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Overview of the Special Issue "Aerosol Source, Transport, Chemistry, and Emission Control" for the 10th Asian Aerosol Conference 2017

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ABSTRACT (About the AAC-2017)

The Asian Aerosol Research Assembly (AARA) advances the promotion of aerosol science mainly within the Asian countries, Australia, and New Zealand. The AARA biennially organizes the most prestigious conference for aerosol researchers in Asian region i.e., The Asian Aerosol Conference (AAC), focusing broadly on the fundamental research as well as the application part of aerosol science. The 10th AAC (AAC-2017) was successfully hosted by Korea Association for Particle and Aerosol Research (KAPAR), on behalf of Asian Aerosol Research Assembly (AARA) at Jeju Island, South Korea during July 2–6, 2017. A total of 600 researchers from 20 countries participated in the conference. There were 6 plenary-lectures, 6 keynote-speeches, 179 oral-presentations, and 227 poster-presentations during the conference. All the aerosol researchers from different countries came together and displayed their latest/recent researches in the domain of aerosol science, strengthening the appreciation and cooperation in this particular field.

Keywords: Aerosol; Asian; Asian Aerosol Conference 2017; Special issue.

IN THE SPECIAL ISSUE

The editorial office of aerosol and air quality research (AAQR) collaborated with AAC-2017 to publish a special issue with the theme "Aerosol source, transport, chemistry, and emission control". 86 papers either presented in AAC-2017 or relevant to this theme have been submitted to the special issue. However, 33 papers are accepted through a vigorous peer-review process and can be categorized into three specific areas; presented as three following subsections.

Aerosol Source, Formation, Transport, Deposition, and its Chemical and Physical Processes

SO_2 is the main precursor of sulfate aerosols in the atmosphere. Zhang *et al.* (2018e) examined the trends in temporal variations in fine sulfate concentrations and related secondary formation process over urban Ji'nan in North China from 2008 till 2015. Li *et al.* (2018) investigated the characteristics of water-soluble ions (WSIs) in size-segregated aerosols from March 2014 till February 2015 in the urban area of Beibei District of Chongqing, China. Zhang *et al.* (2018a) investigated the evolution of major chemical components in $PM_{2.5}$ and the potential formation mechanisms of serious haze pollution in Hadan, China. Open fire is one of the major sources of particulate matter (PM) and trace gases in the atmosphere. Zhou *et al.* (2018) studied the impact of crop fires on ambient $PM_{2.5}$ concentrations in Beijing and Tianjin urban atmosphere by using the Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) model. The impact of crop fires in Tianjin was smaller than that in Beijing due to different fire sources and transport pathways. Kumar *et al.* (2018) investigated the fine ($PM_{2.5}$; cut sizes $\leq$ 2.5 μm) and coarse ($PM_{2.5\text{-}10}$; 2.5 $\leq$ cut sizes $\leq$ 10 μm) aerosols over two urban cities in northern India during wintertime with respect to WSIs and carbonaceous contents. Thuy *et al.* (2018) reported the different characteristics of $PM_{0.1}$ (cut sizes $\leq$ 0.1 μm), $PM_{2.5}$, and PM_{10} (cut sizes $\leq$ 10 μm), including their mass concentrations and carbonaceous fractions, at two urban locations of Hanoi, Vietnam during the wet and dry seasons. Yang *et al.* (2018) examined the secondary organic aerosol (SOA) formation pathways in urban Beijing by using an observation-constrained box model. The SOA formation rate was 30.3 μg m^{-3} day^{-1} in Beijing during Nov. 7–8, 2014.

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Shrestha *et al.* (2018) quantified the influence of semi-volatile aerosol on physical and optical characteristics of ambient aerosols in the Kathmandu valley, Nepal and also reported the amplification of black carbon absorption by up to 28%. Wang *et al.* (2018b) reported the positive correlation of $PM_{2.5}$ concentration with the atmospheric electric field under polluted conditions in Shanghai urban atmosphere. However, Grivas *et al.* (2018) analyzed the elemental composition and light-absorbing carbon in PM_{10} and $PM_{2.5}$ ambient samples collected at a roadside traffic and at an urban background site throughout an annual period (May 2011–April 2012) in Athens, Greece and also identified their sources through Positive Matrix Factorization (PMF) analysis. Likely, Pervez *et al.* (2018) analyzed the source profiles of $PM_{10\text{-}2.5}$ for resuspended-dust and vehicular-emissions with reference to WSIs, carbonaceous fractions, and trace elements. Zhang *et al.* (2018c) identified the sources of polycyclic aromatic hydrocarbons (PAHs) and *n*-alkanes in $PM_{2.5}$ in Xiamen, China. Kozáková *et al.* (2018) investigated the chemical characteristics of size-resolved PM concentrations and also the association between their intermodal fractions under different meteorological conditions at various urban sites (industrial, urban traffic, suburban) in the Czech Republic during both winter and summer. Transboundary air pollutants deteriorate ambient air quality at receptor sites and become an emerging international concern recently. Hung *et al.* (2018) analyzed and simulated an air pollution case study of highly concentrated PM formed by a severe dust storm in East Asia by using WRF-Chem model. Wen *et al.* (2018) applied the comprehensive air quality model with extensions (CAMx) to study the regional transport of various $PM_{2.5}$ components in Beijing during a severe pollution episode. Martins *et al.* (2018) investigated the combination of synoptic conditions and the long-range transport of biomass burning aerosols increases $PM_{2.5}$ concentrations in the northern region of Paraná and in other areas of southern South America. Yin *et al.* (2018) numerically investigated the deposition characteristics of nano-sized particles in a 90° square bend by using numerical model.

A paper by Jethva *et al.* (2018) investigated the impact of agricultural burning on ambient air quality over New Delhi, India by using the long-term datasets (2002–2016) of satellite retrievals along with the ground-based measurements (2013–2016). Zheng *et al.* (2018) made an attempt to compare aerosol microphysical, optical and radiative properties during the spring festival over Beijing and surrounding regions. However, Kishcha *et al.* (2018) developed an approach to differentiate between the local and remote pollution over Taiwan using long-term datasets (2002–2017) from Aerosol Robotic Network (AERONET) measurements and Modern ERA Retrospective-Analysis for Research and Applications aerosol reanalysis (MERRA; http://gdata1.sci.gsfc.nasa.gov/). Xu *et al.* (2018) investigated the effects of wintertime polluted aerosols on clouds over the Yangtze River delta by using datasets of aerosol optical depth (AOD) and cloud parameters obtained from the Clouds and Earth's Radiant Energy System (CERES) products.

Impact of Aerosol on Health and Environment

PM has significant impacts on human health (IPCC, 2007). Zhang *et al.* (2018b) estimated the health impacts of PM_{10} and $PM_{2.5}$ in the roadside microenvironment in Tianjin, China on the basis of elemental compositions. Jin *et al.* (2018) estimated the health risks associated with PM_{10}-bound PAHs in at bus stops in spring and autumn in Tianjin, China. Maciejczyk *et al.* (2018) investigated the association of cardiovascular responses in mice with source apportioned $PM_{2.5}$ aerosols in Beijing. However, Kim *et al.* (2018) estimated the short term effects of $PM_{2.5}$ and $PM_{2.5\text{-}10}$ on mortality in major cities in Korea.

Bio-aerosols are originating from living organisms (i.e., pollen, fungal spores, bacteria, viruses, animal dander, and mite-associated fragments) and also present in the atmosphere (Gonzalez-Martin *et al.*, 2018 and references therein). Gonzalez-Martin *et al.* (2018) analyzed the impact of African dust along with the airborne viruses in the atmosphere in Tenerife, Spain. However, Wang *et al.* (2018a) investigated the concentrations of bio-aerosol and suspended particles emission from gaseous bio-filters under different conditions of velocities, temperatures, and moisture contents.

Aerosol Emission Control Technologies and Policies

Diao *et al.* (2018) studied the characteristics of urea jet pump performance using the optimized NO_x removal equipment in diesel engines. Liu *et al.* (2018) investigated the emission characteristics of finer aerosols from wet flue gas desulfurization system using a cascade of double towers. Begum and Hopke (2018) investigated the ambient air quality for two decades (from December 1996 through September 2015) to understand the impact of air quality policies in Dhaka, Bangladesh. Zhang *et al.* (2018d) systematically investigated the characteristics of polytetrafluoroethylene (PTFE) high efficiency particulate air (HEPA) filters media and their dust loading performance in comparison with that of glass fiber media and reported that PTFE was more energy efficient than glass fiber except in circumstances of heavy-loading/infrequent maintenance. Choi *et al.* (2018) investigated the magnetic capture of fine dust containing iron compounds using a metal mesh and were applied to field dust procured from three different emission sources i.e., a coal-fired power plant, a metro-subway, and an urban power plant firing liquefied natural gas. Moreover, Ni *et al.* (2018) assessed the effectiveness of ultralow emission policies for coal-fired power plants on air quality in China by using various criteria pollutants concentrations using the WRF-Chem model.

CONCLUDING REMARK

The 10th AAC-2017 held in Jeju Island, South Korea was a successful event which attracted 600 participants to share and promote their latest knowledge in the field of aerosol science and technology. This AAQR special issue publishes 33 papers after vigorous peer-review process either presented in AAC-2017 or relevant to the theme "Aerosol source, transport, chemistry, and emission control". Guest editors would like to thank the authors and the reviewers

for their hard contributions towards this special issue. Continuing the successful event in the field of aerosol science and technology, the 11th AAC (AAC-2019) will be held at City University of Hong Kong, Hong Kong. All the aerosol researchers are most welcome to submit their recent works in the form of abstracts to the conference.

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