Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-82-SC1, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The variation characteristics and possible sources of atmospheric water-soluble ions in Beijing" *by* P. F. Liu et al.

M. Ge

gemaofa@iccas.ac.cn

Received and published: 7 April 2016

The manuscript presents results from ion chromatography analysis of samples of PM2.5 collected in Beijing through the year of 2014 aimed at deriving the variation characteristics of water-soluble ions (WSIs) in the PM2.5. Since only a small part of studies focused on the variation characteristics of WSIs in the four seasons by now, I think the intentions of the authors are very good and substantial data about the WSIs in the PM2.5 are provided which can make an incremental gain in the knowledge of the haze occurred in Beijing. The science is sound and the results are meaningful. In addition, the authors are very familiar with the North China plain (NCP) and the agriculture activities and living activities of farmers in NCP. There are

interesting findings that the emissions from farmers' activities in the NCP was one possible emission sources and the influence of fertilization events and crop straw have influence on the regional air quality during the harvest seasons periods which have been neglected by most previous studies. Maybe more attention would be paid to the agriculture activities in NCP and that some field observations would be carried out in rural area after this paper. The detailed data of the daily variations of WSIs in this paper showed an obvious seasonal variation characteristic, which may helpful for further exploring how meteorological factor affect the accumulation and dispersion of atmospheric pollutants. And it was found that the atmospheric concentrations of SO2 and NO2 in autumn are much smaller than that in winter and spring, whereas the mean concentration of WSIs in autumn was almost the same as that in winter and nearly twice as that in spring. This result indicates that unknown mechanisms of atmospheric heterogeneous reactions and transformation of atmospheric pollutants from gas phase to particulate phase should be investigated. Moreover, it was an interesting observation that the increasing rates of SO42- during some serious pollution events were much slower than those of NO3-, especially with the elevation of Ca2+. The heterogeneous reactions of SO2 and NO2 with mineral dust may be an important pathway for the formation of sulfate and nitrate in the urban cities of East Asia because of the frequent occurrence of dust storms. Most previous studies focused on the heterogeneous uptake of SO2 or NO2 on mineral aerosol surfaces without considering coexistent gases in atmospheric condition. Only a few studies reported that SO2 and NO2 likely exert synergistic effect on the surface of mineral dust. To my knowledge there is still a lack of knowledge to explain why the increase of nitrate proportion with increasing pollution levels much faster than the increase of sulfate. I'm interested in the new ideas and inspiring points in this paper.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/acp-2016-82/acp-2016-82-SC1-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-82, 2016.