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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantifying the relationship among $PM_{2.5}$ concentration, visibility and planetary boundary layer height for long–lasting haze and fog–haze mixed events in Beijing city" *by* Tian Luan et al.

Anonymous Referee #2

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Comments on Quantifying the relationship among PM2.5 concentration, visibility and planetary boundary layer height for long-lasting haze and fog-haze mixed events in Beijing city by T Luan et al.

In this manuscript author reported the observation phenomena describing the tight relationship between PM and PBL in two type haze events occurred in Beijing. Facts are always important for our better understating of the severe haze events. Authors suggest possible feedbacks among PM, PBL, and/or humidity, whereas the PBL play dominant roles. However, in the present version of the manuscript, authors just demonstrate their

co-changes by correlations. The physical explanation why/how the PBL changes need careful and substantial analysis/evidence.

Page 3, line 3, '. . .inside of the surface', misleading.

Page 4, line 26, 'NCEPT', typo

Sections 3.1 and 3.2, as authors indicated the humidity is a very important factor modulating both the PM concentration and visibility, the relationship obtained in Section 3.1 and 3.2 would be biased by humidity. Particularly, to what extent the humidity 'contaminate' the PM2.5-PBL and PM2.5-visibility relationship should be clarified. It seems reasonable to perform additional analysis using data under similar humidity conditions. Otherwise the explanation would be vague.

Page 9, line 14, 'col', typo

Page 9, line 23, As you demonstrated, the temperature advection is important, but why the aerosol transport from the south is weak?

On the PBL changes, what's the role played by the background synoptic processes? Is there any non-aerosol related dynamical/thermal causes in lower troposphere?

Page 12, line 1, inconvincing. It seems actually the whole layer get warmer on 13-14 April. This might help set a higher PBL.

Section 3.4.2, The PBL feedback is much stronger in fog-haze events than in haze event. This conclusion cannot be obtained, until you have ruled out the influence of synoptic processes on the PBL in these anaylzed events.

Page 32, The RH in Figure 10 seems not consistent with Fig.7. For example, high RH above 500m are event from 12 April to 14 April in Figure 7. But in Figure 10 (b,d) this feature cannot be found, instead, much drier conditions on 13 April and 14 April. Why?

Page 34, Figure 12(e), PMcorse should be PMcoarse. And how did you define PMcoarse? Should be indicated, and the relevant analysis for PMcoarse also missed in

the text.

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