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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical characterization and sources of submicron aerosols in the northeastern Qinghai-Tibet Plateau: insights from high-resolution mass spectrometry" *by* Xinghua Zhang et al.

Anonymous Referee #1

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A filed campaign was conducted at Waliguan Baseline Observatory (3816 m a.s.l.), the northeast edge of Qinghai-Tibet Plateau (QTP) during summer season using a high-resolution aerosol mass spectrometer to study the highly time-resolved chemistry and sources of submicron aerosols. The authors found that sulfate dominated the total PM1 in the northern QTP whereas organic aerosols contributed more than half of the total PM1 in the southern or central QTP, suggesting the very different aerosol characteristics and sources in different regions of QTP. Source apportionment of organic aerosol (OA) identified two relatively oxidized OAs, more-oxidized oxygenated OA (OOA) and

aged biomass burning OA (agBBOA). Relatively high mass concentrations of PM1 and enhanced contributions from sulfate and biomass burning related OA components were found for air masses from the northeast of WLG with shorter transport distance, indicating the significant impacts of regional transported aerosols from industrial areas in the northwestern China to high elevation site in the northeastern QTP. Overall, the dataset provided by this work is valuable. The manuscript is overall well written and documented. The topic fits well in the scope of ACP. I recommend this manuscript can be published after some revisions.

Comments:

1. Please specify which method was used for elemental analysis, I-A or A-A?

2. Line 195, 0.23 should be 0.25.

3. The description of geographic orientation in the manuscript need to be checked and revised carefully, especially the usage link north/northern, northeast/northeastern, etc. The right usage should to be "in the northeast edge of QTP" or "in the northeastern QTP" rather than "in the northeastern edge of QTP" or "in the northeast QTP".

4. One of the highlights in this study was the unique aerosol chemical characteristics at WLG compared with other highland sites in the central or southern QTP. Can the author present some direct comparisons via tables or figures besides the simple description in sentences?

5. Line 62-63, "due to the influence of anthropogenic emissions from inland of northwest China". The expression of "inland of northwest China" is incorrect and need to be changed to "...from industrial areas in the northwestern China". Similarly, lines 472 and 488.

6. Line 68, change "strongly" to "strong"

7. Line 73-74, "in the northeastern QTP " moved after "aerosol particles".

8. Line 81, delete "species".

9. Line 96, the expression of "long-range transport biomass burning emissions" was used several times in the whole manuscript, however, it seemed inappropriate and could be changed to "long-range transported biomass burning emissions".

10. Line 117, the expression of "GongHe county" need to be changed to "Gonghe county", consistent with that of "Xining".

11. Line 253-256, this sentence is too long and confusing, please rewritten.

12. Line 274-275, Figure 3c, the scales of y-axis for the size distributions of organics and three inorganic species are not consistent. It is difficult to conclude that "organics presented relatively wider distribution than the three secondary inorganic species in the small sizes".

13. Line 329, "... in previous studies", please add the references.

14. In Figure S9, the author shows the scatter plots of the comparisons between the four high-resolution mass spectra identified in this study and those determined from other studies. Are they HMR or UMR spectra?

15. Line 342-343, please explain more on the diurnal variation of HOA at WLG site.

16. Line 401, the expression of "PBL variation" is inappropriate and needs to be rewritten.

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