

The manuscript titled “**Insights on ozone pollution control in urban areas by decoupling meteorological factors based on machine learning**” uses a machine learning method to decouple the meteorological effects on concentrations of O₃ and its precursors. This method provides better understanding of O₃ precursor sensitivity and sources of VOCs. The article is well organized. It can be accepted after considering the following suggestions.

Line 15: The term “atmospheric environment capacity” sounds weird.

Line 81-83: This statement is not justified. The emission reduction policies do not necessarily rely on the two methods, and other methods such as air quality model can also provide basis.

Lines 107-109: How to measure these meteorological factors should be given.

Line 130: the “cluster” should be explained here.

Lines 131-132: From my understanding, the variable “trend” just characterize the date and hour. Why does it relate to the implementation of policy measures?

Line 137-138: It is better to randomly split the data into ten subsets, and randomly use nine of them for training and the rest one for testing.

Line 125: For the performance of the random forest model, which variables are response variable and which are predictors should be clarified.

Line 141: Different VOCs species has different lifetime. Some VOCs with low reactivity have longer lifetime, which can go through regional transport. The difference among different VOCs species should be considered.

Lines 144-145: Which time periods are selected for the resampling? The whole four years or the month to which the investigated day belongs to? This should be clarified.

Line 187: I suggest to give some quantitative description of the consistency.

Line 190: “From the diurnal trends of NO₂ and NMHCs,” sounds weird.

Line 207: “And” is redundant.

Lines 205-210: O₃ concentrations can affect the nighttime NO₂ and VOCs by titration and ozonolysis reactions of alkenes. How do you evaluate it?

Fig. 2. How to evaluate the importance of different features should be depicted in the Method.

Line 215: the reason why the time variables can represent anthropogenic emissions should be clarified.

Line 226-227: This reaction will cause more production of OH, which will increase O₃ production. So this probably cannot explain the negative correlation between RH and O₃. Higher RH generally corresponds to more cloud and precipitation, causing lower O₃ concentrations. The reason for the negative correlation should be double checked.

Line 227-229: In fact, reaction rates does not necessarily increased with temperature increasing. In fact, many important reactions such as NO₂+OH and some VOCs+OH will get slower with higher temperature.

Temperature not only affects chemical reactions and precursors emissions, but also affects physical processes. How do you isolate the physical effects?

Line 281: The term “locally generated O₃” should be defined or explained here.

Line 323: “...more slowly” this description is not clear. Higher value of the turning point indicates the real NO_x concentrations is more likely lower than this value, suggesting a higher possibility to be in the NO_x-limited regime.

Line 327: The transitional regime is not defined here. Do you mean the turning points is transitional regime?

Figure 5. The relationship between O₃ and NO₂ and the turning point are acquired from the normalized O₃ and NO₂. However, it seems that the average values of NO₂ for each year are acquired from the observed values, rather than the normalized values. The reason for the inconsistency should be clarified.

Figure 5 and Figure 6. In Figure 5 O₃ sensitivity shifts from a VOC-limited regime to a NO_x-limited regime, while in Figure 6, this shift is toward inverse direction. The contradiction should be explained.

Figure 6. How do you judge that O₃ sensitivity shifts from NO_x-limited regime to transition regime? It seems that it is in a NO_x-limited regime for both cases.

Line 344: “besides,” This sentence is unclear to me.

Lines 412-414: It is unclear what the decrease or increase of VOCs is relative to. Is it relative to non-pollution period, or observed concentrations?

417-420: Here, you state that the proportion of industrial emission and solvent use decreased. This does not mean the concentrations of VOCs decrease. So this cannot demonstrate the shutdown measures are effective. I suggest to additionally show the changes of VOCs concentrations from different sources in this Figure or in supplementary materials.