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Discussions

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comment**

Interactive comment on "Chemical characteristics of PM$_{2.5}$: Impact of biomass burning at an agricultural site of the North China Plain during a season of transition" *by* Linlin Liang et al.

Anonymous Referee #2

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In this manuscript, the authors report chemical characteristics of PM2.5 under the impact of biomass burning (BB) in the North China Plain. Several BB markers, including levoglucosan, mannosan and water-soluble potassium are measured in daytime and nighttime samples. The authors find large differences in chemical characteristics in different BB periods. They also claim that there might be other sources of potassium. My major concerns are:

1. The authors compare chemical characteristics of PM2.5 in three periods, named minor BB, intensive BB and major BB. The major BB period is from 1-23, November. As I know, the central heating system in Beijing usually starts from the middle of November.

Discussion paper

There should be large increase in the fuel consumption, including biofuel and coal due to residential heating. I suggest to exclude the heating period from the major BB. The authors can also compare chemical compositions in the heating period with other three episodes.

2. The ratio of levoglucosan to mannosan (L/M) is wide used to distinguish different BB types. As Figure 7 showed, the L/M ratios are very stable during the whole campaign. However, the air masses are originated from different places (Figure 5) where should have different BB types. The authors should explain why the air masses passed through different BB areas have the similar L/M ratios. Moreover, recent studies have demonstrated that levoglucosan is not stable in the air and will be decomposed during atmospheric transport. How does the aging process affect the L/M ratio and its application in BB type identification?

3. For the additional sources of potassium, previous studies have demonstrated that coal combustion is the major source of potassium in Beijing, especially during winter haze. Thus, the apparent difference in levoglucosan / potassium ratios between intensive BB and other periods (Figure 7b) could be largely due to the impact of regional coal combustion.