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VALIDATION OF LCS FOR AIR QUALITY INDEX IN JAKARTA, INDONESIA

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INTRODUCTION

*COMMUNITY AIR QUALITY MONITORING
(CAQM) PROJECT*

Community Air Quality Monitoring (CAQM)

A **KOPERNIK** project funded by Islamic Development Bank (IsDB) in collaboration with



UDARA project of ITB

Purpose:

Using LCS to provide real-time information for notifying affected populations :

- to take measures to protect their health
- to deliver general educational material related to poor air quality and health.

Collaborator	Task
Kopernik	Coordinated the project and did social innovation in the affected community
PulseLab Jakarta	Performed air quality data analysis and provided the information on the online platform to be accessed by the public
UDARA ITB	Tested and validated LCS for providing the information in the form of ISPU (Air Quality Index based on Indonesian Air Quality Regulation)

LCS VALIDATION

SENSOR SELECTION AND PROCEDURE

PM Sensor Selection

Desk Evaluation (AQ-SPEC)

- Cost and installation process
- Measure $PM_{1,0}$, $PM_{2,5}$, PM_{10}
- Data can be accessed remotely
- Desk Evaluation (AQ-SPEC)
 - Laboratory evaluation: $r^2 \approx 0,95 - 0,99$
 - Field evaluation (r^2):
 - $PM_{1,0} = 0,96 - 0,98$
 - $PM_{2,5} = 0,93 - 0,97$
 - $PM_{10} = 0,66 - 0,70$

- Purple Air PA II



Validation Procedure

Laboratory Validation:

- We assumed it would be similar to the published validation results

Field Validation:

- The influence of environmental conditions at the field need to be tested

Field Validation:

- **Co-location with FEM** PM_{10} and $PM_{2.5}$ **Beta Attenuation Monitors** (BAM) F-701-20 (EN15267-“Air Quality - Certification of Automated Measuring System” certified) owned by DKI Jakarta Province
- **Three units** of PA II were installed at the Local Government AQMS location of Kelapa Gading (North Jakarta) for **52 days**
- **Data were averaged to 24 hourly**
- After validation 2 sensors were move to Galur (Jakarta) and Rasau Jaya (West Kalimantan) and 1 sensor was left for longer period at the co-location site

VALIDATION RESULTS

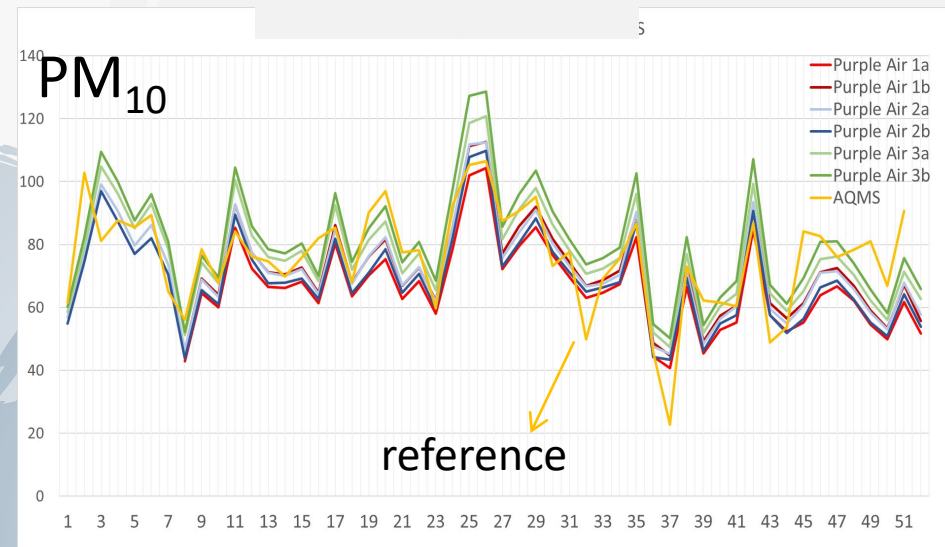
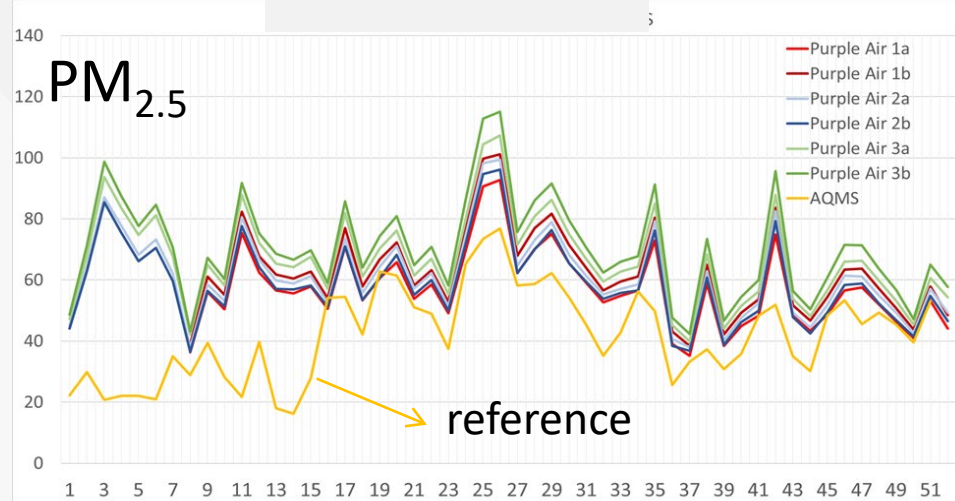
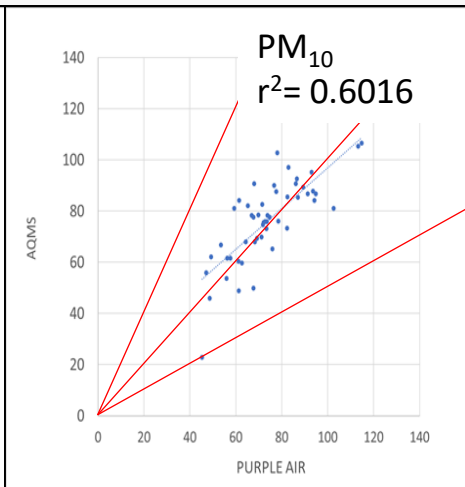
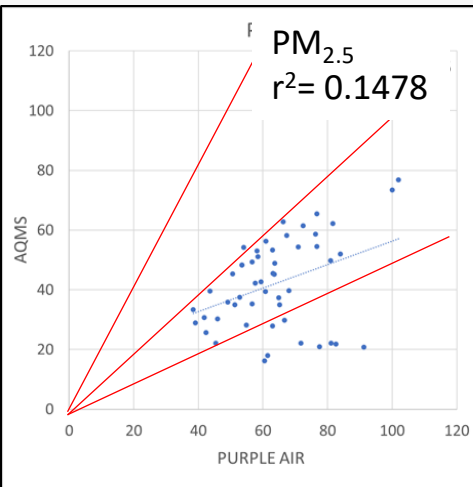
INTRAMODEL, COMPARISON WITH REFERENCE
METHODS, IMPLICATION TO AQI (ISPU)

Precision and Accuracy

Average **precisions**:

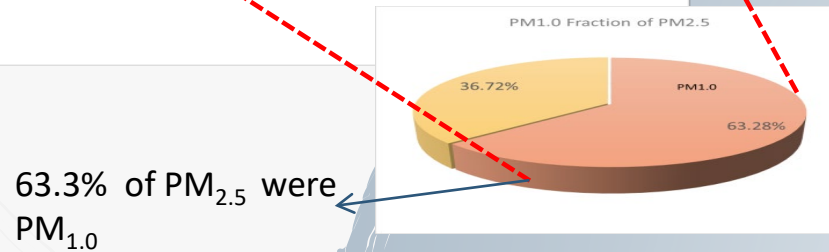
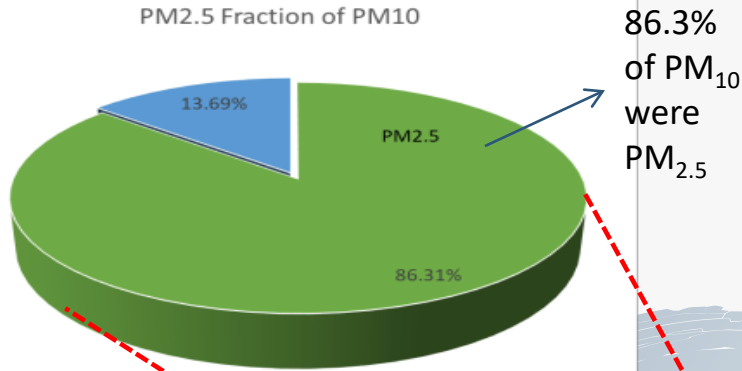
93%; 92.4%; and 93.2% for $PM_{1.0}$; $PM_{2.5}$; and PM_{10}

Accuracy (r^2 with FEM): good for PM_{10}



Implication to Air Quality Index

ISPU	24-hr (PM ₁₀) µg/m ³	24-hr (PM _{2.5}) µg/m ³	AQ Status Category	Color Code
0 - 50	50	15.5	Good	Green
51 - 100	150	55.4	Moderate	Blue
101 - 200	350	150.4	Unhealthy	Yellow
201 - 300	420	250.4	Very Unhealthy	Red
>300	500	500	Dangerous	Black



Daily AQI (ISPU) resulted from PM_{2.5} and PM₁₀

Air Quality Category	PM _{2.5}		PM ₁₀	
	Ref	Sensor	Ref	Sensor
Good	0	0	4	4
Moderate	43	16	48	48
Unhealthy	9	36	0	0
Very unhealthy	0	0	0	0
Total	52	52	52	52

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations

Conclusions

- Precision was good
- LCS $PM_{2.5}$ measurements showed no linear relationship with that of reference
- LCS gave relatively good agreement for PM_{10} ($r^2=0,60$)
- The results were different compared to the studies in the USA
- Over 80% of PM_{10} consisted of $PM_{2.5}$

Recommendations

- Considering :
 - 1) correlation test results ;
 - 2) $PM_{2.5}$ proportion in PM_{10} ;
 - 3) results of air quality category calculated by AQI formula
- the AQI was published based on PM_{10} index
- Due to different climate, validation test should be done locally



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Apa yang bisa dilakukan ketika kualitas udara baik?

 <p>Orang Sehat Dapat melakukan aktivitas normal seperti biasa.</p>	 <p>Anak-anak, perempuan hamil & orangtua Dapat melakukan aktivitas normal seperti biasa.</p>	 <p>Orang pengidap penyakit paru-jantung kronis Dapat melakukan aktivitas normal seperti biasa.</p>
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Tentang Pantau Udara

Platform Pantau Udara dikembangkan untuk membantu masyarakat mengurangi risiko kesehatan akibat polusi udara. Platform ini dapat memberikan informasi mengenai

Unduh Informasi Pantau Udara

Unduh informasi lebih detail mengenai apa itu polusi udara, bagaimana pengaruhnya terhadap kesehatan kita, dan apa yang kita bisa lakukan untuk mengurangi dampak negatif

THANKYOU

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