

# 國立中央大學大氣物理研究所書報討論

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## Low-Cost Air Quality Sensors' Calibration and Validation

### Abstract

The accuracy of the low-cost sensors is a source of concern due to several factors. These include the use of cost-effective components like optical parts and fans, the impact of particle composition, temperature, relative humidity, ambient PM<sub>2.5</sub> concentration, wind direction, and sensor degradation on the reliability of the sensor's output data. Therefore, a calibration process is necessary after measurement.

Researchers both domestically and internationally have been working on developing calibration processes and methods for low-cost air quality sensors. Cavaliere et al. developed a low-cost sensing device called "AIRQino" and initially conducted laboratory calibration for PM<sub>2.5</sub> and PM<sub>10</sub> compared to standard instruments. They found that a Robust linear regression (LR) model provided the best calibration formula. Subsequently, they validated the sensors by placing them at Italian air quality monitoring stations.

In Taiwan, Hong et al. also performed field calibrations of various brands of PM<sub>2.5</sub> sensors at different air quality monitoring stations, taking into account Taiwan's complex climate and geographic characteristics. Both studies reported that the calibrated values conformed to the standards established by the U.S. Environmental Protection Agency.

### Keyword

Low-cost sensor, Calibration, Regression model,

### Reference

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