

Contents lists available at [SciVerse ScienceDirect](http://www.sciencedirect.com)

# Particuology

journal homepage: [www.elsevier.com/locate/partic](http://www.elsevier.com/locate/partic)

## Preface

### Recent advances for aerosol and environment study in Asia

Rapid economic development over the past two decades in Asian countries such as China and India has raised awareness of pollution control measures necessary to protect public health and welfare. The 7th Asian Aerosol Conference (AAC) of the Asian Aerosol Research Assembly (AARA), was held in Xi'an, China, during August 17–20, 2011. The 7th AAC engaged 550 participants from the sciences, industry, and regulatory communities from 21 countries. The conference included ~350 plenary, platform, and poster presentations. In this special issue of *PARTICUOLOGY*, 15 peer-reviewed scientific articles have been selected to publish from the conference abstracts to represent recent advances for aerosol and environment study in Asia.

Topics addressed in this special issue include several interdisciplinary areas covering nanoparticle technology, boundary layer conditions, source characterization, ambient particle measurements, and receptor modeling source apportionment.

With the rapid advance of nanotechnology and applications of nanomaterials, airborne nanoparticles have raised health concerns, both in the workplace and in ambient air. Three papers address the measurement and modeling of these nanoparticles: Wang et al. present a comprehensive review of the emissions, characterization, exposure, and control of airborne nanoparticles using filtration technology; Kallinger et al. analyze environmental nanoparticles and bio-nanoparticles (e.g., human rhinovirus) based on the electrostatic aerosol mobility, a newly developed nanoparticle analysis technique, capable of measuring agglomerated nanoparticles; Wei et al. simulate particle trajectories and investigate electrospray deposition characteristics using a three-dimensional Lagrangian model, suggesting, via comparison with experimental data, that electric force was a dominant factor affecting particle deposition patterns.

Three papers address interactions among aerosols, clouds, and precipitation with their potential effects on local, regional, and global climate. Devara and Manoj demonstrate how to combine in situ measurements and remote sensing techniques to study these interactions. Their studies at Pune, India show strong associations between aerosol content, optical depth, and monsoon precipitation. Based on a field experiment in Tianjin, China, Quan et al. investigate the vertical stratification of the planetary boundary layer (PBL) and its impact on ground-level gaseous (e.g., CO, SO<sub>2</sub>, NO, NO<sub>2</sub>, and NO<sub>x</sub>) and particle concentrations. Effects of aerosols and clouds on solar radiation are evident. Elevated ground-level air pollutant concentrations are associated with reduced heat flux and lower PBL height. Zhang et al. examine the variability of SO<sub>2</sub> concentrations during an extensive fog event in the North China

plain, and elucidate the rapid aqueous-phase SO<sub>2</sub> oxidation in fog droplets.

Three papers address the effects of meteorology on ambient particulate matter (PM) concentrations. Yao et al. apply a sensitivity analysis to investigate the interactions between atmospheric parameters and PM concentrations in Shanghai, China. Atmospheric dispersion and transport greatly affected PM concentrations in the 0.1, 1 and 2.5 μm size ranges. Based on surface and upper air meteorology, Hong et al. identify nine weather patterns associated with temporal and spatial variations for PM<sub>2.5</sub> and PM<sub>10</sub> in Hangzhou, China. Pollution episodes were observed during southwesterly air flow after cold-frontal passages during late fall and winter. Zhang et al. investigate the changes in PM<sub>2.5</sub> and total suspended particulate (TSP) elemental concentrations during the pre-monsoon period (March–May) at Lijiang on the southeastern edge of the Tibetan plateau. Transport from northwestern China during the Asian Dust season was associated with increased crustal components, while anthropogenic impacts such as biomass burning and transported dust were found during westerly transport from south Asia.

Two papers examine PM<sub>2.5</sub> composition. Wang et al. find distinct variations in PM<sub>2.5</sub> mass and its major components during special events such as Asian Dust storms, biomass burning, fireworks, and hazy days in Chengdu, China. Seasonal variations of PM<sub>2.5</sub> carbon and its organic species are reported by Li et al. Increased abundances of polycyclic aromatic hydrocarbons (PAHs) were apparent during the heating season from residential coal combustion as compared to the non-heating season.

Source characterization is reported in two papers. Mu et al. report PAH emissions from four coal-fired coking plants. PAH levels differed among combustion processes such as coke charging, pushing, and combustion. In a source-dominated environment, Li and Xiang find variations in both PM<sub>2.5</sub> and PM<sub>10</sub> mass concentrations between the entrance and exit of an underground parking garage in Wuhan, China. Elevated PM<sub>10</sub> iron was associated with resuspended road dust in the garage.

Receptor modeling source apportionment is presented in two papers. Based on the positive matrix factorization solution to the chemical mass balance equations (PMF-CMB), Geng et al. find soil dust, secondary aerosol, and coal combustion are the major contributors to PM<sub>2.5</sub> in Zhengzhou, China. For source apportionment using the effective variance solution (EV-CMB), Green et al. find paved road dust, on-road gasoline-fueled vehicles, on-road diesel-fueled vehicles, and residential wood combustion emissions are the major contributors to carbonaceous aerosol in Las Vegas, Nevada,

USA. These results are consistent with a conceptual model that can be applied in other urban areas.

The conference was jointly organized by the Chinese Association of Aerosol Science & Technology, the Institute of Earth Environment, Chinese Academy of Sciences, Xi'an Jiaotong University, and the Institute of Atmospheric Physics, Chinese Academy of Sciences. The guest editors are grateful to all of the conference organizers,

presenters, and participants, and to those who submitted and revised manuscripts.

The guest editors hope that the papers in this special issue provide Particuology's readers with useful information that can be used now and will still be beneficial for years to come. These papers provide a sample of the hard work and effort invested by the 7th Asian Aerosol Conference participants.

*Guest Editors*

Junji Cao\*

*Key Lab of Aerosol Science & Technology,  
Institute of Earth Environment, Chinese Academy of Sciences, Xi'an,  
Shaanxi, China*



Judith C. Chow

*Division of Atmospheric Sciences, Desert Research Institute, Reno,  
NV, USA*

\* Corresponding author.

*E-mail addresses: [cao@loess.llqg.ac.cn](mailto:cao@loess.llqg.ac.cn) (J. Cao), [Judy.Chow@dri.edu](mailto:Judy.Chow@dri.edu)  
(J.C. Chow)*