

Interactive comment on “Impact of low-pressure systems on winter heavy air pollution in the northwest Sichuan Basin, China” by Guicai Ning et al.

Anonymous Referee #2

Received and published: 3 June 2018

General comments:

Recently, air pollution issues loom large in most parts of China with the development of the economy. Sichuan Basin is one of the seriously polluted areas. This manuscript analyze the relationships between low-pressure systems and heavy air pollution events, and discuss the physical mechanisms of the heavy air pollution in winter in Sichuan basic. The ten heavy air pollution cases were used to analyse over urban agglomeration during 2006-2012 and 2014-2017 in winter, and the eight of those heavy air pollution cases were affected by a dry low-pressure system at 700hpa. When the urban agglomeration is located in front of the low-pressure system, the weather system

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is controlled by the warm south wind current, and the unstable condition appears at the top of the boundary layer at the same time. The results will be helpful to improve our understanding on environment studies and fall well within the scope of ACP. The minor revisions on the present manuscript are needed before it can be published as followings:

Minor comments:

1. (P.4) Line 120-122: Why the daily average of PM10 is from the last noon to this noon during 2006-2012, but from the last midnight to this midnight during 2014-2017? Please try to describe the purpose.
2. Fig.2: What time is the result in Fig.2?
3. (P8) Line 218: from CASE 3, CASE 4, and CASE 5, the results that is the effect of the low pressure system at 700hpa causing the value of Boundary Layer height fall. Please describe the reasonableness. We know, the inversion disappears at the higher level, the wind speed increases in the lower layer, the turbulent motion enhancement, and the boundary layer height increases in the boundary layer when the low-pressure system at 700hPa passed.
4. Table 3, Please add instructions on how to calculate the boundary layer height. The values in the table 3 are average results, right?
5. CASE 6, the whole pollution process lasts a day, but the relative vorticity of air quality is 02: 00 on February 3, but the air quality improvement is 14: 00 on February 3 in Table2. Please confirm the reasonableness of the boundary layer height.
6. CASE 6 and 7, the low-pressure system at 700hPa throughout all the pollution process, the value of pollutant concentration was decreased quickly, why? due to fireworks only? are other processes affecting pollution ?
7. Fig.6, some discussions about the evolution of the PBL height may be also good for a more complete picture.
8. CASE 6 and CASE 7, the stronger wind shear at 850hPa means the stronger dynamic turbulence (Fig. 9). How about the characteristics of the wind profile in the boundary layer (refer to Table 3) ?
9. Please unify the format of the references, such as uppercase and lowercase.

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