

Review of “Measurement report: The first in-situ PM1 chemical measurements at the steep slope from highly polluted Sichuan Basin to pristine Tibetan Plateau: light absorption of carbonaceous aerosols, and source and origin impacts” by Zhao et al.

Recommendation: Minor Revisions

The manuscript presented the observational results of the first in-situ measurement of atmospheric aerosols, especially aerosol absorption properties, at six sites along eastern slope of the Tibetan Plateau. In general, the paper is well written and presented in a logical way. It is a timely and important piece of work, and of general interest for Tibetan Plateau and atmospheric aerosol related communities. I therefore recommend publication of this paper in *Atmospheric Chemistry and Physics* after minor revisions. My comments are listed as follows:

Major Comments:

Using Equation (5) to separate total aerosol absorption into EC and BrC absorption is an objective and effective method. But the shortcomings of the method should be kept in mind when analyzing and discussing the results. For example, the method does not consider the absorption of mineral dust (or fine soils), which accounts for very small percentage for most urban sites but might account for a large proportion of total aerosols for some other sites. Previous studies have revealed that the mineral dust is an important species of the atmospheric aerosols over the Tibetan Plateau (e.g., Zhang et al., 2021). Besides, assuming AAE of EC as 1 does not take into the aging of EC.

Specific Comments:

1. Page 5, Line 5: Is the meteorological data available for each site? Are the sampling sites near the meteorological observation sites?
2. Page 6, Line 21: “These are wavelength independent factors.” Revise this sentence since it might be misleading.

3. Page 6, Equation 5: Separating total aerosol absorption into EC and BrC absorption is applicable for urban sites with severe anthropogenic pollution and little mineral dust (fine soils).
4. Page 6, Equation 5: Assuming AAE of EC as 1 excludes the influence of EC aging, which causes higher AAE than 1.
5. Page 7, Line 6: The assumption of no vertical gradients within the PBL might overestimate the radiative forcing of aerosols.
6. Page 7, Line 12: Why choose 405 nm as the lower limit of the integral?
7. Section 2.5: Which version of the EPA PMF model was used in the study?
8. Table 1: The abbreviations of the site names were not defined in the manuscript.
9. Page 12 and Figure 7: The physical meaning of the parameter (radiative forcing of BrC relative to EC) is recommended to be further discussed. Were the nighttime samples used when calculating this parameter?
10. Figure 9: Black lines and circles are recommended. It is not necessary to use too many colors in this figure.
11. Page 16, Line 14: Delete "full".