

# **Air Quality Monitoring System Using sensors**



**Green Blue Corporation**

# Business overview of Green Blue Corporation

One of the pioneers in environmental research, measurement analysis, environmental monitoring, and system development, founded in 1972.

Name	Green Blue Corporation
Founded	October 1972
Head office	Yokohama City
Number of employees	92



Maintenance and calibration of automatic monitors



Development of environmental information system



Environmental research and assessment



Environmental chemistry analysis



Product development and sales



Overseas environmental technical cooperation



# GBiot® Environmental sensing service



**Indoor CO2  
monitoring**



**CO2, PM2.5, VOCs**

**Indoor air  
monitoring**



**Outdoor air pollution  
monitoring**



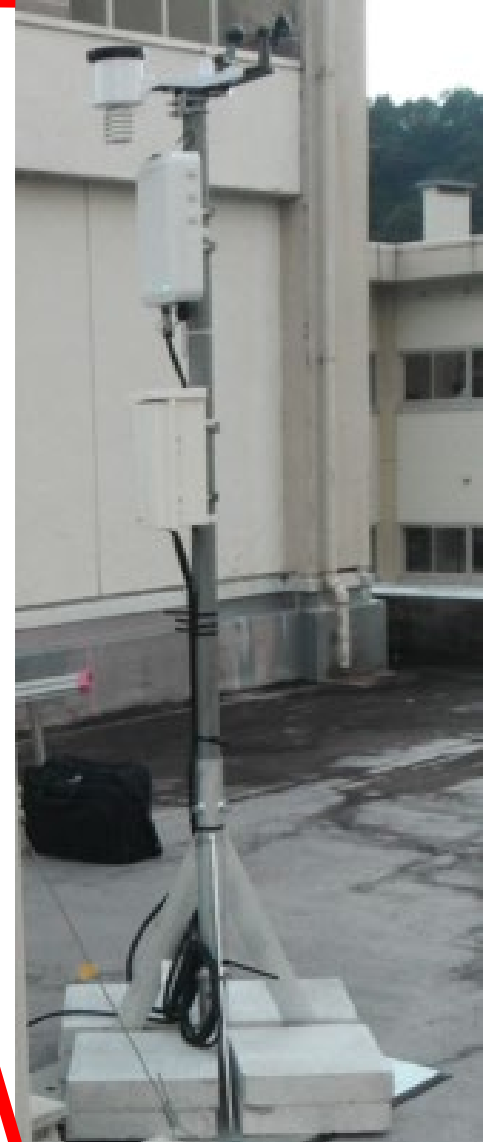
**On-vehicle  
sensor**



**Drone  
atmospheric  
observation**

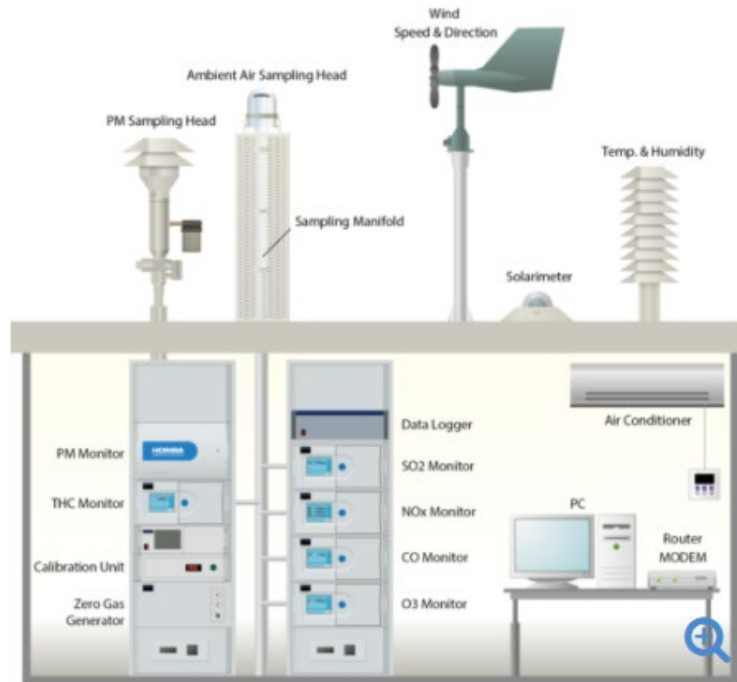


**Walking  
atmosphere  
survey**



# Comparison of automatic monitors and sensors

## Automatic monitors



[https://www.horiba.com/fr\\_fr/products/detail/action/show/Product/aqms-1560/](https://www.horiba.com/fr_fr/products/detail/action/show/Product/aqms-1560/)

## Sensors



GBiot

PM	0 ~ 500 $\mu\text{g}/\text{m}^3$
NO2	0 ~ 250ppb
O3	0 ~ 500ppb
SO2	0 ~ 1000ppb
CO	0 ~ 20ppm
Meteorological	Temp, Hum, Atmospheric pressure, WDWS Rainfall, Solar radiation, UV

<https://gbiot.jp/>

- ❑ In the case of automatic monitor, there are few devices that measure multiple components with one unit, and there are many devices for each measurement component.
- ❑ Automatic monitors have high measurement accuracy, but when building AQMS (Air quality monitoring system) based on them, there are restrictions on location and cost.

- ❑ In the case of sensor boxes such as GBIOT, multiple components can be measured with one unit.
- ❑ Sensors are inferior in measurement accuracy to automatic monitors, but when building an AQMS based on them, there are few restrictions such as location and cost.

## Time Series Plots (1-hour averaged PM2.5)

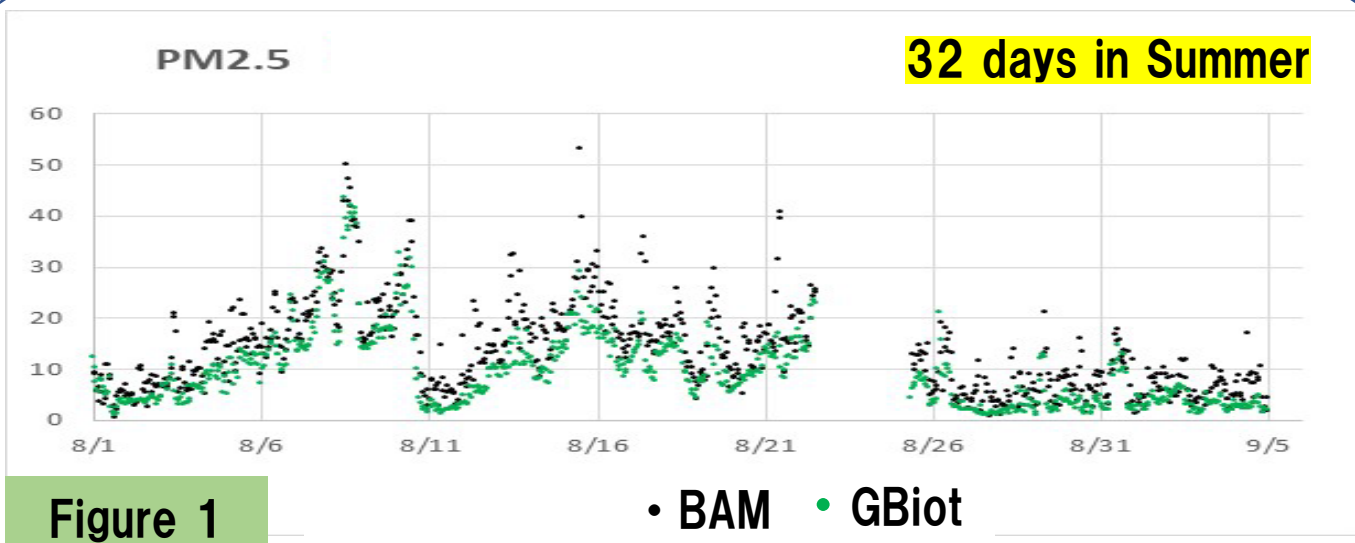


Figure 1

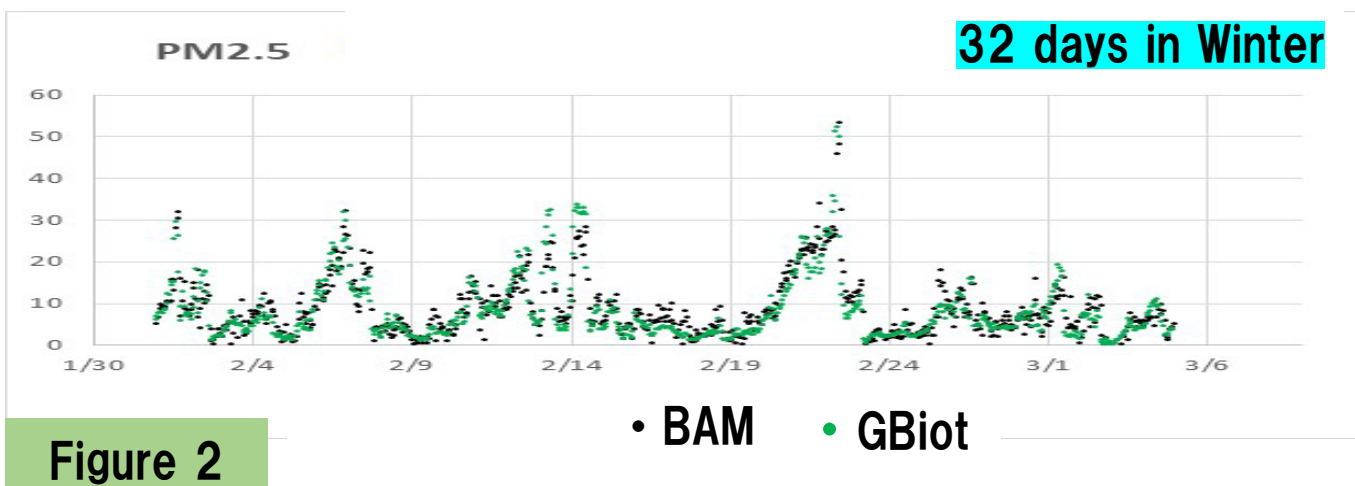


Figure 2

- Parallel operation of GBiot and the official method (BAM) was conducted at GreenBlue's Tokyo office.
- As can be seen from the scatter plots and regression equations, GBiot and BAM showed a high correlation of  $R^2 = 0.81$ .

## Scatter Plots (1-hour averaged PM2.5)

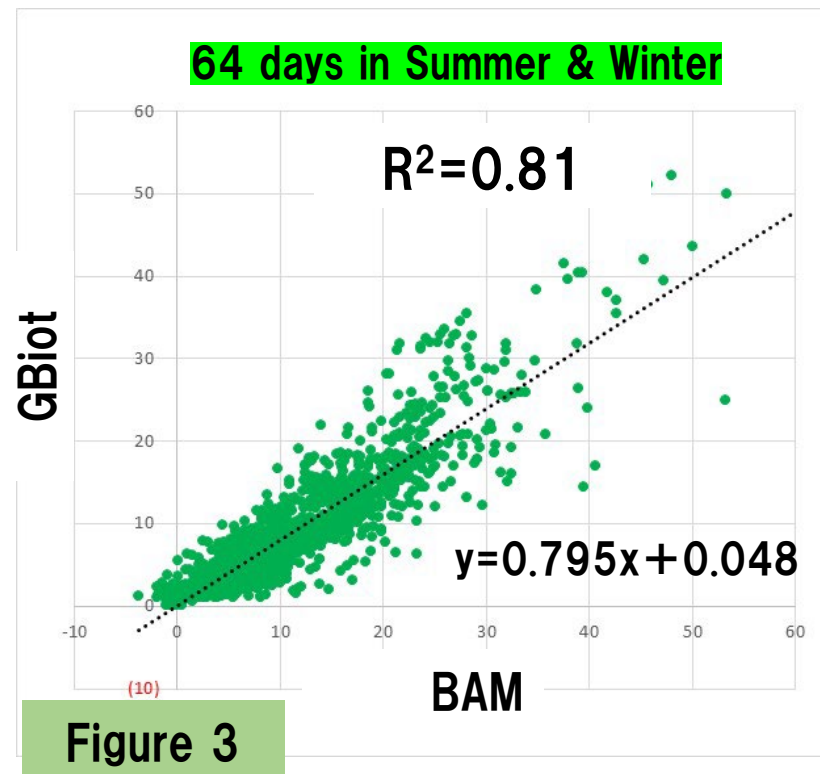


Figure 3

Time Series Plots (1-hour averaged O3)

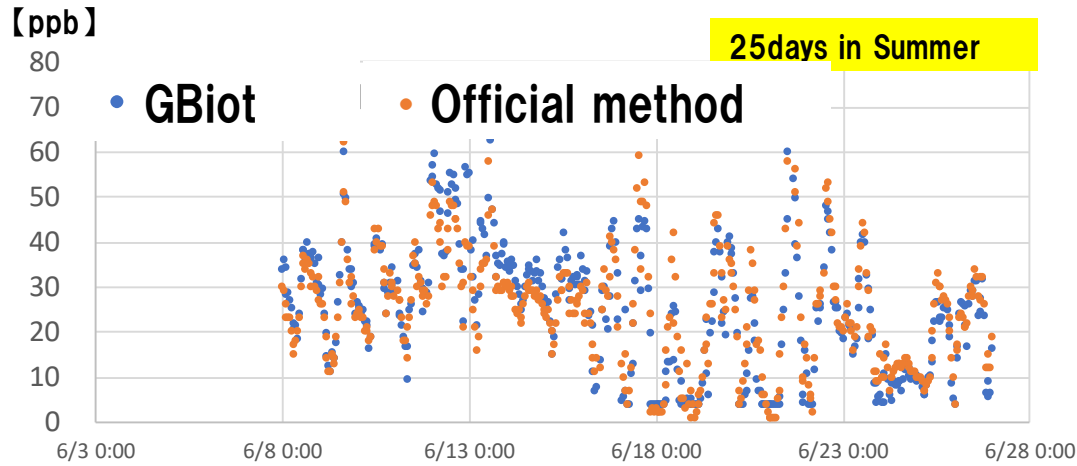


Figure 1

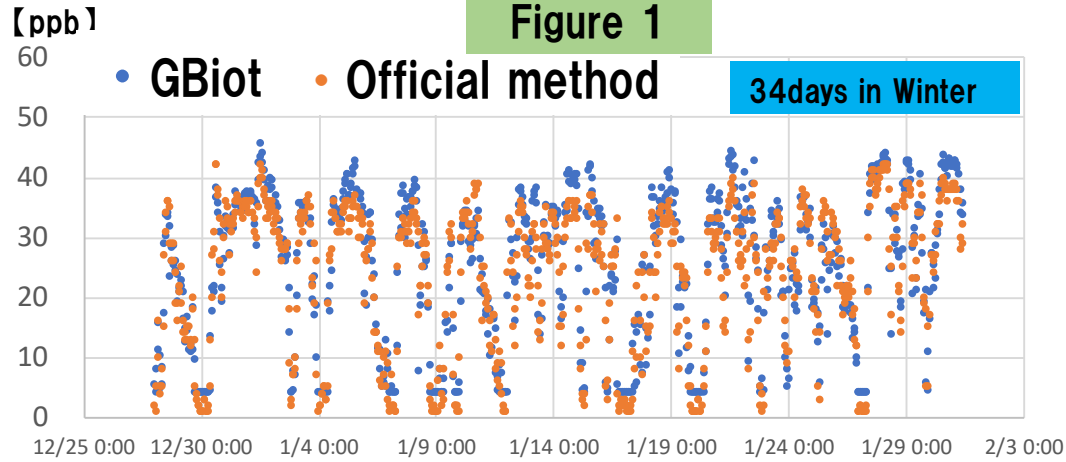


Figure 2

- Comparison tests between GBiot and the official method for O3 were conducted this winter and summer at GreenBlue's Tokyo office and surrounding measurement stations.
- As shown in the scatter plots and regression equations, the comparison between GBiot and the official method showed a high correlation of  $R^2=0.9031$ .

Scatter Plots (1-hour averaged O3)

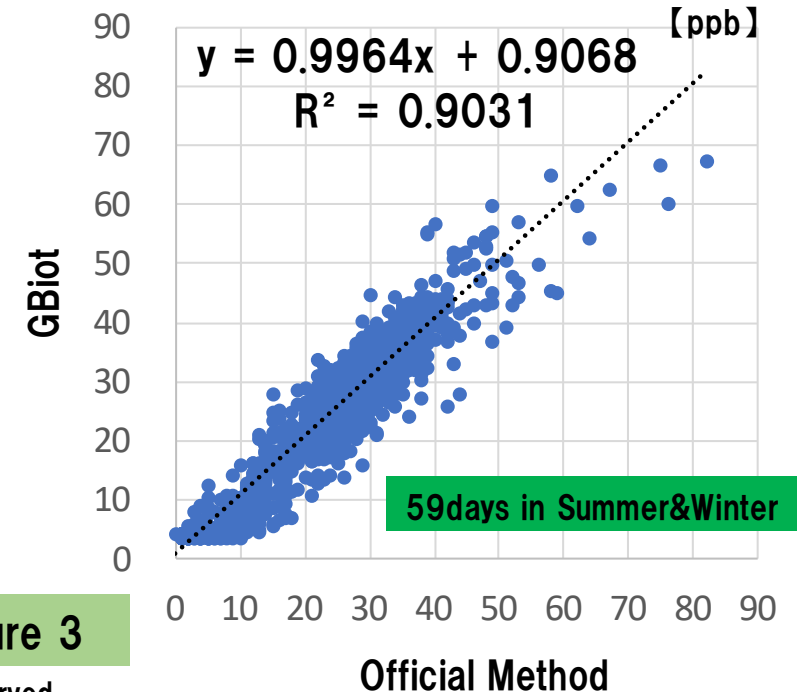
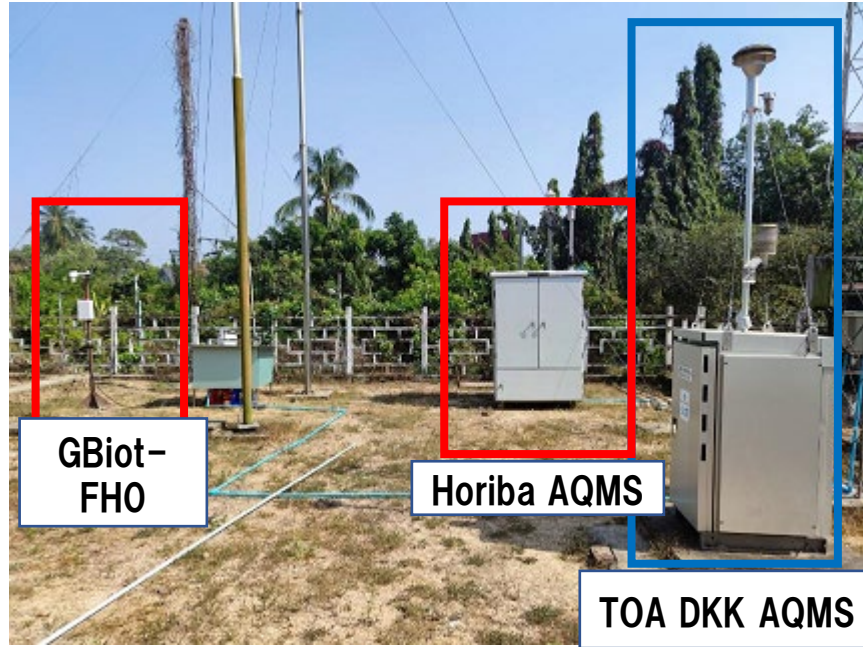


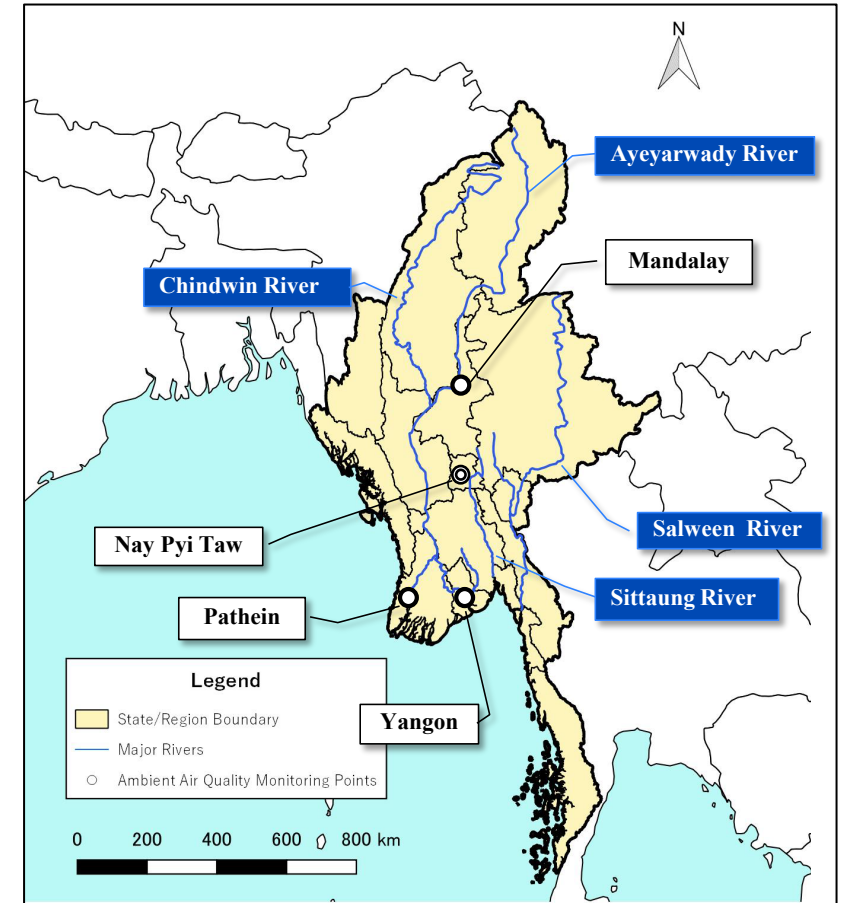
Figure 3

# Example of air pollution observation by GBiot in Myanmar

- As part of the Hybrid air quality monitoring network (HAQMN) project, we conducted parallel operation tests in Myanmar between GBiot and two types of Automatic monitors based on official methods.
- We also performed data analysis and identified challenges for continuous air monitoring, such as power outages, communication interruptions, and maintenance issues.

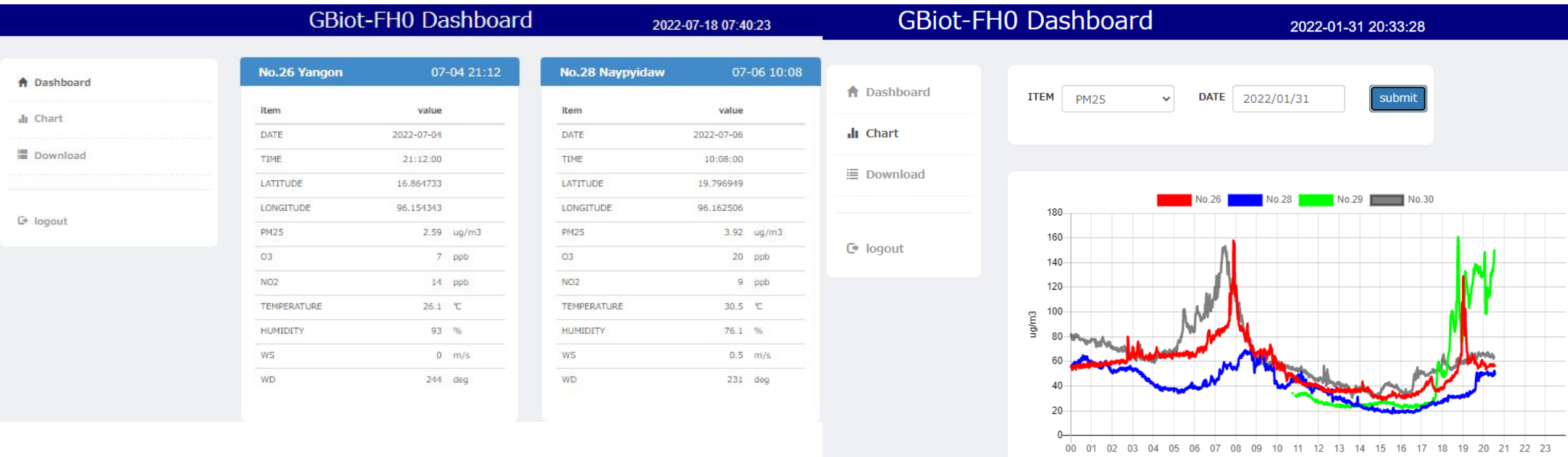


Parallel operation with GBiot and two types of AQMS in Yangon



# Data verification through dashboards and graphing

- ❑ Remote data checking is possible at any point where online communication environment is organized.
- ❑ With GBiot's software, data can be easily graphed and downloaded.
  - The dashboard on the left displays real-time data for each measured substance at each measurement location.
  - The graph on the right shows temporal changes for each measured substance by measurement location.





# Installation and maintenance of GBiot

## Installation

- ❑ For the installation of GBiot, both written manuals and video manuals are available.

## Maintenance

- ❑ The maintenance of GBiot requires daily data checks and sensor replacement approximately once every one to two years, depending on the sensor type.
- ❑ To maintain data accuracy, calibration through parallel operation with official methods is necessary about once a year.



[https://www.youtube.com/watch?v=LH6X00A\\_XBY&t=7s](https://www.youtube.com/watch?v=LH6X00A_XBY&t=7s)

# GBiot Price

**The GBiot system, which includes air pollution and weather observation, is priced at 1.5 million yen.**

**At an exchange rate of 150 yen per dollar, it's approximately 10,000 USD.**

**Thank you for your attention.**

