RC1:

This is a fine piece of measurement calibration paper. My understanding on measurement techniques are very thin, so I will only comment on data processing:

(1) From my point of view, the authors applied different algorithms to fit the low cost sensor data and compared the performance, but the authors do not discuss how the results can be used to predict the PM and other pollutants. Specifically, is it used to predict unobserved locations or forecast short-term future?

Thanks for your question. You are right that we applied different algorithms to fit the low-cost sensor data and compared the performance. **The prediction** in this paper means that we use the fitted model from the empirical value to estimate the current raw data from the sensor with the same location, with the purpose to get more accurate result. The model used to predict unobserved locations or forecast short-term future will be discussed in the future research.

(2) Also, let's say, RF seems to outperform other methods, is RF calibrated output considered to be the final product? or low cost sensor raw data still should be the reference?

Thanks for your question. The RF outperforms other methods. The calibrated output result of RF in this paper is accurate enough, and can be the final product. The current raw data of the sensor is still used as the input of the model to obtain the current accurate calibrated data.

（3）Do the authors consider the better performance from RF that can be overfitting, and other methods with a lower predictive performance can be more explainable?

Thanks for your question. With the purpose of avoiding over-fit in the five models, the randomly divide parameters of train ratio and test ratio are 80% and 20%, respectively. To ensure the robustness of the model evaluation, the 5-fold cross validation is also conducted. The dataset is divided into 5 mutually exclusive subsets with same size, the 4 subset is randomly selected as the training set each time, and the remaining 1 subset is used as the test set. After completing each round of validation, select 4 copies again to train the model and use the remaining 1 copy for validation. After several rounds (less than 5), the loss function is selected to evaluate the optimal model and parameters (Mahesh et al., 2023; Zimmerman et al., 2018).

(4) The formula in Equation (1) does not seem valid for MLR, because all those terms are correlated. Additional treatments or justifications are needed.

Thanks for your question. After the data collected by the LCS, the raw data should be preprocessed. The PM3006 particulate matter sensor can output six kinds of particle range (i.e., >0.3μm, >0.5μm, >1.0μm, >2.5μm, >5.0μm and >10μm, respectively). By subtracting the six particle range values in turn, the individual particle counters are obtained, and expressed as $x_{0.5}$, $x_{1.0}$, $x_{2.5}$, $x_{5.0}$ and $x_{10.0}$, listed in Table 1, the measured particle number concentration is converted to PM mass concentrations in the $PM_{2.5}$ and PM_{10} size fractions.

The particle counter terms are pretreated and individual from each other. The multi-input one-response preprocessing and prediction models can be written as Eq. (1) to obtain the concentrations $Y_{pm2.5}$.

$Y_{pm2.5}=w_{1\_pm2.5}\cdot x_{0.5} + w_{2\_pm2.5}\cdot x_{1.0} + w_{3\_pm2.5}\cdot x_{2.5}+w_{4\_pm2.5}\cdot T+w_{5\_pm2.5}\cdot RH + b_{pm2.5}$, (1)

Where $W_{pm2.5}= [w_{1\_pm2.5}, w_{2\_pm2.5}, w_{3\_pm2.5}, w_{4\_pm2.5}, w_{5\_pm2.5}]$ is the corresponding weight coefficients; the $X_{pm2.5} = [x_{0.5}, x_{1.0}, x_{2.5}, T, RH]$ represents the individual particle counters, the temperature sensor and humidity sensor; the $b_{pm2.5}$ is the intercept values of the model.

To obtain the concentration Y_{pm10}, the multi-input one-response preprocessing and prediction models can be written as Eq. (2).

$Y_{pm10}=w_{1\_pm10}\cdot x_{0.5} + w_{2\_pm10}\cdot x_{1.0} + w_{3\_pm10}\cdot x_{2.5}+w_{4\_pm10}\cdot x_{5.0}+w_{5\_pm10}\cdot x_{10.0}+w_{6\_pm10}\cdot T+w_{7\_pm10}\cdot RH + b_{pm10}$, (2)

Where $W_{pm10}= [w_{1\_pm10}, w_{2\_pm10}, w_{3\_pm10}, w_{4\_pm10}, w_{5\_pm10}, w_{6\_pm10}, w_{7\_pm10}]$ is the corresponding weight coefficients; the $X_{pm10} = [x_{0.5}, x_{1.0}, x_{2.5}, x_{5.0}, x_{10.0}, T, RH]$ represents the individual particle counters, the temperature sensor and humidity sensor; the b_{pm10} is the intercept values of the model.

(5) Minor comments:
p1,l10: a typo "algorithms"
p2,l5: additional parentheses
Table 4: a typo II, III for O3

Thanks for your suggestion. The errors are revised in the new vision.