

## Response to additional comments to authors-acp-2022-336

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Based on the comments of two reviewers, who support the publication, and after my consideration, I have decided that the manuscript is of suitable atmospheric interest to merit publication in Atmospheric Chemistry and Physics. The results of this manuscript present useful information on the important impact of water-soluble organic carbon (WSOC) on snow albedo and the solar radiation balance. The authors have thoroughly responded all the questions/comments raised by the reviewers, and modified the manuscript according to the suggestions.

However, I have still some additional comments, which are needed to be solved before publication.

R: Thanks for the editor's careful reading, helpful comments, and constructive suggestions, which have significantly improved the presentation of our manuscript. We have carefully revised our manuscript, and the related typos and grammar errors have been corrected accordingly.

Comments/ errors: (Lines as in the revised version of MS with tracked changes)

1. Line 13/page 4: "And" can be deleted.

R: Revised as suggested. (Line 20, page 4)

2. Line 16/17, page 6: Please correct as: »To address this deficiency, we made the first investigation...«

R: Corrected as suggested. (Line 1-2, page 7)

*"To address this deficiency, we made the first investigation of the fluorescence characteristics, absorption properties, and radiative effects of WSOC in seasonal snow samples in northeastern China."*

3. Line 9, page 9: Correct: "... until analysis." "... were first melted" (not firstly).

R: Corrected as suggested. (Line 9, page 9)

*"All collected snow samples were stored in a freezer at  $-20$  °C until analysis in the*

*laboratory. In the lab process, the samples were first melted at room temperature (25 °C).”*

4. Lines 15-17, page 9: Please, correct (awkwardly written).

R: Corrected as suggested. (Lines 17-19, page 9)

*“The concentration of WSOC for ultrapure water blank is 0.35 mg L<sup>-1</sup>, and the value of each sample after blank subtraction is presented in Table S1.”*

5. Line 16, page 14: Number of significant digits are now mostly good; but ...”18.0 µg g<sup>-1</sup>” should also be changed (18 µg g<sup>-1</sup>). Please, check again your results throughout the manuscript!

R: Revised as suggested throughout the manuscript. (Line 16, page 14).

6. Line 7, page 34: “...of WSOC, indicating that snowpack WSOC originates...” It should be “..of WSOC indicate that...”.

R: Revised as suggested. (Line 7, page 34)

*“The high degree of humification and minimal bioavailability of WSOC indicate that snowpack WSOC originates primarily from soil sources.”*

7. Reviewer 2: 13. Page 10, Line 23: The author should give the full name of “HULIS”. No need, HULIS is already mentioned in the abstract. Just name it appropriately (humic-like substances).

R: Revised as suggested. (Line 19-20, Page 1; Line 20, Page 16)

8. Please, check again the English language; there are still errors.

R: We have polished the manuscript very carefully.