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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Heavy air pollution episodes in Beijing during January 2013: inorganic ion chemistry and source analysis using Highly Time-Resolved Measurements in an urban site" *by* B. Han et al.

Anonymous Referee #1

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This manuscript examines the inorganic chemistry of ions and their sources by applying highly time-resolved measurements in Beijing samples collected in January 2013, when this area experienced a series of serious haze events.

In the last year more than 20 papers have been published on these pollution events. Some elucidate the meteorological conditions that allowed this exceptional occurrence, while others analyze the chemical composition and mass of atmospheric particles. Other papers examine soluble ions in samples collected during January 2013 in gen-

eral considering daily sampling.

This paper reports data collected with hourly resolution but refers (not in a clear way) to average values. The most original part, regarding diurnal variations, is meager and the discussion is not developed. For example, I wonder if any information on hourly RH or other meteorological parameters is available and if there was an influence on the ion concentrations studied.

The method description in the part on source apportionment needs improvement, and in particular more details on data, number of samples, and PMF parameters. The PMF results are not so unexpected.

This manuscript reports data on a local situation that has no general application in atmospheric science, the discussion draws conclusions from similar papers, and althoughit reports some interesting considerations (e.g., pg 11120 line 5-9),the paper generally lacks originality. On the whole, the manuscript does not fit the aims, scope and quality of ACP.

Minor remarks

Pg 11116 line 8. Table 1. This table reports meteorological conditions and not wind frequencies.

Pg 11116 line 16. "enhanc" correct please.

Pg 11116 Instruments paragraph. This part of the manuscript lacks information, however concise, on the analytical methods employed, such as quantification method, calibration, quality control, limits of detection and quantification, accuracy, and precision.

Pg 11117 line 23. Water-soluble K+ is not a specific tracer of biomass burning. It has other sources, such as soil dust and marine salt: Zhang Y. et al Atmospheric Environment 17 (2013) 27-35, Zhang X. et al. ACP 10 (2010), 6839-6853, Cheng Y. et al. ACP 13 (2013) 7765-7781. Pio et al. Atmospheric Environment 48 (2008) 7530-7543 suggested a method on how to separate biomass burning from sea salt and soil

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dust contributions.

Pg 11118 line 17-19. Table 4. The results reported are interesting. However, considering the exceptional nature of the events of January 2013, I expected higher ion levels in comparison to other data collected previously. These data are surprising. Did similar events occur in the past?

Pg 11118 line 24-25. This sentence is not clear to me.

Pg 11120 line 14. Fig 7. The data reported are the mean value of which period/day? If they are mean values, please report the standard deviation.

Pg 11120 line 20-25. It is not clear to me if this part refers to Gao 2013 or to this paper.

Pg 11122 Source analysis: this part deserves better data description and discussion.

Pg 11120 line 11: "The precursor of aerosol $SO4^{2-}$ is SO2, which may originate from biomassburning and fossil fuel combustion." Please insert a reference.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 11111, 2015.