

Reply to Comments from Anonymous Referee #2 on “Long-term measurements of aerosols and carbon monoxide at the ZOTTO tall tower to characterize polluted and pristine air in the Siberian Taiga” by X.Chi et al.

We appreciate the effort of Anonymous Referee #2 to provide very useful comments on our manuscript. Recognizing that such comments help further improve the quality of published manuscripts, we considered each comment carefully. In almost all cases, we made the suggested revisions. Below we answer the comments point for point. For clarity we reproduce the referee comments in ***bold italic*** style.

Anonymous Referee #2 general comments:

1. Strictly speaking, expression aerosol stands for the whole colloidal system (particles and the air), while its plural form, aerosols is used for the types of the aerosol (e.g. urban, rural remote or biomass burning aerosols). They are not used consequently in the text. Furthermore, the authors often apply the expression aerosols incorrectly for aerosol particles. Some examples are as follows: page 18347, line 11: "biomass burning aerosols that are distributed around the globe". page 18349, lines 3-4: "the composition and the size of the aerosols." page 18349, line 23: "Atmospheric aerosols have diameters" The authors should correct these inaccuracies at many places in the MS.

Thanks for the comment. We accept the referee's suggestion. In the revised manuscript, when we refer to aerosol (particles and air), the term “aerosol” will be generally used, while the term “aerosols” will be used for different types of aerosol; when we refer to particles, “aerosol particles” or “particles” will be used instead of “aerosols”.

2. The "fine accumulation mode (< 250 nm) and coarse accumulation mode (> 250 nm)" (page 18359, lines 10-11) are both unusual and misleading since the size distributions can include nucleation, Aitken, accumulation and coarse modes, and the accumulation mode can be sometimes split into condensation and droplet submodes. The present naming without specific references to earlier work and considerations can hardly be accepted. It is suggested that the authors rethink and modify this sentence.

We agree. The text was changed to avoid this confusion and to be in line with our introduction to: “In this study we assumed, the existence of at least two modes for our measurement size range (15 nm to 835 nm), the Aitken mode (smaller than ~100 nm, mode 1) and the accumulation mode (larger than ~100 nm, mode 2). Occasionally, the agreement between fitted and measured spectra is not perfect for the accumulation mode. In such case, an additional mode (>250 nm, mode 3) was added to the fitting, which we assume to be either a “droplet mode” from cloud processing, or a very aged accumulation mode.”

Anonymous Referee #2 Specific comments:

***There are several typing and smaller grammatical errors in the text, which should be removed by careful reading. Some examples are below.
page 18347, line 25: "... aerosol scattering and absorption shows ...should be replaced by "... aerosol scattering and absorption show ...".***

Corrected as suggested.

page 18349, line 7: Micron is not an SI unit. Write submicrometer size range instead of submicron size range here, and at some other places in the text.

Corrected as suggested, in total 3 places in the text.

Page 18358, lines 22-23: Indicate that the diameters are electrical mobility diameters, e.g. dry particle electrical mobility diameter.

The text is corrected as written.

page 18361, lines 8-9: Write "with a time resolution of 3 hours" instead of "with 3 hourly time resolution".

Changed as suggested.