

Interactive comment on “Diurnal variations of organic molecular tracers and stable carbon isotopic compositions in atmospheric aerosols over Mt. Tai in North China Plain: an influence of biomass burning” by P. Q. Fu et al.

Anonymous Referee #1

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This manuscript presents a thorough investigation on the OC, EC, WSOC, and organic compound species in tropospheric aerosols collected at a high mountain site (Mt. Tai) in Central East China during a biomass-burning season. The authors have found that most of the organic species showed higher concentrations in early June than in late June due to the field burning of wheat straws. The data interpretation was further assisted by a comparison with published data for similar organic compounds from different locations. In my opinion, this is one of the first papers focusing on both primary and secondary organic aerosol tracers, as well as $\delta^{13}\text{C}$ of TC in high mountain

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aerosols, especially in China. The data presented here is interesting and convincing, and it certainly meets the scope of the journal. Therefore, this manuscript is suitable for publication in ACP after a minor revision. Detailed comments and technical errors are given below.

1) Page 9081, the abstract section, line 17-23, how about the boundary layer height? Was it high enough for the transport of the plumes onto the mountaintop? If the night peak was caused by more burning activities at night? 2) Page 9084, Section 2.1. Quartz fiber filters (QFFs) were used for sampling in the present study. Thus the sampling artifacts (see Turpin et al., 2000) and their potential impact on the results should be addressed briefly in this section. 3) Page 9085, line 28-page 9086, line 1. "...whose field blank levels sometimes were high compared to real samples...". Please clarify how "high" the contamination level is. And how about the blank levels of other organic species? 4) Page 9086, line 8. "..., an aliquot (14 mm) of ...". What does it mean? It seems to reference a size of filter punch. 5) Page 9089, line 14-17, in comparison to the fossil fuel combustion, biomass burning can produce more water-soluble organic compounds, (see Wang et al., AE, 45: 2473-2479 and EST 43: 6493-6499), thus WSOC and levoglucosan highly correlated each other. Page 9089, line 8. "...and acting as CCN." This sentence requires a reference. 6) Page 9091, line 19-20, why? Many papers reported that biomass burning can produce lots of PAHs, so I think it's better to give more explanation here. 7) Page 9092, line 16-19. The positive correlation between levoglucosan and the sum of arabitol and mannitol does not necessarily indicate that biomass burning is an important source of these sugar alcohols. Some specific reference is required for this statement. 8) Page 9093, the section 3.3.4, Wang et al have reported the impact of the summertime wheat straw burning on the chemical composition and size distribution of organic aerosols in a Chinese mega-city, I recommend to make comparison with their results, which might be very interesting for readers to see the difference between the lowland urban area and the elevated mountaintop. 9) Page 9094, line 19-21, what is the reason that an extremely high value of benzoic acid (57 ng m⁻³) was observed in early June? 10) Page 9098, line 1-9, how about fatty

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acid C16:0, a compound classified to the category (b), which is abundant in cooking emission. 11) Page 9100, line 16-18, I am not sure this conclusion is strong enough, because $\delta^{13}\text{C}$ value of ambient aerosols including the background is always variable. 12) Page 9122, Figure 11. "Isiprene SOC" should be "Isoprene SOC".

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