*Interactive comment on* “Fine particulate matter (PM$_{2.5}$) trends in China, 2013–2018: contributions from meteorology” *by Shixian Zhai et al.*

**Anonymous Referee #1**

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**General comments**

This manuscript attempts to distinguish contributions from meteorology and emissions reduction to PM$_{2.5}$ trends from 2013 to 2018 in five target regions in China. A multiple linear regression model (MLR) is developed using de-seasonalized (by taking 10-day average of hourly data) and detrended (by subtracting 50-day moving average of 10-day average from 10-day average) PM$_{2.5}$ observations and corresponding five meteorological variables. The coefficients and intercepts obtained for each season and grid are applied to de-seasonalized but not detrended anomalies of meteorological variables (i.e., 50-day moving average minus 6-year average) to calculate PM$_{2.5}$ anomalies attributable to meteorology. Consequently, residual anomalies are attributed to other factors, mainly changes in emissions. The attempt is valuable as the research question, contribution from meteorology to the PM$_{2.5}$ trend, is crucial to East Asian countries. Overall, the results with the MLR is acceptable. I would support publication of this manuscript with minor revision mostly asking clarification.

**Specific comments**

1) L25 ‘minor but significant’: ambiguous expression. Can you add more explanation?

2) L26 ‘residual anthropogenic trends’: anthropogenic emissions?

3) Section 2.3:

You may consider adding another variable for grid. For now, i represents both season and grid which made me difficult to follow at first.

Explicit description of $Y_{a,i}(t)$ is needed. It is not clear to me whether the anomaly is $Y_{a,i}(t) = 50$-day moving average – 6-year average at the grid or $Y_{a,i}(t) = 10$-day average – (50-day moving average – 6-year average) at the grid.

4) Figure S2: How come PM$_{2.5}$ anomalies are greater than de-seasonalized and detrended PM$_{2.5}$? It makes sense if $Y_{a,i}(t)$ is as the second definition as I mentioned above.

**Technical corrections**

L131 K. Li et al. (2019): Couldn’t find this reference. Did you mean Yi et al. (2019)?