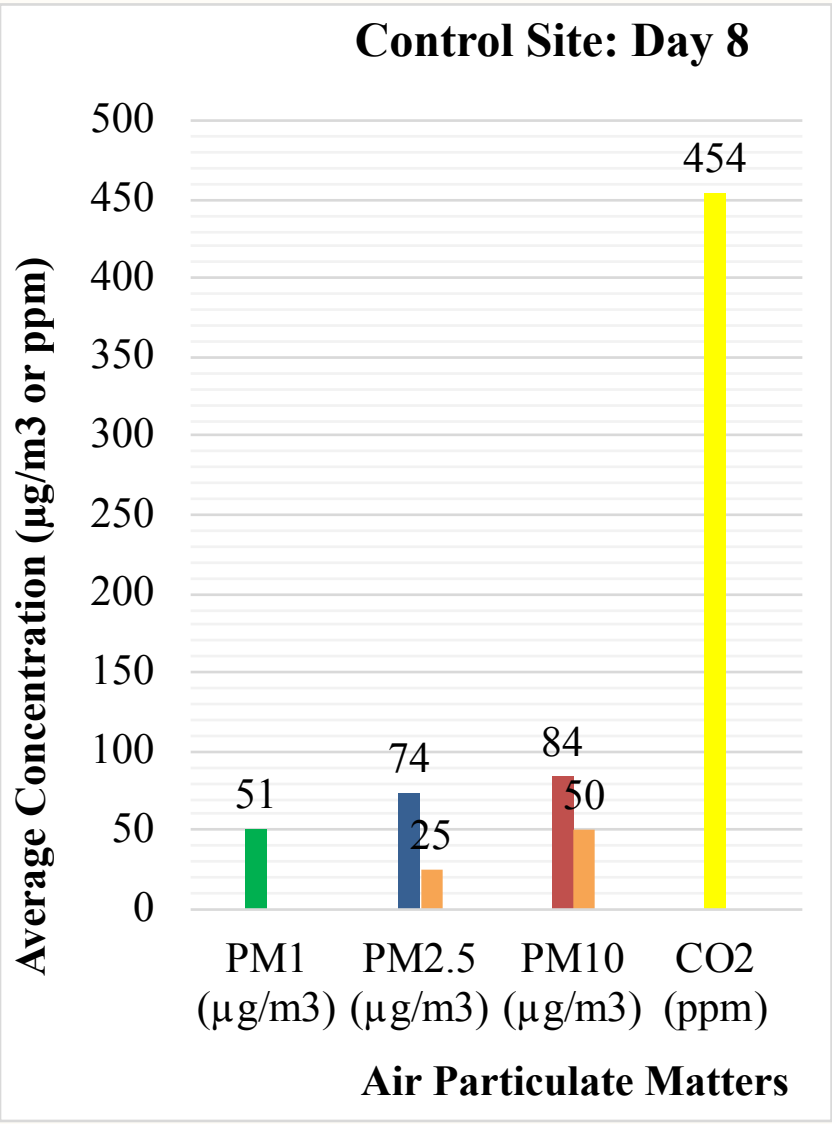
Waste Disposal Site and Control Site Monitoring



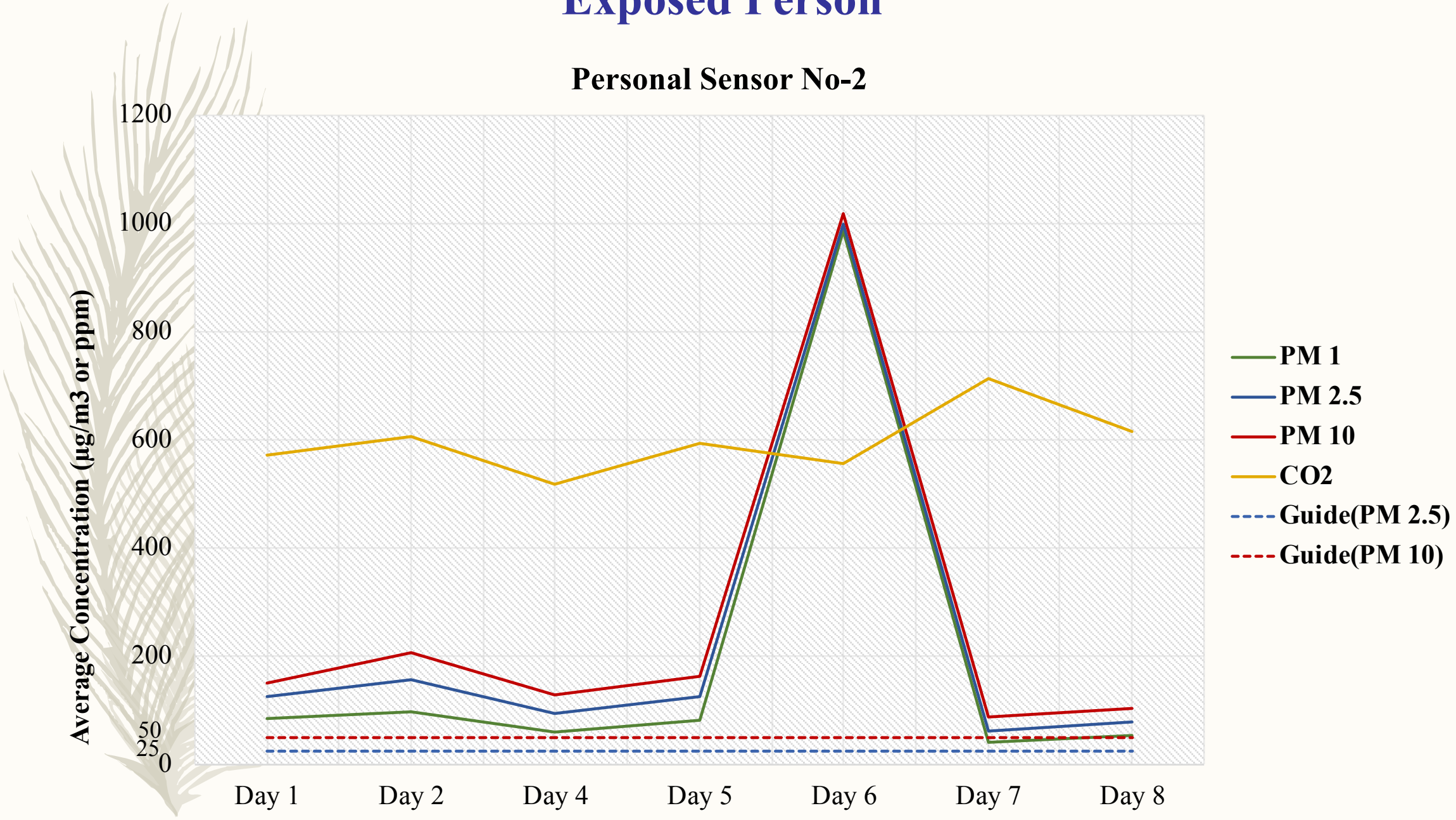


Waste Disposal Site and Control Site Monitoring

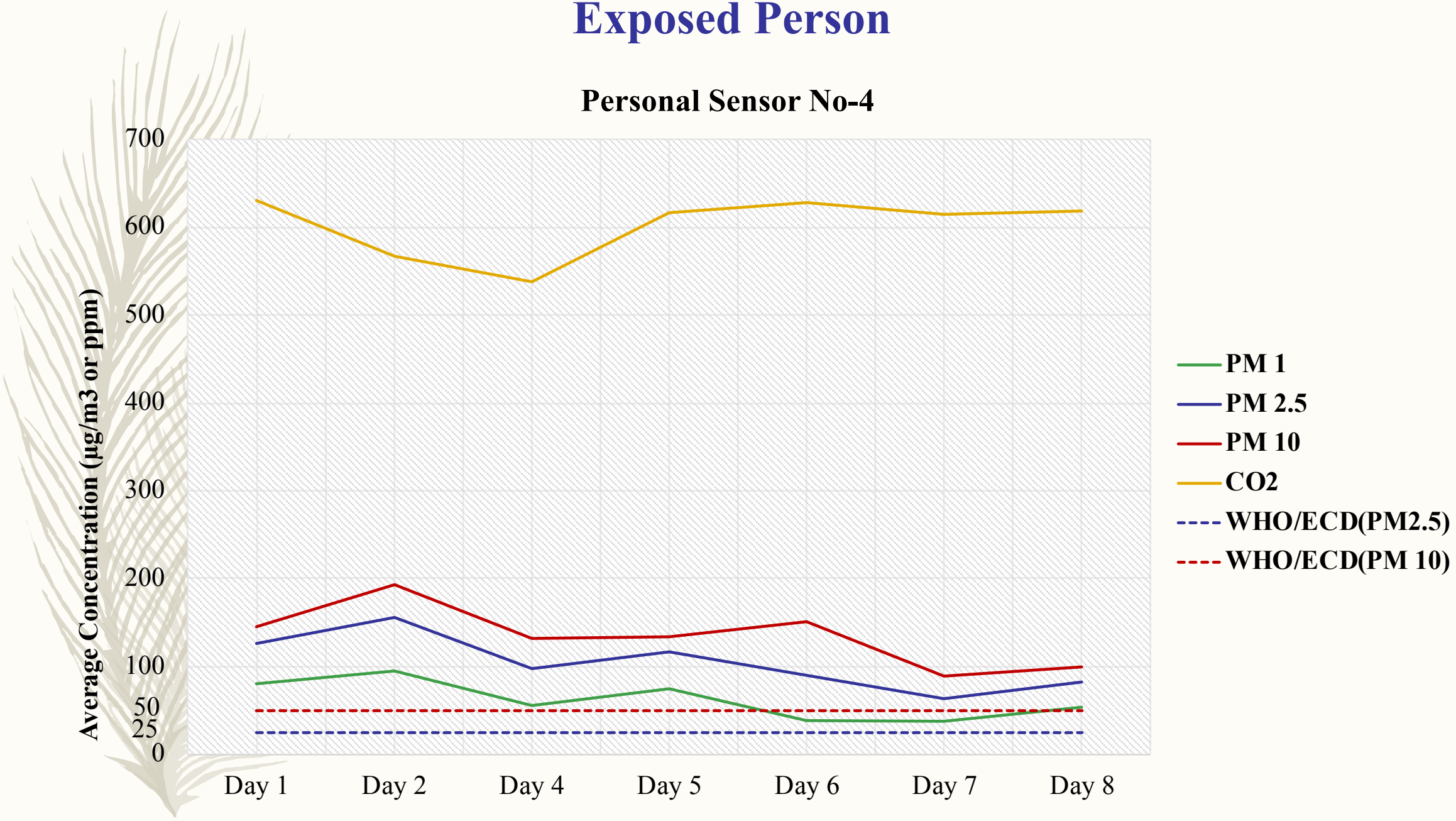




Exposed Person



Exposed Person



Decision Making

Interface between science based data and policy action to improve the existing air quality status

Discussion

- **Surveys identified that *major sources* namely *rice straw, crops residues open burning, waste open burning* and *forest fire* - primarily responsible issues.**

Conclusion

- A predominant view supported that *Particulates and SO2 levels in rural areas become significant*

Recommendation

- Furthermore, *transportation-related strategies only* did *not help* these areas to attain *the national air quality guideline*

- *Policy, Strategy and Action plans* needed to regulate open burning in rural areas

Thank you indeed for your kind attention