

Interactive comment on “The contribution of residential coal combustion to atmospheric PM_{2.5} in the North China during winter” by Pengfei Liu et al.

Anonymous Referee #1

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This manuscript by Liu et al. reports PM_{2.5} and its major components in winter and spring seasons at four sites in North China. Chemical compositions and spatial difference are discussed. The major sources are also attributed. Generally, the study is well-designed and the manuscript should be published after my concerns are addressed.

Major concerns 1. Line 144-159. The authors claim that Cl/Na ratio is 1.4 in coal combustion. And if the ratio high than 1.4, atmospheric Cl and Na would be considered to be totally from coal combustion. In fact, biomass burning, including wild fires, open straw burning and biofuel combustion also emits Na and Cl with the Cl/Na ratios of 1-6

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(e.g. Schauer ES&T 2001). Moreover, the OC/EC ratios in biomass burning samples are as high as those in coal combustion (Table 3). Since biofuel combustion for heating is also enhanced during winter in the northern China, why and how did the authors rule out the influence of biomass burning on PM_{2.5} at the four sites? 2. The authors discuss the spatial difference of PM_{2.5} and the major components at the four sites. Did the meteorological conditions, such as planetary boundary layer (PBL), cause such a spatial difference? 3. SOC is estimated by the EC-tracer OC/EC method. However, previous studies have demonstrated that this method could overestimate SOC under the influence of coal combustion and biomass burning, especially in wintertime. As discussed in the manuscript, coal combustion (maybe also biofuel combustion) had significant impact on PM at the sampling sites in wintertime. Thus, the concentrations and mass fractions of SOC in the winter (Figure 11) should be overestimate.

Specific comments 1. The citation need to be re-formatted throughout the main text. For example, in line 48, the citation formats for the two references are different (Huang et al., 2014; P. Liu et al., 2016). 2. Line 230-232. Is the difference in concentrations statistically significant? Please add p-value to show the significance of the observed difference.

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