

Interactive comment on “Investigating the impact of regional transport on PM_{2.5} formation using vertical observation during APEC 2014 Summit in Beijing” by Yang Hua et al.

Anonymous Referee #1

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This manuscript presents observations of air quality and meteorological parameters including ground level data and vertical profiles. Those measurements were used to analyze emissions and atmospheric processes that had significant impacts on PM_{2.5} air quality during the study period. The topic is relevant to ACP. The approach and applied methods are largely valid. The scientific contribution is good. However, the presentation has room for improvement. My comments and suggestions are listed below.

1. Abstract. The last sentence is unclear, “Further vertical observations are needed to investigate the pollutants transport especially during the explosive increase pollution episode. ” 1) if you recommend that others should use vertical methods, it could

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read: Future studies may consider including vertical observations to aid investigation of pollutant transport especially during episodic events of rapidly increasing concentrations, or 2) if you believe that what you have done in this study is not enough, it could read: Vertical observations beyond those explored in this study may be necessary to investigate pollutant transport, especially during episodic events of rapidly increasing concentrations.

2. Section 3.1, “Period 1 (October 27th to November 2nd) and period 2 (November 3rd to November 12th) were defined to represent the periods before and during the APEC summit.” Given that “Three pollution episodes were selected to discuss the pollution characteristics during the observation (Fig. S3)... Episode 1 (October 27th to November 1st) represents the period before the emission control. Episode 2 (November 2nd to 5th) was the first pollution episode during the emission control plan. Episode 3 (November 6th to 11th) was the second pollution episode during the emission control plan.” (pg 7, L10) and “Summit held in Beijing from November 5th to 11th, 2014. A strict air pollution control plan was carried out in the BTH Region to improve air quality in Beijing from November 2nd to 11th for APEC” (pg 4, L3), the selection of Period 1 and Period 2 seem to be rather arbitrary and confusing. I suggest using “Episode 1 and Episodes 2 and 3 combined” and define the three episodes at the beginning of section 3.1.

3. Pg 8, L13, “The high level of PM_{2.5} is typical in Beijing during the autumn.” Please provide the average PM_{2.5} concentration during this episode.

4. Pg 9, L14, this paragraph seems to be less relevant; it could be better placed in the Supplemental Information.

5. Pg 9, L23, “For episode 1, the regional component accounted for 75%”, did you mean, “For episode 1, the regional component accounted for 75% of PM_{2.5} mass concentration observed in Beijing”?

6. Pg 9, L27, “After that vertical wind direction kept downward and promoted the pol-

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lutants accumulation, especially SNA.” It is uncommon to have a prolonged period and /or a wide spread of downward winds that will result in great changes in atmospheric pressure. The authors may need to provide more data to support this claim or clarify where the downward winds were and for how long.

7. Pg 11, L18, “Concentrations of BC, a marker of vehicular emission in urban settings, had two peaks every day. One was in the early morning and another was in the morning rush hour of 9:00am.” The second peak in BC concentrations (blue line in Fig 11) seems to be near noon, please clarify.

8. References were missing at times, e.g. pg 6, L9, HYSPLIT.

9. Figs 9e & 10e, legends seem to be missing.

10. The use of English language is largely satisfactory. However, there are quite a few awkward sentences and word choices, some examples are listed below:

1) Pg 5, L25, it could read, “Vertical wind profiles indicate the transport direction. Vertical RH profiles reflect the strength of heterogeneous reaction at different layers.”

2) Pg 7, L30, “10-day observation”, the entire observation seems to be either 16 days based on the three episodes (pg 7) or 17 days (“The field campaign was conducted from October 27th to November 12th, 2014.” pg 5, L1).

3) Pg 10, L23, it could read: “Dry and clean air mass from the north arrived in. . .”

4) The word “plan” could be omitted in “control plan” after the Introduction.

5) The use of the word “pollution” is unconventional at times, e.g. “It was also noticed that the pollution occurred when the emission control plan just started,” (pg 10, L31). Large cities like Beijing would not be free from air pollution, however, the extent of air pollution may vary. Please clarify the meaning of “pollution”.

6) Throughout the manuscript, the word “kept” could be replaced by, for example, “continuously”, or “was retained”.

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