

[Home](#)[Online Library ACP](#)[Recent Final Revised Papers](#)[Volumes and Issues](#)[Special Issues](#)[Library Search](#)[Title and Author Search](#)[Online Library ACPD](#)[Alerts & RSS Feeds](#)[General Information](#)[Submission](#)[Review](#)[Production](#)[Subscription](#)[Comment on a Paper](#)

Impact
Factor
4.927

ISI
indexed

[Volumes and Issues](#) [Contents of Issue 3](#)

Atmos. Chem. Phys., 10, 947-959, 2010

www.atmos-chem-phys.net/10/947/2010/

© Author(s) 2010. This work is distributed

under the Creative Commons Attribution 3.0 License.

Size-resolved aerosol water-soluble ionic compositions in the summer of Beijing: implication of regional secondary formation

S. Guo¹, M. Hu¹, Z. B. Wang¹, J. Slanina¹, and Y. L. Zhao²¹State Key Joint Laboratory of Environmental Simulation and Pollution Control, College of Environmental Sciences and Engineering, Peking University, Beijing 100871, China²Department of Environmental Science, Policy and Management, University of California, Berkeley, CA 94720, USA

Abstract. To characterize aerosol pollution in Beijing, size-resolved aerosols were collected by MOUDIs during CAREBEIJING-2006 field campaign at Peking University (urban site) and Yufa (upwind rural site). Fine particle concentrations ($PM_{1.8}$ by MOUDI) were $99.8 \pm 77.4 \mu\text{g}/\text{m}^3$ and $78.2 \pm 58.4 \mu\text{g}/\text{m}^3$, with $PM_{1.8}/PM_{10}$ ratios of 0.64 ± 0.08 and 0.76 ± 0.08 at PKU and Yufa, respectively, and secondary compounds accounted for more than 50% in fine particles. PMF model analysis was used to resolve the particle modes. Three modes were resolved at Yufa, representing condensation, droplet and coarse mode. However, one more droplet mode with bigger size was resolved, which was considered probably from regional transport. Condensation mode accounted for 10%–60% of the total mass at both sites, indicating that the gas-to-particle condensation process was important in summer. The formation of sulfate was mainly attributed to in-cloud or aerosol droplet process (PKU 80%, Yufa 70%) and gas condensation process (PKU 14%, Yufa 22%). According to the thermodynamic instability of NH_4NO_3 , size distributions of nitrate were classified as three categories by RH. The existence of $\text{Ca}(\text{NO}_3)_2$ in droplet mode indicated the reaction of HNO_3 with crustal particles was also important in fine particles. A rough estimation was given that 69% of the PM_{10} and 87% of the $PM_{1.8}$ in Beijing urban were regional contributions. Sulfate, ammonium and oxalate were formed regionally, with the regional contributions of 90%, 87% and 95% to $PM_{1.8}$. Nitrate formation was local dominant. In summary regional secondary formation led to aerosol pollution in the summer of Beijing.

[Final Revised Paper](#) (PDF, 12912 KB) [Supplement](#) (540 KB) [Discussion Paper](#) (ACPD)

Citation: Guo, S., Hu, M., Wang, Z. B., Slanina, J., and Zhao, Y. L.: Size-resolved aerosol water-soluble ionic compositions in the summer of Beijing: implication of regional secondary formation, Atmos. Chem. Phys., 10, 947-959, 2010. [Bibtex](#) [EndNote](#) [Reference Manager](#)

[Search ACP](#)

Library Search

Author Search

[News](#)

- [Bringing Down Geoscientific Barriers](#)
- [New Tax Regulation for Service Charges](#)
- [Sister Journals AMT & GMD](#)
- [Public Relations & Background Information](#)

[Recent Papers](#)

01 | ACP, 19 Feb 2010:
Tropospheric photooxidation of $\text{CF}_3\text{CH}_2\text{CHO}$ and $\text{CF}_3(\text{CH}_2)_2\text{CHO}$ initiated by Cl atoms and OH radicals

02 | ACP, 19 Feb 2010:
Estimations of climate sensitivity based on top-of-atmosphere radiation imbalance

03 | ACP, 19 Feb 2010:
Numerical simulations of contrail-to-cirrus transition – Part 2: Impact of initial ice crystal number, radiation, stratification, secondary nucleation and layer depth