SCI-901

Sensor Based PM & Dust Monitor

Description

The SCI-901 PM (Dust) Monitor utilizes state of the art light-scattering sensor technology enhanced with machine learning calibration algorithm. With an active pump sampling system, it measures the $PM_{2.5}$, PM_{10}, and TSP concentrations in the ambient environment. Combined with optional features, including meteorological parameters (wind speed, wind direction, temperature and relative humidity, etc.), noise monitoring, and CCTV camera, SCI-901 PM monitor is an ideal solution for PM and dust monitoring in construction sites, factories, mines, near road sites, etc.

Applications

- Low-cost Alternative for Monitoring Stations
- Smart Cities
- Pollution Source Tracing
- Traffic Pollution Monitoring
- Industrial Fence Line Monitoring
- Emergency Monitoring
- Air Quality Model Validation
- Community Monitoring
- Pollution Migration Mapping

Features

- Wall AC power
- Pump sampling
- Global communication module
- Cloud-based data platform
- Dynamic heating technology
- PM auto zero drift calibration
- Touchscreen operation
- Sensor status and data access on screen
- SD memory card data storage
- USB flash drive data export
- Wi-Fi, Bluetooth, Ethernet
- Ability of running two identical PM sensor at the same time

Technical Specifications

Parameters		$PM_{2.5}$	PM_{10}	TSP
Range		0 – 10,000 μg/m^3		
Parallelism		≤15%		-
Compared with Gravimetric Measurement	Slope	1 ± 0.3		-
	Intersect	0 ± 10 μg/m^3		-
	R^2	≥ 0.9		-
Mean Error		-		±15%
Repeatability		-		≤ 10%

Other Parameters Features

Parameters	Range	Resolution	Error
Noise	35 – 130 dB	0.1 dB	±5 dB
Air Temperature	-50 – 80℃ (-58 – 176°F)	0.1 ℃	±0.5 ℃
Relative Humidity	0 – 100% RH	0.1% RH	±3% RH
Atmospheric Pressure	500 – 1100 hPa	0.1 hPa	±1 hPa
Wind Speed	0 – 60 m/s	0.1 m/s	± (0.3 ± 0.03V) m/s
Wind Direction	0 – 360°	-	-
Display	7-inches color touch screen or Optional LED Screen		
Data Storage	Local storage of 1 year of data (w/ USB flash drive data export)		
Communication	4G GPRS; USB; Wi-Fi; Bluetooth; RS232; RS485		
Camera (optional)	Local cyclic storage, real time assessment, 4G transmission		
Sampling System	Active Pump Sampling		
Sampling Rate	1 liter/minute (0.264 gallon/minute)		
Heating & Moisture Mitigation	Dynamic heating		
Auto Calibration	Auto zero drift calibration		
Power	AC (100 – 240) V / (50 – 60) Hz		
Operating Environment	T: -30 – 55℃ (-22 – 131 °F) ; RH: 15% – 95% (w/o condensation)		

Sample Data

Four units of the SCI-901 (labeled as Sensor #2, #3, #4, and #5) were co-located with a MetOne BAM 1020 referential equipment from 1 September 2020 to 22 October 2020. No calibration was performed throughout the test period. The data of the SCI-901 showed a strong linear correlation with the referential BAM 1020, with $PM_{2.5}$ R^2 of ~0.90 and PM_{10} R^2 of ~0.85. The time series and linearity plots of the results are shown by Figure *1* and Figure *2*.

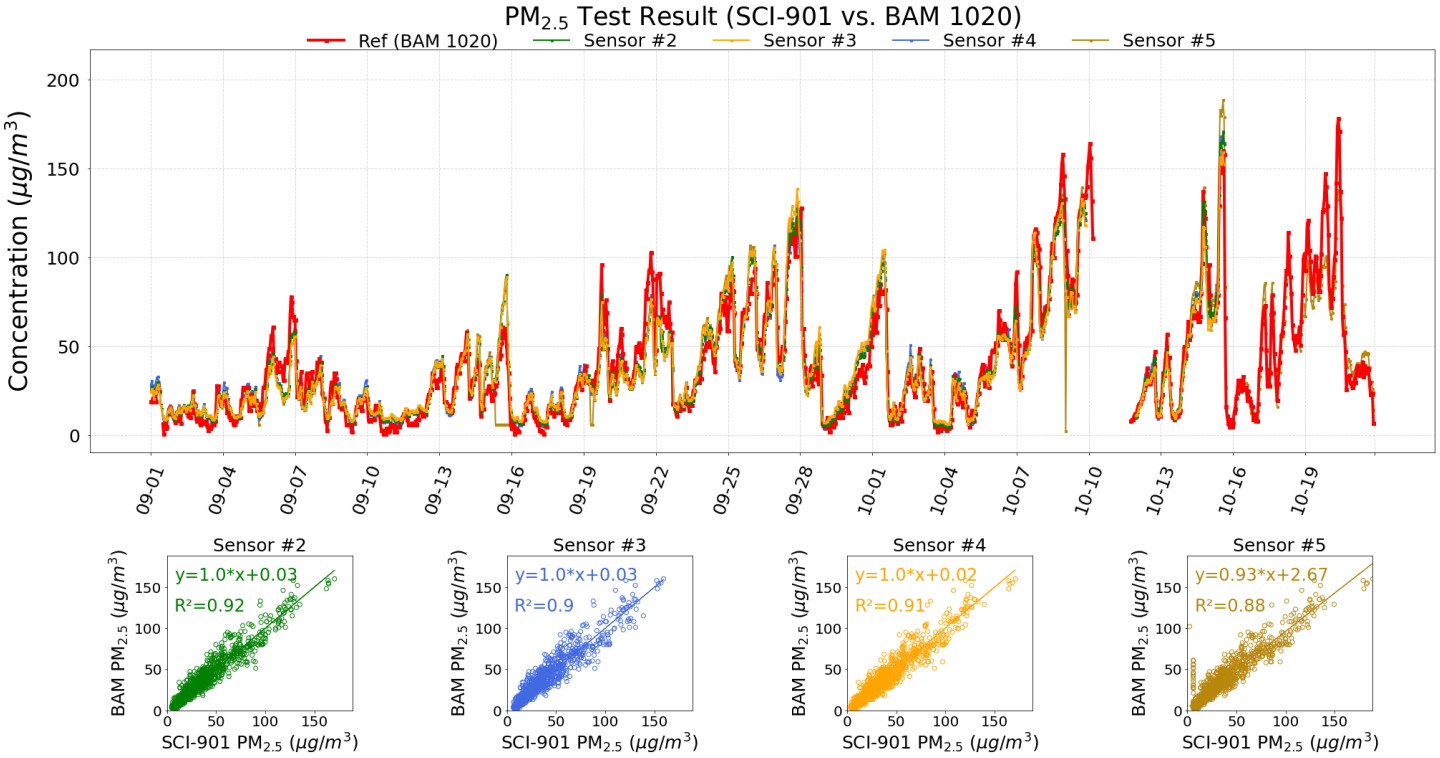

Figure 1: Test Result of $PM_{2.5}$

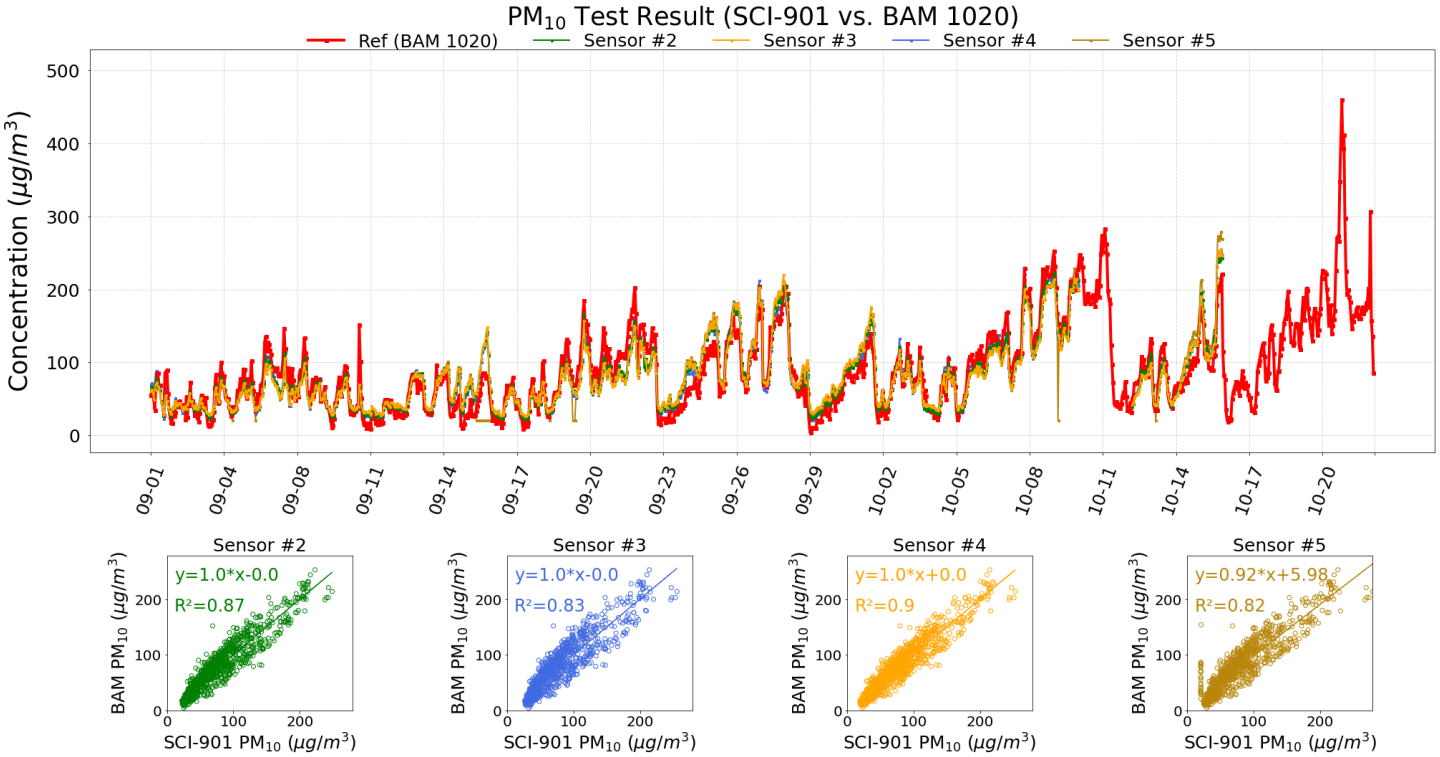

Figure 2: Test Result of PM_{10}