

Comments to the Author

This manuscript presented a topic with spatial and temporal variability and light absorption property of carbonaceous aerosols (OC and BC) in a typical glacierization region of Tibetan plateau. However, there are several key issues that authors should address and enhance/clarify (see below):

- a) The annual mean OC/BC ratio was found to be highest in the monsoon season and lowest in winter. The author needs to mention, which types of photochemical reactions are involved that increased OC/ BC ratio. Generally, photochemical reaction changing their physical and chemical properties from the original molecule of the substance. When this occurs, these molecules tend to form a new structure, or combine with each other or other molecules. This may change the state of OC or BC or OC/BC ratios.
- b) Author mentioned that tourism activities in monsoon season were attributed to relatively high OC/BC ratios in Mt. Yulong region, especially in GHZ basin. Firstly, author did not define tourism activities in whole manuscript. Secondly, how do author think “tourism activities” term used for vehicles or buses emission. Please explain in scientific literature that indicates tourism related activities contributed to OC, BC emissions with references to justify the statement.
- c) In the result and discussion part “human activities” creating difference in Mt. Yulong and GHZ basin. This is a major observation indicated by author, but there is no concrete evidence available to support the results particularly what types of human activities?
- d) Authors stated that “A large amount of biomass burning emissions in the high atmosphere (around 500 m asl) in Mt. Yulong were probably long range transported from source regions”. This observation is supported by the higher BC concentration than OC especially during monsoon season to post monsoon season. How do authors assume this observation without performing Trajectory analysis with HYSPLIT model? In order to find the transport of pollutant emission from biomass burning, author needs to perform trajectory analysis during the study period to support the results for Dec. 014 and Dec.2016.
- e) Authors selected experiment dates (December 2014-Decemembr 2016) for time series of meteorological parameters at Mt. Yulong. On the other hand, in model experimental part for CAM5, selected dates are 2010 to 2014, although the author stated the reason but for actual results synchronization, it should be similar dates to give clearer picture and what is base to select these years?.
- f) In result and discussion parts, author mentioned “seasonal changes in BC and OC sources (e.g., biomass burning vs. fossil fuel combustion) might play an important role for the variations of OC/BC ratios”. How does seasonal change affect in OC/BC ratio? Explain the reason and factors involved in this change.
- g) How did author’s calibrate the Particulate sampling apparatus (TH150-A, Wuhan Tianhong INST Group)? and the quality assurance of this apparatus is not explained in manuscript.

Some minor revision is as follows

- a) In the abstract part line 2-3 write down the name for adjoining areas.
- b) In the introduction part line 1-2 add Bond et al. 2007 reference to support the statement
- c) In the introduction part line 3-4 use words as “ human health and living species” instead of using “living organisms”
- d) In the introduction part line 4 reference is missing.
- e) Page 4; line 4 Tibetan plateau(TP), abbreviation is already used in abstract part, so need to use full word
- f) Page 5; line 12 please elaborate the model names that are not considered absorption by OC with reference.
- g) In material and method part page5; Line 29. This statement needs reference to support the arguments.
- h) Page 13; use some other words instead of using “But”
- i) Page 6; line 16, Is there any other pollution sources?, if yes please mention and explain their sources.
- j) Page 9; line 20, write down “Then they” instead of using “They then”
- k) Page 10; line 20 reference is missing.
- l) Page 12; line 7 what type of human activities involved between Mt. Yulong and the GHZ sampling sites?
- m) Page 14; line 17 write down the full name for “QSMS”
- n) Page 17;line 11 add “in BC emission” after “contribution”
- o) Page 41; Fig. 11. Is there any major difference or key observation that author found in current study which is actually different from others. Please explain in the footnotes of Fig.11