Thanks for the comment given.

For the 1st and 2nd remarks

The equation presented in the discussion paper is:

$$E(Y)_{mn} = \alpha_{\text{fix}} + \beta_{\text{fix}}(AOD_{mn} - [\varepsilon_{mn} + \varepsilon_{\text{fix}}]) \qquad \text{(eq. 1)}$$

Where, $E(Y)_{mn}$ is the estimated PM10 concentration on month m, at site n;

ε_{mn} random error for month m, and site n;

AOD_{mn} is MODIS AOD value in the grid cell corresponding to month m, at site n;

α_{fix} and β_{fix} fix is the intercept, and slope;

ε_{fix} fix error or adjustment derived from longterm observations of MODIS AOD which is correspondent to the **2nd remarks** $\varepsilon_{\text{fix}} = \alpha - \beta(AOD_{mn})$. There is a typesetting error in the paper. Thanks for pointing it out and hope it clarify some of the misunderstanding here.

Furthermore, the AOD fix effect represents the average effect of AOD on PM_{10} concentrations and AOD random effects, ε_{mn} represents the monthly variability in the PM_{10}-AOD relationship. If the equation were to be rewritten as you suggested (eq. 2), and further simplify to (eq. 3) it would have complicate the presentation of the equation.

$$E(Y)_{mn} = \alpha_{\text{fix}} + \beta_{\text{fix}}AOD_{mn} - \beta_{\text{fix}}\varepsilon_{mn} - \beta_{\text{fix}}\varepsilon_{\text{fix}} \qquad \text{(eq. 2)}$$

$$E(Y)_{mn} = \alpha_{\text{fix}} + \beta_{\text{fix}}AOD_{mn} - \varepsilon_{mn} \qquad \text{(eq. 3)}$$

For example, α_{fix} and β_{fix} would model the large-scale and season-independent additive and multiplicative bias, and ε_{mn} would be the season-site-sensor dependent bias. This way is rather confusing and, besides, the assumption is not a seasonal but monthly coefficient. The tropical climate of Malaysia is slightly different from that of Mediterranean climate. In Malaysia we do have monsoon rain but it scattered unevenly across the peninsular due to the topography and, this is the reasons why we uses a random error approach in this robust calibration. If seasonal approach was adopted, this will further generalize the assumption and introduce more error in the output.

I hope this will clarify the issue you commented in the 1st and 2nd remarks.

In this paper, we uses statistical method to robustly calibrate the AOD retrieved from satellite to predict PM_{10} concentration. The method itself works as shown in this paper given that the AOD dataset must be available for that particular locations. While epidemiological studies is important at daily temporal resolutions, this paper focuses on monthly average with an aim to improve the current use of satellite derived air pollution indicators in Environment Performance Index (EPI) reporting. Therefore, the applicability of this approach for a different time window is not an issue.