

**Editor Decision: Publish subject to technical corrections (acp-2020-1223)**

*Comments to the Author: Dear authors. I have examined the final version of the manuscript, and while I think it could be further improved with more precise wording choices, I do not think another round of review is going to help. The results are certainly useful, and deserve to be published, so I am going to go ahead with the acceptance. The manuscript still has an unusually large number of typos, grammatical mistakes, and imprecise wording choices. For example, below is a partial list from the first two paragraphs in the paper. I am going to ask Copernicus (ACP publisher) about their copy-editing services but it is better if they start with a cleaner version. Therefore, please go through the text one more time, perhaps enlisting your own professional editing services.*

We appreciate the positive comments from editor. According to the editor's comments, we have revised this paper. The details are as follows. *The blue italics are comments of reviews. The red italics are improvements and original text.* The black font are responses.

*1. L24: mainly originates from -> is an important component of*

We have revised “*mainly originates from*” to “*is an important component of*” in line 23 in the improved paper.

*2. L25: emission -> emissions*

We have revised “*emission*” to “*emissions*” in line 24 in the improved paper.

*3. L27: absorption for -> absorption of*

We have revised “*Because of the significant absorption for short-wave radiation (Wavelength range from near-ultraviolet light to visible light)*” to “*COM has a significant absorption in the near-ultraviolet and visible region*” in line 25-26 in the improved paper.

*4. L27: (Wavelength -> (wavelength*

We have revised “*Because of the significant absorption for short-wave radiation (Wavelength range from near-ultraviolet light to visible light)*” to “*COM has a significant absorption in the near-ultraviolet and visible region*” in line 25-26 in the improved paper.

*5. L29: atmospheric components and quality -> air quality*

We have revised “*atmospheric components and quality*” to “*air quality*” in line 27 in the improved paper.

*6. L32: As photosensitive substances, the -> The*

We have deleted “*As photosensitive substances, the optical properties and components of COM change significantly under solar irradiation*” in the improved paper.

*7. L34: that due to COM is -> due to*

We have revised “*On the one hand, optical properties change significantly that due to COM is photo-bleaching in aerosol*” to “*Photodegradation changes the optical property of COM*” in line 30 in the improved paper.

8. L36: *because* -> *when*

We have revised “*because*” to “*when*” in line 32 in the improved paper.

9. L37: *the sentence needs to be broken in two sentences*

We have revised “*Zhong and Jang (2014) reported that mass absorption coefficients (MAC) decreased by 41% on average because wood-burning organic matter (OM) was bleaching, such as conjugated aromatic rings and phenols, and hydroxylated aromatic phenols*” to “*Zhong and Jang (2014) reported that mass absorption coefficients (MAC) of wood-burning organic matter (OM) decreased by 41% on average. Conjugated aromatic rings, phenols, and hydroxylated aromatic phenols were the main components in wood-burning OM and these components were photo-bleaching*” in line 31-34 in the improved paper.

10. L39: *spectral* -> *spectral range*

We have revised “*spectral*” to “*spectral range*” in line 35 in the improved paper.

11. L43: *delete “could be”*

We have deleted “*could be*” in line 40 in the improved paper.

... and so on – there are too many mistakes to list here.

**We also corrected other mistakes in the improved paper. For example,**

1. We have revised “*COM can be decomposed into small molecules after photodegradation and the photodegraded COM may have lower volatility and higher oxidation degree*” to “*photodegradation could cause photochemical decomposition of COM and the decomposed COM is characterized by smaller molecule weight, lower volatility, and higher oxidation degree*” in line 37-38 in the improved paper.
2. We have revised “*COM photochemistry may dominate the chemical composition and the aerosol aging process*” to “*Photodegradation may dominate the chemical component of COM and aerosol aging*” in line 72 in the improved paper.
3. We have revised “*Straw and coal burning were the main way of heating and cooking in the rural areas in China*” to “*The main ways of heating and cooking were straw and coal burning in rural China*” in line 88 in the improved paper.
4. We have revised “*The original and photodegraded samples were ultrasonic extracted with ultrapure water (>18.2 M $\Omega$ •cm, Hitech, China) and filtered through a 0.45  $\mu$ m filter (Jinteng, China) to obtain the water-soluble organic matter (WSOM)*” to “*Water-soluble organic matter (WSOM) was extracted from the original and photodegraded samples by sonication in ultrapure water (>18.2 M $\Omega$ •cm, Hitech, China) and filtered through a 0.45  $\mu$ m filter (Jinteng, China)*” in line 97-99 in the improved paper.

5. We have revised “*temperature was risen in a gradient style. Different temperatures are needed for particular analysis phases*” to “*Temperature of the oven risen and the different phases were at a selected temperature*” in line 107 in the improved paper.
6. We have revised “*As short-lived reactive intermediates, <sup>3</sup>COM\* has an important impact on photochemical process in atmospheric environment*” to “*<sup>3</sup>COM\* is a short-lived reactive intermediate and has an important impact on photochemical process in aerosol*” in line 129-130 in the improved paper.
7. We have revised “*TMP was used as the capturing agent for the <sup>3</sup>COM\**” to “*TMP was the capturing agent for <sup>3</sup>COM\**” in line 134 in the improved paper.
8. We have revised “*Phenol solution was used as the internal standard substance for TMP quantification*” to “*Phenol was the interior label for TMP quantification*” in line 140 in the improved paper.
9. We have revised “*COM can be decomposed and transformed due to photodegradation in aerosol*” to “*Photodegradation causes the decomposition and transformation of fluorophores*” in line 223 in the improved paper.
10. We have added “*higher*” in line 287 in the improved paper.

The more changes are presented in the track-change-mode version of the manuscript. For example, line 255-260, line 329-330, and so on.